

EXPLORING ENVIRONMENTAL BEHAVIOURS, ATTITUDES AND KNOWLEDGE AMONG UNIVERSITY STUDENTS: POSITIONING THE CONCEPT OF SUSTAINABLE DEVELOPMENT WITHIN MALAYSIAN EDUCATION

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Movements such as the World Summit on Sustainable Development in Johannesburg (2002) together with the United Nations declaration of The Decade of Education for Sustainable Development (DESD), 2005-2014 should see the increasing need for reorientation of the role of education within the sustainability agenda. Malaysia, unlike other nations, does not have an explicit sustainability education program or even environmental education in place for its school-goers although programs dedicated towards raising awareness and experiences with nature have been carried out within school co-curricular activities and also by non-governmental agencies. An obvious orientation towards an environmental paradigm would indicate a positive inclination to adopt a more sustainable lifestyle and this could be a good starting point for educators to develop a curriculum dedicated to this cause. An understanding of the nature of environmental problems thereby is fundamental for any approach to addressing their solutions and this necessitates the documentation of Malaysian students' present level of environmental consciousness and understanding of related concepts. Thus, this paper discusses the findings of a survey on university students' level of environmental attitudes, behaviours and knowledge and its implications for education in the light of sustainable development.

Introduction

That the world is facing pressing environmental crises is a fact known to many, in and out of educational circles. Although much talk and effort towards resolving these problems have come and gone, the ecological degradation continues - some with irreversible damage to ecosystems. Many firmly believe that the root causes of environmental problems are the result of the nature of the current social, economic and political systems that supports and sustains a materialistic lifestyle of excessive consumerism (Fien & Trainer, 1993,). The Deakin-Griffith Environmental Education Project is one of many that responded to this challenge by rethinking the role of environmental education in promoting ecologically sustainable and socially just patterns of living in and organizing society (Fien, Robottom, Gough & Spork, 1993). Hence, the term 'sustainable development' emerged after acknowledging that the unsustainable pathway of the current lifestyle cannot be addressed by sidestepping the issue of social transformation needed.

The term 'sustainable development' has come to be commonly understood as:

Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs

(World Commission on Environment and Development, 1987, p. 43)

Ever since the Brundlant Commission Report (1987) published in *Our Common Future*, many have emphasized the important role that education has to play. Once again Gro Brundlant (1991) emphasized that:

Teachers play a very important role in the transition between generations, of the knowledge from one generation to the next. Consciousness-raising is vital for change. Teachers can convey to

children a sense of respect and responsibility for nature and for the global environment...(p.5)

From then on, movements such as the *World Summit on Sustainable Development* in Johannesburg 2002 together with the United Nations declaration of *The Decade of Education for Sustainable Development (DESD), 2005-2014* saw the increasing need for reorientation of the role of education within the sustainability agenda. Agenda 21 (UNCED, 1992) calls for education in every chapter. In Chapter 36 of Agenda 21, 'Promoting Education, Public Awareness and Training, it specifically identified four major thrusts:

1. Improving the quality of and access to basic education,
2. Reorienting the existing education to address sustainable development,
3. Developing public understanding and awareness, and
4. Training programs for all sectors

The Need for Education for Sustainable Development/ Sustainability

The Malaysian Ministry of Education formally introduced environmental education in 1983 through subjects such as Man and His Environment (*Alam Dan Manusia*) which was later (in 1994) changed to Science and Local Studies (*Sains dan Kajian Tempatan*) in primary schools and through geography and the sciences in secondary schools as well as pre-University studies. Overall, the environmental education in Malaysia is implemented with the focus on educating the society to be more sensitive and concerned about environmental issues, to be knowledgeable, skilled and committed in order to act as individuals or collectively in addressing environmental issues and this is done by way of the *infusion* approach. Despite these efforts there is still considerable apathy amongst Malaysians about being pro-actively engaged in

environmental issues and portraying responsible environmental behaviours and sensitivities. Incidences of Nature Club members leaving litter around after camping events are normal. Needless to say, a lot can still be done in order to build a future generation of Malaysians who possess a high level of environmental consciousness as a necessary ingredient for citizenry that can champion the path for a more sustainable future. An understanding of the nature of environmental problems thereby is fundamental for any approach to addressing issues of sustainability and this necessitates the documentation of Malaysian students' present level of environmental consciousness and understanding of related concepts.

Environmental Behaviours, Attitudes and Knowledge

With imminent changes taking place in the area of educational reforms and teacher education programs in the light of sustainable development, it is important that these new emphases and efforts do not miss their mark and are attained quickly and with minimal problems. Sterling (1993) reports that there have been numerous calls for social and behavioural changes by various agencies such as the IUCN, UNEP & WWF (1980, 1991) and the World Commission on Environment and Development (1987). Following this, many studies were conducted looking into learners' environmental behaviours (McKenzie-Mohr & Smith, 1999; Newhouse, 1991; Hungerford & Volk, 1990; Marcinkowski, 1989; Ramsey & Hungerford 1989).

To ensure success, the understanding of the target audience is critical with attitudes being a prime example. Though many studies (Kuhlemeier, Berg & Lagerweij, 1999; Clarke, 1996; Uitto, Juuti, Lavonen & Meisalo, 2004) have been carried out regarding a person's attitude as being a major motivator for behaviour almost none have been carried out in Malaysia. While Gough (2002) is critical of ever

reaching the state of sustainable development, he nevertheless argues that the role of learning in this aspect is about influencing the 'travelling' with this intention. He further argues for an education that will increase the value of the environment for the learners, in lieu of the belief that people tend to keep what they value. Knowledge and concepts about the environment as well as other elements are crucial to better understand and participate effectively and meaningfully in this 'journey'.

Objectives of Study

This study was carried with the following objectives to gather data that could serve as baseline data in order to assess the initial starting point of this very important journey. Specifically the objectives were:

1. To assess learners' level of environmental behaviours;
2. To assess learners' level of environmental attitudes which is composed of verbal and actual commitment;
3. To assess learners' level of environmental facts and concepts;
4. To determine whether learners in various groups of understanding the term 'sustainable development' show significant differences in their means for environmental behaviours and attitudes (verbal and actual commitment).

Methodology

The Instruments

This study utilizes three different constructs in a questionnaire that elicit students' responses towards items to assess their environmental behaviours, attitudes as well as knowledge on environmental facts and concepts.

The construct on behaviour items consists of 11 items used by Cuthill (1998) in his study on undergraduate students from a campus

of University of South Australia. Students had to respond to questions about their environmental behaviours and had to respond using either 'yes' or 'no'.

The attitude scale consists of 7 items measuring verbal commitments and 10 items measuring their commitments on things that they actually carried out. The attitude questionnaire was also taken from the study used by Clarke (1996) on Australian learners. The original items to assess the verbal commitment component of attitude were developed earlier by Maloney, Ward and Braucht (1975) and the actual commitment had both extracts from Maloney et al. (1975) as well as some from Yencken (1991). The scores are assessed separately so no overall attitude score will be produced.

Environmental knowledge was tested for both environmental facts (10 items) and environmental concepts (9 items) using the instrument used by Clarke (1996) on learners in Queensland, Australia. Scoring for each item was done by allocating one point for each correct answer giving a possible range of 0 to 19 for the overall Environmental Knowledge Score.

All three of these questionnaires originally developed in the English language were translated into *bahasa* Malaysia and back translated into the English language to ensure that the essence of the items was retained.

In addition to the items measuring environmental behaviours, attitudes and knowledge, the students were also required to respond to an additional item reading "How much do you think you know about the term Sustainable Development?"

The Sample

The Bahasa Malaysia version of the questionnaire was administered to the sample comprising of 615 undergraduate students in a university in Malaysia. Of these, 225 of them were registered to undertake a Science Education degree, 187 an Arts Education degree

and the rest of 203 students were registered for a basic degree in Housing, Building and Planning. The total sample therefore comprised 313 pre-service teachers who, upon graduating, were supposed to infuse environmental education or sustainability education into the Malaysian Secondary Curriculum.

Data Analysis

The data obtained through the questionnaire was analyzed using the Statistical Package for Social Science (SPSS) software version 12. Descriptive, simple correlation and t-test analysis were used.

Findings

Table 1 shows that 69.5% of the overall sample of undergraduates (N=615) professed to having ‘only a little’ or ‘no knowledge at all’ regarding the term ‘sustainable development’ with the rest professing having ‘a fair amount’ and ‘a lot’. However, this item did not in any way require the respondent to state or give an acceptable definition of the term. The term ‘sustainable development’ however is a common enough word and may have been used rightly or wrongly among schoolchildren and even among those doing undergraduate courses.

Table 1
Students Responses to the Item, “How Much Do You Think You Know About ‘Sustainable Development’”? (N=615)

	Frequency	Percent
No knowledge at all	129	21
Only a little	299	48.5
A fair amount	179	29.1
A lot	8	1.4

Tables 2 and 3 show some examples of items found in the Environmental Knowledge Scale with Table 2 showing factual items and Table 3 showing the conceptual questions. Table 4 shows an overview of the overall Environmental Knowledge Scale which comprises scores from both the factual and conceptual questions.

Clearly it can be seen from the means attained, that students' level of factual knowledge was middling with a mean of only 5.96 from a possible maximum of 10. They however, displayed greater performance on the conceptual questions attaining a mean of 6.64 from a possible 9 points. The values of the Standard Deviation also showed that they did not deviate much from the means.

Table 2
Example of Factual Items and Frequency of Correct Response (N=615)

Item	Frequency	% correct
Which of the following does not decompose in sea water? (plastic bag)	440	71.5
Do you think mercury has most often been found at unacceptable amount in: (seafood)	298	48.5
Which of the following do you think is responsible for the build up of most of the lead in our atmosphere? (cars industry)	212 (270)	34.5 (43.9)
Most of the radiation to which people are exposed is due to: (natural sources vs. medical)	191 (172)	31.1 (28.0)

Table 3
Example of Conceptual Items and Frequency of Correct Response (N=615)

Item	Frequency	% correct
Do you think ecology is best described as the study of: (the relationship between organisms and the environment)	385	62.6
Do you think the "Greenhouse Effect" is best described as: (the warming of the Earth's atmosphere by build up of gases, preventing re-radiation and heat loss)	504	82
Living things are interdependent on one another and with their environment (true)	606	98.5
Natural resources are equally distributed with respect to land areas and political boundaries (false)	400	65

Table 4
Overview of Scores on Environmental Knowledge Scales (N=615)

	Theoretical Range	Sample Range	Mean	SD
Factual Scale	0 -10	2 - 10	5.96	0.001
Conceptual Scale	0 -9	2 - 9	6.64	0.001
Environmental Knowledge Scale	0 -19	4 - 19	12.61	0.001

When asked to respond to statements regarding their verbal commitment, the students showed a very positive attitude towards being pro-environment as attested in the items in Table 5. The frequency values with asterisks show pro-environmental responses and are markedly higher than those responding negatively.

Table 5
Examples of Verbal Commitment Items and Student Responses (N=615)

	% Agree	% Disagree	% Not Sure
Even if it was inconvenient I'd be willing to ride a bicycle or use public transport in order to reduce air pollution	45.9 *	30.4	23.7
I don't think I'd ever join a group or club concerned solely with environmental issues	10.9	64.6*	24.6
I'd be prepared to go from house to house to distribute literature on the environment	46.7*	16.3	37.1
I wouldn't go out of my way to do anything about ecology or pollution because that is the Government's job	2.9	88.9*	8.1

When required to respond to statements regarding actual commitments, the students' displayed a different stand altogether. From Table 6, with the exception of the statement 'I have never joined a cleanup drive', the other statements depicting pro-environmental responses (values with asterisks) were decidedly much less in frequency count when compared to their verbal commitment. Even the statement 'I have never joined a cleanup drive' could be seen to have a high frequency of 'No' responses because this activity is constantly being carried out in schools and as such could not be seen to be a strictly voluntary effort.

Table 6
Examples of Actual Commitment Items and Student Responses (N=615)

	% Yes	% No
I have contacted a community body to find out what I can do to help protect the environment	19.2*	80.8
I have attended a meeting of an organisation specifically concerned with protecting the environment	47.0*	53.0
I have never joined a cleanup drive	28.6	71.4*
I subscribe to environmental publications	49.3*	50.6

Table 7 shows some examples of students' current environmental behaviours. Students were found to be conscientious about not wasting water as 91.1% of them turn off the water when brushing their teeth. Quite a high percentage of them (63.4%) regularly recycle their garbage but only a small portion of them (24.1%) confessed to have made an effort regarding attending meetings that discuss conservation or environmental issues.

Table 7
Examples of Environmental Behaviours Items and Student Responses (N=615)

	% Yes	% No
I turn off the water while brushing my teeth	91.1	8.9
I regularly recycle my garbage	63.4	36.6
I keep close track of some environmental issues through the newspaper / TV / radio	50.4	49.6
I have attended a meeting discussing conservation or environmental issues	24.1	75.9
I have voluntarily joined in a 'Clean up' day	51.1	48.9
I have sought out information to find out what I can do to minimize pollution	52.0	48.0

When correlational analyses were done to find out the kinds of statistical relationships that exist between the variables, it was interesting to note that ‘actual commitment’ showed a fairly strong relationship with ‘environmental behaviours’ with a correlational value of .438** which was statistically significant (see table 8). A weaker but statistically significant relationship of .288** was also found between ‘verbal commitment’ and ‘environmental behaviours’. From this analysis, however, it was found that ‘environmental behaviours’ did not have any statistical relationship with the amount of factual or conceptual knowledge of the students.

Table 8
Correlational Analyses

	Verbal Commit- ment	Actual Commit- ment	Environ- mental Behaviours	Factual Knowledge	Conceptual Knowledge	Total Knowledge
Verbal Commit- ment	1.00					
Actual Commit- ment	.154**	1.00				
Environ- mental Behaviours	.288**	.438**	1.00			
Factual Knowledge	.036	.076	.035	1.00		
Conceptual Knowledge	.074	.021	-.031	.373**	1.00	
Total Environ- mental Knowledge Scores	.065	.057	.003	.840**	.816**	1.00

Correlation is significant at the 0.01 level

Lastly, Table 9 attempts to compare the scores for ‘verbal commitment’, ‘actual commitment’ as well as scores for ‘environmental behaviours’ for two groups of respondents categorizing themselves as having either ‘little or no knowledge’ and ‘fair amount to very high ‘ understanding of the term ‘sustainable development’. Using the independent sample t-test it was consistently found that for all three scores, the group that categorized themselves as possessing ‘fair amount to very high’ understanding of the term ‘sustainable development’ scored higher and have mean values to be significantly higher than those professing to have only ‘little or no knowledge’.

Table 9
T- Tests and Mean Scores of Verbal and Actual Commitment and Environmental Behaviours for Two Groups of Students (N=615)

	Mean	Df	t	Significance
<u>Verbal Commitment</u>				
Little/No knowledge	14.32	613	-3.245	.001
Fair to very high	15.12			
<u>Actual Commitment</u>				
Little/No knowledge	18.87	613	-3.842	.000
Fair to very high	19.84			
<u>Environmental Behaviour</u>				
Little/No knowledge	15.94	613	-5.100	.000
Fair to very high	16.97			

Significant at 0.05 level

Discussion

The results show that undergraduate students studying at the university did not possess a particularly high level of environmental factual knowledge (mean value of 5.96, maximum score is 10). They however showed better understanding of environmental concepts (mean value of 6.64, maximum score was 9) which was also reflected

by Clarke's (1996) sample on Australian schoolchildren. This could be due to the current educational emphasis on concepts rather than on facts as suggested by Clarke.

The undergraduates displayed a mean score of 16.15 in their environmental behaviours from a possible maximum of 22 points reflecting moderately strong environmental behaviour patterns. From the correlational analyses, environmental behaviours did not have any statistical relationship with both environmental knowledge and environmental concepts indicating that responsible environmental behaviours were not governed by the amount of knowledge regarding the environment. Environmental behaviours do however show a moderately strong statistical relationship (.438**) with actual commitments and a slightly weaker relationship (.288**) with verbal commitments. This suggests that commitments, which in this study are actually components of environmental attitudes, serve as a better indicator of environmental behaviours rather than knowledge.

Finally, data from Table 9 indicated that respondents claiming to have 'fair to very high' understanding of the term 'sustainable development' consistently displayed higher mean scores on actual and verbal commitments and the overall environmental behaviour scores than those professing to know 'little or no knowledge'. This question, unlike the questions on environmental knowledge, was given as a perception question and did not in any way require the students to elaborate on the meaning of the term neither were they asked to define it. At first glance, this finding appears to be in contrast with the lack of statistical relationship found between environmental knowledge and environmental behaviours. It has to be remembered that the environmental knowledge questions are comprised basically of scientific facts and concepts. The concept of 'sustainable development' however departs from a purely scientific/ environmental science domain by its inclusion of both economics

and social/culture perspectives. A more in-depth treatment of this question would no doubt enrich the findings of this study.

The findings from this study remarkably support the sociological model for analyzing pro-environmental behaviour by Fietkau and Kessel (cited in Kollmuss & Agyeman, 2002). They used sociological as well as psychological factors to explain pro-environmental behaviour or lack of it. In this model, knowledge does not directly influence behaviour but acts as a modifier of attitudes and values as was realised by the results of this study (see Appendix). This factor seemed to suggest that the current practice of disseminating environmental knowledge passively as in lectures are not effective methods when rising to the challenge of educating for sustainability.

Conclusions

The findings of this study established some baseline data regarding the undergraduates' knowledge of environmental issues as well as their willingness to engage in pro-environmental behaviours. Students with strong pro-environmental attitudes were more likely to show greater ecological disposition even though their communicated willingness to take action may actually be less than their actual actions. These data are important to determine the take-off ground when accepting the challenges for educating for a sustainable future and consequently impacting on the curriculum. More innovative methods for teaching need to be considered especially those that position learners in an actual context of a sustainability issue which requires them to take action plans and be in direct engagement. Teacher education especially in the university should now take on a new dimension apart from its usual lecture style approach since it possesses the strategic importance in having the multiplier effect. An effective teacher education curriculum has the potential to impact many future teachers thus ultimately reaching a far greater number of students (Powers, 2004).

The evidence suggests that there needs to be a systematic planning of curriculum reforms or changes with a focus to promote greater understanding of our environmental predicament. Students need to be equipped with the knowledge of action strategies, need to understand the intricacy of problems involved and more importantly to sensitize them to the root causes of an unsustainable future.

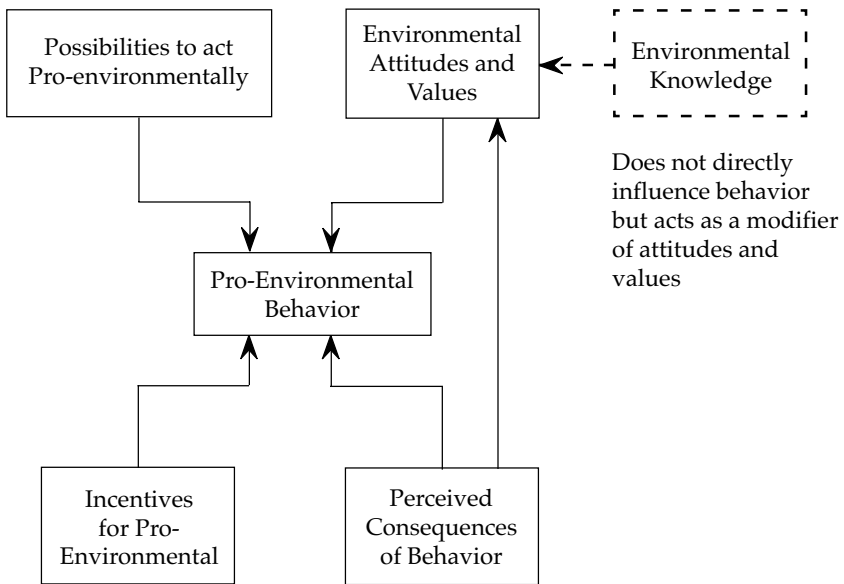
REFERENCES

- Brundlant Commission Report (1987). *Our common future*. Oxford: Oxford University Press.
- Brundtland, G. H. (1991). Foreword. In Benedict, F. (ed.), *Environmental education for our common future: A handbook for teachers in Europe* (pp. 4-5). Oslo: Norwegian University Press.
- Clarke, B. (1996). Environmental attitudes and knowledge of Year 11 students in a Queensland high school. *Australian Journal of Environmental Education*, 12, 19-26.
- Cuthill, M. (1998). Exploring the concept of education for a sustainable world: Report of work in progress. *Australian Journal of Environmental Education*, 14, 49-56.
- Fien, J. & Trainer, T. (1993). Education for sustainability. In J. Fien (ed.), *Environmental education: a pathway to sustainability* (pp. 11-23). Geelong: Deakin University and Griffith University.
- Fien, J., Robottom, I., Gough, A., & Spork, H. (1993). Foreword. In J. Fien (ed.), *Environmental education: a pathway to sustainability* (pp. vii-xii). Geelong: Deakin University and Griffith University.
- Gough, S. (2002). Increasing the value of the environment: a 'real options' metaphor for learning. *Environmental Education Research*, 8(1), 61-72.
- Huckle, J. (1996). Teacher education. In Huckle, J. and Sterling, S. (eds) *Education for Sustainability*. London: Earthscan.
- Hungerford, H. R. & Volk, T. L. (1990). Changing learner behavior through environmental education. *The Journal of Environmental Education*, 21(3), 8-21.

- IUCN, UNEP & WWF (1980). *World conservation strategy*, IUCN, Gland, Switzerland.
- IUCN, UNEP & WWF (1991). *Caring for the earth: A strategy for sustainability*. Gland, Switzerland: IUCN.
- Kollmuss, A. & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239-260.
- Kuhlemeier, H., Van Den Bergh, H. & Lagerweij, N. (1999). Environmental knowledge, attitudes, and behavior in Dutch secondary education. *The Journal of Environmental Education*, 30(2), 4-14.
- Maloney, M. P., Ward, M. P. & Braucht, G. N. (1975). A revised scale for the measurement of ecological attitudes and knowledge. *American Psychologist*, 30, 787-790.
- Marcinkowski, T. J. (1989). An analysis of correlates and predictors of responsible environmental behavior. *Dissertation Abstracts International* 49(12): 3677-A
- McKenzie-Mohr, D. & Smith, W. (1999). *Fostering sustainable behavior: an introduction to community-based social marketing*. Gabriola Island, Canada: New Society Publishers.
- Newhouse, N. (1991). Implications of attitude and behavior research for environmental conservation. *The Journal of Environmental Education*, 22(1), 26-32.
- Powers, A. L. (2004). Teacher preparation for environmental education: Faculty perspectives on the infusion of environmental education into preservice methods courses. *The Journal of Environmental Education*, 35(3), 3-11.
- Ramsey, J. M. & Hungerford, H. R. (1989). The effects of issue investigation and action training on environmental behavior in seventh grade students. *The Journal of Environmental Education*, 20(4), 29-34.
- Sterling, S. (1993). Environmental education and sustainability: a view from holistic ethics. In J. Fien (ed.). *Environmental education: a pathway to sustainability*. Geelong: Deakin University and Griffith University.

- Tilbury, D., Coleman, V. & Garlick, D. (2005). *A national review of environmental education and its contribution to sustainability in Australia: School education*. Canberra: Australian Government Department of the Environment and Heritage and Australian Research Institute in Education for Sustainability (ARIES).
- Uitto, A., Juuti K., Lavonen, J. & Meisalo, V. (2004). Who is responsible for sustainable development? Attitudes to environmental challenges: A survey of Finnish 9th grade comprehensive school students. Paper presented at the Annual Symposium of the Finnish Mathematics and Science Education Research Association, Finland. [online] Available: <http://www.ils.uio.no/english/rose/publications/english-presentations.html>
- UNCED (1992). *Agenda 21, the United Nations programme of actions from Rio*. New York: UN Department of Public Information.
- World Commission on Environment and Development (1987). *Our common future*. Oxford: Oxford University Press.
- Yencken, D. (1991). *Survey of urban and environmental issue*. Melbourne: School of Environmental Planning, The University of Melbourne.

APPENDIX



Model ecological behavior (Fietkau & Kessel, 1981 cited in Kollmuss & Agyeman, 2002).