Children Drawing: Interpreting School-Group Student’s Learning and Preferences in Environmental Education Program at TanjungPiai National Park, Johor Malaysia

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1. Introduction

One of the objectives in environmental education, as outlined by the significant UNESCO Tbilisi Declaration (1977), is the ability to acquire a basic understanding of the environment and its associated environmental problems. Outdoor environmental education has since then expanded into one of the research trend of improving student’s learning ability. It is however notable that the understanding on how does the process of learning took place within the environment is still under research. This research is design to understand on the knowledge obtain by school-

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groups children following their environmental education experience at a national park and their preferences of the learning approaches as well as the learning setting through analysis of the children’s drawings.

2. Children Drawings

The study of children drawings began early as 19th century. Early studies on children drawings focus extensively on it is role to depict human personality or for clinical diagnosis. Among one of the continuing trend on children drawing research is the ‘draw-a-man’ test developed by Good enough (1926). The use of children drawings depict further on a significant subject matter, as a means to solve major ongoing issues, including in environmental issues and educational circumstances. In environmental education, pre-trip and post-trip experiential drawings by the participating students are commonly applied as part of affective interpretations.

2.1. Children’s drawings in education

The use of student’s drawings in education system is extensive and concurred at different level of learning years. In environmental science education, among the most common assessment practice to obtain information about student’s knowledge is by using the student’s drawings on their conceptual learning as well as their misconceptions of the concept learned. SacitKose (2008), for example, studied the conceptual learning of photosynthesis and respiration in plants to a group of university students. In other case study of opposite learning year, Martlew& Connolly (2008) studied the effect of schooled and unschooled experience through children’s drawings. On other interesting subject, Reiss and Tunnicliffe (2001) on understanding scientific phenomena of human internal organ towards wide range of students. These drawing methods studies verified the efficacy of drawing as research method amongst student’s of diverse age.

The analysis of student’s drawings for knowledge assessment purpose requires a categorization of the drawings through tiered content analysis. The drawings are commonly sorted and leveled into several tiers of understanding that range from no drawing to drawing with misconceptions thorough to highly cognitive drawing that shows in-depth knowledge obtain. The number of tiers differs among researchers. Kose (2008) adapted five tier of understanding, while Reiss and Tunnicliffe (2001) outlined seven tiers. The drawing tier levels usually represent the number of subject matter occurred on the drawings and its quality. The content analysis levels are usually adopted based on previous similar studies and modified according to the researcher understanding of the subject matter. Findings and discussion of the studies imply on the qualitative findings outsource from the drawings together with the qualitative values from the interviews of the research participants.

2.2. Children’s drawings in physical planning

From another standpoint nevertheless in similar profound usage, children’s drawing has been widely used in physical planning as guidance to understand children’s place-based experiences and preferences. The context of physical planning assessment through user’s drawings may be within indoor, including for example studies by Pelander et.al. (2007) and Cлатовorthy et.al (1999); on outdoor contexts, as studied by Pluhar et.al (2010) on Hungarian’s urban children; Lindholm (1995) of schoolyard; Malone (2003) of school grounds; Hemming (2007) of primary school round for sports and active play; Holt (2008) of neighborhood development; and KatrinaSoini (2001) particular drawing approach of mental mapping and concept mapping of rural landscape.

3. Methodology

Fieldworks were carried out during peak visitation period amongst primary-school-groups participants to TanjungPiai National Park (TPNP), which was within June to July 2012. TPNP is located at the southern part of east Peninsular Malaysia, in Pontian, Johor and boast of its tagline for ‘the Southernmost Tips of Asia’. The national
park is a wetland mangrove reserve and designated as one of the Ramsar’s site. The selected peak season essentially reflected the end of first academic semester in Malaysia’s educational system, which annually begins in early January and end in late November. The selection of research participants is based highly on volunteering agreement by the school management, the similarity of selected environmental education (EE) program contents and amount of time spent at the national park. The selected EE program for this study is particularly focus on the One-Day Environmental Education program, which will begins at nine in the morning and ended at five in the evening. Two groups of primary school students were finalized as research participants, with accumulation of 57 students (N). Samples are mostly female students and from two different background of either rural or urban settlement.

3.1. Research instrument: children drawings

The equipment needed for the children drawing was a blank A3 size paper for each student. The drawing activities conducted post-trips in school environment and administered to the students in one of the subject classroom, which took approximately 45 minutes. Students were initially given an introduction to the purposes of the drawing exercise. The students were asked to draw as an answer to the main question “What do you learn about the mangrove environment during the trip?”. To help them with the drawing task, the following question was asked; “Where and how do you learn most about the mangrove environment throughout the entire program?”. Students are not in formal situations but are encouraged to draw based on their own experiences and to avoid copying from others. Students are also encouraged to label their drawing. An interview session was afterwards conducted in the following month among selected ten students that represent the diverse quality of the drawings.

3.2. Children’s drawings analysis

Generally, the analysis of the children’s drawings is based on inductive qualitative content analysis (Trochim, 2000). As the study independent variable is on the obtained knowledge, method of analyzing drawings from the context of education was applied as the prime analysis. Five tiers of environmental quality drawings analysis were adapted in this study, based on previous studies (Kose, Barraza, & Laura, 1999) and modified based on the subject matter of this particular research, which is within the context of mangrove wetland. The following Table 1 described the five tiers of the knowledge-based drawings analysis. Another analysis on the children’s preferences of the learning approaches based on their drawings is also conducted. The drawings are categorized based on four significant learning interpretation approaches commonly applied in the planning of environmental education, namely cognitive, physical, visual and tactile approaches. Data were recorded in Excel for analysis.

| Tiers of drawing | Descriptions |
|------------------|--------------|
| Level 1          | Student replied I do not know or no drawing response. |
| Level 2          | These drawings were including identifiable elements of mangrove ecosystem, in words/ diagrams/ formulation instead of the drawings. Also indicated drawing of flora and fauna with misconception of its significant rooting character. The drawings may represent any ecosystem. |
| Level 3          | Drawing includes identifiable single elements of either flora or fauna or environment character at mangrove ecosystem. |
| Level 4          | Drawing demonstrates partial understanding of the mangroves environment concepts. Includes in the drawings are two to three mangrove elements together with its significant physical characters, for example, types of mangroves plants; types of mangrove fauna; roots character, land and mudflats character in mangroves area. |
| Level 5          | Drawings are the most competent and realistic drawings of the mangrove role and mangrove elements. Drawings show understanding of the ecosystem, contained four and more elements of mangrove ecosystem. |
4. Results

4.1. Mangrove knowledge quality drawing

Total of 57 drawings were retrieved from the children. All drawings were combined and repeatedly sorted by researchers based on a ranked order which represent the quality of mangrove environment understanding. Only one particular drawing is categorized as Level 5, the highest amongst all the ranked drawings from samples. This particular drawing represents more than four elements of the mangroves ecosystem expected to be learnt from the outdoor learning program including several flora, fauna, and labeling that shows competency in understanding the mangroves ecosystem and its functions. On the other hand, an example of a Level 2 drawing, which depicted the lowest tier ranking derived in the analysis, includeda single species of mangrove fauna, which may also represent any other ecosystem. In all, most of the drawings are classified moderately from Level 3, thorough to the highest tier of Level 5 (61.4%) in the five-tier mangrove knowledge quality analysis. The lowest tier of the learning quality depicted in the drawings is of Level 2 (38.6%). The drawing analyses are generally described in Table 2, followed by particular analysis by the children’s background and gender.

Another significant finding is high range of urban children drawing quality categorized as Level 3 (62.9%), with identifiable elements or significant character drawn that described mangrove ecosystem. Comparatively, rural students’ drawings were mostly of Level 2 category (60%), which either the drawing included only one or two mangrove elements drawn; or some misconceptions of the mangrove knowledge with elements drawn less likely depicted the mangrove ecosystem.

In gender analysis, girls drawings are notably content with more identifiable mangrove elements and its surrounding environment compared to the boys’ drawings. 56 per cent of the drawings identified as Level 3 and above tier-quality were among drawn by girls’ participants, which will be reviewed in details in the discussion section.

| Table 2. Results of Mangrove Knowledge Quality Drawing by the children. |
|-------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Level of drawing        | Level 1 (%)     | Level 2 (%)     | Level 3 (%)     | Level 4 (%)     | Level 5 (%)     |
| Total (N=57)            | 0               | 22 (38.6)       | 28 (49.1)       | 6 (10.5)        | 1 (1.8)         |
| Background              |                 |                 |                 |                 |                 |
| Urban                   | 0               | 4 (14.8)        | 17 (62.9)       | 5 (18.5)        | 1 (3.8)         |
| Rural                   | 0               | 18 (60.0)       | 11 (36.6)       | 1 (3.4)         | 0 (0.0)         |
| Gender                  |                 |                 |                 |                 |                 |
| Male                    | 0               | 10 (17.5)       | 1(1.8)          | 1(1.8)          | 1(1.8)          |
| Female                  | 0               | 12(21.1)        | 27(47.4)        | 5(8.6)          | 0(0.0)          |

4.2. Learning approaches and learning settings

In relation to the second research question, which environmental learning approach afforded optimum learning opportunity to the children, activities of environmental learning and the illustrated setting on the drawings are observed. In situation whereby more than one setting is identified on the drawings, the most emphasized setting is counted as the one preferred by the children. Several outdoor interpretation approaches were identified. Most children (91.2%) selected their active participation in the mangrove environment through physical and sensorial approaches as the preferred learning interpretations. Adventurous obstacle course was among the highly illustrated (35.1%) as one of the effective activities. This is then followed by around the park mangrove education trail on the provided boardwalk which includes active social participations between the guides and the children with tactile and sensorial based activities (22.8%).

Among the least preferred learning activities isthe children’s participation in indoor slideshows program and activities that required the students to view the mangrove environment passively as part of their cognitive experiences. These findings is of interest as two significant patterns for outdoor learning settings can be concluded;
5. Discussion

Through the research instrument of children drawing which is common among measuring the student’s learning in education sector, this study extended it is application in outdoor learning, in similar way towards understanding the obtainable knowledge. Additionally, combining both analysis of primarily, the knowledge obtained and secondarily the preferences of physical settings illustrated children drawings, the result of the study can be used by both the manager and the user of national park. School-group outdoor environmental learning in Malaysia is still at the very beginning of its application. Previous research on global outdoor environmental education included the difficulty to measure the student’s outcome post EE implementation, and so does in context of Malaysia. One of the successful factors of developing outdoor learning program is through the cycle of it is effectiveness evaluation. Evaluation of EE should be aimed for the improvement of the program through specific, well-planned research strategies. The activities and outcomes of the program are also highlighted as focus of the evaluation, together with a standard set of expectation or criteria for comparison. Thus a longitudinal evaluation of program through specific utilization of user’s post-event obtainable knowledge drawings can suggested to be implemented at TNTP, as well as other national park. At the same time, similar obtainable knowledge indicators can adapted by any school-group’s program leader as part of their institutional program evaluations.

The principal finding of this study lead towards the agreement that the approaches adapted in outdoor environmental learning and utilization of natural surrounding may contribute positively towards environmental knowledge obtain by school-group participants. With reference to Woods and Moscardo’s (2003) ‘Mindfulness’ model of interpretation and based on the findings of this study, the EE program and the physical interpretations at TanjungPiai National Park afforded optimum utilization to understand and study the mangrove environment. The inclusion of varied physical and direct contact within the mangrove provided solid experiential learning to the school-group children. In an interview conducted (but not reported in this study) with the participated children, it is acknowledge that by immersing into the mudflats during the obstacle course activities, they had the opportunity to use their sensory and tactile skills. For example, by falling and getting stuck in the mudflats allows them to actually touch and witness its sticky physical composition; comparing it to the ground soil found within their common neighborhood. Sensorial and tactile opportunity given by the TNTP guides to touch the mollusk, to taste the salty mangroves leaves or to identify mangroves tree through bark touching and scanning, build up their understanding of the mangrove ecosystem. These experiences and memories were recalled and illustrated through the student’s drawings. Similarly, Paisley et al (2008) connoted to the idea that activities which include contact with the natural and social environments were highly ranked as beneficial. Thus, active learning interpretation that took place directly within the environment of TNTP is perceived as among mindful interpretation.

It is also discovered that school-group’s children demographics background may affect the student’s notions towards learning motivation during the environmental education program. The environmental learning experiences at TNTP may have extensive similarity to the living conditions of the rural background children of this study. Interview result with selected rural students agreed to the facts highlighted by Woods and Moscardo’s (2003) in Moscardo (2009) that the repetitiveness and familiarity of the outdoor learning experiences to their daily routine condition may lead to ‘Mindless’ cognitive state. This fact is reflected towards the wide range of moderate to low drawing quality of the students from rural area. Noticeably, novelty experiences such as the new opportunity to view the wide open sea, with lines of ships facing the straits at the surrounding edge of TNTP are considered as active sensorial activities and repeatedly illustrated in the rural children’s drawings. This condition is parallel to Gilbertson et al (2006) guideline for successful outdoor learning, whereby understanding the user background is a crucial factor.

Environmental education program evaluation is also aimed for the purpose of improvement. In the case of TNTP interpretations, extensive uni sensory and static interpretations for visual purposes such as at the globe sculpture and
at the entrance ‘Piai’ leaf sculpture may be value-added for the benefit of education, although it has its own high value aesthetic values. National park has an important role of disseminating environmental and conservation knowledge to the visitors. Thus, the drawing method as an evaluation of the park interpretation is hope to lead toward the betterment of the educational experiences.

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