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Author(s)	Tan Geok-Chin Ivy, Christine Kim-Eng Lee and Goh Kim Chuan
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A Survey of Environmental Knowledge, Attitudes and Behaviour of Students in Singapore

Tan Geok-Chin Ivy, MOE

Christine Kim-Eng Lee & Goh Kim Chuan, National Institute of Education, Singapore

INTRODUCTION

In 1992, at the Earth Summit in Rio de Janeiro, Singapore presented the Singapore Green Plan (Ministry of Environment, 1992a) which defined the goals and strategies for sustainable development and for turning the vision of Singapore as a 'Model Green City' into reality. The plan also spelt out the need for Singapore to become "a city with high standards of public health, with clean air, land, water and a quiet living environment; a city conducive to gracious living, with people who are concerned about and take a personal interest in the care of both the local and global environment; and a city that will be a regional centre for environmental technology" (Ministry of Environment, 1993:10).

In the Singapore Green Plan, environmental education was identified as crucial for the building of an environmentally pro-active society. "It is through knowledge and awareness that positive values and attitudes emerge; values and attitudes that will prompt action to make the adjustments to lifestyles and consumption habits that will reduce the burden we place on the environment" (Ministry of Environment, 1993:13).

Against this background of growing interest in environmental education, a survey was conducted to find out the existing level of environmental knowledge, attitudes and behaviour of a sample of students in Singapore. It is fundamental to know how much the students already know, how they feel and what they are doing regarding environmental matters.

The need for such information has been recognized in other countries (Towler & Swan, 1972; Perkes, 1973; Eyers, 1975; Bohl, 1976; Richmond, 1976) as they would be useful for better planning, organization and implementation of environmental programmes and projects. In addition, the information can provide educators with some insight into the curriculum content of environmental education.

REVIEW OF LITERATURE

Several countries have collected information on a nation-wide scale concerning school students' knowledge and attitudes toward environmental issues. Blum in 1987 reviewed five such nation-wide studies on the knowledge and beliefs of ninth- and tenth-grade students on environmental issues. These studies were conducted in the United States (Perkes, 1973; Bohl, 1976), Australia (Eyers, 1975), England (Richmond, 1976) and Israel (Blum, 1984). The survey questionnaire was used as a means of collecting information about students' knowledge and attitudes about environmental issues.

Since then several other countries have conducted similar types of environmental inquiry. In the Dominican Republic, Roth and Perez (1989) surveyed the environmental knowledge and attitudes of twelfth-grade students; in the Philippines, Cortes (1991) surveyed the

environmental knowledge, comprehension, responsibility, and interest of the secondary level students and teachers; and in Singapore, Lau (1992) conducted a pilot survey to find out the extent of environmental knowledge and commitment of school children. These three studies were conducted in less technologically developed countries. In the United States, Manning (1992) conducted a study similar to his predecessors.

Lau's (ibid) study on environmental knowledge and commitment of school children showed that students' performance in the knowledge section of the survey was very poor. Students fared better in their commitment to environmental protection. However, these findings cannot be taken at face value for several reasons. The sample was small ($n = 455$) and unrepresentative as it sampled schools according to their geographical distribution in Singapore. The study reported in this paper is an attempt to redress some of these methodological limitations.

METHODOLOGY

The survey questionnaire has four sections. Section A measures the students' level of understanding of environmental facts, concepts and generalizations; Section B measures students' attitudes towards the environment; Section C measures the frequency with which they had performed a given list of environmental tasks; Section D includes questions to find out the students' perception of the most serious environmental problems in the world and locally in Singapore, their perception of their source of environmental knowledge and their perception of environmental protection responsibility. Items for the questionnaire were primarily derived or modified from the pool of items used in the other nation-wide studies mentioned in the previous section.

Environmental concerns highlighted at an exhibition during Clean and Green Week in 1993 (The Straits Times, 1993, October 6, 14, 21 & 29, November 25 & 29) provided a focus for the selection of items for the questionnaire. These environmental concerns are categorised under land, air, water, noise, nature conservation and global concerns. "Environmental knowledge" refers to the knowledge and understanding of facts, concepts and generalizations related to the "environmental concerns". "Environmental attitudes" deal with the affective domain, evaluating whether the students agree or disagree, are favourable or unfavourable, with regard to aspects of the environment. "Environmental behaviour" refers to the overt and observable actions taken by a student in response to the environment.

The questionnaire was pilot tested on a total of 316 students from two secondary schools and one junior college. The reliability of the instrument was assessed by deriving the cronbach alpha and the reliability coefficients of Sections A, B, and C are 0.87, 0.73 and 0.57 respectively.

The sampling procedure for the study was divided into two parts. First, there was a stratified selection of schools based on three strata: above average, average and below average schools. The next part of the sampling procedure was to select intact classes within the schools. At least three classes of students in secondary three (grade 10, aged 15) from each secondary school and a representative sample of the first-year students, JC1, (grade 12, aged 17) were selected. The total sample size was 1,256, of which 902 were secondary three student and 354 JC1 students. 43.2% of the respondents were males and 56.4% were females and 0.4% students did not state their gender.

RESULTS AND DISCUSSION

Students' Environmental Knowledge

Table 1 reports the frequency of response (as percentage) to each item in the knowledge section of the questionnaire. The mean knowledge score was 16.3 (70.9%) and the standard deviation was 3.9. The students had the highest mean score in the generalization subtest (mean = 78.0%, standard deviation = 1.2), which was then followed by conceptual subtest score (mean = 68.8%, standard deviation = 1.7) and lastly, the factual subtest score (mean = 68.0%, standard deviation = 1.8). A brief discussion of the students' responses to the knowledge items is being organized in terms of the environmental concerns as specified in the study.

Land (items 1, 2, 3, 4, 5, and 6) :

This environmental concern consisted of items on waste, energy and natural resources. Students had a good level of knowledge on sources of waste, concept of renewable resources, importance of solar energy and the effect of burning fossil fuels for the generation of power (more than 70% correct response rate). The item with the lowest mean score was item 3 which tested students' knowledge of the type of fuel mainly used to generate electrical energy in power plants in Singapore. Only 33.5% of the students got the right answer.

Air (items 7, 8, 9, 10, 11 and 12) :

The students' level of knowledge on air pollution and related issues was high. All six items had correct response rates of more than 70%.

Water (items 13 and 14) :

A good number of the students (74.8%) could identify 'oil tanker operation' as the major source of oil pollution in the oceans. For the other item in this category, only 59% could correctly understand the effect of decaying wastes on marine lives.

Noise (items 15 and 16) :

A high proportion of the students (81.5%) could understand that rapid urbanization, industrial development and increase in vehicle population would increase the noise level. However, only 54.9% of the students understood the cause of sonic booms. A high percentage of students (22.3%) indicated that they did not even know the answer.

Nature (items 17, 18 and 19) :

68.7% of the students correctly chose 'over-hunting by man' as the reason for the near extinction of certain species of whale. Less understood (55%) was the item on mercury poisoning and contamination of fish. However, 80.1% of the students correctly stated that the best way for humans to relate to nature is to co-exist with nature by understanding and protecting it.

Global (items 20, 21, 22 and 23) :

This category includes items on environmental issues that have more global implication like acid rain, deforestation, greenhouse effect and ozone depletion. The students' understanding of these environmental problems was generally lower. 67.9% of the students could correctly identify sulphur dioxide as the main cause of acid rain. The effects of deforestation were only understood by 58.3% of the students. Equally less understood (57.5%) was the cause of the greenhouse effect. The importance of ozone was better understood by 73.7% of the students.

In general, in the analysis of students' environmental knowledge, the mean knowledge score in the present study is higher than those reported in several of the nation-wide environmental studies reviewed. The relatively lower mean factual knowledge subscore was, however, consistent with the other nation-wide studies. For example, in the United States (Perkes, 1973; Bohl, 1976), England (Richmond, 1976) and Israel (Blum, 1984), the students were reported

to have responded poorly in the knowledge items and in particular, the factual knowledge items. The overall correct response rates were less than 50% for the factual knowledge score and a little over 60% for the students' understanding of environmental concepts. The higher mean environmental knowledge score of Singapore students can be explained by the greater exposure our students have to environmental information on pollution (land, air, water and noise) either through the mass media or through related subjects taught in the school curriculum.

Students' Environmental Attitudes

Table 2 provides a summary of the students' responses (in percentages) to the attitude items. The mean attitude score was 42.9 or 66.0% with a standard deviation of 5.2. Further discussion of the students' responses is based on the environmental concerns.

Land (items 24, 25, 26 and 27) :

There was a strong awareness among students of the effect of waste disposal on the oceans and the intricacy of the ecological interdependence in the oceans (83.5%), limited resources on earth (72.4%) and the responsibility of everyone for nature conservation (79.4%). Somewhat weaker was the students' agreement (50.4%) to only allow people to own cars with low petrol consumption.

Air (items 28, 29 and 30) :

There was a high proportion of agreement (71.6%) that 'controls should be placed on industry to protect the environment from pollution, even if it means that things will cost more'. A little less strong was the students' agreement that there is a need to decrease the use of cars to help control pollution and crowding (59.7%) and strong controls by the government are the most effective way to reduce pollution problems (57.5%).

Nature (items 31, 32, 33 and 34) :

There was a strong consensus (80.8%) that 'humans must live in harmony with nature in order to survive'. Somewhat weaker was the students' agreement with the statements that 'when humans interfere with nature, it often produces disastrous consequences' (45.6%) and that 'plants and animals exist primarily to be used by humans' (56%). Likewise only about 54% objected to the fact that 'humans have the right to modify the natural environment to suit their needs'. Hence, it seemed that the students on the whole had less positive attitudes about human's relationship with nature.

Global Issues (items 35 and 36) :

Students appeared to have positive attitudes towards global environmental issues. Both the items regarding conservation of forests (81.2%) and depletion of ozone layer (85.4%) elicited high levels of agreement.

Generally, the students had a moderately positive attitude towards the environment. The mean environmental attitude score of the entire sample was 66.0%. This result is quite similar to the studies done in England (Richmond, 1976) and in Israel (Blum, 1984) where the mean environmental attitude score were 60% and 63% respectively.

Although the level of environmental attitudes of the students was found to be moderately positive, there are certain areas of concern. It was observed that the students' attitudes tended to be strongly positive for environmental concerns which did not have a direct bearing on their lives such as waste disposal in the oceans, the conservation of forest and ozone depletion. Both Perkes (1973) and Bohl (1976) also observed that the students' responses in their own studies were positive on the environmental items which were more general in

nature. Bohl (1976) expressed the concern that such positive responses to the general environmental questions might be “learned responses”.

On the other hand, the responses were least favourable when the environmental concerns were more specifically related to their lives. Perkes (1973) also concluded that the responses became inconsistent when the items required a transfer of that general positive attitude to a more specific personal situation. This was most evident for two of the items in the study which were related to the use of cars (item 25 : to only allow people to own cars with low petrol consumption; and item 29 : the need to decrease the use of cars). Owning a car is every Singaporean’s dream. The newspaper, when highlighting the blueprint for a better land transport system in the nation, stated that “Singaporeans will continue to want to own cars because the private vehicle is flexible, comfortable, and confers status on the owner” (The Straits Times, 1996, January 4).

The other group of items with weaker consensus was those related to the relationship of people with nature. One reason for the weaker consensus in this area is probably the minimal contact the students have with nature. In a small and highly urbanized nation where natural reserves are quite limited, coupled with the need for the students to meet the demands of the pressure in school, many students have forgotten to take time off to be with nature and to appreciate it. Wee (1993) examined the attitudes of Singaporeans towards wildlife and wilderness areas in urban Singapore and stated that to most Singaporeans, nature means “greenery (the manicured kind) and animals that are safely in cages”. Savage (1995) pointed out that the children in Singapore live an unnatural life and that their total recreation is found within the built landscape. Hence, eco-education should re-equip them to understand better the natural world and build a relationship with nature.

Environmental Behaviour

Table 3 provides a summary of the frequency of response to each item in the behavioural section. Minimum possible score on the environmental behaviour scale is 11 and maximum possible score is 44. The students’ environmental behaviour score ranged from a minimum of 19 to a maximum of 44. The mean score was 31.0 or 70.5% with a standard deviation of 4.0. For a more meaningful discussion, the items are divided into two groups : those which measure consumer behaviour and those which measure general environmental behaviour.

Consumer Behaviour (items 37, 38, 39 and 45)

Since the 1980s, the emergence of ‘green consumerism’ has brought a new awareness of the environmental impact of shopping. Both the nature and volume of consumption by the individual should be investigated. The focus is also extended to the consideration given to the amount of packaging involved. Students’ consumer behaviour was measured in terms of the frequency they had reused items; chose products with the GreenLabels; bought products with less packaging; and checked if the aerosols they bought contained chlorofluorocarbons (CFCs).

The survey indicated that for each item, less than 50% of the students showed that they had always engaged in green consumerism. For example, only 36.3% of the students had never bought aerosol products without first checking whether they contained CFCs. Less than 20% of the students surveyed always reused items such as glass bottles. Similarly, less than 20% of them always chose products with the GreenLabels. About half of them only stated that they had sometimes reused products (50.3%) and had been conscious of selecting products with the GreenLabels (53.4%). The students were even less mindful of the amount of packaging of the products they had bought. Only 8.7% would never buy products with lots of packaging.

General Environmental Behaviour (items 40, 41, 42, 43, 44, 46 and 47)

The students' general environmental behaviour was measured in terms of their responses to littering; saving paper, electricity and water; using less of private transport and air conditioning; and attending environmental exhibitions.

The most frequently practiced positive environmental behaviour was saving electricity. About 61% of the students surveyed had always turned off the lights when they were not needed. The next positive environmental behaviour more frequently engaged by the students was saving paper. About 44% of the students had always kept papers which were printed on one side so as to write on the other side. A similar percentage of students had never used the air conditioner when they slept.

The students' responses to the other items would cause some concern. Only 30.7% of the students had never littered even when nobody was watching them. It was also found that less than 20% had always taken shorter showers in order to save water. It was most alarming to find that only 2.6% of the students had attended environmental exhibitions often.

Students' Perception of Sources of Knowledge

The responses to the source of environmental knowledge as perceived by the students are shown in Table 4. 'Reading of newspapers, magazines and books' accounted for the highest response (37.5%) followed by 'general education at school' (30.7%) and 'radio and television' (16.2%). It seemed that most of the students in JCI and secondary three perceived that their main sources of environmental knowledge were from out-of-school sources especially through the media (newspapers, magazines, radio and television) as opposed to within-school sources. Only a fairly small percentage of students selected 'special environmental courses at school' (3.4%) and 'attending talks and exhibitions' (5.7%) as their main source of environmental knowledge. The results provide a good indication of the importance of the media as a source of environmental knowledge.

Television, newspaper and magazine coverage of environmental problems and issues has escalated significantly over the past few years. The importance of media and out-of-school learning in enhancing environmental knowledge has been reported in several studies (Eyers, 1975; Richmond, 1976; Blum, 1984; Ostman & Parker, 1987; Brothers, Fortner & Mayer, 1991; Hausbeck, Milbrath & Enright, 1992). Richmond (1976) reported that 48.1% of the students chose private reading, the radio and television as their main source of environmental knowledge whilst only 31.5% chose general education at school. Special environmental courses at school were also believed to have made little impact. In Eyers' study (1975), 40.1% of the students chose the within-school learning through general education as well as special courses at school as their main source of environmental knowledge compared to 59.9% who chose the out-of school sources through the media. Hausbeck, Milbrath and Enright (1992) also reported that a majority of the eleventh-grade students surveyed in New York State chose electronic media and print media as their main source of environmental information. The importance of the media on environmental knowledge, concern and behaviour was also elicited in Ostman and Parker's study (1987). Brothers, Fortner and Mayer (1991) found that television news programmes about the environment had increased significantly the public's knowledge level of the environment and hence concluded that the media format can be an effective way to educate the public about the environment.

Students' Perception Of The Most Serious Problems

Fifteen common environmental problems were listed for the students to select what they would perceive to be the most serious problem in the world and in Singapore; and the problem which they think they are most concerned with personally. The frequency of responses (in percentage) is shown in Table 5.

It is interesting to note that the problems the students perceived as the most serious globally and locally were different. The top two most serious problems in the world as perceived by the students were ozone depletion (41.6%) and global warming (17.8%). These problems are more related to the changes and deterioration of the physical environment. Locally, however, rubbish disposal was perceived to be the most serious problem in Singapore (17.7%) followed by land use (17.4%). Unlike the previous case, these are the more societal-generated problems and are also more directly related to the lives of the students. The two problems stem out primarily from the nation's small and limited land area. In terms of the students' personal environmental concerns, 20.5% chose ozone depletion as their main concern. This was followed by their concern over public health (15.3%).

This concern for the societal-generated problems instead of the problems of the physical environment within the country was similar to that found in England (Richmond, 1976). From a list of eight environmental problems, the most serious environmental problem indicated by the students in England was overcrowding followed by crime. Evers (1975) compared the responses to the perception of the seriousness of environmental problems in the community of the tenth-grade students in his study in Australia with the responses of the tenth-grade students in Perkes' study (1973) in the United States. Out of a list of four environmental problems (pollution, crime, land use and traffic accidents), the students in the United States were more concerned with pollution and crime while the Australian students were more concerned with pollution and traffic accidents both in the community as well as in the nation.

Students' Perception Of Environmental Responsibility

Table 6 provides the percentage and rank order of the students' responses in the perception of environmental responsibility. Ninety percent of the students perceived that everybody should be responsible for the protection of the environment. Only 4.2% selected the government as being solely responsible for the protection of the environment. The National Council on the Environment (NCE)¹ which was set up by the government and comprising distinguished members from both the private and public sectors, was only considered by 3.9% of the students to be the most responsible organization in environmental protection. An even smaller proportion of the students considered the Nature Society and business organizations to be most responsible for the protection of the environment.

The consensus is that no one single body or institution should be solely responsible for environmental protection but everybody, that is the government, the NGOs, and the public should all play a part in environmental protection. The 1990 and 1991 Clean and Green Week post-campaign evaluations also revealed that 88% and 80% of the respondents respectively indicated that everybody should be responsible for the protection of the environment (Ministry of Environment, 1990 and 1992b). Only a small percentage perceived that the Government (4.2%), the National Council on the Environment (3.9%) and the Nature Society (1.5) should be most responsible for environmental protection. The Government has stated in the Singapore Green Plan that the building of environmental consciousness should involve not only the schools but the environmentally committed organizations and businesses as well.

Environmental NGOs would have a bigger role to play in the building of environmental consciousness in the population and in protecting the environment. The increasing importance of NGOs like the Nature Society and the National Council on the Environment is highlighted in Mekani and Stengel (1995).

CONCLUSION

Some of the findings in the present study may be of interest to educators and have implications for curriculum development in environmental education in Singapore. The study suggests that though the students sampled had high environmental knowledge scores, there are certain areas they did not seem to have adequate information. For example, the type of fuel used in the power plants in Singapore; mercury poisoning of fish; sonic booms; and the effects of deforestation and greenhouse effect. These areas and their related issues should be especially addressed in the school curriculum. Particular attention should be placed on developing the students' level of factual environmental knowledge which is relatively lower than their understanding of concepts and generalizations.

It was also found that the students seemed to have less positive attitudes especially from their responses to the items which had more direct influence on the students' lives such as the issue on cars. Their attitudes towards nature also need further evaluation. Curriculum developers and educators should emphasize the affective domain of environmental education. Attitudes should not be learned responses. Therefore, there is a need to stress that environmental activities in schools should be designed to incorporate the affective domain.

Majority of the students surveyed in the present study were not 'green consumers'. The Green Labelling Scheme in Singapore started in May 1992. So far the categories of products under the Green Labelling Scheme are also quite limited. Existing GreenLabel products include paper and stationery; alkaline batteries; energy-efficient lighting and some aerosol products. The Green Labelling Scheme should be extended to include more categories of products in the market. Much can also be done in school and through the media to convey the message that the individual can be environmentally responsible just by playing their part when they make a purchase. The students indicated a poor response toward attending environmental exhibitions. As much as possible they should be encouraged to attend exhibitions, if not, to set up their own mini-environmental exhibitions in their schools.

The study also provided a good indication of the importance attributed to the media, both printed and electronic media, as an important source of environmental knowledge as perceived by the students. Both the electronic and printed media should therefore be used more intensively to facilitate the transmission of environmental information and promote more positive environmental attitudes. Lim (1995) provides a good description of the roles played by the media in disseminating environmental news in Singapore.

Although schools and special environmental classes in schools were not perceived as important sources of the students' environmental knowledge, the role of the schools should not be overlooked. Blum (1984) stated that while the media could be used effectively in focusing the attention on the problem, the schools are more effective in presenting the facts behind the complex environmental situations and educating students to analyze situations, identify factors, clarify values, weigh alternatives and suggest feasible solutions. Perhaps

future studies should consider the evaluation of the effectiveness of the infusion of environmental education in the existing subjects taught in schools.

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Table 1 : Frequency of Responses (as percentage) to each Option of Knowledge Items

Item : Paraphrase of question	Option					no response
	1	2	3	4	don't know	
1. Which activities produce most solid wastes in Singapore?	72.2*	11.6	1.8	10.0	4.2	0.2
2. Which is likely to be the most important world-wide source of energy for the future?	75.6*	3.6	13.7	1.7	5.2	0.2
3. Which type of power plant provides the most electrical energy in Singapore?	14.5	24.5	33.5*	14.3	12.3	0.9
4. Which source of energy contributes the least to environmental problems?	75.0*	6.7	4.2	10.1	3.8	0.2
5. Which is a renewable resource?	15.6	5.0	3.0	71.7*	4.4	0.3
6. What is the effect of burning coal and oil?	0.9	3.3	4.9	87.8*	2.9	0.2
7. Which is the major air pollutant (by weight) discharged by motor vehicles?	81.4*	4.9	7.9	2.9	2.9	-
8. Which are the major sources of air pollution in big cities?	1.4	1.9	92.4*	3.7	0.6	-
9. Why is carbon monoxide a serious air pollutant?	80.3*	15.1	1.2	1.2	2.0	0.2
10. Which is the cause of an increase in carbon dioxide in the atmosphere?	80.2*	5.4	5.9	2.4	6.0	0.1
11. Which is the main reason for the improvement in air quality in Singapore?	1.1	10.9	9.5	73.3*	4.9	0.3
12. Which statement is true about air pollution?	12.8	3.8	4.9	72.9*	5.4	0.2
13. Which is the major source of oil pollution in the oceans?	8.8	74.8*	9.8	3.2	3.2	0.2
14. Why are fishes killed when wastes are thrown into water bodies?	28.9	3.7	3.1	59.0*	5.0	0.3
15. When are sonic booms caused by aircrafts?	6.6	13.4	54.9*	2.4	22.5	0.2
16. Which does not contribute to an increase in noise levels?	6.7	4.1	81.5*	4.5	3.1	0.1

Table 1 : continued

Item : paraphrase of question	Option					no response
	1	2	3	4	5	
17. Which is the cause of endangering species of whales?	9.7	15.6	2.7	68.7*	3.0	0.3
18. Which is the cause of contamination of fish?	6.1	55.0*	18.6	8.4	11.7	0.2
19. How should humans relate to nature?	80.1*	2.8	2.7	7.8	6.5	0.1
20. Which increases the acidity of rain?	20.4	6.0	1.3	67.9*	4.3	0.1
21. Which is the effect of deforestation?	1.8	16.7	20.4	58.3*	2.6	0.2
22. Which caused the 'greenhouse effect'?	57.5*	4.9	9.1	22.2	6.1	0.2
23. Which statement about the ozone is not true?	73.7*	6.7	5.5	5.0	8.7	0.4

* denotes correct response

Table 2 : Summary of Responses (as percentages) to each Option of Attitude Items

Item : paraphrase of question	Option					no response
	SD	D	N	A	SA	
24. disposal of waste in the oceans	83.5*	9.4	2.4	1.0	3.7	-
25. ownership of cars with low petrol consumption	3.7	10.6	35.3	39.3	11.1*	-
26. only the government's responsibility in conservation of natural resources	34.2*	45.2	13.8	4.1	2.5	0.2
27. earth is like a spaceship with limited room and resources	4.8	8.1	14.4	41.3	31.1*	0.3
28. control of industry to protect the environment	4.0	6.4	17.9	42.7	28.9*	0.1
29. decrease the use of cars	4.5	8.2	27.4	41.1	18.6*	0.2
30. strong control by the government to reduce pollution problems	2.5	12.6	27.2	41.4	16.1*	0.2
31. humans interference with nature and its disastrous consequences	4.4	14.7	35.0	30.5	15.1*	0.3
32. plants and animals to be used by humans	24.8*	31.2	27.7	12.7	3.2	0.4
33. humans must live in harmony with nature	4.1	5.3	9.6	34.2	46.6*	0.2
34. humans have the right to modify the natural environment	23.5*	30.0	29.9	10.6	5.8	0.2
35. conservation of the remaining forest	3.1	4.1	10.7	32.4	48.8*	0.9
36. we are responsible for the depletion of the ozone layer	3.1	4.0	7.2	40.4	45.0*	0.3

- response indicating positive environmental attitudes

Table 3 : Summary of Responses (as percentages) to each Option of Behavioural Items

Item : paraphrase of question	Option				no response
	never	seldom	sometimes	always	
37. reuse items	10.4	24.8	50.3	14.5*	-
38. choose products with green labels	7.1	20.9	53.4	18.6*	-
39. buy products with lots of packaging	8.7*	45.8	38.1	6.9	0.6
40. litter when nobody is watching	30.7*	41.2	22.8	5.3	0.1
41. keep papers printed on one side, so as to write on the other side later	5.3	14.4	35.8	44.3*	0.2
42. turn of the lights when not in use	2.2	5.9	30.3	61.4*	0.2
43. driven around in a private car	22.4*	32.4	33.6	11.5	0.2
44. take shorter showers	7.7	20.9	52.5	18.7*	0.2
45. buy aerosols without checking whether they contain CFCs	36.3*	28.4	23.9	11.1	0.3
46. use air-conditioner while sleeping	42.3*	19.2	17.9	20.4	0.2
47. go to environmental exhibitions	24.7	43.4	29.2	2.6*	0.1

- response indicating positive environmental behaviour

Table 4 : Percentage and Rank Order of the Most Important Source of Environmental Knowledge

Source	Total sample %	rank	<u>Secondary three</u> %	rank	<u>JCI</u> %	rank
General education at school	30.7	2	31.2	2	29.7	2
Special environmental courses at school	3.4	5	3.8	5	2.5	4
Attending talks and exhibitions organized by other organizations	5.7	4	7.0	4	2.5	4
Radio and television	16.2	3	17.7	3	12.4	3
Reading of newspapers, magazines and books	37.5	1	34.1	1	46.0	1
Talking with parents and friends	2.5	6	2.7	6	2.0	6
Others / no response	4.0	-	3.5	-	4.9	-

Table 5 : Percentage of Responses to the Most Serious Environmental Problem

Environmental problem	most serious in the world	most serious in Singapore	most concerned with personally
land use	0.8	17.4*	1.5
traffic accident	1.0	9.2	2.6
over-crowding	1.5	9.6	2.9
poverty	4.4	1.0	6.5
public health	4.1	2.4	15.3*
air pollution	7.4	13.9	10.8
water pollution	1.3	1.0	2.9
noise pollution	0.2	3.0	4.1
rubbish disposal	3.0	17.7*	3.8
resource depletion	8.3	4.8	4.0
deforestation	6.7	0.9	6.4
ozone depletion	41.6*	3.1	20.5*
global warming	17.8*	6.4	11.9
acid rain	1.2	0.9	0.6
vandalism	0.3	8.3	5.2
no response	0.5	0.6	0.9

* the top two most serious problems chosen by the students

Table 6 : Percentage and Rank Order of Students' Responses to Perception of Environmental Responsibility

	<u>Total sample</u>		<u>Secondary three</u>		<u>JCI</u>	
	%	rank	%	rank	%	rank
Government	4.2	2	3.8	3	5.4	2
Business organization	0.2	5	0.2	5	0.3	5
National Council on the Environment	3.9	3	4.3	2	2.8	3
Nature society	1.5	4	1.6	4	1.4	4
Everybody	90.0	1	90.1	1	89.8	1
no response	0.1	-	-	-	0.3	-