ENVIRONMENTAL LITERACY OF TRAINEES FROM MALAYSIAN TEACHER EDUCATION INSTITUTE: THE AFFECTIVE AND BEHAVIOR COMPONENT

Nazifah Shaik Ismail [a], Turiman Suandi [b], Azizi Muda [c], Noriati A Rashid [d], Masitah Mohammad Yusof [e]

[a,e] Faculty of Environmental Studies, Universiti Putra Malaysia.
[b] Faculty of Education, Universiti Putra Malaysia.
[c] Department of Geography and Environment, Universiti Pendidikan Sultan Idris.
[d] Center of Academic Development, Institute Pendidikan Guru Malaysia, Cyberjaya, Selangor, Malaysia.
[a] Corresponding author: nazifah.si@gmail.com

 ISSN: 1923-6654 (print)
ISSN 1923-6662 (online). Available at http://www.ssrn.com/link/OIDA-Intl-Journal-Sustainable-Dev.html

Abstract: Education has been repeatedly highlighted as the primary means of developing an environmentally literate society. As agents of change, teachers themselves have to acquire desirable characteristics of the model environmentally literate citizen. Thus, this article aim to present the preliminary analysis of the affective and behavior component of environmental literacy of teacher trainees who have completed one year of training which includes environmental education course. The respondents were 244 teacher trainees enrolled under post-graduate program from 12 different campus of Malaysian Teacher Education Institute. This article descriptively reports the scores for the subsections of affective and behavior components of environmental literacy. The trainees demonstrated moderately high scores for all subsections of affective component of environmental literacy. However, scores for behavior component were only moderate and were low for some subsections. The trainees did not significantly differ in affective and behavior component of environmental literacy based on gender , race and educational background. Findings also indicate that there is a moderate association between the affective and behavior component of environmental literacy. The correlation of these components is also reported based on gender, race and educational background. These results shows that the intended objectives of environmental education program is not yet commendable and needs further attention, either in the form of revising the program structure or method of delivery.

Keywords: environmental education; environmental literacy; teacher training

INTRODUCTION

Working towards solving the present complex environmental problems is the responsibility of everyone in the world. Sustainable choices and actions can only be made by environmentally literate citizens. Being environmentally literate goes beyond knowing and understanding about the environment but also having the right values, attitude , awareness and skills to impart pro-environmental behavior individually or as part of a group (Goldman, Yavetz, & Pe'er, 2006; Pe'er, Goldman, & Yavetz, 2007). There is no universal definition of environmental literacy. Environmental literacy have been defined by various overlapping dimensions namely environmentally knowledge, sensitivity, attitudes, values, skills, personal responsibility and active involvement (Roth, 1992; UNESCO, 1980). Disinger and Roth (1992) have summarize these dimensions of environmental literacy into four separate elements of environment : knowledge (ecological concepts, environmental issues, and environmental action strategies), skills (environmental actions strategies), affect (values,

environmental sensitivity, environmental attitudes, locus of control), and behavior. Environmental literate citizens can only be developed and nurtured through sound environmental education (Coyle, 2005).

Education have repeatedly been highlighted as an effective change agent in a society. Education is expected to enhance knowledge, develop skill, create awareness and change the behavior of a community (Ajiboye & Ajitoni, 2008; Ifegbesan, Pendlebury, & Annegarn, 2009). Environmental literacy can only be inculcated through sound environmental education (Coyle, 2005). As agents of change, teachers have an implicit role in molding the future generation in becoming environmental steward (World Commission on the Environment and Development, 1987). Environmental education programs can only be effective if the teachers are truly ready in holding this extremely important responsibility. Teachers themselves have to have enough knowledge and understanding about the environment, hold the right values and attitudes, to make environmentally sound actions and decisions. In order for teachers to be able to make students feel that they have the power to promote environmental change, they have to believe that they can do the same (Pe'er, et al., 2007). Environmental education lead by environmentally literate teachers is hoped to be able to develop students with positive attitude towards the environment and can act responsibly in addressing the current environmental challenges. (Roth, 1992; UNESCO, 1980). Sufficient training is essential in preparing environmental literate teachers with the ability to construct and implement effective environmental education (Cutter-Mackenzie & Smith, 2003; Goldman, et al., 2006; McKeown-Ice, 2000). The increase awareness of the importance of environmental education have highlighted the lack of teachers who are adequately trained to implement environmental education effectively (Cutter & Smith, 2001; Knapp, 2000; McKeown-Ice, 2000; Pe'er, et al., 2007). Knapp (2000) emphasized that this issue is one of the most important issues of Environmental Education.

In Malaysia, environmental studies per say in not part of the national educational curriculum in schools. However, teachers are required to integrate environmental education in the curriculum through infusion approach by integrating environmental topics or issues within the subjects in the national curriculum. As part of the effort of the Ministry of Education in developing environmentally literate educator, teacher training institutes are required to incorporate environmental education as part of the training program . Presently in the Malaysian Teacher Education Institute, environmental education is a fifteen hours non examination but compulsory course for all trainees enrolled under the post-graduate level program known as *Kursus Perguruan Lepas Ijazah (KPLI).*

This article aims to explore the status of environmental literacy of the teacher trainees after the present training program. Assessing the environmental literacy of the trainees at different stages of the training program is important in improving and developing successful future programs (Goldman, et al., 2006). Only two components will be addressed in this paper which are the affective and behavior component of environmental literacy. Affective component of environmental literacy refers to environmental sensitivity and the development of a set of positive attitudes toward the environment (Iozzi & Marcinkowsi, 1990). This component is measured through attitudes towards the environment, individual locus of control and degree of personal responsibility towards the environment. Behavioral component of environmental literacy is described through responsible environmental behavior which refers to active participation of individuals in actions that relates to solving environmental problems and resolving environmental issues(Iozzi & Marcinkowsi, 1990). This component is measured through various actions such as ecomanagement, economic action, persuasion, political action, legal actions and others. The authors discuss the affective and behavior component of environmental literacy of the teacher trainees and their correlation with respect to different background factors.

METHODOLOGY

This preliminary study involves 244 teacher trainees from 12 Malaysian Teacher Education Institute located in various regions in Malaysia. The intention of this study is to explore the environmental literacy of the trainees under the present teaching and learning strategies specified by the current syllabus. . This study also explored the affective and behavior component of environmental literacy of the teacher trainees with respect to different background factors. The correlations between the two components were also discussed. The result of this study will serve as a preface of an experimental research that focuses on different teaching strategies on environmental literacy of the trainees.

Participants

The participants of this study are teacher trainees from post-graduate level teacher preparation program for university graduates with a bachelor degree or higher. This is a 1-year program where trainees are awarded teaching diplomas. Base on the demographic

and background data, the participants were classified according to gender, race and academic major of their first degree (Table 1). Since Malaysia in a multi racial country with three dominant race which is Malays, Chinese and Indians, the participants were classified into four groups (Malays, Chinese, Indians and others). Based on their first degree, the participants were also grouped into two groups namely science and non-science. The "science" group included participants who majored in science affiliated fields (geography, environmental sciences, forestry, engineering etc) where as the "non-science" group refers to participants who majored in non-science affiliated fields (social science, law, economic, language etc). Most of the trainees are females (65.6%) and Malays (62.7%) . The majority of the trainees' first degrees were from non-science related fields (63.1%).

Instrument

The Wisconsin Environmental Literacy Survey for High School Students was selected for this study. The questionnaire consist of four sections which includes demographic and background variables , affective variables, behavior variables and cognitive variables. However the discussion in this report will not include the cognitive component of environmental literacy. Various procedures were conducted to attain validity (Table 2) . These steps were essential to ensure that the instrument is suitable for the target population. Through back translation procedure, cultural adaptation was done by changing some proper nouns and concepts that were not suitable for the Malaysian culture and curriculum. Content Validation Index of each item based on the experts rating on the relevance of each item in representing the construct of interest was computed. All the values obtained for content validation index for each item fall within the range of "fair" to "excellent". The values obtained signified that all the items in the questionnaire are relevant and excellently represents each construct (Polit, Beck, & Owen, 2007). Construct validity was conducted using Confirmatory factor analysis. The following criteria was used for assessment of the goodness of fit for the environmental literacy model : x^2 goodness-of-fit index (GFI) >0.9, adjusted goodness-of-fit index (AGFI) >0.80 , Tucker_Lewis index (TLI) >0.90 ,Root Mean Square Error of Approximation (RMSEA) < 0.80 and non-significance of the x^2 statistical test. To satisfy these criteria, five items from the affective component were extracted from the questionnaire. The Cronbach's Alpha for the affective and behavior component of environmental literacy were determined to be .83 and .88 respectively. To ensure that the results reflected the trainees environmental literacy after one year exposure to the teacher-training program, the questionnaire were administered in the final week of the program.

Data Analysis and Results

PASW version 18 was used for all the analysis. Descriptive statistical analysis for the subtotal and total scores for both affective and behavior component were performed and will be discussed in this section. The mean scores and standard deviation for each subsection as well as the total score for both components were reported. These data is hoped to serve as point of reference for future studies as similar studies is very few in Malaysia. A preliminary assumption testing was conducted to check for normality and equality of variance and no violation was detected. Independent samples t-test analysis were conducted to compare the mean scores of affective and behavior component of environmental literacy for different gender and different educational background (science or non-science graduates). One-way ANOVA was used to compare the mean differences between different races. These comparisons were done for the mean scores of all subsections and total mean scores for both affective and behavior component of environmental literacy. Pearson correlation was used to determine the relationships between the affective component and the behavior component of environmental literacy.

Affective component

On the whole, the total mean scores for affective component of environmental literacy was relatively high where the trainees scored more than 73% of the total possible scores (Table 3). The mean score for subsection "Assumption of Personal Responsibility" fared best than the others by slightly exceeding 82% of the total possible score. The subsection with the lowest mean score is "Locus of Control" by attaining only slightly over 59% of the total score.

Results indicated that there was no significance difference in the mean scores for all the subsections in the affective component when compared between males (M=73.417, SD= 10.125) and females trainees [M=74.025, SD= 9.953 ; t (242) =-.451 , p= .653]. In the next comparison, the trainees were grouped base on the field of their first degree, either science affiliated or non-science affiliated fields (Table 4). Even though the mean difference between the group was not significant for the total score where the mean score for science (M =72.509, SD=9.620) and non-science trainees [M =75.386, SD=9.905; t (242) = -1.792 , p= .075], there were however two subsections that were significantly different.

Table 1 : Characteristics of research participants

	Male	Female	Race				First degree	
			Malay	Chinese	Indian	Others	Science	Non-Science
N	84	160	153	36	11	44	90	154
Percentage	34.4	65.6	62.7	14.8	4.5	18.0	36.9	63.1

Table 2 : Validation Process

Scope of Validation	Procedure
Translation validity	Back translation procedure
Content validity	Content Validation Index
Construct validity	Confirmatory factor analysis

Table 3 : Affective component of environmental literacy : Comparing between gender

Subsections of Affective component	Maximum Possible Score	Gender	***n***	***M***	***SD***	***t***	***df***	***p***
Environmental Sensitivity / Awareness	16	Male	84	12.566	2.274	-.247	242	.805
		Female	160	12.488	2.452			
Attitudes and Values for the Prevention and Remediation of Environmental Problems and Issues	56	Male	84	42.679	6.520	-.143	242	887
		Female	160	42.799	6.104			
Locus of Control	20	Male	84	11.738	2.711	-.583	242	.561
		Female	160	11.956	2.802			
Assumption of Personal Responsibility	8	Male	84	6.512	1.331	-1.152	242	.251
		Female	160	6.704	1.189			
Total score for affective components	100	Male	84	73.417	10.125	-.451	242	.653
		Female	160	74.025	9.953			

Table 4 : Affective component of environmental literacy : Comparing between science and non-science graduates

Subsections of Affective component	Maximum Possible Score	First Degree	***n***	***M***	***SD***	***t***	***df***	***p***
Environmental Sensitivity / Awareness	16	Science	90	12.068	1.973	-2.885	242	.004
		Non-science	154	13.040	2.102			
Attitudes and Values for the Prevention and Remediation of Environmental Problems and Issues	56	Science	90	42.610	6.430	-.742	242	.459
		Non-science	154	43.366	6.100			
Locus of Control	20	Science	90	11.424	2.568	-1.497	242	.136
		Non-science	154	12.099	2.855			
Assumption of Personal Responsibility	8	Science	90	6.407	1.220	-2.483	242	.014
		Non-science	154	6.881	2.854			
Total score for affective components	100	Science	90	72.509	9.620	-1.792	242	.075
		Non-science	154	75.386	9.905			

For the "environmental sensitivity / awareness" subsection, the mean score for science (M =12.068, SD=1.973) was significantly different from non-science trainees [M =13.040, SD=2.102; t (242) =-2.885 , p=.004]. For "Assumption of Personal Responsibility" subsection, the mean score for science trainees (M =6.407, SD=1.220) significantly differ from the mean score of non-science trainees [M =6.881, SD=2.854; t (242) =-2.483 , p=.014].

In the case of comparison between different race (Table 5), the ANOVA test revealed that there was also no statistical significant difference in the mean total score among the four race [F (3 , 240) =1.241 , p = .295] . The mean difference was too small and the p-value obtained is larger than the alpha value of 0.05. Nevertheless, significant difference in the mean score were detected for subsection "Environmental Sensitivity / Awareness" [F (3 , 240) =4.014, p = 008]. Post hoc comparisons using the Tukey HSD test indicated that the source of difference in mean score was between chinese trainees (M=11.472, SD=2.408) and trainees indicated as "others". (M =13.114, SD =2.335). It should also be noted that even though the mean scores for Indian trainees was the highest among the four (M =13.364, SD = 2.111), no significant difference was detected. This situation might be due to the small number of participants.

Behavior component. The data revealed moderate scores on the total behavior component of environmental literacy where the trainees scored slightly above 55% of the total score. The trainees mean score for "Ecomanagement" subsection was the highest in comparison to other subsections by scoring slightly exceeding 63% of the total possible score. The trainees failed to reach even one half of the total possible scores for "legal action" subsection by attaining only slightly above 27% of the total score.

When the mean scores were compared between different gender, educational background and race, no significant differences were detected either for the total scores or any of the subsections. In the case of the gender (Table 6), the total mean score for males (M =34.512, SD=9.915) did not differ significantly with the females trainees [M=36.616, SD=9.187; t (242) =-1.652, p=.100]. Similarly, there was also no significant difference in the mean scores for science (M =34.966, SD=9.613) and non-science trainees [M =36.267, SD=9.558; t (242) = -.829, p=.408] (Table 7). One-way ANOVA test revealed that there was also no statistical significant difference in the mean total score for behavior component of environmental literacy among the four race [F (3 , 240) =.091, p = .965] (Table 8).

Table 5 : Affective component of environmental literacy : Comparing between race

Subsections of Affective component	Maximum Possible Score	Race	***n***	***M***	***SD***	***F***	***df***	***p***
Environmental Sensitivity / Awareness	16	Malay	153	12.556	2.256	4.014	3,240	.008
		Chinese	36	11.472	2.408			
		Indian	11	13.364	2.111			
		Others	44	13.114	2.335			
Attitudes and Values for the Prevention and Remediation of Environmental Problems and Issues	56	Malay	153	43.177	6.079	.974	3,240	.405
		Chinese	36	41.417	6.742			
		Indian	11	43.364	3.828			
		Others	44	42.114	6.799			
Locus of Control	20	Malay	153	11.850	2.748	.332	3,240	.802
		Chinese	36	11.722	2.953			
		Indian	11	11.455	2.207			
		Others	44	12.205	2.833			
Assumption of Personal Responsibility	8	Malay	153	6.765	1.128	.802	3,240	.114
		Chinese	36	6.250	1.317			
		Indian	11	6.727	1.009			
		Others	44	6.477	1.517			
Total score for affective components	100	Malay	153	74.346	9.624	1.241	3,240	.295
		Chinese	36	70.861	10.900			
		Indian	11	74.909	7.259			
		Others	44	73.909	10.914			

Table 6 : Behavior component of environmental literacy : Comparing between gender

Subsections of Behavior component	Maximum Possible Score	Gender	***n***	***M***	***SD***	***t***	***df***	***p***
Ecomanagement	16	Male	84	9.905	2.740	-1.507	242	.653
		Female	160	10.396	2.230			
Economic Action	16	Male	84	9.417	2.897	-1.646	242	.101
		Female	160	10.031	2.699			
Persuasion	16	Male	84	7.988	2.999	-1.795	242	.074
		Female	160	8.717	3.015			
Political Action	8	Male	84	3.762	1.436	-.779	242	.437
		Female	160	3.912	1.425			
Legal Action	4	Male	84	.964	1.187	-.920	242	.358
		Female	160	1.113	1.206			
Others	4	Male	84	2.477	1.047	.218	242	.827
		Female	160	2.446	.985			
Total score for behavior components	64	Male	84	34.512	9.915	-1.652	242	.100
		Female	160	36.616	9.187			

Table 7 : Behavior component of environmental literacy : Comparing between science and non-science graduates

Subsections of Behavior component	Maximum Possible Score	Graduates	***n***	***M***	***SD***	***t***	***df***	***p***
Ecomanagement	16	Science	90	9.746	2.663	-1.785	242	.076
		Non-science	154	10.455	2.278			
Economic Action	16	Science	90	9.749	2.801	-.469	242	.640
		Non-science	154	9.960	2.792			
Persuasion	16	Science	90	8.339	2.934	-.560	242	.576
		Non-science	154	8.614	3.030			
Political Action	8	Science	90	3.661	1.295	-.742	242	.459
		Non-science	154	3.842	1.586			
Legal Action	4	Science	90	1.203	1.256	1.644	242	.102
		Non-science	154	3.842	1.586			
Others	4	Science	90	2.271	1.014	-1.512	242	.133
		Non-science	154	2.515	.965			
Total score for behavior components	64	Science	90	34.966	9.613	-.829	242	.408
		Non-science	154	36.267	9.558			

Table 8 : Behavior component of environmental literacy : Comparing between science and non-science graduates

Subsections of Behavior component	Maximum Possible Score	Gender	***n***	***M***	***SD***	***F***	***df***	***p***
Ecomanagement	16	Malay	153	10.255	2.488	.322	3,240	.809
		Chinese	36	10.167	2.118			
		Indian	11	9.545	2.382			
		Others	44	10.318	2.476			
Economic Action	16	Malay	153	9.804	2.693	1.497	3,240	.216
		Chinese	36	10.417	2.761			
		Indian	11	8.454	2.841			
		Others	44	9.659	3.019			
Persuasion	16	Malay	153	8.549	2.967	.170	3,240	.916
		Chinese	36	8.194	2.671			
		Indian	11	8.182	3.341			
		Others	44	8.409	3.460			
Political Action	8	Malay	153	3.863	1.391	.628	3,240	.598
		Chinese	36	3.833	1.424			
		Indian	11	4.364	1.501			
		Others	44	3.705	1.564			
Legal Action	4	Malay	153	1.072	1.193	.197	3,240	.899
		Chinese	36	1.028	1.133			
		Indian	11	1.273	1.348			
		Others	44	.977	1.267			
Others	4	Malay	153	2.438	.992	.520	3,240	.669
		Chinese	36	2.333	1.042			
		Indian	11	2.727	.904			
		Others	44	2.523	1.0672			
Total score for behavior components	64	Malay	153	35.980	9.350	.091	3,240	.965
		Chinese	36	35.972	9.019			
		Indian	11	34.546	10.520			
		Others	44	35.590	10.330			

Table 9 : Comparison of Correlation between affective and behavior component of environmental literacy by different demographic variables

Demographic Variables		Correlation
Gender		
	Male	.193
	Female	.367**
Graduates		
	Science	.452**
	Non-Science	.417**
Race		
	Malay	.328**
	Chinese	-.025
	Indian	.260
	Others	.515**

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

Correlation between environmental literacy components: Affective and behavior. Overall, there was a moderate and positive correlation between the two component of environmental literacy (r = .307, N = 244, p < .01). Further analysis revealed that there was a significant moderate correlation between the affective and behavior component of environmental literacy for female trainees but not for male trainees (Table 9). However for both science and non-science graduates, there was a significant moderate relationship between the two components. When the correlation analysis were conducted with respect to race, the authors finds a significant correlation between the two components only for Malay trainees (moderate correlation) and the "other" trainees (strong correlation).

DISCUSSION AND IMPLICATION

Recent literature suggest that among the factors that significantly influence environmental literacy are gender, academic major, grade level, and culture (Goldman, et al., 2006; Hunter, Hatch, & Johnson, 2004; Milfont & Gouveia, 2006; Moody, Alkaff, Garrison, & Golley, 2005). However, in the case of the trainees from the Malaysian Teacher Education Institute, based on the total mean scores, both the affective and behavior component of environmental literacy were not affected by background factors. The results suggest that there are no significance differences in both affective and behavior component of environmental literacy based on gender, educational background and race.

On the whole, the trainees revealed reasonably high scores on all subsections under the affective component except for "locus of control". The high total mean score of affective component of environmental literacy indicated that the trainees possess pro-environmental values and attitudes. Although the affective component of environmental literacy was fairly high, the behavior component of environmental literacy was only moderate. Previous related research also reported that relatively high concern towards the environment is not necessarily translated to environmentally oriented behaviors (Goldman, et al., 2006; Scott & Willits, 1994). Dunlap (1989) as cited in Scott & Willits (1994) suggested that individuals concern toward the environment may be weakened due to the increasing attention given by the government on the environmental issues that make them believe that the current situation is being taken care of . He further asserted that the public might only be willing to change when the actions require less commitment and sacrifices of personal comfort. Goldman, et al. (2006) reported that student teachers in Israel were more interested in environmental activities that require less commitment and have financial benefit such as resource-conserving actions. Another explanation would be that the positive environmental attitudes are not supported by environmental knowledge about consequences of individual behavior (Pe'er, et al., 2007). Pruneau, et al.(2006) reported that among the factors that may inhibit the environmental behaviors are time, fatigue and lack of

support and awareness from people around and the society as a whole. Kollmuss and Agyeman (2002) on the other hand, claimed than behavior can only be changed if the an individual is persistent enough the make the behavior a habit. Conversely, the high concern toward the environment might be due to normative influences where attitudes expressed are largely affected by social desirability (Acott & La Trobe, 2000; Schindler, 1999) rather than their true values. This can be extremely possible for profession that is value-laden such as an educator. Continuous national concern and media exposure on environmental issues may also be one of the factors that increase the awareness level (Goldman, et al., 2006). Blake (1999) pointed out that that there are three distinct barriers to action: individuality, responsibility and practicality. Individuality deals with the barriers that lies within a person and are closely related to attitude and temperament. On the other hand, "responsibility" is connected to "locus of control". "Practicality" is related to social and institutional constraints. Since the analysis of this study showed that "locus of control" was the lowest subsection in the affective component of environmental literacy, the authors assumed that "responsibility" might be the main barrier for the trainees to carry out pro-environmental behavior. The trainees might feel that their actions may not give any prominent effect to the environment.

The authors found a positive relationship between the affective and behavior component of environmental literacy. This relationship is found to be common in most studies (Kraus, 1995; Scott & Willits, 1994). In this study, however, when the relationship was tested based on different background factors, there was no significant relationship between affective and behavior component of environmental literacy for three groups namely the male, Chinese and Indian trainees.. Further research needs to be done to understand this situation. Pe'er, et al. (2007) asserted that the relationship between attitude construct and the behavior construct is complex and not essentially linear. Follow-up research needs to be conducted to better understand the variances in the results. In-depth interview or focus group discussion may lead to deeper understanding of the complex relationship between the affective and behavior component of environmental literacy.

There are countless gaps in the literature on teacher trainees' environmental literacy. Research addressing questions that are related to the preparation or training of teachers for environmental education is still limited (Pe'er, et al., 2007). More in depth study should be done to understand the complex phenomena of environmental literacy and the effects of other social variables on the relationship between the different component of environmental literacy. Periodic assessment at different stages of training program should also be conducted to better understand the development of environmental literacy. Possible impact of different instructional strategies and initiatives must also be explored (Negev, Sagy, Garb, Salzberg, & Tal, 2008). The data gathered in this report will serve as a guide for the subsequent experimental study in the aim of developing an effective training programs .

Acknowledgements

This research was supported by the Ministry of Education and Malaysian Teacher Education Institute. The authors extend their gratitude to all the Heads of Research and Development Department, Teacher Education Institute, for their assistance in conducting this study.

REFERENCES

[1] Acott, T. G., & La Trobe, H. L. (2000). A Modified NEP/DSP Environmental Attitudes Scale. *Journal of Environmental Education, 32*(1), 12-20.

[2] Ajiboye, J. O., & Ajitoni, S. O. (2008). Effects of Full and Quasi-Participatory Learning Strategies on Nigerian Senior Secondary Students' Environmental Knowledge: Implications for Classroom Practice. *International Journal of Environmental and Science Education, 3*(2), 58-66.

[3] Blake, J. (1999). Overcoming the 'Value--Action Gap' in environmental policy: tensions between national policy and local experience. [Article]. *Local Environment, 4*, 257.

[4] Coyle, K. (2005). *Environmental Literacy in America: What Ten Years of NEETF/ Roper Research and Related Studies Say About Environmental Literacy in the US* Washington, DC: National Environmental Education and Training Foundation.

[5] Cutter-Mackenzie, A., & Smith, R. (2003). Ecological Literacy: The "Missing Paradigm" in Environmental Education (Part One). *Environmental Education Research, 9*(4), 497-524.

[6] Cutter, A., & Smith, R. (2001). Gauging primary school teachers' environmental literacy : An issue of priority. *Asia Pacific Education Review, 2*, 45-60.

[7] Disinger, J. F., & Roth, C. E. (1992). Environmental Literacy. *ERIC/CSMEE*.

[8] Economic Planning Unit (1996). *Seventh Malaysia Plan 1996-2000*. Kuala Lumpur.

[9] Goldman, D., Yavetz, B., & Pe'er, S. (2006). Environmental Literacy in Teacher Training in Israel: Environmental Behavior of New Students. *Journal of Environmental Education, 38*(1), 3-22.
[10] Hunter, L. M., Hatch, A., & Johnson, A. (Writer) (2004). Cross-National Gender Variation in Environmental Behaviors [Article], *Social Science Quarterly (Blackwell Publishing Limited)*: Wiley-Blackwell.
[11] Ifegbesan, A., Pendlebury, S., & Annegarn, H. (2009). Forest People, Two Countries and One Continent: What Empirical Connections? *International Research in Geographical and Environmental Education, 18*(1), 45-56.
[12] Iozzi, I., & Marcinkowsi, T. (1990). Assessment of learning outcomes in environmental education. Methods and techniques for evaluating environmental education.
[13] Knapp, D. (Writer) (2000). The Thessaloniki Declaration: A Wake-Up Call for Environmental Education? [Article], *Journal of Environmental Education*: Taylor & Francis Ltd.
[14] Kollmuss, A., & Agyeman, J. (Writer) (2002). Mind the Gap: why do people act environmentally and what are the barriers to pro-environmental behavior? [Article], *Environmental Education Research*: Routledge.
[15] Kraus, S. J. (1995). Attitudes and prediction of behavior: A meta-analysis of the empirical literature. *Personality & Social Psychology Bulletin, 21*(1), 58.
[16] McKeown-Ice, R. (Writer) (2000). Environmental Education in the United States: A Survey of Preservice Teacher Education Programs [Article], *Journal of Environmental Education*: Taylor & Francis Ltd.
[17] Milfont, T. L., & Gouveia, V. V. (2006). Time perspective and values: An exploratory study of their relations to environmental attitudes. *Journal of Environmental Psychology, 26*(1), 72-82.
[18] Moody, G., Alkaff, H., Garrison, D., & Golley, F. (Writer) (2005). Assessing the Environmental Literacy Requirement at the University of Georgia [Article], *Journal of Environmental Education*: Taylor & Francis Ltd.
[19] Negev, M., Sagy, G., Garb, Y., Salzberg, A., & Tal, A. (2008). Evaluating the environmental literacy of Israeli elementary and high school students. *Journal of Environmental Education, 39*(2), 3-20.
[20] Pe'er, S., Goldman, D., & Yavetz, B. (2007). Environmental literacy in teacher training: Attitudes, knowledge, and environmental behavior off beginning students. *Journal of Environmental Education, 39*(1), 45-59.
[21] Polit, D. F., Beck, C. T., & Owen, S. V. (2007). Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research In Nursing & Health, 30*(4), 459-467.
[22] Pruneau, D., Doyon, A., Langis, J., Vasseur, L., Martin, G., Ouellet, E., et al. (2006). The Process of Change Experimented by Teachers and Students when Voluntarily Trying Environmental Behaviors. *Applied Environmental Education and Communication, 5*(1), 33-40.
[23] Roth, C. E. (1992). Environmental literacy : Its Roots, Evolution, and Direction in the 1990s. *ERIC/CSMEE*,
[24] Schindler, F. H. (1999). Development of the Survey of Environmental Issue Attitudes. *Journal of Environmental Education, 30*(3), 12-16.
[25] Scott, D., & Willits, F. K. (1994). Environmental attitudes and behavior. *Environment & Behavior, 26*(2), 239.
[26] UNESCO (1980). *Environmental Education in the Light of the Tbilisi Conference*.
[27] World Commission on the Environment and Development (1987). *Our common future*
[28] Oxford, England.