Poltekita: Jurnal Ilmu Kesehatan
http://jurnal.poltekkespalu.ac.id/index.php/JIK

Vol.17 No.2 August 2023: Hal. 399-405
p-ISSN: 1907-459X e-ISSN: 2527-7170

Original Article

Engklek as Media Edugames to Improve Knowledge and Attitudes About Waste Classification and Management of Students

Elvi Sandra Widarto[1], Heru Subaris Kasjono[1*], Sri Haryanti[1]
[1]Department of Environmental Health, Politeknik Kesehatan Kementerian Kesehatan Yogyakarta, Yogyakarta, Indonesia

(Correspondence author's e-mail, heru.subarisk@poltekkesjogja.ac.id, +6282136677760)

ABSTRACT

Low knowledge and attitudes related to awareness of waste classification and management in children aged 10-12 years. One of the efforts to increase knowledge and attitudes in waste classification and management is the engklek media. This study aims to determine how using engklek as educational media increases knowledge and attitudes about waste classification and management. This study uses a research design, a non-equivalent control Group. The population studied was all SD Keputran 1 Yogyakarta students, as many as 59 students in collecting data using Non-Random Sampling. The data analysis used was quantitative data analysis using the Microsoft Excel 2016 program and the IBM SPSS Statistik 23 program. From this univariate analysis, an average knowledge score was obtained. The pre-test was 4.42, and the post-test was 8.07. While the average attitude score pre-test obtained 36.96, the post-test obtained 47.54 with a p-value of 0.000. Based on the study's results, it can be concluded that the crank game is more effective for increasing knowledge and attitudes about waste classification and management.

Keywords: Crank, Edugames Media, Waste, Knowledge, Attitudes

https://doi.org/10.33860/jik.v17i2.2056

INTRODUCTION

In Yogyakarta, the amount of waste produced by the community in 2022 is 1,133.94 tons/day[1]. Based on data on waste generation generated by sources of waste in public facilities such as educational facilities, it reaches 6.8%. The amount of waste that has not been managed properly is 10,116,203.57 tons/day with a percentage of 35.3% [2]. Judging from these data, it can be concluded that many residents still have not managed the waste they produce every day properly and correctly, so the amount of waste generated is still very large.

Health problems that occur from accumulated waste can be transmitted through animals and disease-carrying vectors that carry pathogenic bacteria that cause disease, one of which is diarrhea. This problem is also often found in elementary school education facilities, this is due to the habits of students who do not maintain personal hygiene and low awareness of environmental cleanliness. Data on cases of diarrhea for the age group 5-14 years occurred as many as 182,338 with a percentage of 6.2% [3].

According to previous research, it has been proven that there is an influence between the level of knowledge about sustainable waste management and the behavioral intention of waste management. Therefore efforts are needed to increase knowledge from an early age to elementary school regarding waste classification and management [4]. Counseling can be done by providing material with various media to make it easier to accept new knowledge conveyed by extension workers [5].

Engklek is a traditional game that is drawn in checkers and has several forms, one of which is a mountain crank, where the highlight of this game is a semicircular shape resembling a mountain [6]. Edugames are learning media in

the form of games to make it easier for students to absorb new knowledge. The use of counseling media, in addition to arousing enthusiasm, willingness, and desire to learn, also affects student psychology [7].

This game is done together so that it is required to socialize directly and therefore can also improve good socialization. This hopscotch game aims to develop gross motor skills such as standing on one leg, climbing, running, jumping, kicking, and somersaults. In addition, to train body balance, agility, strength, speed, flexibility, and accuracy of body coordination with the eyes [8].

Based on the results of a preliminary survey conducted on Tuesday, 6 September 2022, at SD Negeri Keputran 1 Yogyakarta, it is known that there is still trash that has not been disposed of in the trash and is still scattered in front of the classroom. The trash cans provided by the school management are only trash cans without lids, trash baskets that are not watertight, and only one waterproof trash can with a lid. There is only one trash can at several points in the school environment. The trash found on average is plastic waste used for snacks, used snacks, milk boxes. The results of interviews with students found that they still like to litter. The school principal also revealed that he had never given all of his students material on waste classification and management.

This study aims to determine the effect of using crank games as medium *edugames* to increase knowledge and attitudes in managing and classifying waste in class V SD Keputran 1 Yogyakarta.

METHODS

This type of research uses *Quasy Experience* with research design *Non Equivalent Control Group* which used two groups, namely the control group and the experimental group with two treatments, namely before and after treatment. The samples taken in this study were 59 children who were taken using the Non-Random technique with a total sampling system, which means using the entire class V sample population. The control and experimental groups were also directly selected by the researcher taking into account the number of students in the class.. There were 31 students in class 5 A as the control group and 28 students in class 5 B as the experimental group.

The control group was given an explanation regarding the classification and management of waste using poster media, while the control group used engklek media which contained material on waste classification and management. Then the researcher can compare the results *of the test* & *post-test* in each group as well as know the effectiveness of using engklek media.

This research was conducted in September 2022 – February 2023 at SD Keputran 1 Yogyakarta. Data collection techniques in this study used direct interviews with school principals and observation. The dependent variable in this study is knowledge and attitude towards waste classification and management.

The instrument for measuring the level of knowledge and attitudes used in this study is a questionnaire, which has been tested for validity and reliability. Question naires to measure the level of knowledge using a multiple choice questionnaire and while using an attitude questionnaire *checklist.* The results of the validity testr-count0.534 – 0.813 can be seen so that it is declared valid. While the results of the reliability test are known as *Cronbach's Alpha* of 0.814 – 0.888 so that it is declared reliable.

Univariate analysis in this study used frequency distribution tables and bivariate analysis to determine the effect of using a crankshaft as a medium *edugames* to increase knowledge and attitudes using the Paired Sample T and Mann Whitney tests. This research was conducted after obtaining approval from the principal of SD Keputran 1 Yogyakarta.

RESULTS

Table 1. Characteristics of Research Respondents Based on Gender and Age in the Control and Experiment Groups.

Characteristics	Control Group		Experiment Group		*p-Value*
	Amount	Presentase	Amount	Percentage	
Gender					
Man	17	54,8%	15	53,6%	0,851
Woman	14	45,2%	13	46,4%	

Age					
10 years	2	6,5%	2	7,1%	0,772
11 years old	29	93,5%	24	85,7%	
12 years old	0	0%	2	7,1%	

The homogeneity test based on the table above shows that in the control and experimental groups the sex characteristics are known to have a p-value of 0.851 while age characteristics are known to have a P value of 0.772. Significance p-value> 0.05, in the control and experimental groups p>0.05, which means there is no significant difference in the characteristics of sex and age. It can be concluded that the characteristics of the sex and age of the control and experimental group respondents are homogeneous.

The results of the measurement values of knowledge and attitudes are entered into *dummy table* to find out the difference in the results of *pre-test* & *post-test*. After being treated with crank game media in the experimental group, it can be seen that there are 8 students with sufficient knowledge with a percentage of 28.57%, and students with good knowledge as many as 20 with 71.42%. In the treatment with crank game media in the experimental group can be seen that there are 28 students with a good attitude with a percentage of 100%.

Based on the results of calculations using *dummy table* in excel, the average post test value of knowledge in the control group was 5.68, which was higher than the average pre test knowledge value of 4.35 with an increase rate of 25.18. Meanwhile, the average post-test score is 38.52, higher than the average pre-test practice value of 32.45 with an increase rate of 15.6.

Whereas in the experimental group, the average post-test value of knowledge was 8.0.7, which was higher than the average pre-test knowledge score of 4.42 with an increase rate of 45.37. Meanwhile, the average post-test value for attitude is 47.54, which is higher than the average pre-test value for practice, which is 36.96 with an increase rate of 22.2.

Table 2. Test Results for Differences in Pre-Test and Post-Test Values for Knowledge with Tests *Paired Sample T-Test*

Group	***p-value***	**Information**
Poster Media (Control)	0,000	There is a significant difference
Media Crank (Experiment)	0,000	There is a significant difference

In the table above, the value of knowledge in the control group and the experimental group is Sig (p-value) 0.000. From these results, sig (p-value) <0.05 means that there is a significant difference between the pre-test and post-test differences in knowledge about waste classification and management in SD Keputran 1 Yogyakarta students.

Table 3. Test Results for Different Pre-Test and Post-Test Values for Attitudes with Tests *Paired Sample T-Test*

Group	***p-value***	**Information**
Poster Media (Control)	0,000	There is a significant difference
Media Crank (Experiment)	0,000	There is a significant difference

In the table above, the value of knowledge in the control group and the experimental group is Sig (p-value) 0.000. From these results it can be seen that sig (p-value) <0.05 means that there is a significant difference between the pre-test and post-test differences in attitudes about waste classification and management in SD Keputran 1 Yogyakarta students

Table 4. Test Results for Differences in Pre-Test and Post-Test Values on Knowledge Between Groups with Tests*Mann Whitney*

Group	**Sig. (*2-tailed*)**	**Information**
Poster Media (Control)	0,000	H_0 rejected H_a accepted
Media Crank (Experiment)		

In the table above the control group and the experimental group obtained sig. (2-tailed) < 0.05, which is equal to 0.00, this means that H0 is rejected, Ha is accepted. This means that there is a significant difference between the control group using poster media and the experimental group using the crank game media as an educational medium to increase knowledge about waste classification and management.

Table 5. Test Results for Differences in Pre-Test and Post-Test Values Against Attitudes Between Groups with Tests *Independent Sample T-Test*

Group	Say. (*2-tailed*)	Information
Poster Media (Control)	0,000	H_0 rejected H_a accepted
Media Crank (Experiment)		

In the table above the control group and the experimental group obtained sig. (2-tailed) < 0.05, which is equal to 0.00, this means that H0 is rejected, Ha is accepted. This means that there is a significant difference between the control group using poster media and the experimental group using the crank game media as an educational medium to increase knowledge about waste classification and management. This is because respondents prefer games, have enthusiasm and appear enthusiastic in participating in crank games as educational media. In the crank game there is writing that looks big and clear, pictures that are more varied about waste classification and management and are more colorful.

DISCUSSION

The Effect of Providing Poster Media on the Level of Knowledge and Attitudes of Students in Waste Classification and Management

The use of poster media on waste classification and management to increase knowledge and attitudes shows an increase in the results of the difference in value *pre test* and *post test* before and after being given treatment. Based on the statistical test results, it is known that the p-value is 0.000. In this group there was an increase in the value of knowledge by 25.18% and the value of attitude by 15.6%. This study's results align with research by Nurcahyani, which shows the results of increasing the value of knowledge by 52.3% by using poster media [6].

Posters are visual media that involve 30% of the senses of sight, so that more respondents receive counseling information because they involve the senses of sight a lot[7]. The poster also contains the essence of the information to be conveyed, making sentences more efficient and making it easier for respondents to understand the information. The use of poster media also has an influence on the activity of providing information or learning materials, this is because poster media can help overcome problems in understanding and receiving information in children[8].

When compared with engklek media, the increase in the value of knowledge and attitudes in counseling with media posters is lower than counseling using engklek game media[6]. This is because the respondents only received information in a sitting manner that they felt was boring, lacking interaction and approach with researchers and attracted less attention.

The Influence of Giving Cenglek Game Media to the Level of Knowledge and Attitudes of Students in Waste Classification and Management

The use of engklek media as media *edugames* regarding the classification and management of waste in increasing knowledge and attitudes shows an increase in the results of the difference in value *pre test* and *post test* before and after being treated with known value *p-value* 0.000. It is known that the increase in the value of knowledge is 45.37% and the increase in the value of attitude is 22.2%. This is due to the use of appropriate media so that it can make it easier for respondents to capture and understand the information provided quickly during counseling[9].

The results of this study align with research conducted by Agustina which shows that there is an increase in the ability to explore new student knowledge and teacher teaching skills, indicating an increase from cycle I to 64% and cycle II to 92%[10].

All respondents enthusiastically participated in the crank game about waste classification and management during the game. Before starting the game the researcher

gave an explanation of the ways and rules of the game, then the respondents began to play the game alternately and cooperatively. Respondents who can throw the gacuk on the plot can continue the game by jumping on one foot and passing through a plot that has the gacuk. Then take the quiz paper to be discussed in the group and answer the quis questions. Respondents were judged to be quicker in understanding waste classification and management material using the engklek game as media. Thus, this hopscotch game can increase respondents' enthusiasm so that respondents are also seen to be active in information delivery activities. So that these findings also support previous research related to means of conveying information or learning materials with traditional games, this is because traditional games can involve respondents more actively in participating in these activities[11].

It is known that several factors influence the increase in knowledge and attitudes of students by using crank games as edugames media, namely play media that are fun and liked by children and are designed to be more attractive because there are many colors and varied images. This can lead to a sense of excitement so that students' interest in participating in counseling also increases. In addition, the engklek game media uses the senses of sight (30%) and the sense of hearing (10%), where while playing they will read and answer questions and see the design of the pictures and writing contained in the game. Basically, humans learn through what is seen and heard, humans are said to learn as much as 50%. If the more senses of the body are used, the more messages and information the brain receives[12]. In addition, the hopscotch game media is designed to be bigger using banners and has a different color, so that it raises the curiosity and interest of the respondents.

The Effectiveness of Cenglek Game Media and Posters on Differences in Average Values of the Level of Knowledge and Attitudes Before and After the Intervention of Each Group

In the test results, the average difference in knowledge and attitude with the pre-test and post-test questionnaires in the control group and the experimental group obtained a p-value of 0.000 so that it can be concluded that the engklek game as an educational media about waste classification and management is considered more effective than poster media. in increasing the knowledge and attitudes of elementary school students. This is because learning while playing is preferred by children.

When the researcher explained how to play and the playing rules, the respondents immediately became interested in this modified crank game, this was due to their curiosity about the shape and design of the crank game. In general, every child has a high curiosity, where his curiosity begins by asking questions about things he sees, hears, observes, and so on[13].

The results of this study are in line with the research conducted by Herawati which obtained the results from the percentage of the experimental group I, namely by playing crank games increasing students' knowledge experienced an increase in scores where the difference in the post test was higher than the pre test. The hopscotch game with an average of 33.30 is the most effective increase in knowledge. Based on the results of the pre-test and post-test, the average attitude score in the experimental group I increased. It is known that the results of the statistical analysis of differences in the pre-test and post-test attitudes in the experimental group I obtained a p value <0.05, which means there is a significant difference. The respondents' interest occurred in children who had an interest in traditional games. So it can be concluded that the hopscotch game is effective for increasing students' knowledge and attitudes. This is because when playing it is very possible for repetition of questions to occur because pawns in the crank game that fall right on the same box can occur more than once[14].

The results of this study align with research conducted by Irbah who used the crank game which showed differences in knowledge and behavior scores before and after being given treatment[15]. This is because the hopscotch game is included in learning by providing simulations, where this method has the advantage of increasing the participation of respondents in an activity. This method also provides a more relaxed atmosphere and is able to understand problems in everyday life.

The sensory organs of the human body are factors that can affect the level of knowledge and attitude, one of which is the use of the crank game media because when the respondent plays the crank media using his eyes

and ears, where in this game the respondent will see pictures and writing on the crank game design and read and answer questions provided by the researcher[12].

The hopscotch game can also develop children's logical intelligence, this is because the child who plays the hopscotch media must be able to count and determine the steps that must be passed in the game[16]. The material for classifying and managing waste uses appropriate methods and media for respondents, so that respondents can receive and capture the information conveyed by researchers properly. The use of poster media was also considered boring because the respondents only sat and listened to the delivery of information.

The use of traditional game media such as hopscotch can have a major influence on the development of psychology, character and social life in the future. This game moves and uses the muscles of the body such as the leg muscles in jumping, flexibility of the limbs and maintaining body balance, stimulating the senses of the body and exploring the surrounding environment. Apart from that, the angklek also provides training in the skills and agility of the players[17].

Compared to the use of poster media as a means of conveying information about waste classification and management, the engklek game is used as a medium *edugames* This has other benefits, namely training gross motor skills such as running, jumping, walking. This gross motor uses the muscles of all body parts and large body parts such as moving activities. Children who have good motor skills will have good mental development too[18]. It can be seen that respondents who were given the hopscotch game treatment had higher scores because the gross motor system worked well and this game could make it easier to understand the material.

CONCLUSIONS

Based on the results of the research that has been done, it can be concluded that there is an effect of using the crank game as a media for educational games about waste classification and management to increase knowledge and attitudes.

This media can be played anywhere and anytime as waste classification and management information for other students. This media requires someone who understands waste classification and management as a game facilitator and assessor.

ACKNOWLEDGMENTS

Acknowledgments are given to the Principal of SD Keputran 1 Yogyakarta who has given permission to carry out this research and the respondents of class V SD Keputran 1 Yogyakarta who also contributed to this research.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

REFERENCE

1. Hijriani H, Agustini A, Karnila A. Knowledge of Healthy Clean Living Behavior (PHBS) in Children with Diarrhea at Class B General Hospital, Subang Regency. J Heal Science [Internet]. 2020;1(5):1–7. Available from: https://media.neliti.com/media/publications/330916-knowledge-perilaku-life-clean-health-fb5d7430.pdf
2. Astriani M, Angraini E, Kholillah. Counseling on Waste and its Processing Techniques in Kelurahan 14 Ulu Palembang. J SOLMA [Internet]. 2020;9(2):361–6. Available from: https://journal.uhamka.ac.id/index.php/solma/article/view/3084/1981
3. Annur MN, Sumarwiyah, Purbasari I. Media Engklek Gunung to Improve Learning Outcomes of Grade V Students at Public Elementary School 1 Payaman. EduBase J Basic Educ [Internet]. 2020;1(2):102–13. Available from: http://journal.bungabangsacirebon.ac.id/index.php/edubase/article/view/134/117
4. Fitriyah A, Khaerunisa I. The Effect of Using the Modified Crank Game Assisted Drill Method on the Problem Solving Ability of Class VII Students. J Medives J Math Educ IKIP Veterans Semarang [Internet]. 2018;2(2):267–77.
5. Wiranti DA, Mawarti DA. The Effectiveness of Crank Playing in Developing Gross Motor Skills in Early Children. J Science Education [Internet]. 2018;9(1):66–74. Available

from: http://jurnal.umk.ac.id/index.php/RE
6. Nurcahyani WF, Rizka M, Rismayan R, Pradani SA, Astuti D, Haryani F, et al. Empowerment of the Sonorejo Village Community in the Context of Increasing Knowledge of Hypertension with Media Posters. J War LPM [Internet]. 2021;24(4):656–66. Available from: https://journals.ums.ac.id/index.php/warta/article/view/14730/6985
7. J H, Oktavidiati E, Astuti D. Effect of Health Education Media Videos and Posters on Children's Knowledge and Attitudes in Diarrhea Prevention. J Kesmas Asclepius [Internet]. 2019;1(1):75–85. Available from: https://journal.ipm2kpe.or.id/index.php/JKA/article/view/747/424
8. Caesar DL, Prasetya BA. The Effectiveness of Poster Media in Increasing Basic Sanitation Knowledge at Wonosoco Undaan Kudus Sdn 01. J-KESMAS J Public Health [Internet]. 2020;6(1):83–91. Available from: https://journal.lppm-unasman.ac.id/index.php/jikm/article/view/655/532
9. Nikhayah S, Murtono, Roysa M. Application of Numbered Head Together Assisted by Engklek Media to Improve Learning Outcomes of Elementary School Students. J Educ FKIP UNMA [Internet]. 2021;7(3):785–90. Available from: https://ejournal.unma.ac.id/index.php/educatio/article/view/1284/812
10. Agustina E, Purbasari I, Ristiyani. Crankshaft Teaching Aid as an Effort to Increase Students' Ability to Explore New Knowledge. J Science Educator [Internet]. 2020;1(2):93–8. Available from: https://jurnal.umk.ac.id/index.php/wasis/article/view/5082/2332
11. Mulyasari DW, Abdussakir, Rosikhoh D. The Effectiveness of Ethnomatematics Learning "Crank Game" on the Understanding of Elementary School Students' Geometry Concepts. J Tadris Mat [Internet]. 2021;4(1):1–14. Available from: https://ejournal.uinsatu.ac.id/index.php/jtm/article/view/3478/1553
12. Arifin NF, Febriany M, Aldilawati S, Pamewa K, Masriadi, Khaeriah Y. Differences in Knowledge Levels Before and After 8-11 Years Old Crank Game Modification. Sinnun Maxillofac J [Internet]. 2020;02(01):18–25. Available from: http://103.133.36.86/index.php/sinnunmaxillofacial/article/view/51/18
13. Wariyanti, Nur W, Ananda R. The Development of Social Emotional Aspects and Early Childhood Science Through Traditional Engklek Games. J Basicedu [Internet]. 2022;6(3):5351–61.
14. Herawati V, Kasjono HS, Windarso SE. Engklek and Monopoly as Media to Improve DHF Vector Control Behavior in Karangjati Elementary School Students, Bantul. J Environmental Health [Internet]. 2018;10(1):21–31. Available from: http://e-journal.poltekkesjogja.ac.id/index.php/Sanitas/article/download/779/544
15. Irbah N, Yuhandini DS, Vimala D. Health Education Through the Media of Crank Games on Reproductive Health Knowledge and Behavior in Grade 5 Students at Jagasatru I 2020. J Ilm Pannmed (Pharmacyst, Anal Nurse, Nutr Midwivery, Environment, Dent Hyg [Internet]. 2020;15(2):313–20. Available from: http://ojs.poltekkes-medan.ac.id/pannmed/article/view/750/569
16. Ayuningtyas EE, Hidayat S, Nur L. The Influence of Traditional Engklek Games on Students' Self Control in Elementary Schools. J Abmas [Internet]. 2022;22(1):1–14.
17. Rozana S, Pillow A. Stimulation of Early Childhood Development Through Traditional Engklek Games [Internet]. 1st ed. Kholik N, editor. Tasikmalaya, West Java: Edu Pubblisher; 2020.
18. Indriyani D, Muslihin HY, Mulyadi S. Benefits of Traditional Angklek Games in Children's Gross Motor Aspects. J Undiksha Early Childhood Educator [Internet]. 2021;9(3):349–54.