Importance of Involving Children in Designing Recycling Facilities: A Case Study of Hong Kong Children Collecting and Recycling Recyclables

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Abstract. Recycling is an uncommon habit for Hong Kong households. The adults in the older generation seldom teach their children to recycle recyclables at home. It is important to teach our next generation to understand recycling for a sustainable future. Taking a case study in Hong Kong, the study reveals the importance of involving children through teaching children to design and make their own recyclable storage bags. The findings show that although the participating children did not have a habit to recycle, they were more eager to do so after making their own bags. More involvement in designing recycling gadgets and facilities would result higher participation and motivation. This study provides a strong basis on the effect of children's involvement in re-cycling activities through designing and making recycling-related items.

Keywords: Recycling · Participatory Design · Design and making · Children

1 Introduction

Environmental sustainability is one of the pressing issues that all nations in the world are considering and developing appropriate and efficient policies to maintain. Carbon dioxide emission is the hot topic that the 24th Conference of Parties (COP24) to the United Nations Framework Convention on Climate Change had worked towards agreements [1]. International agreement, government policies and educational programs have been achieved and adopted to help our planet to be more sustainable. However, most of these measures had only focused on behavior and attitudes of adults but not children. It can be argued that the current policies and programs should put more emphasis on children, the next owner of our planet.

Educational programs for children inevitably should start at home, children should be taught by their caretakers in daily basis in order develop environmental-friendly habits. Among all simple sustainability concepts, recycling is the easiest for children to understand and learn. However, recycling is an uncommon habit for Hong Kong households. The adults in the older generation seldom teach their children to recycle

recyclables at home. Some of them may have done so but the purpose is not to be environmental-friendly but to sell the recyclables to private recycling stores to earn money. Children may learn the concept of recycling at school; however, the education is very limited, and they are not motivated to participate in recycling activities without incentives.

The paper argues that in order to facilitate and motivate children to develop habits of recycling, it is essential to involve children in not only the recycling activities but also the design process of the recycling gadgets and facilities. Experiencing the design process with hands-on activities allows children to develop a more long-lasting recycling habit [2]. Taking a case study in Hong Kong, the importance of involving children through teaching children to design make their own recyclable storage bags is studied. Including children in the design process is able to change the passive role to active participating role in recycling [3]. The findings show that although the participating children did not have a habit to recycle, they were more eager to do so after making their own bags. It was also more conceivable for them to use the public recycling facilities. More involvement in designing recycling gadgets and facilities would result higher participation and motivation. This study provides a strong basis on the effect of children's involvement in re-cycling activities through designing and making recycling-related items.

2 Method

2.1 Participants

Ninety-three children (33 boys and 58 girls) aged 9-11 were involved in the study. They are elementary school children who were selected randomly by their teachers from 26 elementary schools. They agreed to join a lecture, a hands-on workshop to make a recyclable storage bags, and use the bag at home to store recyclables. All of them did not have hands-on experience on making bags; however, they had Art lessons in their school learning some basic drawing techniques.

2.2 Instruments

A survey was conducted to obtain feedback after attending the lecture and children's behavior towards recycling. A set of questions were designed, and the children had to answer either yes-no questions or rate on a 4-Likert scale from very satisfactory/very often (4) to not satisfactory/never (1). They were also asked to prove comments about the improvement of the lecture. The two-page questionnaire was distributed to all the children attending the lecture.

2.3 Procedures

The kick-start event of the study is a lecture about environment protection. Government officers were invited to give the children a talk, and the lecture was about an hour and a half. Other research studies have also showed that adequate knowledge

regarding recycling is one of the key factors for people to participate in recycling activities [4]. Questionnaires were distributed to all the children after the lecture.

After few weeks of the lecture, several workshops were conducted to teach the children making recyclable storage bags. Recycling materials such as banners were given to the children, and the children could design and make their storage bags with the facilitators in the workshop. Each of the children had to make a bag, and was asked to bring the bag home and use them to store recyclables at home. The children were also taught to bring the storage bags with the recyclables to recycling point nearest to their home. The hands-on workshops allow children to develop recycling habits more efficiently [2].

The children had recorded the number of recyclables they collected and stored everyday, and took photos to track the record. They also took photos of how they used the storage bags and the procedures of recycling. A photo diary of using the bags were compiled.

3 Findings

3.1 Survey

Seventy-seven children had attended the lecture, and 60 questionnaires were collected after the lecture. The return rate is about 77.9%. The findings of the survey showed that the children were satisfactory with the arrangement and the content of the lecture (mean = 3.32 and 3.28, SD = 0.79 and 0.75 respectively). They were also very attentive and motivated to response to the lecturers' questions. Almost all of them found that after attending the lecture they have gained more knowledge about energy conservation and waste reduction, and plastic recycling (96.7%). The findings also revealed that the children sometimes separated and recycled waste (mean = 3.05, SD = 0.76). Forty-nine of them (81.7%) also expressed that they would change the habit of handling waste after attending the lecture. Fig. 1. and 2 show the findings of the survey.

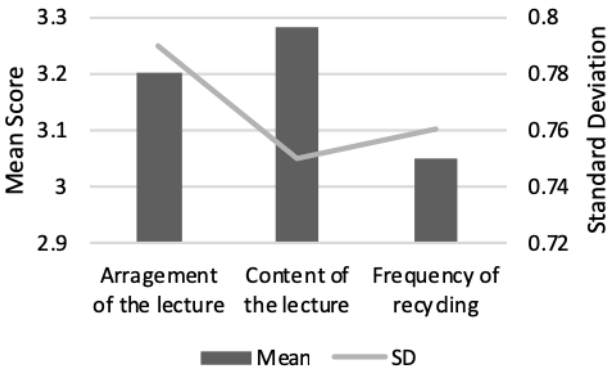

Fig. 1. Mean score and the standard deviation of the children's satisfaction level of the arrangement and the content of the lecture (4 = very satisfactory, 1 = not satisfactory), and the frequency of recycling (4 = very often, 1 = never).

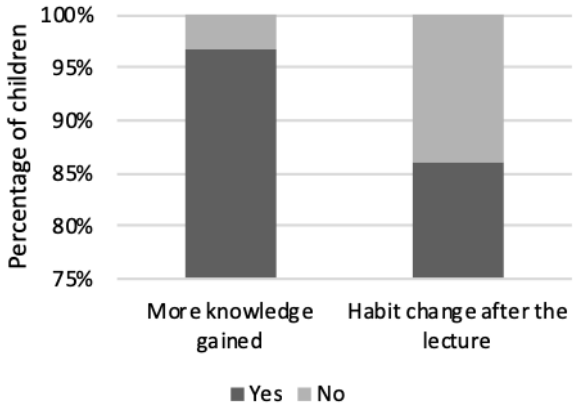

Fig. 2. Percentage of the children who had gained more knowledge and would change their recycling habits after attending the lecture.

3.2 Workshops

Fig. 3. Making process of the recyclable storage bags in the workshops.

Seventy-nine children had attended the workshop to make recyclable storage bags. Not all of them had attended the lecture. They were divided into five groups, and the facilitator-child ratio is about 1 to 4. The children were briefed about the process of making the bags before they started. The facilitators assisted them making the bags and answered any questions they raised during the process. Tools such as rubber mallets, cutting knifes, scissors and punches were provided to them. They used materials such as recycled banners, double-sided tapes, snap fasteners and eyelets to make their bags. Fig. 3. shows the making process in the workshops.

3.3 Photo Diary

After making the storage bags in the workshops, children were asked to bring the bag to home and hang it in kitchen or next to the bins for general waste. They started to collect recyclables using the bag at home, and they were asked to take photos to make records. Some of them also recorded how they used the bag to bring recyclables to the recycling points at their living areas. Fig. 4. are the photos taken from the children and their family members for recording the process.

Fig. 4. Recyclables that children collected and the way they used the recyclable storage bags in their daily life.

Few of the children were unable to understand the usage of recyclable storage bags and the meaning of the project. They had used the bags for shopping. They carried

food from supermarkets to home. Fig. 5 shows a photo provided by one of the children showing how the bag was used for shopping.

Fig. 5. Children used the recyclable storage bags for shopping.

4 Children's Involvement and Value Creation

The children were actively involved in the design process from understanding the issues to using their design in daily life in the final stage. It is found that through this design process, children were more willing to use their own design recyclable shopping bags than other kinds of storage bags. The children in this study were active to involve in recycling activities than before. The sense of belongings has motivated children to engage actively in the activity with minimal support and reminders from adults [5-6]. Besides, because of the higher participation and motivation, children were more encouraged to use the public facilities related to recycling such as the recycling bins. This is a good start for children to develop habit for recycling, and to learn to be environmental friendly.

The study also reveals that adequate understanding before any activities is important for children to proceed the work in making and designing, and using the bags they made. Without thorough understanding, children would misuse what they had created and designed. No matter how good their design was, the value of the process had lost. Giving lecture to the children before conducting the workshop is important in this sense.

This design process is also a value creation process. Through active participating and the design-and-make and hands-on activity, children themselves had created values for recycling in their daily lives. They have also developed positive attitudes towards recycling, which is considered as an important factor for making sense of the recycling participation [7]. As the entire project had lasted for more than a month, it is believed that the value created would stay in their attitude towards recycling. In addition, as the children had designed and made the bags in a group with their schoolmates, some of them would participate in the recycling activities using the bag in a group as well. In this process, children's behavior and recycling habits in the same

group were similar. The value may also be spread to other persons whom the children contact with in daily life or in school.

5 Conclusions

The importance of the abovementioned case study of Hong Kong is not only regarding its academic value in research but also its impact by its applied research outputs. The designs generated by the children have brought high degree of influence to their recycling practice, i.e., not only the time right after the study, but also up to the preparation of this paper. The findings of the case study of Hong Kong illustrates that it is important to have the involving of children through teaching children to design make their own recyclable facilities, e.g., storage bags. It is also important to teach children knowledge and information related to recycling before teaching them how to design and make the recyclable storage bags. The lecture makes sense of what children is doing during the process. Although few children were unable to understand the objective of the project, it is not suggesting that the study had failed because these children had also experienced using recyclables for daily life purpose. Positive values and attitudes related to recycling had been created in all of the participating children, and they would be spread out to other community circles now or in the near future.

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