

Education and Environmentalism: Ecological World Views and Environmentally Responsible Behaviour

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Introduction

Concern for the environment has traditionally been associated with youth. Studies in the USA over the past twenty-five years have consistently shown that environmental concern declines with age (Buttel, 1979; Van Liere and Dunlap, 1980; Lowe, Pinhey and Grimes, 1980; Lowe and Pinhey, 1982; Honnold, 1981, 1984; Mohai and Twight, 1987; Arcury and Christianson, 1990). Just why this is so has been a matter of some dispute; the 'aging' hypothesis suggests that it is due to the socio-biological aging process; the 'cohort' hypothesis points to the differential influence of important historical events on birth cohorts, particularly in their formative years; and the "period" hypothesis proposes that both of these processes can be over-ridden as all age cohorts adapt to changing social, cultural and economic circumstances. Both the 'cohort' hypothesis (Mohai and Twight, 1987; Samdahl and Robertson, 1989) and the 'period' hypothesis (Honnald, 1984) have received some support.

A recent study in Australia (Blaikie, 1992) has offered some support for the 'cohort' hypothesis but has shown that the relationship between age and Ecological World View (environmental attitudes) is curvi-linear rather than linear. The strongest commitment to an Ecological World View (EWV) is to be found in a middle-aged cohort; younger cohorts hold a middle position and older cohorts have the lowest level of commitment. It would appear that this middle-aged cohort was influenced in its youth by the earlier wave of environmental concern in the 1970s, and it has either maintained this level of concern, or had it revived in the more recent wave. Today's younger generation has not reached this same level of concern, perhaps because of the differences in socio-economic climate between the 1970s and the present, and their greater susceptibility to the effects of the current recession.

This same study has demonstrated that, compared with people generally, university students, on average, are no more committed to an EWV, are no more active in or supportive of environmental groups, and do not exhibit a higher level of environmentally responsible behaviour (Blaikie, 1992; Blaikie and Ward, 1992). This raises some interesting questions about the extent to which education is influencing the environmental commitment and action of the current cohort of students, and about the relationship between environmental commitment and action.

Environmental attitudes, concern and behaviour

Over the past fifteen years, particularly in the United States, considerable research has been devoted to the nature of environmental attitudes and concern, and to their distribution in the population. The tradition established by Catton and Dunlap and their associates has conceptualised environmental and related attitudes as 'world views' or 'paradigms' (Catton and Dunlap, 1978a, 1978b, 1980; Dunlap, 1980; Dunlap and Van Liere, 1978, 1984). In particular, these authors have defined and developed a scale for measuring what they have called the 'new environmental/ecological paradigm' in which humans are seen to be exceptional within but interdependently involved in the global ecosystem.

A variety of variables have been used to explore the socio-demographic bases of 'environmental concern': age, social class (income, education, occupation), residence, political partisanship, political ideology, and gender. (See Van Liere and Dunlap, 1980 for a review of this research between 1968 and 1978, and the studies cited above for more recent research) However, little attention has been given to the socio-demographic correlates of the 'new ecological paradigm'.

This US research has produced conflicting results on the relationship between gender and environmental concern (Van Liere and Dunlap, 1980; McStay and Dunlap, 1983; Blocker and Eckberg, 1989; Samdahl and Robertson, 1989; Arcury and Christianson, 1990). Australian data indicate that women of all ages are only marginally more committed to an EWV than men (Blaikie, 1992).

The extent to which a commitment to an EWV is associated with environmentally responsible behaviour is a complex matter. Building on two decades of research in the Netherlands, Nelissen and Scheepers (1992) found a positive but only modest association between 'ecological consciousness' (appreciation of the natural environment, willingness to take action and to make sacrifices for the environment) and 'ecological behaviour' (recycling, not consuming non-ecological products, reducing energy consumption and avoiding relying on cars for transportation). In examining a number of measures, including 'avoiding buying environmentally damaging products', 'recycling' of paper, glass, cans and plastic, and 'support for environmental groups', Blaikie and Ward (1993) found level of commitment to an EWV to have the strongest association with avoidance of damaging products, followed by support for environmental groups. There was only a weak association with recycling.

The study

This paper reports some results from the student sub-sample of this Australian study (Blaikie, 1992; Blaikie and Ward, 1992) which has addressed five research questions:

- 1 To what extent is an Ecological World View adopted?
- 2 How extensively is environmentally responsible behaviour practiced?
- 3 What is the level and type of involvement in environmental groups?
- 4 To what extent does EWV relate to environmental behaviour?
- 5 What are the socio-demographic bases of an ecological as against a dominant world view, and of environmentally responsible behaviour?

Question 1 and the first part of Question 5 have been discussed in Blaikie (1992), and Questions 2 to 4, and the second part of Question 5, have been discussed in Blaikie and Ward (1993) with regard to the combined sample. This paper addresses Questions 1 to 4, and two additional questions, with the student sub-sample:

- 6 What type of students are most likely to adopt an EWV and practice environmentally responsible behaviour?
- 7 What role does education play in the type of EWV students adopt and in their environmental behaviour?

The student sub-sample consists of two parts. The first was a random sample of all students who took classes in the Context Curriculum¹ at the Royal Melbourne Institute of Technology in the first semester of 1989. Twenty-four classes, each with an enrolment of between 20 and 25 students, were selected by a 1 : 8 systematic sampling procedure from the 162 classes offered in the on-campus mode. The population of students in these classes was approximately 4,000. A questionnaire was distributed in class and was collected in the following class, or delivered by respondents to a number of collection points on campus. The response rate was approximately 40 per cent.²

The second part was a quota sample using the students' faculty-affiliation and gender as selection criteria. Interviewers were required to interview one student from each of the six faculties, to achieve a gender balance, and not to interview any student who had completed a questionnaire. The response rate was almost 100 per cent. The data for both parts of the sub-sample were collected in a four week period in May, 1989. By coincidence, the number in each part of the sub-sample was 195, giving a total of 390.

Description of the samples

The student sub-sample consisted of 47 per cent females and 53 per cent males, with a mean age of 20.8 (ranging from 18 to 52). The majority (93 per

cent) were full-time under-graduate students; 37 per cent were in their first year of study, 34 per cent in their second year, 16 per cent in their third year, and the remaining 13 per cent had been studying for four or more years. On all the major variables, and particularly on the measure of EWV, the distributions on the two parts of the student sample are almost identical. Hence, they have been combined for the analysis.

Ecological World View Scale

EWV is measured by a 24 item scale composed of items drawn from a number of scales that had been used in the US and Britain. In some cases, the wording was modified to suit the Australian context. Five Likert response categories were used, ranging from 'strongly agree' to 'strongly disagree', and these were weighted from 1 to 5 in the direction that gave the highest score to a commitment to an EWV. (See Appendix for a list of the items and mean scores, and Table 1 for a distribution of the scores) Six of the items (a, e, g, k, u, v) came from the Dunlap and Van Liere (1978) 'New Environmental Paradigm' scale; six items (c, f, i, m, n, s) came from their 'Dominant Social Paradigm' scale (1984); and eight items came from the Richmond and Baumgart (1981) scales (b, h, l [modified], p, q, r [modified], t, w).

Table 1: Ecological World View Scale

| Categories | Scores | n | % |
|--------------|-----------|------------|------------|
| Very High | (110-118 | 13 | 3 |
| | (100-109 | 63 | 16 |
| High | 90-99 | 135 | 35 |
| Moderate | 80-89 | 116 | 30 |
| | (70-79 | 48 | 12 |
| Low | (61-69 | 14 | 4 |
| TOTAL | | 389 | 100 |

Mean = 90.3; standard deviation = 10.8

The scale was tested for uni-dimensionality in the total (student and community) sample using factor analysis (principal component, varimax rotation). The unrotated matrix produced a strong general factor with loadings on all items ranging from 0.66 to 0.32; all but four items (f, i, n, s, x) had loadings greater than 0.40. Three of these latter items (f, n, s) formed the only other unrotated factor. The oblique transformation produced seven multi-item sub-scales with factor loadings of at least 0.40. All 24 items have been used to form the EWV Scale. (See Blaikie (1992) for a discussion of the factor analysis, the use of the seven sub-scales, and the relationship between these sub-scales and those in previous studies)

Results

Environmentally responsible behaviour

The extent to which environmentally responsible behaviour was practiced by these students is assessed in two ways: by identifying products which they try to avoid using or buying, because of their detrimental effects on the environment; and the extent to which glass, aluminium cans, paper and plastic containers are recycled. A large majority (80 per cent) said they try to avoid using or buying environmentally damaging products. Five main categories of products were identified: those containing Cfc's; those made of non-biodegradable materials; those containing toxic materials; those which use scarce resources as raw materials (e.g., rain forest timbers, endangered animals) or that require excessive packaging; and those associated with machines that use non-renewable energy and/or emit pollutants. The Cfc issue had clearly gained a high level of acceptance due to publicity about its role in the depletion of the ozone layer. It is on this issue that the highest level of environmental awareness is to be found in this sample. (See Table 2)

Table 2: Avoidance of environmentally dangerous products

| Product | Try to avoid | |
|---------------------------------|--------------|----|
| | n | % |
| Contain Cfc's | 295 | 76 |
| Non-biodegradable | 94 | 24 |
| Toxic | 48 | 12 |
| Made from scarce resources | 29 | 7 |
| Use fossil fuels and/or pollute | 22 | 6 |
| Other | 17 | 4 |

Opportunities for recycling materials such as paper, glass, aluminium cans and plastic containers is largely dependent on whether household collections are organised by the city councils which make up the Melbourne Metropolitan area, or on whether other neighbourhood collection points are available. In recent years, opportunities for collection have increased but the capacity of manufacturers to cope with increased volumes has varied from time to time. In addition, not all students have domestic responsibility for dealing with household waste. Therefore, responses to questions about recycling behaviour reflect both the desire and the opportunity to do so. With these considerations in mind, students were asked how frequently ('regularly', 'occasionally', 'never') they recycled four categories of material, and they were also given the opportunity to indicate whether they avoid using them ('do not use').

Paper and glass are the most commonly recycled materials, with two-thirds (67 per cent) of the respondents doing so either 'regularly' or 'occasionally'. Nearly half (46 per cent) responded in these two categories for cans but only a fifth (20 per cent) for plastic containers. For subsequent analysis, a recycling scale has been produced by weighting the responses to each material as follows: 'do not use' = 3; 'regularly' = 2; 'occasionally' = 1; and 'never' = 0.³ Scores range from 0 to 12. For some analysis the scores have been collapsed into five categories: 'Very high' (8-12); 'High' (6,7); 'Moderate' (4,5); 'Low' (2,3); and 'Very low' (0,1).

Support for environmental groups

There is a popular conception that many students are environmental activists. Respondents were asked about the extent to which they supported any environmental groups concerned with either the natural or built environments. Only 7 per cent indicated that they offer regular support, 26 per cent responded 'occasionally', and 67 per cent responded 'never' (n=388). Six categories were offered as a means of assessing the form of the support: financial (17 per cent), voluntary work (6 per cent), attending meetings (8 per cent), being on committees (2 per cent), participating in demonstrations (11 per cent), just moral support (31 per cent), and other forms (3 per cent). A second measure of support was created by summing the number of forms of support: 'High' = two or more forms of support (18 per cent); 'Moderate' = one form (27 per cent); and 'Low' = no forms (55 per cent).

It is evident from these data that the level of support for environmental groups is rather limited. Very few students are actually involved in any movement and only a handful are committee members. However, about a quarter say they offer some kind of financial support and there is a relatively high level of moral support. The latter would indicate some potential for involvement. However, given the generally low level of involvement in voluntary association in Australia, these data are not surprising.

Ecological World View and environmental behaviour

EWV shows positive linear associations with the various measures of environmental behaviour. (See Table 3) Almost all (99 per cent) of students with 'Very High' EWV scores avoid using or buying environmentally damaging products compared with 48 per cent with 'Low' scores. The strongest association⁴ is with the Avoid Products Scale; 71 per cent of students with 'Very High' EWV scores identified two or more products, while 51 per cent with 'Low' scores identified no products; the overall sample percentages are 35 and 20, respectively. There are moderate associations with the two measures of Support for Environmental Groups; 20 per cent with 'Very High' scores (sample = 8 per cent) say they support these groups 'regularly', and 39 per cent with the same scores offer 'two or more' forms of support (sample = 18 per cent). In contrast, 89 per cent with 'Low' scores say

they 'never' support these groups (sample = 66 percent) and 87 per cent offer no forms of support (sample = 55 per cent). The weakest association is with the 'recycling' scale. Nevertheless, 42 per cent of respondents with 'Very High' EWV scores have 'High' or 'Very High' recycling scores (sample = 25 per cent) and 36 percent with 'Low' EWV scores have 'Very Low' recycling scores (sample = 23 per cent). It is evident that people recycle for a variety of reasons, environmental considerations being only one of them. The interrelationships between the measures of environmental behaviour, and with EWV, are shown in Table 4.

Table 3: Ecological World View and environmental behaviour

| | (Percentages) | | | | Totals | n | Coefficients |
|-------------------------------------|-----------------------|------|----------|-----|--------|-----|---------------------|
| | Ecological World View | | | | | | |
| | Very High | High | Moderate | Low | | | |
| Avoid Products | | | | | | | |
| Yes | 99 | 89 | 77 | 48 | 81 | 311 | p<0.001 C/L=0.49 |
| No | 1 | 11 | 23 | 52 | 19 | 75 | r=0.40 |
| Avoid Products Scale | | | | | | | |
| Three or more | 37 | 10 | 3 | 2 | 12 | 46 | p<0.001 |
| Two | 34 | 27 | 16 | 13 | 23 | 88 | C/L=0.55 |
| One | 28 | 50 | 57 | 34 | 45 | 175 | r=0.49 |
| None | 1 | 13 | 24 | 51 | 20 | 79 | |
| Recycling Scale | | | | | | | |
| Very High | 11 | 5 | 6 | 5 | 7 | 25 | p<0.001 |
| High | 31 | 22 | 11 | 8 | 18 | 70 | C/L=0.33 |
| Moderate | 33 | 23 | 26 | 21 | 25 | 97 | r=0.25 |
| Low | 16 | 29 | 31 | 30 | 27 | 105 | |
| Very Low | 9 | 21 | 26 | 36 | 23 | 86 | |
| Support Environmental Groups | | | | | | | |
| Regularly | 20 | 8 | 3 | 0 | 8 | 29 | p<0.001 |
| Occasionally | 38 | 34 | 18 | 11 | 26 | 102 | C/L=0.42 |
| Never | 42 | 58 | 79 | 89 | 66 | 256 | r=0.39 |
| Forms of Support | | | | | | | |
| Two or more | 39 | 23 | 7 | 3 | 18 | 70 | p<0.001 |
| One | 28 | 38 | 23 | 10 | 27 | 106 | C/L=0.49 |
| None | 33 | 39 | 70 | 87 | 55 | 212 | r=0.44 |
| TOTALS | 100 | 100 | 100 | 100 | 100 | | |

Table 4: Correlation matrix of Ecological World View and environmental behaviour (Pearson's r)

| | 1 | 2 | 3 | 4 | 5 | 6 |
|------------------------------------|------|------|------|------|------|------|
| 1 Ecological world view scale | 1.00 | | | | | |
| 2 Avoid damaging products | 0.40 | 1.00 | | | | |
| 3 Avoid products scale | 0.49 | 0.63 | 1.00 | | | |
| 4 Recycling scale | 0.25 | 0.11 | 0.24 | 1.00 | | |
| 5 Support for environmental groups | 0.39 | 0.18 | 0.35 | 0.20 | 1.00 | |
| 6 Number of types of support | 0.44 | 0.22 | 0.41 | 0.16 | 0.81 | 1.00 |

Differentiation of Ecological World View and environmental behaviour

At the time the data were collected, RMIT had 51 under-graduate degree courses. Students from all but two of these courses are represented in the sample, with a range of one to 22 students (mean = 7.4) from each course. The six faculties were all well represented but not in proportion to their enrolments. The largest faculty in this regard, Applied Science, made up 22 per cent of the sample, while the smallest faculty, Applied Social Sciences and Communications, made up 15 per cent. Other faculties ranged from 12 per cent to 25 per cent. The gender balance in most faculties was approximately equal, the exceptions being the Faculty of Engineering and the Faculty of Applied Social Sciences and Communications; the percentage of females in the sample (18 per cent from the former and 82 per cent from the latter) reflects the gender imbalance in each. As the number selected from each course is too small for useful analysis, the courses have been grouped by faculty.

In spite of the lack of any real differences between the student and community samples on the variables being examined here, students were found to have very different profiles in terms of the faculty in which they were enrolled. The greatest differences are to be found in their commitment to an EWV. Compared with an overall mean score of 3.76, the mean scores by faculty are: Applied Social Sciences and Communications, 4.11; Art, 3.96; Environmental Design and Construction, 3.85; Applied Science, 3.69; Engineering, 3.62 and Business, 3.46. The overall association between EWV and faculty is relatively strong ($C/L=0.48$). These differences are more

dramatic when the percentages are compared of students with 'Very High' of 'High' EWV scores (54 per cent of the sample had scores in these two categories). At the extremes are students in Applied Social Sciences and Communications (86 per cent) and the Faculty of Business (25 per cent). The differences between the faculties is even more exaggerated for males (100 per cent and 19 per cent, respectively, for these two extreme faculties). It is worth noting that there is a much higher percentage (82) of females than males (52) in the Faculty of Environmental Design and Construction with these scores, the reverse being the case in the Faculty of Art (65 per cent of females compared to 80 per cent of males). (See Table 5)

Table 5 Ecological World View and gender by faculty and high school subjects (Percentages; numbers in brackets)

| Gender | Ecological World View | | | | | | Total Scores | | |
|-----------------------------|-----------------------|-------------|-----------|--------------|-----------|--------------|--------------|------------|--------------|
| | Very High and High | | | | | Total n | Mean | SD | Coefficients |
| | Males | n | Females | n | Total | | | | |
| Faculty | | | | | | | | | |
| Soc. Sci. & Commun | 100 | (10) | 85 | (40) | 86 | (57) | 4.11 | 0.4 | p<0.001 |
| Art | 80 | (20) | 65 | (20) | 71 | (56) | 3.96 | 0.4 | C/L=0.48 |
| Env. Design & Constr. | 52 | (13) | 82 | (18) | 66 | (47) | 3.85 | 0.4 | |
| Applied Science | 46 | (19) | 45 | (20) | 46 | (85) | 3.69 | 0.4 | |
| Engineering | 41 | (32) | 38 | (6) | 40 | (94) | 3.62 | 0.5 | |
| Business | 19 | (5) | 33 | (7) | 25 | (47) | 3.46 | 0.4 | |
| High School Subjects | | | | | | | | | |
| Humanities ¹ | 78 | (14) | 63 | (20) | 68 | (50) | 3.88 | 0.4 | p<0.001 |
| Humanities ² | 86 | (18) | 74 | (26) | 79 | (56) | 4.01 | 0.5 | C/L=0.30 |
| Mixed ² | 58 | (11) | 78 | (14) | 67 | (37) | 3.87 | 0.4 | |
| Maths/Science ³ | 55 | (11) | 53 | (16) | 54 | (50) | 3.81 | 0.5 | |
| Maths/Science ⁴ | 37 | (38) | 48 | (19) | 40 | (143) | 3.63 | 0.4 | |
| Commerce ⁵ | 29 | (7) | 64 | (16) | 47 | (49) | 3.64 | 0.4 | |
| TOTALS | 48 | (99) | 62 | (111) | 54 | (385) | 3.76 | 0.5 | |

1 Including geography, environmental studies and biology, and excluding commerce subjects.

2 Excluding geography, environmental studies, biology and commerce subjects.

3 Including biology.

4 Excluding biology.

5 With humanities subjects.

The Role of education

These results suggest that students with particular EWVs tend to be attracted to particular courses and/or that the courses promote particular world views. However, this combination of past and present influences on world view is difficult to unpack. Nevertheless, it is possible to pursue it to some extent by examining the type of subjects students studied in their VCE/HSC year at high school, on the assumption that humanities subjects, more than maths and science or commerce subjects, may encourage a commitment to an EWV. The exception might be for students who have taken biology in a maths/science program. In addition, the inclusion of geography, environmental studies and/or biology with humanities subjects could lead to an even stronger commitment.

High school subjects have been coded into six categories: humanities, including geography, environmental studies and biology, and excluding commerce (accountancy, economics) subjects; humanities, excluding geography, environmental studies, biology and commerce subjects; mixed humanities and science subjects, excluding geography, environmental studies, biology and commerce subjects; maths and science subjects, including biology; maths and science subjects, excluding biology; and, commerce subjects with humanities subjects. The order in which these categories are listed hypothesises the association with EWV. A moderate association was found ($C/L = 0.36$) but not entirely in the expected direction. (See Table 5) Students who have taken humanities subjects, excluding those directly involved with environmental matters, have the highest mean EWV scores. However, maths/science students who have taken biology have higher mean scores than straight maths/science students, and a similar mean score to the humanities (plus environmentally oriented subjects) and the mixed science and humanities categories. Students who have taken one or more commerce subjects, in combination with humanities subjects, have similar scores to the straight maths/science students. Again, these differences are more marked when the percentages of students with 'Very High' or 'High' EWV scores are compared; 79 per cent of students who did straight humanities, compared with 40 per cent of straight maths/science students, had these scores. The percentages for males in these categories are 86 and 29, respectively, representing the greatest difference in the table. Another difference worth noting is between males and females who have taken one or more commerce subjects; 29 per cent for males compared with 64 per cent for females.

As the parallels in the patterns of EWV with both faculty and high schools subjects could be attributable to the fact that most university courses set prerequisite or preferred subjects for entry, the relationship between faculty and high school subjects needs to be explored. It is not surprising that there is a very strong association between them ($p < 0.001$, $C/L = 0.73$). (See Table 6) The Faculty of Art had very few students in the sample from a math/science background (4 per cent), and the Faculty of Applied Social

Science and Communications (17 per cent), and the Faculty of Business (20 per cent), attracted only a small proportion. At the other extreme, most students in the Faculties of Engineering and Applied Science had taken maths and science subjects (87 per cent and 80 per cent, respectively). Half of the students in the Faculty of Business had taken one or more commerce subjects. Students in the Faculty of Environmental Design and Construction had a wide spread in their subject backgrounds, including nearly half (48 per cent) with maths and science subjects.⁵

Table 6: Faculty and gender by high school subjects (Percentages)

| Faculty and Gender | High School Subjects | | | | | | TOTALS |
|--------------------|-----------------------|-----------|-----------|------------|------------|-----------|------------------|
| | Hum'ties ¹ | Hum'ties | Mixed | Maths/Sci. | Maths/Sci. | Commerce | |
| Soc. Sci. & Comm. | 23 | 37 | 5 | 12 | 5 | 18 | 100 (57) |
| Males | 20 | 30 | 0 | 20 | 0 | 30 | 100 (10) |
| Females | 23 | 39 | 6 | 11 | 6 | 15 | 100 (47) |
| Art | 23 | 46 | 20 | 0 | 4 | 7 | 100 (56) |
| Males | 24 | 60 | 8 | 0 | 4 | 4 | 100 (25) |
| Females | 23 | 35 | 29 | 0 | 3 | 10 | 100 (31) |
| Env. Des. & Con. | 11 | 4 | 22 | 24 | 24 | 15 | 100 (46) |
| Males | 12 | 4 | 21 | 21 | 21 | 21 | 100 (24) |
| Females | 9 | 5 | 23 | 27 | 27 | 9 | 100 (22) |
| Applied Science | 11 | 2 | 2 | 27 | 53 | 5 | 100 (85) |
| Males | 7 | 0 | 3 | 17 | 73 | 0 | 100 (41) |
| Females | 14 | 5 | 2 | 36 | 34 | 9 | 100 (44) |
| Engineering | 2 | 0 | 11 | 9 | 78 | 0 | 100 (94) |
| Males | 1 | 0 | 13 | 8 | 78 | 0 | 100 (77) |
| Females | 6 | 0 | 0 | 18 | 76 | 0 | 100 (17) |
| Business | 17 | 11 | 2 | 0 | 20 | 50 | 100 (46) |
| Males | 11 | 8 | 4 | 0 | 23 | 54 | 100 (26) |
| Females | 25 | 15 | 0 | 0 | 15 | 45 | 100 (20) |
| TOTALS | 13 | 14 | 10 | 13 | 37 | 13 | 100 (386) |
| Males | 9 | 10 | 9 | 10 | 50 | 12 | 100 (205) |
| Females | 18 | 19 | 10 | 16 | 23 | 14 | 100 (181) |

¹ See Table 5 for definitions of categories.

It is not surprising that there are some overall gender differences in subjects taken at high school. For example, 60 per cent of males, compared with 39 per cent of females in the sample, had taken maths and science subjects, while 37 per cent of females, compared with 19 per cent of males had taken subjects coded in the two humanities categories. Males are also much more likely than females to have taken commerce subjects; 50 per cent and 23 per cent, respectively. The association between faculty and high school subjects is slightly stronger for males than females ($C/L= 0.78$ for males and 0.70 for females).

Within faculties, some gender differences are worth noting. Males in Applied Social Sciences and Communications are more likely than females to have taken maths and science subjects (50 per cent compared with 26 per cent) and less likely to have taken humanities subjects (50 percent compared with 62 per cent). Males in the Faculty of Art are much more likely than females to have taken straight humanities subjects (60 per cent compared with 35 per cent) and less likely to have taken mixed humanities and maths/science subjects (8 per cent compared with 29 per cent). Males in Environmental Design and Construction are more likely than females to have taken commerce subjects (21 per cent compared with 9 per cent). Females in Applied Science are more likely than males to have taken biology with maths and science subjects (36 per cent compared with 17 per cent) and less likely to have taken straight maths and science subjects (34 per cent compared with 73 per cent). Females in Engineering are also more likely than males to have taken biology with maths and science subjects (18 per cent compared with 8 per cent). And females in Business are more likely than males to have taken humanities subjects (40 per cent compared with 20 per cent) and less likely to have taken maths and science subjects (15 per cent compared with 23 percent).

Results presented in Tables 5 and 6 suggest that the association between EWV and faculty has been influenced by the type of subjects taken at high school and gender differences in the latter. The possibility that family socialisation has both laid the foundation for commitment to an EWV, and determined the selection of high school subjects, cannot be explored here. However, another hypothesis can be entertained: that the duration of exposure to a university course which has an implicit or explicit position on the environment, may influence level of commitment. This hypothesis must be tested with cross-sectional rather than longitudinal data.

There is some evidence that commitment to an EWV is lower amongst later year students than first year students; 48 per cent of third and later year students, compared with 59 per cent of first years students, have scores in the 'Very High' or 'High' categories, this difference being greater for females than males. (See Table 7) However, when mean EWV scores are compared by year of study (1, 2 and 3 or more years), the maximum difference from the overall mean is 0.04. It is possible that the rise of environmental concern in

recent years has had more impact on younger students as they have gone through critical socialisation stages. Alternatively, the downward trend in commitment may be due to the tempering of environmental idealism with pragmatism as a consequence of exposure to a university education and, more particularly, the anticipation of employment.

Table 7: Ecological World View and year of study by faculty and gender

| Faculty and Gender | Ecological World View | | | Total n |
|--------------------|-----------------------|-----------|-----------|------------|
| | Very High and High | | | |
| | Year 1 | Year 2 | Year 3+ | |
| Soc. Sci. & Comm. | 83 | 89 | 100 | 50 |
| Males | 100 | 100 | 100 | 10 |
| Females | 78 | 88 | 100 | 40 |
| Art | 67 | 78 | 67 | 40 |
| Males | 100 | 79 | 60 | 20 |
| Females | 56 | 78 | 67 | 20 |
| Env. Des. & Con. | 67 | 75 | 58 | 31 |
| Males | 42 | 50 | 67 | 13 |
| Females | 87 | 100 | 33 | 18 |
| Applied Science | 46 | 42 | 50 | 39 |
| Males | 43 | 46 | 50 | 19 |
| Females | 47 | 38 | 50 | 20 |
| Engineering | 43 | 44 | 35 | 38 |
| Males | 44 | 44 | 36 | 32 |
| Females | 40 | 40 | 33 | 6 |
| Business | 27 | 22 | 29 | 13 |
| Males | 14 | 17 | 30 | 6 |
| Females | 50 | 33 | 27 | 7 |
| TOTALS | 59 | 55 | 48 | 211 |
| Males | 51 | 48 | 46 | 100 |
| Females | 65 | 64 | 52 | 111 |

This overall trend masks quite different patterns between the faculties and some gender variations within them. In the Faculty of Applied Social Sciences and Communications, the trend is in the reverse direction; this is entirely due to the females as the males are 100 per cent in all years. In the Faculty of Art, the percentages rise and then fall, with males showing a steeper decline. In the Faculty of Environmental Design and Construction, there is a rise and then a distinct fall. However, this pattern is determined by an even more marked fall for females, while males show a steady rise. In Applied Science, there is a minor dip in year 2, again produced by the female rather than the male pattern. Males and females in the Faculty of Engineering show identical patterns (but females have marginally lower percentages), flat in years 1 and 2 and then tailing off. The Faculty of Business shows a dip in year 2, but this is the result of reverse trends for males and females, rising for the former and falling for the latter. Due to the small numbers in some of the cells of Table 8, and the sampling procedures used in the study, the results must be regarded as inconclusive. However, the inter-faculty differences persist, with some interesting gender variations.

Faculty is not as good a predictor of environmental behaviour as it is of EWV. (See Table 8) Apart from a tendency for students from the faculty of Applied Social Sciences and Communications to be more inclined to avoid environmentally damaging products, students from the other faculties are undifferentiated on this measure and on recycling behaviour. However, compared with the other faculties, Applied Social Sciences and Communications students and, to a lesser extent Art and Environmental Design and Construction students, have identified a wider range of products which they try to avoid. Support for environmental groups is strongly associated with faculty in the expected direction.

Table 8: Faculty and environmental behaviour (Percentages)

| Env. Beh. | Faculty | | | | | | | n | Coefficients |
|-------------------------------------|---------|-----|---------|--------|-----|-----|-------|-----|--------------|
| | Soc Sci | Art | Env Des | Ap Sci | Eng | Bus | Total | | |
| Avoid Products | | | | | | | | | |
| Yes | 95 | 80 | 79 | 79 | 77 | 79 | 81 | 311 | N.S. |
| No | 5 | 20 | 21 | 21 | 23 | 21 | 19 | 73 | C/L=0.19 |
| Avoid Products Scale | | | | | | | | | |
| Three or more | 25 | 16 | 19 | 7 | 7 | 2 | 12 | 46 | p<0.005 |
| Two | 35 | 25 | 19 | 18 | 21 | 21 | 23 | 88 | C/L=0.33 |
| One | 35 | 38 | 41 | 53 | 47 | 56 | 45 | 175 | |
| None | 5 | 21 | 21 | 22 | 25 | 21 | 20 | 77 | |
| Recycling Scale | | | | | | | | | |
| Very High | 9 | 9 | 4 | 6 | 9 | 2 | 7 | 26 | N.S. |
| High | 25 | 20 | 22 | 15 | 13 | 20 | 18 | 69 | C/L=0.24 |
| Moderate | 30 | 23 | 22 | 23 | 33 | 15 | 25 | 97 | |
| Low | 20 | 30 | 24 | 33 | 26 | 30 | 28 | 105 | |
| Very Low | 16 | 18 | 28 | 23 | 19 | 33 | 22 | 84 | |
| Support Environmental Groups | | | | | | | | | |
| Regularly | 19 | 11 | 6 | 4 | 4 | 4 | 8 | 29 | p<0.001 |
| Occasionally | 42 | 31 | 35 | 15 | 23 | 19 | 26 | 101 | C/L=0.35 |
| Never | 39 | 58 | 59 | 81 | 73 | 77 | 66 | 255 | |
| Forms of Support | | | | | | | | | |
| Two or more | 44 | 30 | 17 | 9 | 7 | 11 | 18 | 70 | p<0.001 |
| One | 35 | 23 | 35 | 20 | 30 | 23 | 27 | 105 | C/L=0.43 |
| None | 21 | 47 | 48 | 71 | 63 | 66 | 55 | 211 | |
| TOTALS | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | |

High school subjects are an even weaker predictor of environmental behaviour, there being no significant relationship with Avoid Products, recycling behaviour and level of support for environmental groups. Again, there is a reasonably strong association with the number of products identified; students who had taken math/science subjects without biology were least inclined to identify two or more products (22 per cent; sample = 34 per cent), followed by those who had taken commerce subjects (27 per

cent). The other four categories, including those who had taken science subjects with biology, show a similar high level of avoidance (ranging from 44 to 49 per cent). Students who had taken science subjects, with or without biology, are now the least likely to support environmental groups in two or more ways (10 per cent; sample = 18 per cent), followed by those who had taken commerce subjects (16 per cent). Those who had taken straight humanities subjects are the most likely to provide this level of support (34 per cent).

Summary and conclusion

The answer to research Question 1 is that there is a wide range of commitment to an EWV amongst these university students, with a normal distribution in the scores; less than a fifth have 'Very High' scores. The measures used to identify forms of environmentally responsible behaviour indicate a range of activity (Question 2). Willingness to avoid purchasing or using environmentally dangerous products is very high but there is considerable diversity in students' ability to actually identify such products; only 11 per cent identified three or more. The degree to which students engage in recycling behaviour varies considerably according to the material concerned; paper and glass are most commonly recycled. Very few students have a direct involvement in environmental groups (Question 3) although they do express a moderate level of 'moral' support; two thirds provide no support.

A relatively strong association was found between commitment to an EWV and both level of environmentally responsible behaviour and support for environmental groups (Question 4). Recycling behaviour revealed the weakest association with the EWV scale, suggesting that it is motivated to a considerable extent by other factors.

Large differences were found in the level of commitment to an EWV in terms of the faculty in which students were enrolled. At one extreme, students in the Faculty of Business showed the lowest level of commitment, followed by the Faculties of Engineering and Applied Science, and, at the other extreme, students in the Faculty of Applied Social Sciences and Communications showed the highest level of commitment (Question 6). However, important gender differences between faculties are evident. Faculty differences were not as evident in the environmental behaviour of students. The major exception is support for environmental groups, which follows the pattern for EWV.

The role of education, in influencing commitment to an EWV and environmental behaviour, both at the secondary and tertiary levels, is difficult to discern in a study of this kind (Question 7). It is clear that selection of tertiary course is strongly associated with EWV, and that the kind of subjects studied in the final year at high school is a good predictor of course selection. While a moderate association was found between EWV and high school

subjects, length of exposure to tertiary education appears to have a very limited effect on the former. Nevertheless, there are some interesting differences between faculties, and gender differences within them. For a better understanding of these relationships it will be necessary to look to the influence of family and peer groups.

If level of understanding of, and commitment to the solution of, both local and global environmental problems is necessary for the survival of the human as well as other species, then the case study reported here would suggest that much needs to be done. That tertiary courses appear to, at best, reinforce prior levels of environmental commitment and behaviour, and, at worst, reduce these levels, that students do not differ in commitment and behaviour from other members of the community, and that the current highest level of environmental concern is to be found amongst the middle-aged rather than youth, must be a matter of some concern to environmental educationalists.

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Appendix

ECOLOGICAL WORLD VIEW SCALE ITEMS

| | Items | Mean | SD |
|----|---|------|-----|
| a) | Humans have the right to modify the natural environment to suit their needs. | 3.21 | 1.1 |
| b) | Priority should be given to developing alternatives to fossil and nuclear fuel as primary energy sources. | 4.19 | 0.9 |

| | | |
|--|------|-----|
| c) Rapid economic growth often creates more problems than benefits. | 3.71 | 1.0 |
| d) Human beings were created or evolved to dominate the rest of nature. | 3.78 | 1.2 |
| e) The balance of nature is very delicate and is easily upset. | 4.35 | 0.9 |
| f) Through science and technology we can continue to raise our standard of living. | 2.35 | 1.0 |
| g) Humans must live in harmony with nature in order for it to survive. | 4.43 | 0.8 |
| h) A community's standards for the control of pollution should not be so strict that they discourage industrial development. | 3.49 | 1.3 |
| i) Science and technology do as much harm as good. | 3.30 | 1.1 |
| j) Because of problems with pollution, we need to decrease the use of the motor car as a major means of transportation. | 3.65 | 1.1 |
| k) Humans need not adapt to the natural environment because they can remake it to suit their needs. | 3.82 | 1.1 |
| l) Governments should control the rate at which raw materials are used, to ensure that they last as long as possible. | 4.02 | 1.0 |
| m) The positive benefits of economic growth far outweigh any negative consequences. | 3.55 | 0.9 |
| n) We cannot keep counting on science and technology to solve our problems. | 3.47 | 1.2 |
| o) People in developed societies are going to have to adopt a more conserving life-style in the future. | 4.13 | 0.9 |
| p) Controls should be placed on industry to protect the environment from pollution, even if it means things will cost more. | 4.38 | 0.8 |
| q) Most of the concern about environmental problems has been over-exaggerated. | 4.15 | 0.9 |
| r) The remaining forests in the world should be conserved at all costs. | 4.33 | 0.9 |
| s) Most problems can be solved by applying more and better technology. | 2.91 | 1.0 |
| t) Industry should be required to use recycled materials even when it costs less to make the same products from new raw materials. | 4.13 | 0.9 |
| u) When humans interfere with nature it often produces disastrous consequences. | 3.94 | 1.0 |
| v) Plants and animals exist primarily to be used by humans. | 4.01 | 1.1 |
| w) The government should give generous financial support to research related to the development of solar energy. | 4.19 | 0.8 |
| x) To ensure a future for succeeding generations we have to develop a no-growth economy. | 2.72 | 1.0 |

| | | |
|------------------------------------|-------------|------------|
| ECOLOGICAL WORLD VIEW SCALE | 3.76 | 0.5 |
| (Mean of all item scores) | | |

Note

- ¹ At the time the data were collected, the Context Curriculum consisted of a set of nineteen subjects which address issues of relevance to a student's role as a responsible citizen. Students in all courses in the Advanced Education Sector are required to take four two-hour semester subjects from this program. As these subjects are taken at different points throughout a course, not all students are participating in the program each semester.
- ² Some classes had an almost 100 percent response, but in others the response was very low. While these differences were due in part to the approach adopted by the students who distributed the questionnaire, other factors such as lecturer attitudes and the culture of each individual class, may have contributed.
- ³ Where respondents have indicated their behaviour on only two or three materials, non-responses have been coded as zero.
- ⁴ Two correlation coefficients have been used: for ordinal, interval and ratio data, Pearson's r ; for these types of data when reduced to categories, and for nominal data, the contingency coefficient corrected for its upper limit for each table. This coefficient, C/L , is calculated by dividing the contingency coefficient 'C' by its upper limit 'L'.

$$L = \sqrt[4]{\frac{r-1}{r} \times \frac{c-1}{c}} \quad \text{where } r = \text{number of rows and } c = \text{number of columns.}$$

For linear relationships, the values of these coefficients are similar, although C/L usually has a higher value due to its capacity to detect any form of relationship.

- ⁵ The degree courses are Architecture, Building, Construction Economics, Interior Design, Landscape Architecture and Planning. This faculty shares a B.Soc.Sc. degree (Socio-Environmental Assessment and Policy, $n=16$) with the Faculty of Applied Social Sciences and Communications, but for the purpose of the analysis the students have been included in the latter faculty.