

Children's Participation in Urban Heat Island Mitigation Strategies in Malaysia:

A report of workshops for promoting green spaces in residential neighborhood

Participation: Workshop
 Urban heat island: Environmental education
 Children: Malaysia
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1. Introduction

The goal of this study is to develop a participatory workshop method for use with children to help mitigate urban heat island in developing countries. It has been widely reported that green areas play a significant role to create cool spots in cities and divide urban heat island (UHI). Thus, this study attempts to find out the means to promote green spaces in urban areas through a participatory approach. Since children account for a large portion of the population in most of the developing countries, this study focuses especially on the children's participation. Three workshops were conducted with about 50 elementary school children (fourth and fifth year) in one of the typical neighborhoods in the city of Johor Bahru, Malaysia. This paper summarizes the results of these workshops for discussing the possibility of the program as a participatory approach for mitigating UHI.

2. Results of workshops

A typical neighborhood, which is located about 5km from the city center, was selected as case study area (see Fig.1). This project was conducted in collaboration with the local university (*Universiti Teknologi Malaysia*), local authority, local urban developer and elementary school located in the selected neighborhood. The roles of respective organizations were determined through discussions as indicated in Table 1.

(a) Preliminary questionnaire (Sep 2010)

A preliminary questionnaire was carried out to 140 pupils in the above elementary school in order to investigate favorite and problem places perceived by the children (Fig. 1). As shown, the large town park, which is situated at the center of neighborhood, was found to be favored by almost all the children (99%), followed by their elementary school (29%), the gas station including small convenience store (17%) and the large shopping center (13%). It can be seen that there are several major places favored by many children regardless of the location of their residences. Meanwhile, there was a tendency that the problem places are broadly distributed. About 97% of the

Table 1. Responsibilities of respective organizations

Local Univ.	Local authority	Developer	Elementary school
- Project management	- Advertising in mass media	- Informing residents	- Collaboration in questionnaires and WS
- Technical supports	- Funding tree planting	- Providing food in WS	- Selecting participants for WS
- Providing student assistants	- Providing tents for WS		

respondents answered that they were interested in participating in the forthcoming workshops. Out of the above interested respondents, 50 pupils who live in the neighborhood were chosen as participants by the principal of the said elementary school. The contents of the workshops are summarized in Fig. 2.

(b) 1st Workshop: Town watching (Oct 2010)

The main purpose of the 1st workshop was to let the children walk around their neighborhood from their school to the town park in group and observe their favorite and problem places. They took some pictures and discussed the reasons why those places were favored or disfavored among the group members. The results of observation were presented by each of the groups at the end of workshop.

(c) 2nd Workshop: Air temperature recording (Nov 2010)

The 2nd workshop aimed to enhance the children's awareness towards the importance of green spaces by letting them experience the real environment. The children were divided into ten groups and given a small air temperature and RH data logger (T&D TR-72U). They were guided to measure these data and

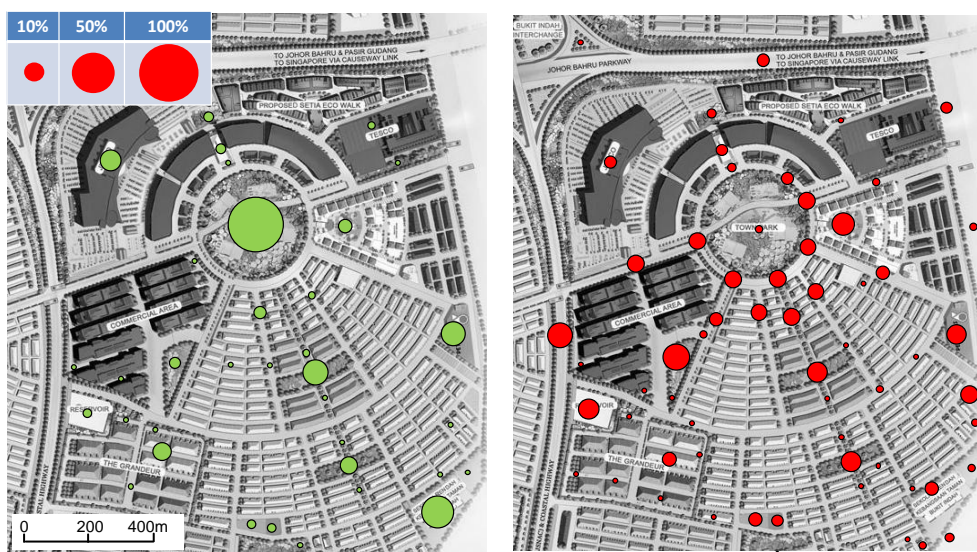


Fig. 1. Favorite and problem places perceived by children

answer some questions on thermal conditions in several places with the help of instructors, i.e. university students (Fig. 3). After arriving at the town park, each of the groups presented their results in front of the other groups. Moreover, a short lecture about thermal effects of green spaces was given to the children by a university lecturer at the end of workshop in order to encourage them to understand the scientific grounds after experiencing it in the field measurement.

(d) 3rd Workshop: Greening plan (Jan 2011)

The idea of the last workshop was to let the children design and propose a greening plan based on the previous measurement experiences. The children were divided into ten groups and proposed their own designs by making simple 3D models. As before, each of the groups presented their plan by showing the model in front of the other groups. Their plans will be




WS1 Oct 2010	Town watching 1. Ten groups of five children. 2. Visited their favorite/problem places in group, taking pictures. 3. Discussed the reasons. 3. Presentation and discussion.	
WS2 Nov 2010	Air temperature recording 1. Ten groups of five children. 2. Visited the selected places and measured thermal conditions. 3. Presentation and discussion. 4. Lecture on thermal effects of green space.	
WS3 Jan 2011	Design workshop 1. Ten groups of five children. 2. Distributed the results of the previous WS. 3. Designed a greening plan by making a simple model in group. 4. Presentation and discussion.	

Fig. 2. Summary of workshop programs

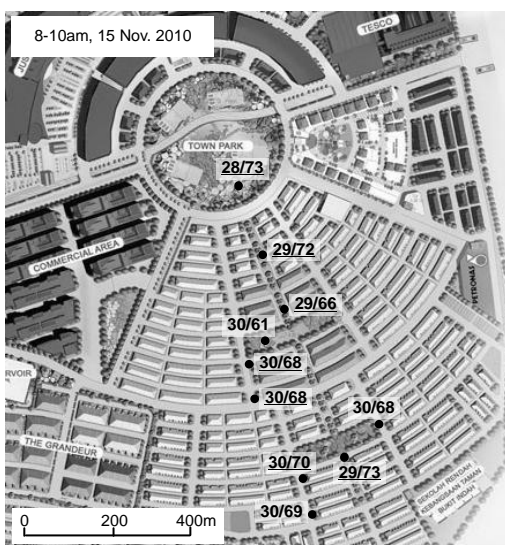


Fig. 3. An example of field measurement results. Left; Air temperature (°C), Right; Relative humidity (%).

summarized and improved by the local university lecturers. The children’s greening plan will eventually be implemented through the tree planting organized by the local authority in April 2011.

3. Environmental educational effects of the workshops

The questionnaires were conducted before and after the three workshops in order to examine the change in children’s environmental awareness. Fig. 4 indicates the averaged scores for respective questions in three-point scale. The left side of Fig. 4a shows the children’s current practice in respective eco-friendly activities, while the right side indicates their intentions to do these activities in the near future. Moreover, Fig. 4b illustrates their current practice in eco-friendly community activities and their intentions. As shown in both figures, the improvements of children’s awareness can be seen in most of the questions except for some items that already recorded high scores before the workshops, such as “Turn off the tap during tooth brushing” and “Turn off the lights and TV when not in use”. This indicates that a series of workshops particularly enhanced the environmental awareness in which their awareness used to be relatively low.

4. Conclusions

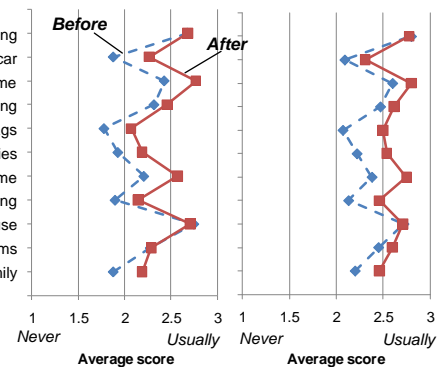
A total of three workshops were carried out in Johor Bahru, Malaysia with about 50 elementally school children in collaboration with some local organizations. The main idea was to enhance children’s environmental awareness by letting them experience the actual environment through conducting field measurement. The improvements of the children’s awareness were well observed.

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(a) Eco-friendly activities in their daily life

- Turn off the tap during tooth brushing
- Use more public transportation than a private car
- Use things carefully for lasting long time
- Select eco-friendly goods when buying something
- Do not use plastic shopping bags
- Separate garbage into respective categories
- Grow flowers or trees at home
- Participate community cleaning
- Turn off the lights and TV when not in use
- Pay attention to the news about environmental problems
- Talk about environmental problems with friends or family



(b) Eco-friendly community activities

- Clean the public spaces like parks or streets
- Plant trees or flowers in your neighborhood
- Study your neighborhood and global environments at school
- Recycle renewable or reusable items

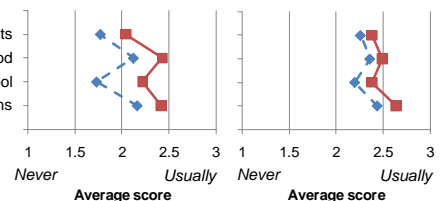


Fig. 4. Change in children’s environmental awareness before and after the workshops. Left; Current practice, Right; Intention to do.

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