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Environmental Education Through Mural Painting Activities as to Enhance Secondary School Students' Knowledge And Awareness on Environment

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Abstract: This study aims to evaluate the impact of environmental education activities and mural painting appreciation in enhancing students' knowledge and awareness to the environment. Environmental education activities were performed in classes for an hour per week for four times. Mural painting activity with the theme of marine ecosystems were conducted outside the classroom for a month. The design of this study was quasi-experimental with a pretest-posttest control group and experimental group, involving 128 students from two ordinary secondary schools in Gombak district, Selangor. The students divided into two groups according to the schools to represent the control and experimental groups, i.e. 64 students for each group. This study used three types of instruments, which are pretest, first post-test and second post-test. Each instrument consists of 20 multiple choice knowledge questions and 18 statements on the environmental awareness based on the 5 Likert scale. The results indicated that the experimental group significantly increased their environmental knowledge and awareness after the experiment, whereas the control group did not.

Key words: Environmental educations · Mural painting · Environmental knowledge · Environmental awareness · Marine ecosystem

INTRODUCTION

Malaysia is a developing country that suffers environmental degradation as result of rapid development and improper management of natural resources. Environmental problem in Malaysia include air pollution, water pollution, noise pollution, illegal dumping of scheduled wastes, soil contamination, the case of oil spills and many others [1, 2, 3]. Environmental damage should be restored and maintained so that their impact on the environment can be minimized. Environmental conservation is not the responsibility of some individuals or certain agencies, but it is the responsibility of every human being on this earth. Awareness to conserve and preserve the environment should begin from within us. Malaysia has a tremendous wealth in natural resources and biological diversity [4]. Therefore, efforts should be intensified to maintain the environment in the right way.

Community awareness about the importance of protecting and conserving the environment should be improved. Environmental education is a very potential tool to inculcate early awareness in society. The process in environmental education involves human interaction with environment. It tells how to manage the environment wisely through enhancing knowledge, understanding and awareness to the environment [5]. Effective early environmental education could promote better environmental awareness and environmental values particularly among the young generations which could finally result in people's good action towards sustainable environment.

This study aimed to determine the effect of environmental education activities and appreciation of mural painting among school students as to enhance their knowledge and awareness to the environment. Environmental education activities were performed in

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classes and mural painting appreciation activity was conducted outside the classrooms. Marine ecosystem was selected as the theme for mural panting activity. The theme was chosen because of species diversity in marine ecosystem besides highlighting the relevance and importance of marine ecosystem to the whole environment. This study was based on Project Based Learning - an experimental type of study - unlike many previous studies conducted in Malaysia which was merely of social survey type.

Environmental education in Malaysia is not taught as a single subject in school, unlike those that have been practiced in Denmark [6]. Level testing and assessment mastery of students on environmental knowledge from education system has not been reported like other academic subject [7]. Therefore, adequate knowledge on the natural environment and positive public behavior towards sustainable environment need to be taught to school students because the fate of environment will rely on them in the future.

Currently, the world is dealing with serious degreadation in environmental quality. Among the issues include thinning of ozone layer, air and water pollution, greenhouse effect which has lead to global warming, destruction of habitat, extinction of flora and fauna species and the decline in quality of life and livelihood of human kind. In respond to that, Ballantyne *et al.* [8] proposed that environmental education should be taught to young and adults as to solve future environmental problems. According to Barraza and Walford [9], knowledge on the environment is often assumed to have a link to the development of positive attitudes towards the environment and the school plays an important role in the formation of these attitudes. Therefore, an individual must be aware of and have knowledge on environmental issues before they can act to address these issues. While Kaiser *et al.* [10] also noted that knowledge on the environment is a precondition in the formation of attitudes.

The background, knowledge, attitudes and their sensitivity to the environment influence environmental awareness among students. Fishbein and Ajzen (1975) in Ozden [11] also expressed awareness and sensitivity to the environment is influenced by beliefs, attitudes and social pressures. While Aminrad [12] stated environmental awareness as knowledge, attitudes and actions of a person on the environment. This fact clearly shows that awareness of the environment depends on many factors and it should be taken into account to ensure good conduct and actions on the environment by individuals.

Many previous studies on environmental awareness used the results of opinion polls to gauge attitudes towards the environment [13]. Study the relationship between knowledge and attitudes [14], knowledge, attitudes and behavior [15, 16] as well as knowledge, attitude and levels of enjoyment [17] has also been done before. According to Iizuka [13], most environmental studies undertaken by social researchers and political scientists that have been conducted before used the level of attitude or commitment to assess environmental awareness. Therefore, in this study we wanted to know the students' environmental awareness by measuring their attitudes towards the environment through experimental studies.

Study Objectives:

- To identify students' knowledge and awareness on environment before and after environmental education activities; and as well as after mural painting activties.
- To know if there is any significance difference on knowledge and awareness on environment between control and experimental groups after the experiment.

MATERIALS AND METHODS

Sampling: For the purpose of this study, we used a quasi-experimental design because participants were not randomly assigned, but they must work in whole classes [14]. The participants consist of 128 of form 2 students from two ordinary secondary schools in Gombak district, Selangor. The students were divided into two groups according to the schools to represent the control and experimental groups which 64 students respectively.

Study Instrument: The evaluation instrument consisted of a questionnaire to measure students knowledge and awareness on environment. It comprised 20 multiple-choice knowledge questions with four response options and 18 statements based on five-points Likert awareness scale. Below are sample of knowledge questions with the correct answers in italics:

- Environmental pollution can adversely affect...

Response Options: Many tropical plants and animals, wild species in forest, most people in island country, all living things in the world.

- Which of these is the impact of noise pollution on humans?

Response Options: Affecting eyesight, causing sterility, hepatitis, deaf.

Whereas, for sample of statements based on five-points Likert awareness scale with the questions ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) are:

- In my opinion, we should recycle the items used to preserve energy.
- I hope we will carry plastic bags of garbage while picnicking on the beach.

Reliability and Validity of Instrument: We completed the knowledge on environment instrument twice in a class of 42 form 2 students at an interval of 14 days to determine stability (test-retest reliability) (Streiner & Norman (1989) in Dimopoulos *et al.* [14]. The test-retest value was 0.771 (general part) and 0.732 (marine ecosystem part). For the awareness on environment instrument that measure students' attitudes, a Cronbach's alpha internal consistency reliability test was 0.743 (general part) and 0.651 (marine ecosystem part).

Measure: Control and experimental groups assessed using pre-test (before the experiment), first post-test (after the environmental education activity) and second post-test (after mural painting activity). However, only the experimental group carried out environmental education and mural painting activities while the control group did not.

Data Analysis: The data obtained were analyzed using SPSS version 17. The descriptive analysis statistic used to find the mean and standard deviation of environmental knowledge and awareness of both groups whereas the inferential analysis statistics through independent samples t-test used to identify the significant difference of both groups.

RESULTS AND DISCUSSION

Students Knowledge and Awareness Before and after Environmental Education Activities as Well as after Mural Painting Activity: The analysis showed that the experimental group showed an increase in the percentage of the mean score of knowledge after exposure to environmental education and mural painting activities as presented in Table 1. In the pretest, experimental group obtained 54.2969% (S.D = 10.68552) of mean score, 70.7813% (S.D = 12.41539) in first post-test and 74.0625% (S.D = 14.22258) in second post-test. Compared to control group, 53.4375% (S.D = 10.75982) in pre-test, 56.8750% (S.D = 12.19875) in first post-test and 53.3594% (S.D = 13.86026) in second post-test.

For awareness on environment, the experimental group showed higher in the mean score of awareness after environmental education activities as well as after mural painting activity compared to control group as presented in Table 1. In the pretest, experimental group obtained 3.8918 (S.D = 0.44130), 4.1165 (S.D = 0.43753) in first post-test and 4.0755 (S.D = 0.39843) in second post-test. Whereas, control group obtained 3.8093 (S.D = 0.47696) in pretest, 3.8064 (S.D = 0.38180) in first post-test and 3.8661 (S.D = 0.40708) in second post-test.

Based on the result, we found that environmental education and mural painting activities have an impact in increasing knowledge and awareness on environment. The findings show there has been increasing the mean score of knowledge and awareness on environment of experimental group. The increase in mean score of knowledge and awareness (measured attitudes) on environment in this study matched with the findings of the study conducted by previous researchers such as de-White and Jacobson [18], Kruse and Card [15], Covit *et al.* [19], DiEnno and Hilton [17] and Kartini Abdul Muttalib [20]. This proves that the treatment or environmental education learning activities either within or outside the classroom effectively in increasing level of knowledge and awareness (attitude) towards environment.

For control group, result showed that there are no changes in the mean score of knowledge and awareness on environment before and after the experiment because they are not exposed to any activity either environmental education or mural painting activities as the experimental group. The results match the findings of Kartini Abdul Muttalib [20] which found that knowledge and awareness (attitude) of control group is at the same level before and after Forest Ecosystems Teaching Module given to the experimental group.

Significant Difference on Knowledge and Awareness on Environment Between Experimental and Control Groups after *Environmental Education Activities*: Since the independent samples t-test indicated statistically differences did not exist on a pretest, $t(126) = 0.453$, $p = 0.651$ for mean score of knowledge and $t(126) = 1.016$, $p = 0.311$ for mean score of awareness, we considered the experimental and control groups to be equal.

Table 1: The mean score of knowledge and awareness on the environment for experimental and control groups in pretest, first post-test and second post-test

	Mean Score (S.D)		
Variable	Pretest	First post-test	Second post-test
Knowledge			
Experimental	54.2969 (10.68552)	70.7813 (12.41539)	74.0625 (14.22258)
Control	53.4375 (10.75982)	56.8750 (12.19875)	53.3594 (13.86026)
Mean Difference	0.8594	13.9063	20.7031
Awareness			
Experimental	3.8918 (0.44130)	4.1165 (0.43753)	4.0755 (0.39843)
Control	3.8093 (0.47696)	3.8064 (0.38180)	3.8661 (0.40708)
Mean Difference	0.0825	0.3101	0.2094

Note: Knowledge scores ranged from 0 to 100. Awareness scores represent the mean coded on a 5-point Likert scale where 1= strongly disagree and 5= strongly agree

Table 2: The differences of mean score of knowledge and awareness on environment in first post-test between experimental and control groups after environmental education activities

	First post-test			
Variable	Mean	S.D	*t*-value	*p*
Knowledge				
Experimental	70.7813	12.41539	6.392	0.000
Control	56.8750	12.19875		
Awareness				
Experimental	4.1165	0.43753	4.273	0.000
Control	3.8064	0.38180		

Note: Knowledge scores ranged from 0 to 100. Awareness scores represent the mean coded on a 5-point Likert scale where 1= strongly disagree and 5= strongly agree

Table 3: The differences of mean score of knowledge and awareness on environment in second post-test between experimental and control groups after mural painting activity

	Second post-test			
Variable	Mean	S.D	*t*-value	*p*
Knowledge				
Experimental	74.0625	14.22258	8.340	0.000
Control	53.3594	13.86026		
Awareness				
Experimental	4.0755	0.39843	2.941	0.004
Control	3.8661	0.40708		

Note: Knowledge scores ranged from 0 to 100. Awareness scores represent the mean coded on a 5-point Likert scale where 1= strongly disagree and 5= strongly agree

In first post-test, the independent samples t-test indicated that the knowledge and awareness on environment differed significantly between experimental and control groups, $t(126) = 6.392$, $p = 0.000$ for knowledge and $t(126) = 4.273$, $p = 0.000$ for awareness as presented in Table 2. The result showed that the mean score of knowledge of experimental group was significantly higher than control group as well as awareness variable. The results indicate that exposure to environmental education activities have succeeded in increasing the level of knowledge and awareness on environment of experimental group.

Knowledge score of experimental group in first pos-test was higher than in pretest. This finding is congruent with the findings of previous researchers such as de-White and Jacobson [18], Covit *et al.* [19], DiEnno and Hilton [17], Kartini Abdul Muttalib [20] and Dimopoulos *et al.* [14]. They found a significant difference on knowledge between experimental group which received exposure to treatment with control group who did not receive exposure to any activity.

Awareness score which measured students attitude towards environment of experimental group also higher than in pretest. This findings similar to the findings of attitude study conducted by de-White and Jacobson [18], DiEnno and Hilton [17], Covit *et al.* [19] and Kartini Abdul Muttalib [20]. They found that there are changes in attitude only to experimental group which received treatment and not to control group.

Significant Difference on Knowledge and Awareness on Environment Between Experimental and Control Groups after *Mural Painting Activity*: In the second post-test, the independent samples t-test indicated that knowledge and awareness on environment differed significantly between experimental and control groups, $t(126) = 8.340$, $p = 0.000$ for knowledge and $t(126) = 2.941$, $p = 0.004$ for awareness as presented in Table 3. The result showed that the mean score of knowledge of experimental group was significantly higher than control group as well as awareness variable.

The experimental group certainly has higher knowledge and awareness than control group because they have been exposed to environmental education activities in the classroom before. Then, when the experimental group is undergoing mural painting activity, no doubt that increased knowledge on environment has occurred again. Therefore, the result indicated that knowledge of experimental and control groups have significant difference statistically after the activity. Despite there is slight decrease in the mean score of awareness of experimental group in second post-test, these values are found still in a higher level than control group.

This study is in common with the study of Kruse and Card [15] who found that campers with previous conservation education camp experience had higher in knowledge and attitude than those without prior camp experience.

This proves that the addition of information and activities about environment has further improved the level of existing knowledge and awareness of students on environment. This means that environmental education should be an ongoing process and according to Joseph [21], knowledge about the environment is not an end, but rather a beginning. He added that knowledge about the environment promotes attitudinal and behavioural change. Therefore, environmental education is an agent of change and a step toward community empowerment.

CONCLUSION

The results showed that there are no changes in the mean scores of knowledge and awareness on environment of the control group. This is because they are not directly exposed to any activity either environmental education activities or mural painting activity. The existence of this group actually serves as a comparison group to see the effects of the treatment given to the experimental group. The experimental group showed an increase in the mean scores of knowledge and awareness on environmental in the first post-test obviously. The increase in the mean score of knowledge occured again in the second post-test but slight decrease in the mean scores of awareness. However, the mean score was higher than the control group.

Based on the results in this study, we found that environmental education activities or mural painting activity have a positive impact in increasing knowledge and awareness to the environment. The mean difference of knowledge and awareness between the experimental and control groups was also evident as presented in Table 1. However, these activities should be conducted continuously to students to inculcate their awareness and positive attitudes towards environment. According to Kainth [22], environmental awareness requires a person to have knowledge and realize how to conserve resources, check environmental pollution and control population. However, this requires a lot of efforts related agencies. Successful control of these problems needs a global approach and a change in man's attitude towards environment. What must be understood here, by improving the quality of life. we can improve the environment.

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