Reduce, Reuse, and Recycle (3R) waste activities in the school environment for elementary school students

R Rudiyanto*, E Kurniati, A D Fitriani, I Rengganis, M Mirawati and R Justicia

Universitas Pendidikan Indonesia, Bandung, Indonesia

*rudiyanto@upi.edu

Abstract. This paper discusses the implementation of reduce, reuse and recycle waste activities for elementary school students as one of the after school care programs. The problem that underlies this study is the lack of concern for the natural environment, especially in waste management in the school environment. The research used the action research method involving one teacher and 20 children aged 6-8 years who participated in the after school care program in elementary schools. Data were collected through observation, interviews and documentation, then analyzed using thematic analysis techniques. The results of the study describe the implementation stages of the Reduce, Reuse and Recycle (3R) activities including the introduction of the program provided by the teacher through animated video media, discussion of the 3R program with children, direct practice of sorting and recycling waste in the school environment, and evaluation of the implementation of the 3R program. Other results also describe that children able to identify categories of organic, inorganic and hazardous waste, as well as the emergence of children's caring attitudes towards waste management in the school environment.

1. Introduction

Waste is defined as solid remains of human daily activities and natural processes. The waste problem is a complicated problem because it involves various parties. The waste problem in Indonesia also faces big challenges, especially in the aspect of public awareness regarding the habit of throwing garbage in its place and sorting waste according to its type [1,2]. To reduce and handle this waste, there must be a comprehensive and sustainable management system, so that environmental quality and public health can be better and make waste a resource [3,4].

Prohibition not to enter waste into the territory of the Unitary State of the Republic of Indonesia, namely by mixing waste with hazardous and toxic waste, disposing of waste inappropriately and other actions that can pollute the environment. Unfortunately, there are still many people who don't care about waste, even when they know the impact, there are still individuals who litter [5]. Based on the description above, it can be seen that one of the aspects that need to be improved to deal with waste-related problems is increasing public insight and awareness in precisely disposing of waste and sorting waste by type.

Efforts to increase public awareness and concern regarding waste can be carried out in the family environment, schools to the wider community. One of the efforts that will be described in this study is the implementation of the Environmental Care Children (APEL) program which is part of after school care for elementary school children [6]. The implementation of the children caring for the environment program through the reduce, reuse and recycle waste activities aims to introduce various types of waste and instill children's awareness of waste problems, especially in the school environment, considering...
that schools as a gathering place for many people can become the biggest waste producer besides markets, households, industry and offices [6-9].

According to Amri and Widyantoro waste management requires more changes and the formation of individual behavior, not just sophisticated technology [8]. The formation of individual behavior in managing waste properly needs to be instilled from an early age. The formation of behavior at this age is easier and more visible. The formation of waste management behavior from an early age can be started from the formation of the habit of sorting and placing waste in its place. It is hoped that the habit of sorting and placing garbage in its place from an early age will continue to adulthood, so that it will be able to contribute in creating a clean and healthy environment.

The reduce, reuse and recycle program can also be used as a science learning process for children because it can introduce children to the process of waste management and changing waste into other, more useful objects. The purpose of this study was to obtain an overview of the stages of implementing reduce, reuse and recycle activities in after school care activities in elementary schools. In addition, this research also wants to see to what extent reduce, reuse and recycle activities can stimulate children's concern for the environment.

2. Methods

The research method of this study is action research by Kemmis and MC Taggart [10]. Collaborative research was employed in this study where the researcher made collaboration directly with the school from the beginning until the end of the research process. Kemmis and MC Taggart’s research design consists of four components as follows planning, implementation, observation and reflection. The data collection technique in this research employed three techniques, namely observation in the forms of field notes, interview, and documentation [11]. The data obtained were analyzed through a qualitative approach by using thematic analysis. Hancock and Algozzine notes that thematic analysis is to provide a report with the emphasis is on the answers to the research questions thereby constructing themes of report that are appropriate with the research questions [12].

3. Results and discussion

3.1. Introduction to information related to waste, waste problems and waste management

The first stage carried out in the waste sorting activity is providing information to children regarding waste, types of waste, problems caused by the accumulation of waste and the integrated waste management process. In this case the teacher provides information through video shows. The teacher also provides a trash can that contains pictures of types of waste that have been grouped including organic, inorganic and hazardous waste, as documented in Figure 1 below.

![Provision of trash bins contains pictures for organic, inorganic (paper and plastic) and B3 waste.](image)

Children are given information regarding various types of waste grouping into organic, inorganic and hazardous waste. This is in accordance with Law No. 18 of 2008 regarding the characteristics of waste in waste management. The characteristics of waste in waste management are divided into 1) Organic
waste or wet waste or biological waste is a type of waste originating from living bodies so that it is easily decomposed and can be destroyed naturally such as vegetables and fruits, 2) Inorganic waste or dry waste or non-biological waste is waste that is difficult or cannot decompose, is waste composed of non-organic compounds originating from non-renewable natural resources such as minerals and petroleum, or from industrial processes such as plastic bottles and cans, 3) B3 waste (hazardous and hazardous materials) is classified as specific waste. Specific waste is waste which due to its nature, concentration, or volume requires special management, for example Batteries, Cleaning Liquids and other waste that can endanger humans and the environment such as polluting the soil and endangering health [13].

3.2. Discussion and direct practice of reduce, reuse and recycle waste

In the second stage, children are given the opportunity to discuss the reduction of plastic waste that can be done by reusing equipment that can reduce waste (Reduce), especially plastics in everyday life. Various examples that children discuss include the use of reusable drink bottles compared to packaged drinks and the use of environmentally friendly shopping bags compared to plastic bags.

At this stage children are also allowed to observe the school environment. Children are given the task of collecting and sorting waste in the school environment by type, then putting the trash into the place provided based on the type of waste. Documentation of children's activities sorting waste at this stage can be seen in Figure 2.

![Figure 2. Activities of children sorting waste in the school environment.](image)

Assigning children to observe environmental cleanliness and sorting waste by type is one of the efforts to cultivate children's concern for the environment. In this case the child observes directly and gains experience in sorting waste. This is in accordance with the statement of Amri & Widyantoro that waste management requires more change and formation of individual behavior, not just sophisticated technology [8]. The formation of individual behavior in managing waste properly needs to be instilled from an early age so that it becomes a good habit as an adult.

In this program the Children collect various organic waste to be processed into fertilizer and reused for school gardens. The children also collect recyclable inorganic waste. The various waste products collected are then cleaned and made into valuable playing tools. An example of a recycling activity that is introduced to children is through making bottle dolls. This stage emphasizes the recycling of waste into other, more useful objects.

3.3. Evaluation of waste reduce, reuse and recycle programs in the school environment

The final stage in the waste sorting activity is a review or evaluation of the activities that have been carried out. At this stage the teacher asks about the results of children's observations on the cleanliness of the school environment. The children provided information that there was still garbage scattered in
several corners of the school and the majority was plastic waste such as drink bottles and snack packaging. In addition, the teacher conducts questions and answers related to waste grouping. In the question and answer activity, children are able to present waste based on its type.

At this review stage, it can be seen that the children already have a fairly good understanding of waste grouping. Children are also able to give their opinion on the problem of waste in the school environment.

This success can be achieved because the reduce, reuse and recycle activities provide direct experiences for children to be involved in picking up garbage and getting used to throwing garbage in its place. Not only that, children are given the opportunity to think about finding solutions to reduce waste through reuse and reduce activities, recycling waste into objects that have more beneficial value.

Children are also given the opportunity to observe the environment directly and solve problems related to waste in the school environment [3,9]. The opportunity to learn and feel being directly involved in reduce, reuse and recycle activities is what strengthens the values of children's care for the environment [5], especially because direct experience is a meaningful learning process for children [6].

4. Conclusion
Based on the findings and discussion, it can be concluded that the 3R program can provide meaningful experiences for children related to the process of sorting, reusing and recycling waste in the school environment. Through this program, children also get to know various scientific concepts that can provide positive experiences for children. Children also describe that children able to identify categories of organic, inorganic and hazardous waste, as well as the emergence of children's caring attitudes towards waste management in the school environment.

References
[1] Undang-undang Republik Indonesia Nomor 18 18AD tahun 2008 tentang Pengelolaan Sampah Jakarta Sekr. Negara
[2] Kementerian Negara Lingkungan Hidup Republik Indonesia 2008 Panduan Praktis Pemilahan Sampah Jakarta Kementeri. Negara Lingkung. Hidup Republik Indonesia.
[3] Pertiwi A A, Mustikawan A and Siswanto R A 2016 Perancangan Buku Interaktif Pentingnya Memilah Sampah Dalam Upaya Membentuk Kebiasaan Memilah Sampah Untuk Anak-anak eProceedings Art Des. 3
[4] David A, Thangavel Y D and Sankriti R 2019 Recover, Recycle and Reuse: An Efficient Way to Reduce the Waste Int. J. Mech. Prod. Eng. Res. Dev. 9 31–42
[5] Kurniati Y, Nararaya W H B, Turawan R N and Nurmuhmadad F 2016 Mengefektifkan Pemisahan Jenis Sampah Sebagai Upaya Pengelolaan Sampah Terpadu Di Kota Magelang Varia Justicia 12 135–50
[6] Rudiyanto R 2018 After School Care: Alternatif Layanan Pendidikan Dan Pengasuhan Bagi Anak Usia 6-8 Tahun Early Child. J. Pendidik. 2 46–56
[7] Krisnani H, Humaedi S, Ferdryansyah M, Asiah D H S, Basar G G K, Sulasstri S and Mulyana N 2017 Perubahan pola pikir masyarakat mengenai sampah melalui pengolahan sampah organik dan non organik di Desa Genteng, Kecamatan Sukasari, Kab. Sumedang Pros. Penelit. dan Pengabdi. Kpd. Masy. 4
[8] Amri C and Widyantoro W 2017 Pendampingan Pembelajaran Memilah Dan Menempatkan Sampah Pada Tempatnya Sejak Usia Dini Di TK Imbas 1 Int. J. Community Serv. Learn. 1 121–6
[9] Widiarti I W 2012 Pengelolaan sampah berbasis zero waste skala rumah tangga secara mandiri J. Sains Teknol. Lingkung. 4 101–13
[10] McNiff J 2013 Action research: Principles and practice (Routledge)
[11] Kemmis S McTaggart.(2005). Participatory action research: Communicative action and the public sphere N. denzin, y. Lincoln (eds.), Handb. Qual. Res. 559–604
[12] Hancock D R and Algozanne B 2017 Doing case study research: A practical guide for beginning
researchers (Teachers College Press)

[13] Kementerian Pekerjaan Umum 2010 Modul Pengelolaan Sampah berbasis 3R Jakarta Kementeri. Pekerj. Umum, Badan Penelit. dan Pengembangan, Pus. Penelit. dan Pengemb. Permukim.