



Short Communication

Recycling of solid wastes at kindergartens centers

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Abstract

The present study aimed to conduct an activity on environmental awareness campaign at a kindergarten center, with the children age 4-6 years old. The activity included identify the various types of waste generated at the kindergarten and to realize the conservation practice by participating in simple waste management strategies and an explanation about recycling, reusing and reducing waste (3R). The activity provided the children more awareness about the importance of minimizing the plastic wastes. The activity had created an interesting experience to the young generation through practice activity and has given a light on the nature conservation along their growing years. It can be concluded that the awareness of environmental issues among children have risen up as noted by looking at students physical expression. Children have understood the potential to conserve nature from a simple action which is recycling. After the activity, children's were able to identify and divide the rubbish.

Keywords: awareness, environment, children, activity

1. Introduction

The importance of environmental education and awareness in early childhood is a holistic concept of the natural world as well as emotions, dispositions, and skills (Davis & Elliot, 2003). This education brings a slew of benefits to young kids, which includes the development of a sense of wonder, appreciation for the beauty and mystery of the natural world, opportunities to experience the joy of closeness to nature, and respect for other creatures. It also includes the development of problem-solving skills, and students' responsibility in protecting and preserving the environment as well as allows students to be more concern with their surroundings (Wilson, 1997). Experiences and interactions with nature have often been seen as a significant means for guiding children's interest in and concern for the environment (Chawla, 1998, 1999; Ewert *et al.*, 2005; Wilson, 1997). These goals acknowledge that learning is more than

a cognitive process and that emotions play a particularly important role (Harlan & Rivkin, 2007). Therefore, the need of awareness is to continuously educate the public especially young generation on environmental issues and promote action to minimize damage on the environment is vital (Gardner, 1999; Ibrahim *et al.*, 2011).

In Malaysia, environmental education has been formally introduced through the publication of Teachers' Handbook for Environmental Education across the curriculum for primary and secondary schools. The book was prepared by the Curriculum Development Division (CDC) of the Ministry of Education for preschool level the book was published in 2005 (Zarrintaj *et al.*, 2012). However, the effectiveness of its implementation is still limited and the level of implementation is not the same from one school to another school (Azizi *et al.*, 2010). Implementing environmental education programs in schools, principals are expected to play an important role in enhancing knowledge, awareness and changing attitudes of students in tackling environmental issues so they can take part in efforts to actively protect the environment in line with the National Education Philosophy and the National Curriculum, Ministry of Education Malaysia.

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Various governmental and non-governmental organizations in Malaysia promote and implement environmental education and awareness programs but the awareness program is site specific such as in Sabah, Malaysia. The lack of continuous and comprehensive environmental education in learning institution has caused youth to overlook the importance of the environmental protection in their daily life. Despite, a research has identified that youth has the significant role that fun activity and friends play in influencing engagement in environmental action (Arnold *et al.*, 2009). There is a body of literature on the role of youth (e.g. university student) as mentors and enablers that can encourage young children to connect with nature.

On the other hand, solid wastes have several benefits and can be recycled for many of application (Yusuf *et al.*, 2013; Mohamed *et al.*, 2014; Al-Gheethi, 2015). In Malaysia solid waste management is consider as crucial issue especially in urban setting (Dawda *et al.*, 2012). Increasing solid waste can be due to the urban migration, affluence and rapid development (Agamuthu, 2001). Plastic is the second highest solid waste composition in Malaysia (Armi *et al.*, 2013) and it is non-biodegradable materials. However, plastics can go through photo-degradation process when sunlight breaks it down into smaller pieces until only plastic dust remains. Plastics required long period of time to breakdown into small pieces up to 400 years (Amaral, 2015).

In Malaysia, the government had set a target to achieve 22% waste recycling, especially waste generated in Kuala Lumpur (Saeed *et al.*, 2009). However, the recycling is much slower compared to Austria, the Netherlands and Germany which recycle around half of their waste (FOE, 2008). This might be due to Malaysian's attitude towards recycling and limited recycling activities taken place (Agamuthu, 2001). Hence, Malaysia needs to enhance method to recycle waste and reduce dependency on landfill by proper implementation of acts and method to achieve that 22% recycling target on 2020.

This study was initiated to contribute in the advancement of environmental awareness and education among the

children. With project theme named Environmental Education Campaign, the program will contribute towards educating for socio-environmental change that will benefit the successfulness of recycling activity.

2. Activities

The present study focused on ten kindergartens (between 4 and 6 years old). The selected kindergartens for the module activities were located at Parit Raja, Ayer Hitam and BatuPahat, Johor, Malaysia. The total number of respondents was 87 children. The responses of respondents to module activities were recorded based on the observations for the activity and quality of drawing on a piece of paper.

The project was divided into two phases. In Phase (I), module activities of environmental education and awareness to children at kindergarten were prepared by the research team (have a good experience with the environmental issues) to include the super creative and fun, in order to accessible the children find it attractive and attach to it. The module activity contents were inverted from Teachers' Handbook for Environmental Education across the curriculum for primary and secondary schools prepared by the Curriculum Development Division (CDC) of the Ministry of Education and natural conservation course at University Tun Hussain Onn Malaysia (UTHM). The activity program was conducted as illustrated in Table 1. The children were divided into four groups (5 members for each). Module activities were carried out for one hour for each group. The activities aimed to enable the children to identify the various types of waste generated at the kindergarten and to realize the conservation practice by participating in simple waste management strategies such as recycling, reusing and reducing waste.

Phase (II) started with video presentation for the children about recycling of solid wastes and then the process involves the recycling of solid wastes was carried out. Thereafter, the children were divided into groups. The research team started to teach the children the steps to recycle solid wastes.

Table 1. Module activity program introduced to children at studied kindergarten.

Time	Activity	Outcomes
10.30 am	Ice breaking and magic show	To attract the children
10.45 am	- Explanation about recycling, reusing and reducing waste (3R). - Show the example of recycle bins (using basket) and tell them the uses each bin - Understanding and knowledge test	To know the knowledge and understanding from the explanations.
11.10 am	- Reuse the plastic bottles as a pencil box using zip	To tell and show them plastic bottles can reuse.
11.30 am	- Photo session, thanks to student and teachers	As memories.

2.1 Drawing on a piece of paper and plates

The children were asked to draw on paper what they know about nature. The plastic bottle was cut off into two parts. The beautiful drawing was pasted on the bottom of the bottle (Figure 1). For recycling the paper plates, the research team distributed the materials which including plates and colors, the children were asked to color the plates and paste the bird picture drawn on the papers. The children were asked to collect some grass to use it in the process (Figure 1c).

2.2 Make a jellyfish

A plastic bag was cut to make Jellyfish tail (10 mm wide x 100 mm length), the jellyfish tails was pasted on the surrounding plastic cups using adhesive tape. The Jellyfish face was drawn on the surface of the cup, a puncture hole under the plastic/paper cups was made to put the rope.

2.3 Bowling for beginner

To make the bowling ball, four or five pieces of newspaper were crumpled into a ball. An adhesive tape was wrapped around the newspaper ball to hold the bowling ball together. Then for the bowling pins, A4 recycle paper was used and painted using water color with varies color to look colorful. Thereafter the paper was left to dry and a glue stick was run adhesive tape along the top end of the paper and the plastic bottle was placed on the bottom end.

2.4 Create pencil holder

Two types of pencil holder were designed from the plastic bottle. The materials used in this project were plastic bottles, unused paper, zipper, basket, sticker and markers. A mainly use is waste materials. Two baskets with orange (paper) and blue (plastic) was prepared with the color sign to replace the real recycle bin to test students understanding towards recycling and whether they can isolate the items according the right basket/bin or not. After that, second activity conducted with them is, make pencil box from the plastic bottles. The organizer has provided one bottle for each person and some materials to decorate the bottles. The steps for makes the pencil case using unused plastic bottles is as shown in Figure 2.

The second type of pencil holder was prepared in four steps, in which a plastic bottle (600 mL) was washed and cut off into 2 parts, the bottom part of the bottle was chosen as a pencil holder, before the final usage a color paper was pasted on the external surface of bottle as a decoration by using gum, some of pencil holder was colored (Figure 3).

2.5 Create a mini pot

The production of mini pot was created from using the upper part of bottles. This part was fixed on hard paper

to make it stable, and the cotton was inserted to plant the bean. The outside of the mini pot was decorated with colored stickers (Figure 4).

2.6 Make fish patch from paper plate

A part of a paper plate in triangle form was cut to be used as a fish's tail, while a hole cut as a fish's mouth. The tail was adhered to the end of fish using glue. A small paper with circular shape was pasted to form the fish eye. The paper plates were colored to produce different colors for the fishes.



Figure 1. Children drawing, A) drawing on papers B) pasting on plastic bottles.

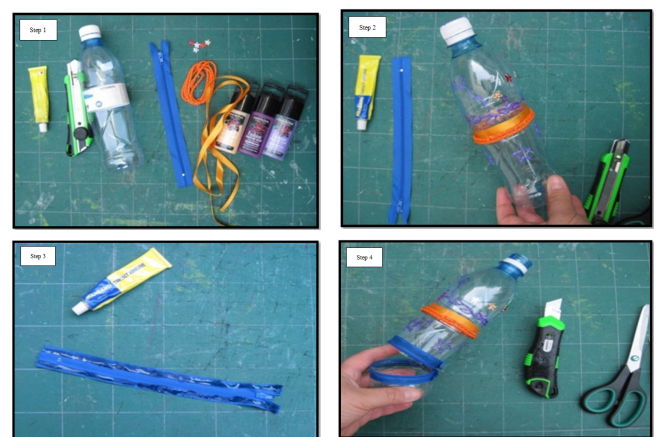


Figure 2. Steps to create a pencil holder using plastic bottles; Step 1 Remove all tags/stickers from the bottle, make sure it is clean and dry; Step 2 Decorate the bottle; Step 3 Glue the zipper around the bottom (undecorated) strip of the bottle; Step 4 Open the zipper, place the cutting knife between the zipper's teeth and cut through the bottle.

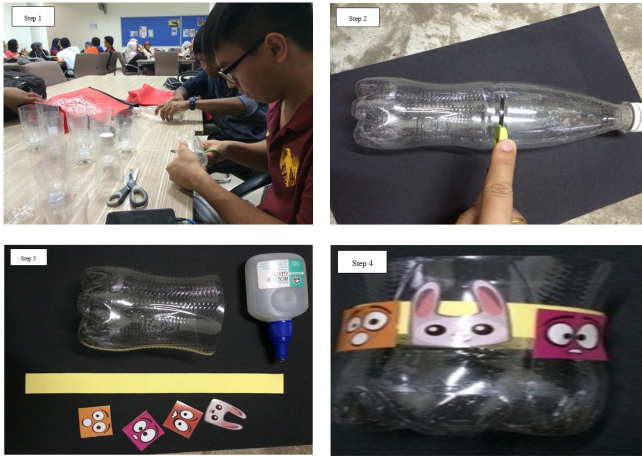


Figure 3. Steps for creating a Pencil Holder; step 1) The cleaning up process of the used 500ml plastic bottle, step 2) cutting the plastic bottle into half; step 3) use the bottom of the bottle as pencil holder and color paper to gum it on the bottle as decoration; 4) finally, pencil can be putted on it.

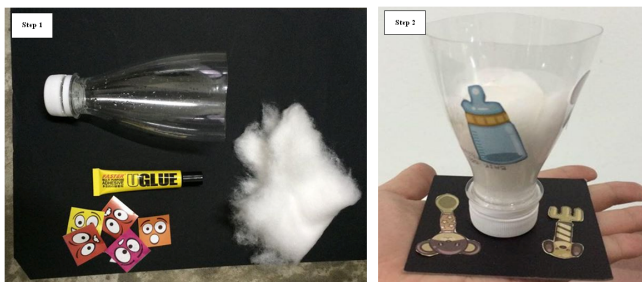


Figure 4. Creating of mini pot; step 1) Step 1: Use upper part of bottles as mini pot and color paper to decorate bottle body; step 2) Stick bottle to hard paper to make it stable and cotton inserted to plant the bean.

2.7 Rabbit pocket

Two paper plates were used for this purpose. The water colored was used to paint both sides of plates. After the paint was dried, humps in the paper plate were cut to appear as a pocket. Both paper plates were decorated and then pasted together using glue. A thick bead of craft was run using glue around the edge of a semi circles shaped plate. The plate was settled with the glue on top of the other one. In order to hang or carry your pocket, a piece of ribbon with 12-20 inches long was glued the two ends to the back of the rabbit pocket.

3. Results and Discussion

The present was conducted at ten kindergarten children. The total number of respondents was 87 children ranged in the age between 4 and 6 years old. As presented in Figure 5, among all respondents, 41% of children are within 4 years, 38% in the fifth year while only 21% were in the sixth

year. Therefore, it was not easy to deliver an idea or activity to a child’s mind, but there is the benefit derived by the child, and even that was at a low rate. The distribution of the respondents is illustrated in Figure 6 which shows that 54% of them were male while 46% were female. However, the females appear to have a more concern about environmental issues, as shown in the quality of drawing on paper. Larson *et al.* (2010) also indicated that gender differences in environmental orientations, where the females were more inclined to support preservation of nature. However, previous studies have reported that the females have less knowledge about environmental and less interested in outdoor recreation than males (Busser *et al.*, 1996; Coyle, 2005). Therefore, inconsistent data regarding gender differences in children’s environmental awareness, suggest that the influence of an activities to young children remain uncertain. But it can be explained based on the nature of the work of male and female especially in the house as the female are more contact with the solid waste than male and thus they have more idea about the recycling and the methods to dispose it.

Outdoor activities are known as giving something to wellbeing and development as well as bringing up environmental awareness (Chawla, 1998, 1999; Elliott, 2008; Ewert *et al.*, 2005; Wilson, 1997). In Malaysian kindergarten, outdoor activities are part of the school routines and have been since they started in the mid-1800s. However, no studies have conducted to evaluate the quality of outdoor activities (Elliott, 2008; Halldén, 2011). For instance, in kindergarten investigated here, no excursions for walks in the woods to understand and follow the seasonal changes and to make discoveries, experiments, experience and learn about being careful about the different plants and animals. Therefore,

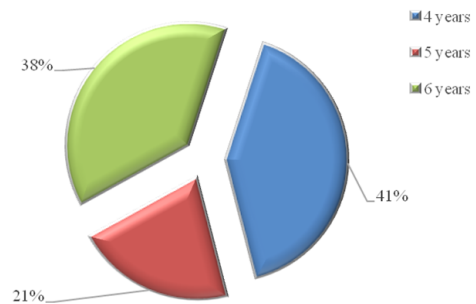


Figure 5. Distribution of respondents based on gender.

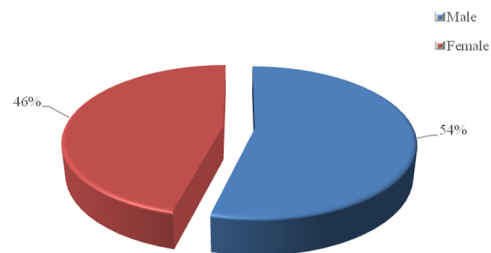


Figure 6. Distribution of respondents based on age.

drawings conducted by children were limited to reflect the surrounding area such as palm oil trees, sun, moon, stars. There is no more diversity in the types of drawing to include many of living organisms in the nature or that available in zoos as well as fruit and vegetable garden. These findings demonstrated that the knowledge about the environmental diversity among the children was poor.

The module activities introduced during this study for children might be given some idea on the environmental diversity and pollution as well as increased the awareness among the respondents. However, these activities would not be replacement for excursions which might provide the children more knowledge about the nature of organisms which inhabits the surrounding area. Therefore, children's participation and agency can be related to an individual interest in development and wellbeing. The relationship between humans, nature and the Earth need to be further scrutinized in early childhood education from both theoretical and practical points of view.

In this study the session has begun with an overview about the pollution and recycle of solid wastes. During the speech section, it was noted that the children think that the environment contains animals, flowers and trees. It can found that majority of children do not aware about the environmental pollutions and on how they should solve it or recycle it into useful things.

The research team taught the children the steps to make jellyfish sea by use easy way simple tools as well as the ball and bottles of bowling in the activity for recycling of solid wastes and production of pencils holder and mini pot from waste bottles. The children were teaches to how to divide and identify the recycle rubbish and let them know what is recycle bin. Facilitators prepared three baskets and each basket is stick with three different color paper which are blue, orange and brown. Orange rubbish bin used to put plastic kind material, blue rubbish bin used to put paper kind material, and brown color rubbish bin used to put aluminum and glass. Besides that, children prepare some rubbish and asked to divide the rubbish among three different color rubbish bins to test their understanding. The rubbish that organizer prepare included; paper, plastic bottles and aluminum tin. During the activity, it was found that the children start to understanding what rubbish can be recycle rather than throw them. About 60% children do well in recycle activity.

The activity aimed also to teach the children to reuse some rubbish, like plastic bottle. The purpose for this activity was to teach the children a concept of reuse. The study focused on reuse plastic bottle due to the long period required for plastic bottle to decay and decomposes. The children asked to modify the plastic bottle into pencil box and mini pot. During the make a jellyfish, bowling for beginner, pencil box and mini pot making section, the children have understood the usefulness of rubbish. It was observed that most of the children attracted to reuse some waste materials (Figure 7). After the activity, the children understood the different between recycle and reuse. Recycle is convert waste

materials into reusable things. However reuse is using again or more than once for a thing.

4. Conclusions

The program achieve its objectives, the awareness of environmental issues among children have risen up as noted by looking at students physical expression. Children have understood the potential to conserve nature from a simple action which is recycling. After the activity, children's were able to identify and divide the rubbish among recycle rubbish. Besides that, pencil box making activity successfully attract children attention. Moreover, the activities has to be recorded as a video to record all the process and activities carried out in the kindergarten and then to analyze the children responses by psychologist and scientist in kindergarten. This can give a more perfect outcome from the program. Finally, the government should held more activities at kindergarten and school to increasing future generation awareness about environment. Teachers should always teach children to love their environment.

5. Recommendation

Society should play their role and to cooperate for the success of recycling programs. These programs need to provide recycling bins in all areas, particularly in the area of schools and cities as well as villages. Presence of recycling bins to teach and educate children to love the environment and avoid the rampant waste dumps will be more useful. It has to mention that many of the projects meet many of difficulties during the activity. In particular, the challenges were to cope with some of the overly active children. The



Figure 7. Final products of recycling solid wastes; A) drawing on paper; B) pencil holder; C) Jellyfish D) Bowling for beginner; E) fish patch from paper plate; F) pencil box from water bottles wasted; G) Rabbit pocket; H) colored pencil holder

team researchers also found that some children tends to have short attention span Therefore, it is suggested that the research team to make a preliminary visit to assess the children's background and their behavior. There are a number of reasons that some children have fail to engaged with the activity. Situations include the hyperactive and impulsive disorder, nature of behavior and home atmosphere and food intake. At the same time, when do the activities, the organizer have an opportunity to ask those questions personally to know they are understood or not. Further studies for the education awareness on nature conservation could also be held among primary and secondary school students because these it easy to control their behaviors and the organizer. Finally, the media will play the major role of recycling and the benefits of recycling in a more creative and interesting.

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