



Enhancing Environmental Awareness in Early Childhood Through the Trash Tracking Game

Halida^{1*}, Bujang Aswat², Ayu Aprilia Pangestu Putri³, Putu Ari Dharmayanti⁴, Ririanti Rachamayani Jamain⁵ 

¹Program Studi Bimbingan dan Konseling, Universitas Tanjungpura, Pontianak, Indonesia

²Taman Kanak-kanak Negeri Pembina Pontianak Selatan, Pontianak, Indonesia

³Program Studi Pendidikan Guru Pendidikan Anak Usia Dini, Universitas Mulawarman, Samarinda, Indonesia

⁴Program Studi Bimbingan dan Konseling, Universitas Pendidikan Ganesha, Singaraja, Indonesia

⁵Program Bimbingan dan Konseling, Universitas Lambung Mangkurat, Banjarmasin, Indonesia

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ABSTRAK

Penelitian ini berangkat dari data observasi dan wawancara dengan guru TK, yang menunjukkan rendahnya perilaku cinta lingkungan pada anak. Hal ini terlihat dari kurangnya kepedulian anak-anak terhadap sampah basah dan kering yang berserakan di lingkungan sekolah. Kepekaan terhadap lingkungan bersih merupakan hal penting untuk mendukung pembelajaran yang optimal dan pembentukan karakter anak. Penelitian ini bertujuan untuk meningkatkan perilaku cinta lingkungan melalui permainan jejak sampah. Penelitian ini menggunakan pendekatan kuantitatif dengan jenis penelitian eksperimen menggunakan desain one group pretest-posttest. Subjek penelitian adalah anak usia 5–6 tahun berjumlah 17 anak, terdiri atas 8 perempuan dan 9 laki-laki. Teknik pengumpulan data dilakukan menggunakan observasi dengan instrumen yang sama untuk mengukur perilaku cinta lingkungan pada saat pretest dan posttest. Data dianalisis menggunakan uji-t sampel berpasangan. Hasil penelitian menunjukkan bahwa permainan jejak sampah yang menarik dan menyenangkan memberikan efek positif terhadap perilaku cinta lingkungan pada anak. Permainan ini juga mampu membiasakan anak untuk membersihkan sampah di dalam dan luar kelas dengan membuangnya di tempat yang sesuai, serta membantu anak membedakan sampah kering dan basah. Kesadaran anak untuk melestarikan lingkungan bersih semakin baik, sehingga mendukung proses pembelajaran yang kondusif dan nyaman baik di dalam maupun luar kelas.

ABSTRACT

This research is based on observation data and interviews with kindergarten teachers, which revealed a low level of environmental care behaviours among children. The observed behavior includes the children's lack of attention to wet and dry waste scattered around the kindergarten environment. Sensitivity to a clean environment is essential to achieving optimal learning and character development in children. This study aims to improve environmental care behaviours through the Trash Tracking game. The research uses a quantitative approach with an experimental design of one group pretest-post-test. The subjects of the study were 17 children aged 5-6 years, consisting of 8 girls and 9 boys. Data were collected through observation with the same instrument related to environmental care behaviours administered during the pretest and post-test. The data were analyzed using paired t-test. The results showed that the Trash Tracking game, which is engaging and enjoyable, positively influenced the children's behavior toward environmental care. This game also helped children get accustomed to cleaning up waste inside and outside the classroom, as well as distinguishing between wet and dry waste. The children's awareness of preserving a clean environment improved, supporting a conducive and comfortable learning process both inside and outside the classroom.

1. INTRODUCTION

The early childhood period is a potential period to develop all aspects of development, including instilling environmental loving behavior. Children with character are the hope of Indonesian families and

*Corresponding author.

E-mail addresses: halida@fkip.untan.ac.id (Halida)

the nation, because they are able to keep the environment clean (Ismail, 2021; Suryani & Seto, 2020). The environment is something that exists outside of living things in the form of a living environment or a non-living environment. Preserving the environment is closely related to environmental love behavior. The character of environmental love is expected to exist in every human being, including children to adults (Feby et al., 2022; Saragih et al., 2024). By loving the environment will result in behavior that always maintains and cares for the environment. The feeling of love and care for the environment is a real manifestation of the behavior of loving the environment. The environment greatly influences the formation of the quality of human life, because the more the environment is maintained, the better the quality of human life (Abdatisyah et al., 2021; Isnaeni et al., 2023). The claim is in line with that stated in the Ministry of Education and Culture in 2019 that the form of environmental concern is an attitude or action that tries not to damage the surrounding natural environment and continues to strive and develop efforts to repair the damage that has occurred and is occurring (Azima, 2021; Baiah, 2024).

Environmentally loving behavior can be fostered through various interesting activities and games. When children are in a conducive, clean, healthy and comfortable environment, their brain nodes are easily connected. Optimizing child development is also influenced by a conducive environment (main key) (Rezkita & Wardani, 2018; Wardani, 2020). The problem related to waste that is owned by the country of Indonesia is a major problem, this problem will cause bad things to happen if it is not quickly fixed (Rahmani & Rahiem, 2023). The bad things in question are the growth of littering behavior, making the environment polluted with unpleasant odors and damaging the environment which results in soil pollution to groundwater channels. So, it is necessary for the knowledge possessed by the community in doing and managing waste to be something useful in everyday life. In addition, along with the development of the times, the emergence of behaviors related to the preservation and sustainability of the environment that are worrying comes from modern society, so efforts are needed to increase awareness regarding cleanliness environment (Aulia et al., 2018; Pohan & Rialdy, 2023).

In the world of education, professional teachers are able to provide a clean classroom environment that optimally supports children's interest in learning (Nugroho & Muhroji, 2022; Pratomo et al., 2023). Increasing environmental loving behavior starts from the beginning to build environmental awareness by providing environmental love education to children from an early age, so that environmental awareness will be formed very easily at an early age (Halida et al., 2023). The good habit of throwing garbage in its place and sorting in waste management is something that is no longer forced but must become a habit. Teaching and instilling environmentally friendly behavior require high patience. The main stages that need to be applied at an early age are selecting and placing garbage in its place which is considered as instilling simple cleanliness values in loving the environment. The values of loving environmental cleanliness are important to be instilled in children as an effort to improve the next generation of the nation to be of high quality.

To make a school that has a beautiful, clean and comfortable environment, awareness is needed from the entire learning community at the school (Putri et al., 2023). This is because a clean environment can create health and positive thoughts. Stimulation in planting attitudes and actions or attitudes to avoid actions that damage nature is an example of environmentally friendly behavior, then other actions can be in the form of not throwing dry and wet garbage that causes an unpleasant odor. In maintaining the environment from an early age, learning needs to be designed in such an interesting way that it can foster a character of caring for the environment. Mutual cooperation among fellow learners is highly expected in order to realize a beautiful, beautiful, comfortable and clean environment (Syahri et al., 2021). The reality in the field, found an environment that is not comfortable to look at due to garbage scattered outside and inside the classroom at TKN Pembina Pontianak Selatan. Some things found such as the many dry leaves scattered, wet and dry garbage everywhere, there is an unpleasant odor, and wet and dry garbage has not been managed properly by separating the trash cans.

The facts found above have illustrated the existence of an uncomfortable and unhealthy environment. The character and personality of the child will be affected if the condition is not handled immediately. In order for children to realize the importance of maintaining and loving a clean environment, of course, appropriate and appropriate actions (efforts) are needed and applied in the learning that children do. Therefore, this condition is not only the responsibility of educators, cooperation from all school residents is very much needed, such as children, parents, teachers and other school residents. In the implementation of schools so far, there have been learning efforts made by teachers related to caring for a clean environment such as implementing singing methods, habits, storytelling, discussions, questions and answers, and role playing. However, these methods are considered still not optimal in fostering behavior that loves a clean environment.

In recent years, there have been research results stating that instilling environmental values can be done by caring for the environment, gardening and involving all residents in the learning environment (Sari

et al., 2022; Ubaidillah et al., 2023). In addition, there is a game, namely My City Cleaning Waste Recycle, which is able to form a strong character in the nation's children regarding environmental concerns (Halida et al., 2023). Furthermore, there is research that reveals the existence of an effective waste management method using 3R (reduce, reuse, recycle) (Firdaus, 2021; Sufia & Arisona, 2021). Environmental care character values can be stimulated through the habit of cleaning up trash in the morning before school hours begin, and doing so during the learning process in extracurricular activities (Efendi et al., 2020). Activities about caring for the environment can also be implemented through the application of a learning method (Siregar et al., 2020; Suciati et al., 2022). In line with this, the government has made a policy of implementing character and instilling the concept of caring for the environment which is integrated through the implementation of learning programs in learning and self-improvement activities (Purwanti, 2017).

From the explanation above, there are many innovations that can be applied to improve environmental behavior, for example, waste management activities through 3R activities; the habit of cleaning up garbage in the morning; gardening; application of a learning method; applying analysis activities related to the implementation of learning programs; self-development efforts and development of instruments on instilling values contained in the character of caring for the environment. From the many research results that have been presented, there has been no application of the waste footprint game to instill children's environmental behavior. Therefore, an offer related to something different in improving environmental behavior is presented in this study, namely the waste footprint game in waste management so that the environment becomes clean.

The efforts of environmental character education combined with an interesting and challenging game are used as an advantage in this study. The game is designed with play and competition and has been adjusted to the characteristics of early childhood, namely exploring curiosity to live clean and free from garbage. The games played really make children happy, challenged, care about a clean environment and instill environmental character values by keeping the environment free from germs and rotten garbage. The games played also provide a message to be able to clean the environment around the school both in and outside the classroom, sorting organic and inorganic waste. Information on how to play is conveyed by the teacher before the child starts the garbage trail game. By playing the garbage trail game, it is expected to increase the character of environmental love in children at Pembina Pontianak Selatan State Kindergarten.

2. METHOD

Quantitative experimental research through one group pretest posttest design is used in research which is considered as a method for finding the effect of a treatment in controlled conditions (Creswell & Creswell, 2017). In this research design there are pretest and posttest values, where before there is a trash trail game the children are observed and given a score, then after being given the action the children are observed and given another assessment. The same instrument is given to children both before and after treatment. Participants in this study were group B children totaling 17 children consisting of 8 girls and 9 boys at TKN Pembina located on Jalan Karya Bhakti Pontianak Selatan, the data is presented in Table 1.

Table 1. The Research subject data

No	Gender	Amount
1.	Woman	8 children
2.	Man	9 children
Total		17 children

The method of collecting data through observation in the garbage trail game using an environmental behavior instrument that has been validated by experts. In its implementation, the garbage trail game is given to children guided by teachers, of course before playing the game the children have been given the rules of the game. The activities carried out by children in the garbage trail game are (1) looking for wet garbage inside and outside the classroom; (2) looking for dry garbage inside and outside the classroom; (3) sorting wet and dry garbage; (4) putting it in the trash according to type.

Interval data analysis was conducted using descriptive analysis, then the data was analyzed through normality test, homogeneity test and hypothesis testing through paired sample t-test. Descriptive analysis was used to describe the average level of environmental behavior. The normality test used the Kolmogorov-Smirnov test followed by the homogeneity test (Levene test) to determine sample data from the same variance population. The t-test for use on paired samples covering the differences before and after treatment was given then comparing the averages on the two research variables. The magnitude of the influence of the implementation of the trash trail game will be measured from the magnitude, significance value (2 tailed) <0.05. Below are the steps for implementing the research as in Figure 2.



Figure 1. The Trash Trail Game Research Design

The instrument related to the character of loving a clean environment in this study was validated by three (3) expert validators including; Masters in early childhood education; PAUD, Masters in psychology; and Doctorate in Education. The validation results contain indicators of caring for the environment (Table 2) including children being able to find traces of wet garbage and pick it up, this indicator consists of 3 items; children being able to find traces of dry garbage and pick it up, this indicator consists of 4 items; children being able to sort wet and dry garbage as many as 4 items; and children being able to throw garbage into the trash according to its type, consisting of 3 items.

Table 2. The Indicators and Sub-Indicators of Research on Environmental Loving Behavior

Indicator	Sub Indicators	Number of items
Environmentally friendly behavior	Children look for traces of wet rubbish and pick them up	3
	Children look for traces of dry rubbish and pick them up	4
	Children sort wet and dry waste	4
	Children throw rubbish into the bin according to its type.	3
Total		14

In the research, the trash trail game was carried out for approximately six (6) weeks starting from October-December in 2023. The meetings in the research were carried out five (5) times, then the treatment activities in the core activities for 40 minutes with a scenario that had been agreed upon by the researcher and the class teacher (Table 3).

Table 3. The Indicators and Sub-Indicators of Research on Environmental Loving Behavior

No	Meeting	Treatment at Every Meeting
1.	Meeting 1	The educator provides directions regarding the trash trail game.
2.	Meeting 2	Children play looking for traces of wet rubbish and picking them up
3.	Meeting 3	Children play looking for traces of dry rubbish and picking them up
4.	Meeting 4	Children sort wet and dry waste
5.	Meeting 5	Children put in wet and dry waste

The implementation of the posttest after the treatment was carried out was intended to determine the effectiveness of the trash trail game on the learning process inside and outside the classroom. In this study, there were assessment criteria during the observation (Table 4). One of the criteria shows that if 76% or more of environmental love behavior is formed, then the treatment is declared successful.

Table 4. The Assessment Criteria

No	Presentation	Category	Score	Criteria
1	76% - 100%	Very Well Developed (BSB)	4	Children are able to play trash trail and direct friends to clean the school environment.
2	51% - 75%	Developing as Expected (BSH)	3	Children are able to play trash tracks to clean the school environment without the help of teachers and friends.

No	Presentation	Category	Score	Criteria
3	26% - 50%	Starting to Grow (MB)	2	Children play trash tracks to clean the school environment guided and directed by teachers and friends.
4	≤25%	Not Yet Developed (BB)	1	Children are not yet able to play trash tracks to clean the school environment, they need guidance from teachers and friends.

3. RESULT AND DISCUSSION

Result

The results of the study conducted at TKN Pembina for six weeks with five meetings, related to the game of tracking garbage guided by the teacher gave a surprise, where the children were happy and enthusiastic in looking for garbage inside and outside the classroom, both wet and dry garbage. Table 5 is a description of the average behavior of loving the environment both inside and outside the classroom.

Table 5. The Statistical Description of Average Environmental Loving Behavior

No	Information	Score before treatment	Post-treatment score
1.	N Valid	17	17
2.	Mean	24.50	32.20
3.	Median	28.00	34.00
4.	Std Deviation	12.92	8.87
5.	Range	18	14
6.	Minimum	20	36
7.	Maximum	38	50

Before the treatment on 17 children, namely obtaining an average of 24.50 then a median value of 28.00; std deviation 12.92; range of 18; minimum value 20; maximum value is 38. After the treatment of the garbage trail game, the values obtained by the children changed to an average of 32.20; median value 34.00; std deviation 8.87; range 14; minimum value 36 and maximum value of 50. From these results, it is clear that there is a difference in results, so it can be indicated that there is a positive impact from the implementation of the garbage trail game in the form of increasing environmental love behavior in group B children at TKN Pembina Pontianak Selatan.

Table 6. The Categories of Environmental Loving Behavior before and after Treatment

Category Valid	Frequency	Percent	Valid Percent	Category Valid	Frequency	Percent	Valid Percent
Low	6	35.0	35.0	Low	-	-	-
Currently	8	47.0	47.0	Currently	9	53.0	53.0
Tall	3	17.0	17.0	Tall	8	47.0	47.0
Total	17	100.0	100.0	Total	17	100.0	100.0

Based on the Table 6, the activities before (pretest) treatment were 6 children or 35% declared low; 8 children or 47% categorized as medium; and 4 children or 17% categorized as high. After the treatment with the garbage trail game, there were 9 or 52% children in the medium category; the high category was 8 children or 47% and none of the children were in the low category. From these results, an increase in the behavior of loving a clean environment was seen after the treatment (garbage trail game). It is known that the positive effects caused in the form of increased children's knowledge about environmental cleanliness are increasing and awareness of the behavior of cleaning the environment and disposing of garbage in its place in kindergarten institutions is getting better.

The significance value (sig) of the variable related to environmental care behavior is $0.347 > 0.05$, stated that the data obtained is homogeneous which is then analyzed by the paired sample t-test hypothesis to compare the difference between the two means in two paired samples on the research variables. The variables come from different conditions or situations both before and after treatment. Based on the results shown in (Table 7), it can be concluded that there is a difference in environmental love behavior before and after being given treatment in the form of a garbage trail game. This means that the garbage trail game is effective in increasing environmental love behavior in children. The results of the t-test are presented in Table 7.

Table 7. The Results of the t-test of the Garbage Trail Game

Pretest Posttest	Mean	Std deviation	Std error mean	Lower	Upper	t	df	Sig.(2-tailed)
	-6.000	5.595	2.004	-8.122	-3.191	-5.198	16	0.000

From the output box above, it is known that sig (2-tailed) is obtained $0.000 < 0.05$ data shows that the alternative hypothesis (H_a) is accepted. It can be concluded that there is a difference in environmental love behavior before and after being given treatment in the form of a garbage trail game. This means that the garbage trail game is effective in increasing environmental love behavior in children. During the study, the children were very happy and excited to play this environmental cleanliness game. Challenging games are in accordance with the characteristics of early childhood. Figure 2, Figure 3, Figure 4 and Figure 5 present several children's activities playing garbage trail games to clean the school environment.



Figure 2. The Teacher Gives Directions for Playing the Trash Trail Game.



Figure 3. Children Playing on the Garbage Trail Collecting Dry Garbage.



Figure 4. Children Playing on the Garbage Trail Picking Up Wet Garbage.



Figure 5. Children Sorting Wet & Dry Waste

Discussion

In the implementation of the trash trail game, it shows that there is significant development in children's clean environmental behavior. The steps of the game in sequence and systematically are stated to be able to provide an effect of changing behavior and thinking in children. Clean environmental behavior can be seen when children are able to pick up wet or dry garbage, followed by activities to sort garbage such as organic and inorganic (waste). Instilling a clean environmental behavior in early childhood will form a personality that can always care for and maintain environmental cleanliness as early as possible and create a beautiful, clean and comfortable environment. The creation of a clean environment must begin with clean behavior in an individual or group of people with a healthy lifestyle. According to WHO (World Health Organization), various efforts must be made to maintain health will bring positive results both mentally, spiritually, socially and physically. For that, one of the efforts in cultivating clean living behavior starts from small things (cleaning the body, clothes, food and the surrounding environment). Environmental awareness education; formation of environmental cadres; recycling waste; Holding waste bank management activities and developing ecotourism are examples of efforts to create a clean environment (Ismail, 2021; Syahri et al., 2021; Wahyudi et al., 2020). Efforts to foster environmentally conscious behavior play a major role in the welfare of society and the survival of an individual, so these efforts can be carried out in various ways, one of which is education (Masruroh, 2018). Creating a conducive and clean environment in everyday life can create quality learning. (Wardani, 2020). One of the most important things in instilling environmental love behavior in early childhood is by providing an example and becoming a good role model from the community, adults, teachers and parents (Fauzi & Syarifudin, 2024; Natsir et al., 2018). The habit of cleaning the school environment can be done through small things, such as picking up trash around the school yard after morning exercise; then picking up trash in the classroom; and getting used to the behavior of throwing trash in its place.

This study applies the game of garbage trails in instilling a clean environmental behavior. In implementing this game, children seem happy to do school environmental cleaning activities. The game is carried out both inside and outside the classroom with guidance provided by the teacher. The design of this game considers the interesting side and benefits that children will get when playing it. The benefits provided and have been proven by research in the form of learning media that contain economic value and are based on a "recycling system" and can be implemented in early childhood learning (Novitasari et al., 2020). The findings of the research conducted can be evidence that children's environmentally conscious behavior is influenced by the environment, including how to behave; communicate; behave and think when responding to the stimulus given (Kasim & Wickens, 2020). A person's thoughts and behavior are apparently greatly influenced by the environment around them (Maithreyi, 2019; Rumjaun & Narod, 2020; Wahyu et al., 2017).

The trash trail game has a positive impact on instilling a clean environmental behavior in early childhood. This is in line with several studies that have been conducted by holding a game to instill a loving environmental behavior in children (Fithri et al., 2022; Halida et al., 2023; Hasan, 2019). The learning steps prepared in the children's trash trail game are able to pick up trash and then sort wet and dry trash. Furthermore, children are able to put the trash into the provided trash bin. Children are also able to clean up trash scattered in the classroom and there are also children who sweep and then put it in the trash can. This behavior appears without any coercion so that they are able to clean up trash according to their abilities. The trash trail game with the theme of cleanliness is packaged attractively so that it can attract attention and form a character of environmental love in early childhood. In this situation, comfortable, cooperative, conducive, fun, friendly and challenging learning has been created for children when playing

the game. This situation certainly contributes greatly to influencing the mind of clean living so that it creates children's behavior that cares about the environment.

4. CONCLUSION

The conclusion of the research results related to the garbage trail game is effective in increasing the behavior of loving a clean environment. Providing treatment using the garbage trail game can provide children with a real picture of cleanliness and a sense of caring for the environment and their own cleanliness. The game that is played is proven to be able to provide meaningful knowledge and changes in thoughts and behavior from less clean habits to clean ones. Research indicators are also used as a picture of children's abilities during the game. Environmental factors and the application of learning methods that are challenging and attract children's attention are determinants in strengthening the behavior of loving a clean environment. The garbage trail game can be used as an alternative that can contribute to changing clean and healthy living behavior. The recommendation from this study is that teacher supervision and guidance must be focused on children when the game is played to obtain optimal improvements in the behavior of loving a clean environment. Then this game can also be used as additional wealth or insight owned by early childhood education teachers which is beneficial and valuable for them when carrying out learning activities.

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