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Pro-Environmental Concern Among Primary School Students

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Abstract

Public awareness on environmental issues is the prerequisite of the behavioural changes towards environmental-friendly activities. People who are concern about preserving the environment for present and future generations are more prone to engage in pro-environment lifestyles. In this study, the modified New Ecological Paradigm (NEP) scale was used to gauge 348 students' pro-environmental concern. Based on 1 to 5 Likert scale response, students' pro-environmental values was found to be high (mean=3.66, SD=0.59). Data analysis showed no difference in students' belief system across gender and between students in Penang and Perak states. However, there was variation in pro-environmental concern between schools. It was also revealed that students' science achievement in school is a moderate-effect predictor of their pro-environmental concern.

Keywords: New ecological paradigm scale for children; pro-environmental concern; primary school students

Abstrak

Kesedaran orang awam terhadap persekitaran adalah prasyarat perubahan tingkah laku ke arah aktiviti-aktiviti mesra alam. Orang yang prihatin tentang memelihara alam sekitar untuk generasi kini dan akan datang akan lebih cenderung untuk melibatkan diri dalam gaya hidup pro-persekitaran. Dalam kajian ini, Skala *New Ecological Paradigm* (NEP) yang diubah suai digunakan untuk mengukur kebimbangan pro-alam sekitar bagi 348 orang pelajar. Berdasarkan jawapan skala Likert 1 hingga 5, nilai pelajar pro-alam sekitar pelajar didapati tinggi (min=3.66, SD=0.59). Analisis data menunjukkan tidak ada perbezaan dalam kepercayaan pelajar merentasi jantina dan antara pelajar di negeri Pulau Pinang dan Perak. Walau bagaimanapun, terdapat perubahan berkaitan dengan pro-alam sekitar antara sekolah-sekolah. Ia juga mendedahkan bahawa pencapaian sains pelajar di alam sekitar antara sekolah-sekolah. Ia juga mendedahkan bahawa pencapaian sains pelajar di sekolah adalah faktor peramal sederhana bagi kebimbangan pro-persekitaran mereka.

Kata kunci: New Ecological Paradigm Scale bagi kanak-kanak; kebimbangan pro-alam sekitar; kanak-kanak sekolah rendah

1.0 INTRODUCTION

Environmental issues pertaining to green-house effect, erratic climate patterns, destruction of wildlife habitats and species extinction have become a global-scale concern. Human activities for the past 50 years have changed the world ecosystem in unprecedented magnitude since the history of mankind (Millennium Ecosystem Assessment, 2005). The inescapable link between the ecosystem condition and human well-being can be clearly discerned in the ecosystem services rendered for human use, namely provisioning, regulating, and cultural and supporting services.

Environmental problems in Malaysia started with traditional industries since the colonial rule in early 20th century when tin mining developed rapidly, polluting rivers with mine waste water and sludge. In later years, aggressive natural rubber and palm oil production aggravated water pollution in Malaysia. When Malaysia turned to modern industries supported by foreign investment as precursor for development, industrial wastes became apparent since the early 1970s. However, Malaysia is committed to protection of the environment through development of environmental administrative framework and legislative system. The third Malaysia Plan (1976-1980) was the first to incorporate environmental policies into the country socio-economic blue print. In the subsequent Malaysia Plans, the government made its environmental policies more substantial and concrete to promote a clean, safe and healthy environment for the present and future generations and to improve existing policies to meet the need for sustainable development.

Environmental education in Malaysia started in 1998 with the publication of Environmental Education Across Curriculum – Guide Book For Teachers by Curriculum Development Centre of Ministry of Education for the use of teachers in primary and secondary schools. Teachers' Guide Book for Preschool was

subsequently introduced in 2005 (Mohammad Zohir Ahmad & Nordin Abdul Razak, 2007). Embedded elements of environmental education in different subjects, namely Moral Education, Islamic Study, Geography, Civic Education and languages were emphasised (Ministry of Education, Malaysia, 2004). Besides formal classroom education in school, co-curricular activities were aligned to focus on activities related to environmental awareness and green lifestyles through recycling campaign, compost-making, and field trips (Department of Environment, Selangor, 2009).

2.0 BACKGROUND & OBJECTIVE

Environmental activists in the US were inspired by the Rachel Carson's Silent Spring published in 1962. Social psychologists believed that the Dominant Social Paradigm (DSP) worldview in the 1960s was taking a new turn as people were becoming more concern with the environment. The Dominant Social Paradigm postulates endless human growth, progress, and abundance, leading to environmental degradation. In an attempt to develop a valid and reliable measure to help scholars understand the world view transition from Dominant Social Paradigm to a more environmental-conscious perspective, Riley Dunlap and his colleagues of Washington State University published the New Environmental Paradigm, a 12-item scale in 1978. This new scale highlights industrial needs that exceed environmental limits and ecosystem disruptions caused by modern industrial societies (Dunlap & Van Liere, 1978). Responding to critics of the New Environmental Paradigm scale over several shortcomings, a revised New Ecologial Paradigm (NEP) scale with 15 items was later introduced (Dunlap *et al.* 2000). Researchers have used the NEP scale in different contexts to assess adults' environmental views and found the scale to be reliable and valid (Johnson *et al.* 2004; Poortinga *et al.* 2004; Rideout *et al.* 2005).

The modified New Ecological Paradigm (NEP) Scale for Children (Manoli *et al.* 2007) was used in this study because the scale had been thoroughly tested and validated for use with children (Jagger, 2009). The modified version of NEP scale had its number of items reduced to ten from the original version (Dunlap *et al.* 2000) which consisted of 15 items. Vocabulary used in the modified scale had been simplified to better suit primary school students. The NEP Scale for Children has a short list of items for students to work through and the length best suited their attention span.

Some other environmental attitude scales for children are the Children's Environmental Attitude and Knowledge Scale (CHEAKS) (Leeming, Dwyer & Bracken, 1995) and the Children's Attitude toward the Environment Scale (CATES) (Mussler & Malkus, 1994). Both scales are designed for primary school students, and are divided into different domains. Likert scoring was also used for ease of scoring and interpretation. Similarities aside, both scales were too lengthy. CHEAKS consists of 66 items and CATES 25 items. Challenging vocabulary is used in these scales. Some statements are leading while some others do not have a clear correct answer. Since these two scales consist of larger number of items it is therefore, in the context of this study, which involves primary schools students these scales with larger number of items would be less suitable.

Van Petegem & Blieck (2006) used the NEP Scale for Children to compare cross-cultural differences in children's perspectives on human-environment interactions. Children in Belgium believed in human-nature equality whereas Zimbabwean children laid emphasis on a utilitarian view of the environment. Qualitative study based on NEP scale for Children had shown that the scale can be sensitive to socio-cultural contexts (Kopnina, 2011a, Kopnina, 2011b). Kopnina's study among the Dutch students discovered that educational curriculum and influence of parents, peers and media could leave impacts on formation of Dutch's children's knowledge and attitudes towards nature.

The objective of this study is to investigate Malaysian children's environmental concerns. Information on children's perspectives and pro-environmental conceptions is fundamental as these young people will be responsible for the environment protection in the future. Since most environmental programs are designed for school students, information obtained from this study could be useful for policy-makers, environmental learning program designers and teachers.

3.0 METHODOLOGY

Penang and Perak are two northern states of Peninsular Malaysia. The sample of this study comprised of 348 Year 6 primary school students, aged 12, from four schools in Penang (N=153, 44%) and four schools in Perak (N=195, 56%). Penang students consisted of 61 males and 92 females whereas Perak students were made up of 98 males and 97 females. Sample profile by gender was 45.7% females (N=159) and 54.3% males (N=189)

This study was conducted to investigate the pro-environmental concerns of primary school students in Penang and Perak. The instrument used in this study was the 15-item New Ecological Paradigm (NEP) scale (Dunlap *et al*., 2000), modified by Manoli *et al.* (2007) for children aged 10 to 12. The modified NEP scale was translated into Bahasa Malaysia, the official language of Malaysia. Respondents were asked to indicate the strength of their agreement or disagreement with each statement. Responses were then used to construct various statistical measures of environmental concern. Responses for certain statements were recoded so that all scores 1 to 5 express an increasing degree of pro-environmental concern. All hypotheses were tested at $\alpha = 0.05$. Data were analysed by descriptive statistics approach using SPSS version 13.

4.0 RESEARCH QUESTIONS & HYPOTHESES

This study attempts to answer the following research questions:

1. What is the level of primary school students' pro-environmental concern?
2. Does the pro-environmental concern among students differ across gender, state where the schools are located and between schools?
3. What is the impact of students' science achievement on their pro-environemtal concern?

The corresponding null hypotheses to these research questions were:

H1: The mean score of pro-environmental concerns is less than 3.66, referring to less favorable concern towards the environment

H2: There is no significant difference in pro-environmental concern between male and female students

H3: There is no significant difference in pro-environmental concern between students in Perak and Penang

H4: There is no significant difference in pro-environmental concern between the students in the eight schools

H5: Students' science achievement has no impact on their pro-environmental attitude.

5.0 RESULTS

Table 1 presents the means and standard deviations of each item on the modified NEP scale for children. The mean score for the sample was 35.03 with the lowest possible score of 10 and highest possible score of 50. The overall reliability of the 10 items in this scale was measured as Cronbach's alpha of 0.66. According to DeVellis (1991), the implied reliability of such Alpha coefficient was acceptable. The low value of the coefficient was largely due to small number of items in the modified NEP scale which consist of only 10 items (Pallant, 2011).

Table 2 shows the result of one sample t-test test for H1. Mean score of pro-environmental concern for the sample is 3.6631(SD=0.577), significantly more than 3.66 at $p < 0.001$. Table 3 shows the result of independent t-test for H2, indicating that there is no significance difference between boy and girl students in their pro-enviromental concern. Mean score of pro-environmental concern for boys is 3.72 (SD=0.61) and for girls is 3.61 (SD=0.57).

Table 1 Pro-environmental concern measured using modified NEP scale for

Item		Strongly disagree N (%)	Disagree N (%)	Not sure N (%)	Agree N (%)	Strongly agree N (%)	Mean (5=pro)	SD
1.	Plants and animals have as much right as people to live	6 1.7	19 5.5	44 12.6	132 37.9	147 42.2	4.14	0.95
2.	There are too many (or almost too many) people on earth	152 43.7	95 27.3	89 25.6	7 2.0	5 1.4	1.90	0.95
3.	People are clever enough to keep from ruining earth	24 6.9	44 12.6	119 34.2	119 34.2	42 12.1	3.32	1.06
4.	People must obey the laws of nature	6 1.7	15 4.3	53 15.2	124 35.6	150 43.1	4.14	0.95
5.	When people mess with nature it has bad results	23 6.6	31 8.9	68 19.5	107 30.7	119 34.2	3.77	1.20
6.	Nature is strong enough to handle the bad effects of our modern lifestyles	22 6.3	44 12.6	119 34.2	112 32.2	51 14.7	3.36	1.08
7.	People are supposed to rule over the rest of nature	24 6.9	31 8.9	33 9.5	101 29.0	159 45.7	3.98	1.24
8.	People are treating nature badly	53 15.2	89 25.6	101 29.0	65 18.7	40 11.5	2.86	1.22
9.	People will someday know enough about how nature works to be able to control it	12 3.4	19 5.5	104 29.9	99 28.4	114 32.8	3.82	1.06
10.	If things don't change, we will have a big disaster in the environment soon	22 6.3	30 8.6	85 24.4	89 25.6	122 35.1	3.74	1.20

Pro-environmental concern among students in Perak schools was measured to be 3.67 (SD=0.60) and Penang school students scored 3.65 (SD=0.59). Result of H3 testing was presented in Table 4, showing no significant difference in the mean score between Perak and Penang students. Table 5 shows the results of one-way ANOVA followed by Tukey HSD analyses comparing the mean score of pro-environmental concern between schools was carried out to test H4. These schools are national type government schools which use the same curriculum and national language as the medium of instruction. Result revealed that three schools scored significantly higher than the rest of the five schools in their pro-environmental concern.

Table 2 One-sample t-test for score of pro-environmental concern

	Test Value = 3.66					
	t	df	Sig.(2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
ProEnv Concern	-35.447	347	.000	-1.09678	-1.1576	-1.0359

Table 3 Independent t-test comparing mean score of boy and girl students

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Proenvironmental_Concern	Equal variances assumed	.319	.572	-1.724	346	.086	-.10939
	Equal variances not assumed			-1.713	326.104	.088	-.10939

Table 4 Independent t-test comparing mean score of Perak and Penang students

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Proenvironmental_Concern	Equal variances assumed	.027	.869	.265	346	.791
	Equal variances not assumed			.265	328.346	.791

Table 5 Tukey HSD post-hoc analyses of mean scores between schools

Proenvironmental_Concern

School		Subset for alpha = 0.05		
		N	t	2
Tukey HSDa,b	Perak A	58	3.2802	
	Penang A	37	3.4122	
	Penang B	59	3.4619	
	Perak B	31	3.5403	
	Perak C	38	3.5757	
	Penang C	33		3.9697
	Penang D	24		4.0625
	Perak D	68		4.1158
	Sig.		.167	.907

Means for groups in homogeneous subsets are displayed

H5 was tested with calculating Pearson correlation coefficient. As presented in Table 6, there was weak correlation between science marks and pro-environmental concern ($r = 0.291$, $p < 0.001$). Regression analysis showed that 8.5% variation in pro-environmental concern can be explained by science achievement as a predictor (Table 7). Based on Table 8, estimated regression equation can be written as:

Pro-environmental Concern = 3.159 + 0.01(science marks)

Table 6 Pearson's correlation coefficient between science performance and pro-environmental concern

		science marks	Proenvironmental_Concern
science_marks	Pearson Correlation	1	. 291**
	Sig. (2-tailed)		.000
	N	296	296
Proenvironmental_Concern	Pearson Correlation	.291**	1
	Sig. (2-tailed)	.000	
	N	296	348

**Correlation is significant at the 0.01 level (2-tailed)

Table 7 Regression analysis of science achievement and proenvironmental concern

Mo-del	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.291[a]	.085	.081	.55597	.085	27.170	1	294	.000

a. Predictors: (Constant), science_marks
b. Dependent Variable: Proenvironmental_Concern

Table 8 Coefficients for regression

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.159	.114		27.754	.000
	Science marks	.010	.002	.291	5.213	.000

a. Dependent Variable: Proenvironmental_Concern

6.0 DISCUSSION

Measurement of pro-environmental concern among children is important as posited in the theory of reasoned action (Ajzen, 1991). Pro-environmental concern forms part of the students' attitude that precedes behavioral intention, which in turn leads to action of the desired behaviour. In the context of environmental education, students' attitude is one of the determinants, other than subjective norms that may affect their decision regarding the consequences of engaging in environmental-friendly behaviour. Response to certain statements in the children NEP scale may reflect the attitudes that influence behaviorial intention. For example, students who strongly agree to 'Plants and animals have as much right as people to live' may be more readily available to commit to causes related to conservation and preservation of biodiversity. Similarly, students who are agreeable to 'When people mess with nature it had bad results' may be hesitant to encroach into hillside slope for

development when they grow up to be town planners. Taylor and Todd (1995) noted that attitude, along with subjective norm and perceived behavioral control all positively predicted behavioral intention. Flannery and May (2000) found attitude to be marginal predictor and subjective norm a significant predictor in managerial decision making on environmental ethical intentions.

Pro-environmental concern measured among primary school students in this study was found to be high. Thus we can expect these students to be environmentally responsible citizens when they assume socio-political roles in the future. Based on the theory of altruistic behaviour (Schwartz, 1977), these students are more likely to engage in altruistic behaviour when personal norms are activated. Positive environmental concern among these students may reflect their awareness for the need to be responsible for the environment, the potential positive consequences for maintaining a healthy environment and acceptance of responsibility to protect the nature.

Some research suggested that attitudes and beliefs could be the moderator between an individual's values and their pro-environmental behaviour (Karp, 1996; Thogersen & Grunert-Beckman, 1997). The values-beliefs-norms theory (Schwartz, 1994) proposed three factors that activate the norms of helping in pro-environmental behaviour, namely personal values, beliefs that these values are under threat and beliefs that these values can be restored through individuals' intervention. In this study, high pro-environmental concern/attitude forms a positive moderator for pro-environmental behaviour.

The favourable pro-environmental concern reported in this study could be attributed to successful infusion of environmental education in school curricular. The crucial role of teachers in the instruction of environmental education has been widely reported. Teachers need to have the necessary knowledge, cognitive skills and affective attributes to achieve the desired learning outcomes. According the Wilke (1985), teachers without the knowledge, skills and commitment to environmentalism their classroom lesson would not be able to produce students who are environmentally literate. Therefore teachers need to be equipped with the understanding of environmental concepts, awareness of environmental issues as well as the creativity to deliver the intended lessons (Lee, 1996; Than, 2001; Zak, 2005). Kunz (in Krantz, 2002) noted that teachers with good knowledge about the environment would have positive concern on the instruction of environmental education.

7.0 CONCLUSION

Pro-environmental concern among primary schools students was found to be high. There is no difference of pro-environmental concern between male and female students and between Penang and Perak students. However pro-environmental concern differed from school to school, probably owing to distinct school policies practised by school headmasters. School headmasters who emphasise on 'green policies' such as recycling campaign and trees planting may increase students' pro-environmental concern than headmasters who put greater emphasis on academic achievement. Effective education for sustainable development could be supported by school leadership that spur efforts and create conditions to help teachers and students to engage in building green schools (Leithwood & Riehl, 2003). As mentioned by Van Petegem & Blieck (2006), continuous educational support is crucial to prepare young people to grasp the nature of environmental problems and to be socially responsible for conservation of the environment.

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