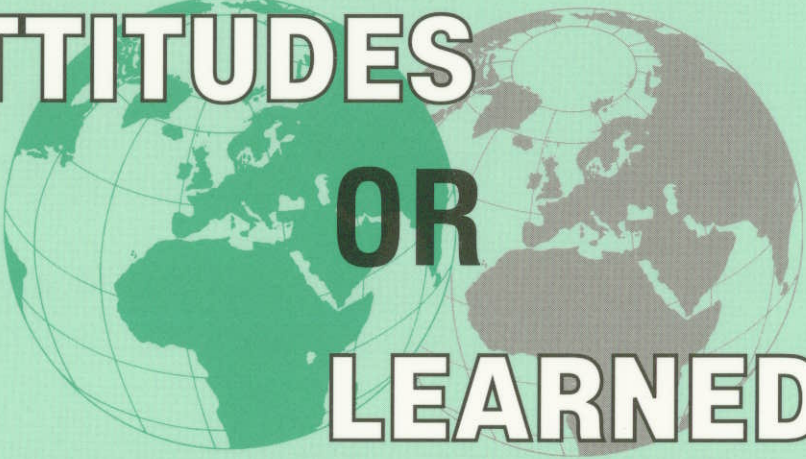


**GREEN  
ATTITUDES  
OR  
LEARNED  
RESPONSES?**



**Marian Morris with Ian Schagen**

*nfer*

**Global Environmental Education**

# **GREEN ATTITUDES OR LEARNED RESPONSES?**

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with  
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# 1. INTRODUCTION

Over the past three decades, **global and local** environmental issues have moved from being on the fringe of political concerns to become a more powerful force in the agenda of both developed and developing countries. At the same time, the issues that have dominated the public arena have changed, from the widespread fears of pollution in the 1960s, through concerns about land-use and nuclear power in the 1970s, the threat since posed by the discovery of holes in the ozone layer and the concerns about global warming which have dominated the late 1980s and early 1990s. Nonetheless, such concerns have rarely led to coherent action, either by governments or by individuals. As far as individuals are concerned, it is arguable whether the dearth of action reflects a lack of scientific and factual knowledge, a lack of personal, social, economic or political motivation or simply a feeling of powerlessness in the face of complex, interrelated and often poorly understood issues. For young people, in particular, such feelings of powerlessness can often be compounded by the fact that they have limited spending power and do not generally perceive themselves as having any political or social voice.

One of the central questions in the Global Environmental Change programme funded by the Economic and Social Research Council (ESRC) focuses on the need to change from concern to action. In particular, it asks whether people can be '*persuaded to make changes in behaviour – through reducing consumption, recycling or conserving resources*'. In this paper, one of a series based on a research project entitled *Environmental education: teaching approaches and student attitudes*, we explore the extent to which young people, nearing the end of their compulsory schooling, a) were informed and concerned about environmental issues, b) felt able to address those issues through their own actions and c) had a clear idea of how to behave in the future. We look at the links between the environmental information they received, from school, home and the media, their expressed attitudes and concerns about the environment and their current and intended behaviour towards it.

To what extent has environmental education in school been able to help children develop a rational, rather than a romantic,<sup>1</sup> understanding of the world around them and the ways in which they can contribute to its conservation and improvement?

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<sup>1</sup> The notion of 'romantic' and 'rational' views on environmentalism is explored in WITHERSPOON, S. (1994). *The greening of Britain: romance and rationality.* In: JOWELL, R., CURTICE, J., BROOK, L. and AHRENDT, D. (Eds) (1994). *British Social Attitudes: the 11th Report.* Aldershot: Dartmouth.

## 2. SETTING THE EDUCATIONAL CONTEXT

Richmond and Morgan (1977), in a survey of fifth year (Year 11) pupils in 1976, explored young people's factual awareness, conceptual understanding, perceptions and beliefs about the environment. They found that, although young people had poor factual knowledge, they nonetheless demonstrated a positive attitude to the environment. They argued that this indicated that pupils' attitudes at that time were *'not based on understanding and hence [could not] be seen as personal attitudes arrived at as a result of deep consideration of the facts'*. To them this was a matter of grave concern. Without understanding, they pointed out, young people were unlikely to feel any personal responsibility in environmental matters. They believed that the attitudes which pupils held appeared to be learned 'responses' and therefore lacked *'the concomitant predisposition to action which is inherent in true attitudes.'*

Nonetheless, there was a recognition that attitudes did not rely totally on factual knowledge, but that conceptual understanding was an essential prerequisite. Richmond and Morgan emphasised the importance of exploring *'ways of developing and emphasising conceptual knowledge in the environmental field and correcting the tendency towards a predominance of factual knowledge in so many of the syllabuses being used.'* It is a matter for debate as to whether this concentration on factual content is less evident now than in the 1970s.

To begin with, since the 1976 study, there have been a number of significant changes in the pedagogical approaches adopted by secondary schools in England and Wales. These changes have variously reflected the different emphases and influences of the Technical Vocational and Education Initiative (TVEI), the advent of GCSE and, more recently, the National Curriculum. Each of these has had an impact (even if tangentially) on the teaching of environmental education.

- ◆ TVEI encouraged the wider availability of science education for all, and emphasised experiential and flexible learning and the development of core skills. At its best, this led to a more student-centred approach to learning in which young people were encouraged to critically examine their own understanding and beliefs.
- ◆ GCSE, with its early emphasis on enquiry-based learning and practical experience, also focused on the development of young people's knowledge, skills, attitudes and values.

- ◆ The National Curriculum Council, by identifying environmental education as a cross-curricular theme, led to the inclusion of environmental elements in a number of different subject areas outside the traditional range of science and geography. However, the extent to which it enhanced environmental education, or broadened the area of delivery, is open to question. To begin with, the large number of attainment targets in the early science and geography curricula led to an apparent concern amongst teachers with the need to deliver specific subject content, rather than to a focus on developing students' skills, attitudes and values. Secondly, as Tomlins and Froud (1994) noted, few schools had adopted a strategic and co-ordinated cross-curricular approach to environmental education, with the result that school managers acknowledged that the dominant delivery mechanism was still through geography (92%) and science (91%). Finally, some staff, and science teachers in particular, felt that the actual amount of environmental education taught within their subject area had decreased since the advent of the National Curriculum.

Secondly, any emphasis on conceptual understanding in the environmental field needs to take account of the socio-historical milieu in which young people live, since it is this milieu that will determine the concepts which are available to them. As Harris (1979) argues, *'knowledge can be seen as the product of sensory experience filtered through conceptual schemes'*. In other words, young people might, for example, become aware that summers seemed wetter and winters warmer, but, without a concept of the 'greenhouse effect', would be unable to attribute this to a global phenomenon or to understand how everyday actions, such as burning fossil fuels or using electricity, could have any impact on the climate. Furthermore, as Harris noted, *'perception and knowledge are influenced by mediating factors and are not merely a result of a direct sensory response to a given external world'*. It needs to be recognised that, where the concepts available to young people are incomplete (as may be the case when either scientific understanding of a phenomena is undeveloped, or where those teaching the concept lack expertise), then a young person's ability to interpret information, to make links between facts and concepts or to develop appropriate attitudes, will be limited.

So far, this discussion has focused on the acquisition of knowledge and concepts and the development of positive environmental attitudes. However, a number of researchers have questioned whether the acquisition of knowledge or understanding can of itself lead to action. As Richmond and Morgan themselves noted, young people's attitudes *'tended to be positive when the object of concern did not impinge*



*directly on respondents' lives'*, while Moyer (1975) pointed out that *'cognitive understanding does not automatically lead to strong attitudes about an issue'*. Elliot (1991) questioned the whole notion that developing students' understanding could lead to action, since teachers *'imparting understanding'* involved students in a role which was essentially passive rather than dynamic. Posch (1993) argued further that *'the assumption that environmental behaviour can be influenced via environmental knowledge and attitudes is not well founded'*.

This paper sets out to address the areas identified above and in particular to:

- ◆ assess the attitudes of young people in Year 11 towards key environmental issues in the 1990s;
- ◆ explore their views of the environmental education they received at school and elsewhere and how it may have affected their behaviour towards the environment, given other influences;
- ◆ investigate the relationship between students' learning outcomes and:
  - the subjects young people studied,
  - teachers' different teaching approaches,
  - teachers' different attitudes towards environmental issues,
  - the status of environmental education in the school.

To begin with, young people's concerns about the environment are explored in order to identify consistencies and inconsistencies in response. Are young people who express a concern about holes in the ozone layer, for instance, as likely to express concern about the amount of litter in their local area? To what extent have they turned those concerns into action, and to what extent are their attitudes and actions based on a real understanding of the issues involved? Secondly, the role played by schools, families and the media in shaping young people's concerns about, attitudes towards and activity in, the environment, are explored and significant factors identified. Is the media the most influential factor in promoting environmental awareness and action or do schools have an important role to play? Are any particular subject areas more successful than others in changing students' attitudes towards the environment? Has the implementation of environmental education in the curriculum led to any changes in environmental behaviour? Finally, the strategies which schools have adopted in order to link environmental understanding, attitudes and action, are identified and outlined.

### 3. THE DATA

The data<sup>2</sup> for this paper was obtained from a detailed semi-projective questionnaire survey carried out amongst 428 young people from 19 schools during the autumn term of 1994, when students had just begun their Year 11 courses. These schools were selected after an initial survey of 1035 school staff, in which questionnaires were completed by senior managers and heads of science, geography, technology and PSE departments, in 294 schools in England and Wales in autumn 1994 (see Tomlins and Froud, 1994). Young people were asked a series of questions, based on issues included in National Curriculum documentation and identified through fieldwork in schools. These sought to identify their environmental concerns, explore the factors that shaped those concerns and furnish information on their likely behaviour towards the environment in the future.

### 4. YOUNG PEOPLE'S ATTITUDES TO THE ENVIRONMENT

Young people's responses to the survey indicated that they tended to express what might be generally perceived as 'environmentally correct' attitudes. These attitudes could be said to reflect the 'green morality' identified by Coward (1990), in which so-called green issues are given widespread media coverage and are no longer seen as the preserve of a 'sandal-wearing macro-biotic culture'. The vast majority of the respondents to the student survey (92%) felt that it was at least 'quite important' that they should understand environmental issues, that young people should do something to protect the environment (88%) and that people, generally, should change the way they behave in order to look after it (83%).

However, despite expressing their concern about environmental issues, their levels of environmentally focused activity (actual or potential) were highly variable. While young people indicated a perceived ability to have some influence on, or impact in, locally focused issues (such as

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<sup>2</sup> Further details about the data sets which were drawn on for this report are given in Section 1 of the Technical Annex at the end of this paper.

the conservation of energy in the home, the reduction of litter and recycling – see **Table 1** below), few were consistent in their actions. None of the respondents, for example, indicated that they were regularly involved in all aspects of recycling and conservation. Furthermore, many felt they could play no role in ameliorating large-scale problems, with the majority feeling they could do little to offset the loss of habitats or plant and animal species or the pollution of air and water. Most thought that they had no significant power to influence global climatic change, or to reduce the loss of the ozone layer – issues which, nonetheless, were chief amongst their concerns.

**Table 1 Ability to Influence Environmental Change**

Environmental Issue	I can do a lot %	I can do quite a lot %	I can't do much %	I can't do anything %	No response %
Litter	40	42	16	1	1
Recycling	29	50	16	5	1
Conserving energy	22	55	18	4	1
Loss of the ozone layer	6	26	46	21	1
Loss of animal and plant species	4	5	62	28	1
Air pollution	4	20	53	21	1
Global warming/greenhouse effect	4	19	54	22	1
Water pollution	3	14	55	27	1
Loss of habitats	3	5	60	30	1
Running out of fossil fuels	2	6	51	40	1
N = 428					

*A series of single response questions*

*426 young people gave one or more responses to this question*

This perceived lack of influence may reside partly in young people's perceptions of issues as local (therefore accessible) or global (therefore somebody else's problem). During interviews, teachers frequently commented on the difficulties they faced in helping students to link local action and global phenomena: *'Young people can understand issues, but the effects aren't tangible to them; therefore they don't lead to action'*. However, they noted that some young people were also filled with campaigning zeal, particularly for the more 'attractive' environmental issues such as saving endangered species or protecting the Amazon. In such cases, positive environmental attitudes were not

necessarily reflected in personal action. As one teacher remarked, *'They think globally, but they don't act locally...it's all "let's do something to save the rainforest"...but [they] don't pick up the litter in the yard.'*

It is clear that the problem is a complex one and young people's reactions, arguably, are little different from those of the population at large (see Witherspoon and Martin, 1992; Witherspoon, 1994). Although a number of teachers argued that young people were more environmentally aware than those of 10 or 20 years ago, they were also likely to comment that *'it does not follow that because children are aware they will change their lifestyle'*. Equally, others felt that pupils rarely took their learning outside the classroom: *'They can answer questions on environmental issues correctly, but this does not mean they have positive attitudes and behaviour...they can be very knowledgeable and tell you how they should behave – but they don't do it'*. For some teachers, this lack of connection between individual actions and environmental actions was put down to a lack of real understanding: *'They know **about** [environmental issues] – if they really **understood** them, they'd all be doing something'*. For others, it was seen as much more symptomatic of what one teacher described as the innate selfishness and egocentrism of teenagers: *'Most pupils these days can tell you about global issues – they just feel it is someone else's problem...They have the attitude that it's years away...it won't happen to me.'*

This difficulty in making the connections between individual actions and environmental outcomes at either a local or a global level was evident in students' responses to the questionnaire. Links between the amount of packaging on a product and the problem of litter, or the problem of air pollution and an individual's use of cars, were rarely made. As far as the young people were concerned, it was the industrialists, rather than the ordinary man or woman in the street, who were clearly the 'bad guys', with 83% believing that industrialists bore much of the responsibility for damaging the environment. Politicians and scientists were regarded as being equally culpable (49% of the students regarded them as playing a significant role), while everyday actions were viewed as playing a more minor role. Only six per cent of the students thought that these contributed significantly, and 41% marginally, to the problems faced in the environment.

There was also an element of uncertainty, with students sometimes having difficulty ascertaining what was the truth in any particular circumstance. Global warming was identified as a serious issue by 355 of the 428 students (that is, 83%), while 52 (12%) identified it as the single issue that gave them the most concern. However, while nearly

two-thirds felt that there was some justification in the claim that the atmosphere was warming up, 24% were clearly unsure as to whether such claims were valid and some 9% were definitely sceptical. This uncertainty was also reflected in young people's responses to a question about their personal power. Even though 23% said that global warming was an issue that individuals could address, there was a general feeling that they could do little to reduce the risk it posed. Nonetheless, for some students, we found that there was a much more overt link between the concerns they expressed, the attitudes they adopted and the action they undertook. What enabled such links to be made and to what extent have schools played a role in their development?

## 5. YOUNG PEOPLE'S ENVIRONMENTAL CONCERNS

A number of the items in the Year 11 students' survey were designed to ascertain the degree of concern which young people felt for different environmental issues. While they thought that all issues were 'serious' (with the possible exception of noise pollution), a factor analysis<sup>3</sup> revealed that there were two broad areas of concern. These divided into those issues which could be described as of a general or 'global' nature and those which reflected specific concerns with local issues and pollution.<sup>4</sup>

◆ <b>Global environmental issues included:</b>	<b>% saying 'very serious'</b>
loss of the ozone layer	(58%)
destruction of the tropical rainforest	(55%)
global warming and greenhouse effect	(47%)
loss of plant and animal species	(34%)
◆ <b>Pollution issues included:</b>	<b>% saying 'very serious'</b>
air pollution	(47%)
water pollution	(39%)
loss of habitats	(32%)
acid rain	(30%)
litter	(22%)
noise pollution	(8%)

Few young people expressed concern about all of the issues (less than 2% thought that all of the issues were 'very serious'), although further analysis of the items, using a scoring system<sup>5</sup> linked to the factor analysis, revealed that young people were more concerned about global

<sup>3</sup> For an explanation of the process involved, see the Glossary of Terms in Section 2 of the Technical Annex at the end of the paper.

<sup>4</sup> Two other issues included in the initial question – running out of non-renewable resources (seen as very serious by 33%) and over-population (seen as very serious by 23%) – did not meet the factor analysis loading being used (0.45) and so were omitted from subsequent analysis of this question.

<sup>5</sup> Responses of 'not at all' or 'not very' serious and 'not sure' were scored as 0, 'quite serious' as 1 and 'very serious' as 2. The scores for each factor – global issues and pollution – were calculated for each student and the mean score that was derived was then divided by the number of items in the issue to obtain the average score. The score of 1.276 for global environmental issues indicates an average rating of between 'quite serious' and 'very serious'. The pollution score of 0.5 indicates an average rating of 'not serious' to 'quite serious'.

environmental issues (1.276) than about pollution issues (0.5). Interestingly, the responses are in direct contrast to those emerging from a study of adult attitudes to the environment, conducted by Witherspoon and Martin in 1992, in which adults revealed more concern about pollution and other visible forms of damage to the environment, than about global issues. While Witherspoon and Martin argued that adults did not yet fear the potential consequences of human intervention in global environmental conditions, it may be that, as one teacher argued, the focus on global environmental education in schools had made some pupils *'think that Britain is pollution free and [that] all environmental problems are a long way away because they know more about global issues than local ones'*.

The findings also revealed the changing focus of environmental education in schools identified by teachers and the changes in the social and economic climate in which young people are currently operating. In the 1977 Richmond and Morgan study, overcrowding and crime were chief amongst young people's concerns while bio-physical issues scored low.

## 6. LINKS BETWEEN STUDENT UNDERSTANDING, ATTITUDES AND ACTIONS

Although young people freely expressed both their concerns about the environment, and their reasons for such concern, they did not always follow through with appropriate action. For instance, many expressed fears about global warming, and were aware that they could do quite a lot, potentially, to conserve energy (thereby reducing demands for fuel at power stations and reducing emissions of carbon dioxide). Nonetheless, despite their claims that they turned off lights (78%) and electrical appliances (81%) when they were no longer needed, there was a greater reluctance to undergo discomfort – only 50% generally put on extra clothing rather than turning up the heating – or to apply energy considerations to purchases made in the market place. **Fewer than one per cent of the students were consistent in their responses to questions about energy saving.** Other such mismatches are outlined below:

- ◆ While young people seemed aware of the link between an increased use of public transport and a potential decrease in air pollution (67%), few indicated that they would therefore travel by bus rather than buy a car in the future (9%). Furthermore, they noted that the need to impress others (49%) would be a potent force in their search for the ideal car, although most agreed with the need to buy a car that consumed little petrol (73%). However, it is not clear from their responses whether this last was a cost consideration or an environmental decision.
- ◆ The message about house insulation had obviously been assimilated (90% said that it was important to insulate a house to conserve heat), but fewer seemed aware of the potential impact of using (more expensive) energy-efficient bulbs (35%) or of buying less power-hungry appliances (19%).
- ◆ Although nearly three-quarters of the young people thought that litter was a serious issue, it was seen as a matter of major concern only by a minority (3%). This is also evident with respect to the action they took – even though 82% felt they had the power to reduce litter, the majority (52%) never considered the quantity of packaging on the products that they bought.



- ◆ The issue of environmentally friendly products was one which raised mixed feelings. Few reported that they or their families regularly assessed products in terms of their environmentally friendly status – only 36% said that this was at least a consideration ‘most of the time’. An increase in cost was seen as a constraint by many, with nearly half (48%) saying they would not buy products which were more expensive. However, decreases in cost, greater choice, better image and higher quality were all conducive to an increased likelihood of purchase. In other words, market forces and self-image appeared to dominate young people’s actions rather more than any environmental considerations. Overall, less than one per cent of all the students in the survey said that they regularly took any notice of the environmentally related information on packages.
- ◆ More than three-quarters (79%) said that they could play a role in recycling materials, but few regularly made the effort to ensure that they recycled cans (27%), paper (30%), or household waste (23%).

Following on from Richmond and Morgan’s work, and given the findings described above, a logical next stage in the analysis of the student data, therefore, would have been to examine the extent to which student concerns were based upon a real understanding of the environmental issues involved and to examine the extent to which such understanding led to action. However, a major difficulty in assessing conceptual understanding is that individual issues, such as air pollution, water pollution or acid rain, are not discrete and independent elements of the environment. That young people find it hard to understand the complexities and implications of issues was made evident from their questionnaire responses and during teacher interviews. Teachers often noted that ‘*they [the students] tend to have very black and white views*’. Furthermore, teachers argued, young people frequently failed to make connections with the wider issues. One pupil, asked at the end of a lesson on the ozone layer what he could do to help, said, quite seriously, that he supposed he ‘*might use a pot of paint instead of an aerosol to do graffiti*’.

Because of this interdependence, it was decided instead to draw up an index of ‘**environmental consciousness**’ based on 30 individual items throughout the questionnaire.<sup>6</sup> Some of these items were factual statements to which students responded; for example, ‘If more people switched to buses and trains from cars, air pollution would be reduced’. Other items reflected conceptual understanding and particular attitudes;

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<sup>6</sup> Items were scored on a scale of 0 to 2, comparable to a low (0), medium (1) or high (2) environmental consciousness.

for instance, 'Pandas are nice to look at, but it doesn't really matter if they die out in the wild', or 'If some poorer countries want to cut down their tropical rainforests then other countries should not try to stop them'. The final group of items was linked to a student's expressed concern for individual elements in the environment. Out of a maximum score of 60, only 12% of the young people scored 40 or higher, indicating that overall environmental consciousness, in terms of both factual knowledge and conceptual understanding, was not particularly high, even though young people showed widespread concern for environmental issues.

A further score, reflecting young people's **current behaviour** with respect to the environment, was then drawn up and revealed that even fewer young people (9%) were regularly involved in environmentally friendly practices. The behaviour and consciousness scores were then tested for correlation, and found to be highly correlated (0.62), suggesting that the two indices were potentially measuring different dimensions of the same environmental indicator. When young people's individual behaviour scores were cross-tabulated with their environmental consciousness scores, in order to identify any significant statistical relationships, it revealed that those with high environmental consciousness scores were far more likely to be involved in environmental action. In other words, **those young people who had both factual awareness and conceptual understanding were more predisposed to action**. While this finding at least challenges Posch's argument that environmental behaviour is not necessarily influenced by increased environmental knowledge and understanding, further analysis of the data was required in order to identify the factors which underpinned any predisposition to action. Young people are exposed to many different influences, via the curriculum, family, friends and the media. Were any of these more influential than others in developing positive attitudes to the environment, or promoting positive action? Were factual awareness and conceptual understanding the precursors to, or the outcomes of, any specific action taken? In particular, what role did schools play in ensuring the development of such attitudes and actions?

## 7. THE ROLE OF THE SCHOOL

According to Richmond and Morgan (1977) media was *'the most fruitful influence'* and school courses *'the least effective'* in promoting attitudes and action towards the environment. As far as the young people in the NFER survey were concerned, the single most important source of information about the environment was indeed the television. It rated more highly than each of the subject areas under study, although the scores for geography and science were only marginally lower when the responses to 'A lot' and 'Quite a lot' are added together, as indicated in Table 2 below.

Table 2 Sources of Information About the Environment

	A lot %	Quite a lot %	A little %	None %	No response
Television	44	40	14	1	1
Geography lessons*	30	48	18	3	-
Science lessons*	23	42	33	3	-
Magazines	15	40	35	8	1
PSE or tutorial lessons*	6	19	39	36	-
Other lessons at school	4	18	50	24	4
Family	3	17	43	36	1
Friends	2	8	36	54	1
Technology lessons*	2	4	42	52	-
N* = 428					

\* All percentages calculated out of a response of 428, other than for science (424), geography (266), technology (382) and PSE (377) lessons, where calculations were based on the young people who were studying the subjects.

A series of single response questions

426 young people responded to one or more parts of this question

However, the question remains as to the relative importance of the media as a source of information or as a means of developing student attitudes or promoting environmentally friendly behaviour. Was the media more or less effective than schools in significantly influencing students in these areas? The teachers who were interviewed for this research were divided as to the potential role that schools could play in developing environmental consciousness. For some, environmental education was clearly a side issue in the curriculum (this attitude was

expressed most clearly amongst teachers in independent schools), while, for others, there was a feeling that schools had only a marginal impact, as shown by the following comments:

*People's attitudes and views come from their home environment...the visual impact of the TV is the strongest influence...schools can give knowledge.....but it is not their role to change views, attitudes and behaviour. Teachers' attitudes might influence pupils, but it is very marginal. What goes on in the classroom has very little influence compared with home and peers.*

However, in some schools there was a much stronger feeling that teachers had a key role:

*The school has a tremendous role to play...in acting as a counter-balance to negative outside influences. In theory, the pupils are environmentally friendly, but they can find it hard to put their ideals into practice. So the school is important as it can make students aware of what they can do...the school should help them guide their ideals into action.*

## 8. IDENTIFYING THE FACTORS INFLUENCING YOUNG PEOPLE'S ENVIRONMENTAL AWARENESS AND ACTION

In order to assess the relative impact of school, home and the media, the data from the 428 students and the 19 schools from which they were drawn was analysed by constructing a series of multilevel models.<sup>7</sup> These models, which are a development of traditional multiple regression techniques, allow information which is arranged hierarchically (for example, at school, department or student levels) to be examined and related. In this way, particular outcomes, such as a young person's degree of concern for the environment, or the environmentally friendly actions they take, can be related to the inputs they receive from their school, the media or other bodies, and the significant factors identified. However, two points need to be made at the outset:

- ◆ The models do not identify causality in a definitive way, but simply indicate significant factors which appear to bear some relationship to the outcomes. For instance, one of the findings of the modelling was that young people who were involved in environmental organisations were shown to be significantly more environmentally conscious and more likely to be involved in related action than others. What we cannot know from this is whether membership of an organisation was a key element in the development of the young people's environmental awareness, whether the young people became environmentally aware before joining an organisation and then become actively involved in recycling and/or conservation or whether such awareness and activity acted as a spur to joining a specific organisation.
- ◆ The findings should, therefore, be regarded as indicative rather than conclusive since the numbers of students (428) on which the models were devised mean that the models are still fairly volatile.

The outcome variables to be used in each of the models were obtained from a factor analysis of the student survey. This identified five specific factors which 'explained' different percentages of the variance.<sup>8</sup>

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<sup>7</sup> For an explanation of *multilevel modelling*, and a detailed statistical breakdown of the outcomes of the analysis, see Sections 2 and 3 of the Technical Annex at the end of this paper.

<sup>8</sup> For an explanation of the term *variance* and the extent to which it can be explained by the individual factors, see the Glossary of Terms at the end of the paper.

<b>OVERALL FACTOR</b>	An overall factor which represented <b>general environmental awareness</b> and concern and explained 17.8% of the variance at student level.
<b>FACTOR 1</b>	This factor represented the individual <b>actions taken</b> by students and explained 9.54% of the variance at student level.
<b>FACTOR 2</b>	This factor represented students' specific <b>environmental concerns</b> and explained 6.86% of the variance at student level.
<b>FACTOR 3</b>	This factor represented students' <b>attitudes toward the actions to be taken by others</b> and explained 5.53% of the variance at student level.
<b>FACTOR 4</b>	This factor represented students' <b>feelings of personal influence</b> in environmental issues and explained 5.12% of the variance at student level.

Each of these outcomes was examined in relation to a series of background variables about the student and the school from which the student came. These variables were obtained from quantitative data from student and staff questionnaires and from composite scores derived from the more qualitative data.

The background variables at **school and department level** included:

#### **School variables**

- **size, location, type;**
- existence of environmental education **policy;**
- inclusion of environmental education in **institutional development plan;**
- existence of **co-ordinator** for environmental education;
- **importance** attached to environmental education in the curriculum;
- **staff attitudes** towards environmental education;
- amount of **INSET** on environmental education.

#### **Department variables**

- **dominant department** for environmental education;
- **importance** of environmental education in department;
- extent of environmental education **content** in the curriculum;
- perceived **effectiveness** of curriculum in raising environmental awareness;
- any **constraints** on delivery of environmental education (skills, time, resources, etc.).

The background variables at **student level** included:

- **sex**;
- **ethnicity**;
- **subjects studied** (including average ability and liking for subjects);
- number and range of **environmental bodies** to which the student belonged;
- **internal and external influences** (including school, family and the media).

Each model was constructed at two levels, with simple residuals<sup>9</sup> at school and student levels. In order to identify all significant variables, a procedure was adopted whereby the model was first set up without the background variables in order to establish the amount of variance at school and student level for each of the outcome variables. Subsequently all of the student level variables were included and those which were not significant were removed. School and department level variables were then fitted and all non-significant variables removed in order to get the most 'parsimonious' overall model.

The significant background variables relating to the five outcome variables for young people are summarised below.<sup>10</sup>

### **Overall Environmental Awareness**

**Perceived input from the school, the family and the media were significantly related to overall environmental awareness amongst students.**

The **highest scores on environmental awareness** were found amongst:

- girls;
- students who enjoyed the subjects they studied (ability was not found to be significant here);
- students who belonged to an environmental organisation;
- students from LEA and GMS schools (those from independent schools had significantly lower scores);
- students from schools in which there was a designated environmental education co-ordinator;
- students from schools in which staff were thought to be expert in, and strongly motivated towards, teaching environmental education.

<sup>9</sup> For an explanation of the term *residuals*, see the Glossary of Terms at the end of the paper.

<sup>10</sup> Full details on the statistical elements of the model are included in the Technical Annex to this paper. Variables which were subsequently judged to be spurious, or which were identified as interrelated, are not reported on in this paper, but are identified in the annex.

At a **departmental** level:

- even when controlling for the presence of **constraints** on teaching environmental education within other departments, it emerged that the only constraints which appeared to have a significant link with students' overall environmental awareness were those operating in **geography departments**. Geography students in departments in which such constraints operated had a significantly lower score on environmental awareness than geography students in other schools.

This indicates that overall environmental awareness amongst students is a product not only of media input, but of school and family influences. In particular, students from schools in which there was a clear emphasis on environmental education, either through the curriculum, or through extra-curricular activities, and in which staff were both expert in, and motivated towards, environmental education, showed a higher degree of awareness than did other young people. It is interesting to note that any reported lack of expertise in geography departments seemed to have a more pronounced negative effect than such a lack in other areas of the curriculum, since it is perhaps in geography that the social impact of environmental change is most likely to be explored.

### Individual Actions

**Perceived school and family input were significantly related to action, but media input did not play a significant part.**

The **highest scores, in terms of the individual actions** taken by young people, were found amongst:

- girls;
- students who enjoyed the subjects they studied (ability was not found to be significant here);
- students who belonged to an environmental organisation;
- students from schools in which there was a designated environmental education co-ordinator;
- students from schools in which staff were thought to be expert in, and strongly motivated towards, teaching environmental education.

The influence of the **media** has long been recognised as playing a part in developing young people's environmental awareness, but the findings from this study suggest that it **plays a much less significant role in determining the extent to which young people become involved in**



**environmental action.** Family background and the role of the school were demonstrably more influential in promoting environmentally friendly behaviour than either the television or the press.

However, the views of senior staff on the importance accorded environmental education in their school were not an effective indicator of its actual impact on student action and neither was the existence of an environmental education policy. Schools in which an environmental co-ordinator had been appointed appeared to be more effective in terms of promoting action – possibly because the presence of a co-ordinator is both more tangible and more likely to be linked to environmental practice than the development of a policy document which may or may not be implemented. Overall, these findings back up the view, which emerged strongly during fieldwork interviews, that **it is the beliefs and practices of environmentally motivated teachers which are the most significant elements in prompting young people to undertake environmental action.** Environmental co-ordinators, particularly those with a key subject area or with an extra-curricular role, were thought to be particularly influential.

### Environmental Concerns

**Perceived school, family and media input were all significantly linked to concern for the environment.**

The highest scores on **concern for the environment** were found amongst:

- students who enjoyed the subjects they studied (ability was not found to be significant here);
- students from ethnic backgrounds other than Asian (note, however, that only six per cent of the students reported that they were of Asian origin).

Concern for the environment is clearly not based on ability, although it is evident that, without an enjoyment of the subjects they studied, students were less likely to have reported that they regarded environmental issues as a matter for consideration. To this extent at least, schools have a role to play in encouraging a concern for the environment.

One interesting relationship emerged as significant in the model, but is not included above because of the degree of interrelatedness between the variables. However, it appeared that technology (studied by at least 90% of the students) was positively linked with student concerns, while science (studied by at least 98% of the students) was negatively linked. It may suggest some possible differences between the subjects in terms of the extent to which they promote concern for the environment. Does

studying science mean that students feel more informed and therefore able to make a realistic appraisal of the issues or does it simply indicate that they are more familiar with the issues and therefore less worried about the 'unknown'? Does the focus on industrial and health and safety issues, as opposed to social or scientific issues, in technology mean that young people are more aware of everyday hazards in the environment?

### **Actions that Should Be Undertaken by Other People**

**Media input was the dominant variable in influencing young people's attitudes towards the actions that should be undertaken by other people with respect to the environment.** Perceived school and family input appeared to play no significant overall role in influencing such attitudes.

**The strongest views on the action that should be undertaken by other people in the environment,** were found amongst:

- girls;
- students whose average self-reported ability was high;
- students in rural schools.

At a **departmental level:**

- controlling for constraints within each department, it emerged that geography students in schools in which there were **few constraints** on the teaching of environmental education in the **geography department** had higher scores than other geography students;
- controlling for the **level of importance accorded by all subjects**, it emerged that students were more likely to have **strong views** on the action that should be undertaken by other people with respect to the environment in schools where **science staff** accorded a high level of importance to environmental education.

Information provided by the media proved to be dominant in promoting strong student attitudes to the action that should be undertaken by others, through behavioural change and through legislation. Schools and families appeared to play a much less significant role in communicating such attitudes to young people and many teachers felt that the strong imagery and the campaigning stance often adopted by the media far outweighed the comparatively low-key approach that schools were able to adopt. This clearly has implications for the way in which teachers make use of the media, in terms of both developing a critical approach to television broadcasts amongst students and utilising such imagery in the broader curriculum work of the school.

### **Feelings of Personal Power**

**Family and media input appeared to be more important than school input in influencing overall feelings of power.**

**The highest scores in terms of feelings of personal ability to influence environmental change in the future were found amongst girls.**

**At a departmental level:**

- where there were **constraints** on environmental teaching in geography or PSE, students studying such subjects were less likely to feel they could play a positive role in the future.

The impact of formal education was far less significant than that of external influences in creating the pre-conditions for young people to feel that they had a part to play in ameliorating the effect of man's intervention in the environment.

## 9. THE IMPACT OF THE SCHOOL, THE MEDIA AND THE FAMILY

The story which emerges from the analysis is a complex one, in which there are clear sex differences in young people's attitudes and behaviour, although not in environmental concerns. Girls were significantly more likely than boys to be involved in environmental organisations, to be active in conservation and recycling and to feel that they had a significant part to play in improving conditions within the environment. Student ability appeared to be less of a factor than their liking for a subject (or subjects) in determining the extent to which young people became involved in environmental action, although it seemed to be positively linked to the likelihood that they would select an appropriate response to a particular environmental issue. However, the models clearly indicate that, unlike the conclusions reached by Langeheine and Lehmann (1986) and Schleicher (1989), **schools have a key role to play in influencing both environmental awareness and action** for all young people. The provision schools made for environmental education was a significant factor in developing overall environmental awareness, raising concerns and promoting student action, although their role in shaping young people's attitudes towards other people's actions was less significant than that of the media.

The significant differences, with respect to young people's environmental awareness, attitudes and action, within and between schools, and between schools and the media, are summarised below.

Firstly, there were indications that both school type and location had an impact on the role played by schools. Interestingly, students from independent schools were significantly less likely to be environmentally aware than those from other schools. Indeed, teachers from one such school indicated that, '*environmental education is really a side issue in the school*' and that it had '*not been considered an important aim of the school*'. They expressed themselves '*surprised at the amount of environmental questions in the [science GCSE] papers...[which] were contrary to what we expected...*'. The catchment area of schools was also important, with young people from rural schools expressing the strongest views on the action that should be taken in the environment. According to teachers, students from such schools often had far more opportunity for field experience than those in semi-urban or inner-city areas, suggesting that first-hand experience is perhaps a prerequisite for the development of positive attitudes. Experience certainly emerged as a clear prerequisite for promoting positive action towards the

environment, with the highest scores being found amongst students actively involved in organisations such as the World Wide Fund for Nature and the Royal Society for the Protection of Birds.

Secondly, within schools, the presence of a designated co-ordinator and other staff who were strongly motivated towards, and expert in, environmental education was a key factor in promoting awareness and action. As far as individual subjects were concerned, some interesting findings emerged from both the analysis and the visits to schools:

- ◆ The role of the **geography** department seemed key, with any constraints there apparently having a significant effect on overall levels of student awareness, attitudes and feelings of power within the environment. Geographers also appeared to be more realistic than others in identifying the role that geography played in promoting positive attitudes towards the environment. In all, 91% of the teachers felt that geography had at least 'quite an effect' on students' attitudes to the environment, with 78% of the students agreeing that geography kept them well informed. One respondent expressed the role of environmental education in geography succinctly:

*Environmental education has a fundamental role to play within the geography curriculum. With its relationship to the natural processes and human-made activities...environmental education is the mechanism for developing awareness and management of the 'whole' environment, both natural and built,*

while another expressed the view that

*it [environmental education] allows a teacher to engage students' values, attitudes and empathy in a meaningful context.*

- ◆ Within the **science** curriculum, according specific importance to environmental education (and not just '*doing ecology with environmental impact tagged on*', as one teacher expressed it) appeared to be important in promoting positive student attitudes towards solutions to environmental problems. However, in responding to the questionnaire, some scientists expressed concern that there was often too much theory involved in the environmental education content of the science curriculum and that the predominant focus on environmental problems led to a '*doom and gloom mentality*'. Others, however, felt that the '*informed attitude [of scientists] to the problems [was not] usually the case in other subjects*' and were of the opinion that the approach adopted by scientists needed to be used much more widely across the curriculum.
- ◆ The views of **PSE** staff were not always consonant with those of the young people in terms of the perceived impact that the subject had in raising awareness and developing positive attitudes. At least 76% of the PSE staff responding to the survey thought that the PSE

curriculum was at least 'quite effective' in helping students to develop positive attitudes to the environment, yet only 25% of the students believed that this was the case. Teachers were generally uncertain about the role that environmental education should play within the PSE curriculum, with staff much more likely to see it as peripheral (14%) than either geographers (1%) or scientists (6%).

- ◆ The part played by **technology** was not clear. According to one respondent, teachers in this area had not yet fully exploited the potential of the subject for making the links between the outcomes of everyday life and environmental issues:

*If staff were sure that it was an area that was here to stay and therefore worthy of continued serious development, it would have a higher profile. Technology has suffered over recent years from constant change and shifting sands and goal posts.*

Technologists were apparently just as likely to regard environmental education as a central part of the curriculum (11%) as peripheral (12%).

Finally, the media was, as Richmond and Morgan indicated, the most frequently occurring significant variable, but its influence extended primarily to raising concern and promoting positive attitudes. **It was not as important in influencing action as the work of either schools or families.** The media can certainly be credited with raising student awareness; teachers frequently mentioned Blue Peter, Tomorrow's World and various wildlife programmes as having a positive impact. However, they noted that few young people, and particularly the less able, regularly read newspapers or magazine articles, or watched the news or the more taxing documentaries. One noted that '*anything useful on the media is over their heads – they remember the terms, but not what they mean.*' Others pointed out that the influence of the media could often be negative in that it desensitised young people, using images that were too remote from their everyday experience. They also felt that, while students responded to the '*sensationalist approaches*' of the media, and particularly of television, it tended to leave them with a one-sided view of issues and a range of stereotypical attitudes:

*They tend to be pretty black and white...they see the problem and can't understand why someone isn't doing something about it...they can't appreciate the range of arguments and don't understand the price to be paid for environmental concerns.*

Knapp, in 1972, explored this link between attitudes and actions, emphasising the distinction between a view which might genuinely be held and the part played by circumstance in any subsequent action taken:

*The term 'attitude' is defined as a person's favourable or unfavourable expression towards a class of objects or events. Attitudes are primarily characterised by evaluative human responses. For example, if a person says that he likes to swim in clean water, he is expressing an attitude. The expression of an attitude may or may not be accompanied by the associated action beyond the verbal level. An individual may state an attitude about liking to swim in clean water, but may swim in a polluted lake because it is more accessible.*

Translating this into environmental terms, a young person might agree that cycling the short distance to school or to visit friends is a more environmentally responsible way to behave, but persuade a parent to give them a lift because it is raining. Equally, they might support the principle of recycling, while throwing a can in the nearest waste bin, because it is easier than carrying it home. It is in translating these attitudes into affective action that the school has a role to play. It is significant that the evidence to date suggests that it is not so much the input from any single school course which is effective. None of the subjects studied by the young people were significantly related to the extent of environmental **action** in which they were involved. Rather, it is the ethos of the school and the overall importance it accords to environmental education which appears to be a key factor. In other words, it is the culture that the school creates which has the strongest impact on the behaviour of young people.

The creation of such a culture requires careful planning and support. As Richmond and Morgan reported in 1977:

*If attitudes of young people are to be translated into responsible social behaviour it would appear that these attitudes should be deeply rooted and based upon knowledge, experience and conviction, rather than superficially learned or instilled by indoctrination.*

The implications of this are clear: the development of positive attitudes to the environment in the school requires more than the inclusion of environmental content in the school curriculum, it also requires the need for opportunities to experience the environment and for those experiences to lead to self-motivation in action. How can schools set about doing this? As teachers intimated, the constant raising of environmental issues can lead to indifference among students. They frequently referred to what one described as 'exposure fatigue':

*For a number of kids, as soon as you mention the environment, they've been bashed with it quite a bit. But when you get down to what they actually know, it's not much – they just think they know all about it...*

In addition, there was a recognition that familiarity with issues could lead to a feeling that they are not overly important, that litter is less of a worry than nuclear power because it is less frightening.

Some schools had clearly begun to address this difficult issue of changing student attitudes and actions, but in doing so they faced a number of significant challenges (see Froud, forthcoming). Summarised below, these included:

- ◆ **Creating a coherent, progressive curriculum** in which the elements of environmental education across the curriculum were identified and successfully co-ordinated.
- ◆ **Coping with the complexity of many environmental issues** and the conflicting messages emerging from the media, scientists, economists and politicians.
- ◆ **Enabling young people to experience work in the environment** in the context of a growing public awareness of health and safety concerns. Particular difficulties were faced by schools in metropolitan areas which did not always have access to a wild garden, nature area or nearby stream.
- ◆ **The tendency to focus on catastrophes**, which, while thought to motivate students, was felt to contribute to feelings of powerlessness and to reduce young people's ability to see the problems posed by slow degeneration.
- ◆ **Countering materialism**, particularly amongst older students, for whom the need to impress peers was often thought to outweigh environmental idealism.
- ◆ **Coping with different levels of ability**, which was believed, by many teachers, to have a significant impact on student attitudes, and on their willingness to adopt different patterns of environmentally-friendly behaviour.
- ◆ **Coping with different levels of maturity**, with younger students thought to be less able to relate individual human actions to global outcomes.

Nonetheless, there was evidence that schools in the study had developed a variety of strategies for linking environmental understanding, attitudes and action. In addition to having a designated co-ordinator in post, these included:

- ◆ **Creating opportunities for environmental experiences.** While some teachers argued for a hands on approach, '*If you want to make an impact then you need to show them something that is in a mess...they need to get their feet into it,*' others were clear that careful use of media imagery could have an equally strong impact,



*'Dropping oil into water in the lab is not as effective as watching a video on pollution caused by an oil tanker in the Antarctic'.*

- ◆ **Linking curriculum examples to young people's daily experiences.** Environmental education was felt to be fraught with examples which presented conceptual problems. Teachers, especially non-specialists, found it difficult to present issues they did not fully understand themselves, with a number referring to the difficulty of understanding how widespread changes in sea level, weather systems and vegetation systems could result from a change in global temperature that was too small for the individual to notice. Therefore, many had tried to link issues to things that students could be expected to experience in their daily life, making links, for example, between air pollution and asthma. In this way they hoped that young people would be able to *'see the sense of what they do – it's not [the teacher] preaching at them again'*.
- ◆ **Putting more emphasis on local issues.** Throughout the study, teachers referred to the difficulty of helping young people to make the link between local and global issues. This was compounded where staff felt that they themselves were also uncertain about the links between certain phenomena, particularly with respect to global warming, or the value of recycling, and they noted that the messages from scientists, politicians, industrialists and economists were often conflicting. Partly in response to this, some focused more centrally on local issues where they felt that young people could see the benefit of action. As one teacher remarked, *'kids are difficult to motivate about issues that they don't see as affecting them'*.
- ◆ **Establishing student motivation.** Ownership was emphasised as a key factor in leading to student motivation to adopt environmentally friendly practices: *'We don't really involve the kids enough in finding practical solutions to problems.'* One school found that by putting a year group in charge of both establishing and maintaining the school pond they had also reduced the amount of litter generated: *'They stopped throwing things out of the window when they realised it might end up in the pond.'* A second school was running a successful recycling scheme which had been set up by the young people following a short environment course. There was a general consensus that compulsory action (such as the weekly litter pick-up often used as a punishment) and constant repetition of environmental themes were more likely to lead to resentment than to any long-term changes in behaviour. Citing an example from another cross-curricular area as evidence, one environmental education co-ordinator noted of a vigorous, and outwardly successful, health promotion activity in the school: *'If you make a big fuss about a lot of things, the kids just turn off...we've done endless work on healthy eating – but they're still shovelling the chips down.'*

## 10. CONCLUSION

The Year 11 students involved in the survey were **significantly more concerned about large-scale global environmental issues**, concerning which they felt relatively powerless, than about more local issues. Whilst this indicates a different focus for concern than that of the adults in Witherspoon's study, in common with her findings (Witherspoon, 1994), based on a survey of over 1000 adults in 1993, the research has shown that environmental concern is more prevalent amongst young people than environmental activism. There is still clearly a problem in transforming anxiety into action and in changing individual behaviour in ways that could impact on global environmental problems, along the lines advocated in the ESRC Global Environmental Change Programme. **Young people who were both informed and had developed positive attitudes towards the environment showed that they were more predisposed to action than those with factual information alone.**

While some of the factors that seemed common to young people who were involved in environmental action are outwith the direct control of the school, **a key finding of this research is that the extent to which schools can play a role seems greater than that which has previously been identified or assumed in other studies.** In particular, their role in encouraging young people to act in environmentally friendly ways appears to be significantly more influential than that of the media. Interestingly, this role seems to be less dependent on the subjects which young people study than on the ethos and culture that have been created within the whole school and the attitudes of individual teachers towards environmental education.

At present, the full potential of the schools' role has clearly not been exploited, with few schools giving much priority to environmental education (see Tomlins and Froud, 1994) and only one-third of the schools appointing an environmental education co-ordinator, for example. However, even with a limited commitment to the theme, some significant results have emerged that highlight areas for development in the future. In particular, schools face key challenges in enhancing environmental awareness and action amongst young people in terms of:

- ◆ **Re-evaluating some of the prevailing preconceptions about the teaching approaches adopted for environmental education.** A traditional approach to many areas of the curriculum has been to start small, or to use local examples, before addressing issues which are on a larger scale or are more distant. However, this research has shown that young people were clearly more concerned about global, rather than local or pollution issues. While there is a need to be wary

of adopting an approach to environmental education which focuses on catastrophes, there is also a need to help young people understand that global problems:

- are generally the result of cumulative individual actions;
- have implications for local behaviour;
- can only be ameliorated by adopting strategies that address the causes of the problem, rather than the symptoms.

This last point, in particular, highlights the need for young people to develop greater environmental literacy. Campaigning to save the rainforest sounds worthy, but unless people have some idea of the complex social and economic interactions that have led countries, for example, to cut down large swathes of the forests, such campaigns will be poorly focused and, ultimately, have little impact.

- ◆ **Addressing the gender differences in environmental attitudes and behaviour.** Although there were no significant differences in the environmental concerns expressed by boys and girls, there were clear differences in their attitudes and the ways they behaved. According to one teacher, green issues had a '*sissy image*' and few schools had developed strategies akin to those in careers education for addressing stereotypical responses. As Harris (1979) noted, '*we should never dare to undervalue the power of group pressure to influence and determine an individual's knowledge.*'
- ◆ **Co-ordinating environmental education.** Co-ordination, where it existed, seemed to focus on preventing duplication rather than ensuring continuity and progression. A number of teachers felt that this was primarily a result of National Curriculum pressures, with the focus on thematic work rather than on subject links. In a recent report on the geography National Curriculum, Roberts (1995) identified the difficulty that some teachers felt they faced in continuing with integrated approaches to the curriculum, a difficulty that was raised more than once during the fieldwork for this project. Nonetheless, there were a number of instances in which a careful cross-curricular audit, followed by a co-ordinated strategy in which departments made use of related data, enabled teachers to maximise their use of environmentally related resources.
- ◆ **Making appropriate use of the media in schools.** The dominant role of the media in promoting student awareness and attitudes is recognised. The use of documentaries and other mainstream programmes, over and above those made specifically for school use, was widespread amongst geography departments, but was less utilised by staff in other areas.
- ◆ **Promoting positive attitudes amongst teaching staff.** The attitude and expertise of subject staff was a significant variable in promoting student awareness and environmental action. However, the initial survey of 294 schools revealed that most departments experienced

some degree of constraint with respect to lack of expertise or staff motivation, although this was less prevalent amongst geography and science staff (Tomlins and Froud, 1994).

- ◆ **Identifying viable school strategies which motivate young people towards environmental action.** Key factors in motivating young people, according to the teaching staff who were interviewed, seemed to be the provision of first-hand experience and involving them in the decision-making processes with respect to any action taken in the school or the local community.

The challenge faced by schools is not a simple one. In her paper, 'The greening of Britain', Witherspoon (1994) identified three factors at work in influencing environmental values, individual behaviour and policy preferences. She listed these as '*social values*' (including altruism), '*rational perceptions*' based on well-documented and presented scientific evidence and '*romantic world views*' which were based on '*scepticism about scientific and economic progress*'. In this last case, she argued, '*those who espouse this sort of romantic environmentalism are particularly unlikely to have a very clear sense of which policies or actions might best address their concerns.*' For schools, this means that they not only need to present clear information and ideas about elements of the environment which are not in themselves conceptually easy, but also that they need to counter some of the emotive and often sensationalist messages put forward by the media and enable young people to appreciate other people's perspectives and points of view. The difficulties inherent in this should not be overlooked, but indicate a need for more focused INSET and the development of more objective resources for teachers' use. The recent controversy surrounding the disposal of Shell's North Sea oil platform is a case in point. Most young people and their teachers will have been made aware of the arguments put forward by environmental pressure groups, by other political and economic forces and by the media. However, rather fewer will have heard those put forward by the scientists. Without appropriate resources, teachers attempting to use this incident as part of the science, geography or technology curriculum would be hard pressed to avoid inculcating the '*romantic environmentalism*' identified by Witherspoon.

Overall, however, it is clear that there is scope for schools to play a more substantial role in influencing environmentally friendly behaviour amongst students and in helping them make the link between global and local issues. Whilst schools may not have the same immediate impact as the media (and, in particular, television) in swaying public opinion and in influencing people's attitudes, they have the ability to play a significant part in promoting a more proactive approach to environmental issues amongst young people and in enabling them to find their way through the '*minefield of misleading information, and contradictory attitudes and values*', identified by many teaching staff.

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# TECHNICAL ANNEX

## 1. DATA SETS

Three sources of primary data were used in this research. These included a series of questionnaires to teaching staff in schools, detailed interviews with teachers in a selected sub-set of schools and a survey of young people in Year 11. In detail:

- i. A representative sample of 500 secondary schools in England and Wales was drawn in order to administer a set of five questionnaires. Each school was sent questionnaires targeted at the deputy head with responsibility for curriculum (or cross-curricular themes), the heads of the science, geography and technology departments and the teacher with responsibility for personal and social education programmes (PSE). Responses of one or more questionnaires were received from 294 schools (a response rate of 59%). Over half (56%) of the responding schools returned at least four questionnaires, with 37% returning all five. **Table A1** gives the total number of respondents to each questionnaire.

**Table A1 Questionnaire responses**

Questionnaire	Respondents	
	Percentage	Number
Deputy head	48	239
Head of science	44	221
Head of geography	43	217
Head of PSE	36	182
Head of technology	35	176
N =	1035	1035

- ii. Forty of these 294 schools were selected for a programme of detailed semi-structured interviews and classroom observations. These schools were selected using a factor analysis of the teacher questionnaires to draw up an index of environmental activity for each school. The score for each school was then tested against school location, size and type, in order to identify schools covering the range of environmental policies and practices within a stratified regional framework. In total, 153 staff were interviewed and these included the designated environmental co-ordinators (where appropriate), heads of department and senior managers. In addition 16 lessons with an environmental education focus were observed in 16 schools.



- iii. An attitudinal and semi-projective questionnaire was administered to 428 Year 11 students in 19 of the 40 schools visited. This further sub-set of schools was selected to represent a range of school locations, types and sizes and varying practices with respect to departmental involvement and commitment to environmental education. In the original proposal, the intention had been to administer these questionnaires in 15 schools, yielding approximately 375 students, but, in the event, an additional 4 schools also expressed a willingness to use the questionnaire with their Year 11 students, so that the original target was exceeded.

## 2. GLOSSARY OF TERMS

### **Variance**

A measure of the spread of values between different objects in the same data set. It is based on the squares of the differences between individual values and the overall mean, and is always greater than or equal to 0. A variance of 0 implies that all values are identical.

### **Factor analysis**

The aim of factor analysis is to reduce a large set of interdependent variables to a smaller set (usually just one or two, but can be more) of derived variables or 'factors', whose relationships to the original variables are such as to reproduce the largest part of their inter-correlations in terms of the new factors. This technique enables 'factor 'scores' to be derived for each individual in a survey, which can be studied in lieu of the original more complex set of variables.

There are many techniques in use for carrying out a factor analysis. In the method used in this research, each factor can be said to 'explain' a certain percentage of the dataset. If, for example, a data set consisted of 80 completely unrelated items, then any factor would only explain 1/80th of the variance. In social science research, as compared with physical science research, any factor which explains more than 10% of the variance can be thought to be important. In the factor analysis used to identify the outcome variables in this study, the principal factor (overall environmental awareness) explained 17.8% of the variance. The four sub-factors (action, concerns, attitudes and feelings of power) jointly explained 27.05% of the variance. All five factors were therefore deemed to be important for the study.

### **Multilevel modelling**

Multilevel modelling is a development of **multiple regression techniques**. The latter studies the relationships between variables in terms of the dependency of a single variable (the dependent or **outcome**

**variable**, which may be a factor score) on a set of other explanatory or **background variables**. In multilevel modelling, the assumption is made that the data is collected from a hierarchical system, with, for example, some data relating to individual students and some relating to schools. Random variations can occur at any of these levels (see notes on **standard error** and **residuals** below), and can be fitted in the model. The model can therefore study the relationships between outcome variables and background variables, taking into account any random variations that might occur at student or school level.

Multilevel models allow us to estimate variances at different levels. For example, the student level variance is a measure of the variability in outcomes between different students, and the school level variance measures the variability between the average outcomes for different schools. These variances are generally reduced by the addition of background variables for the model, which tend to 'explain' some of the variability.

#### **Outcome variable**

A numerical measure of some desired outcome, computed for each individual being modelled. It is assumed to be single-valued and continuous. Thus student outcomes, such as action taken in the environment, must be converted to a single-valued score for use in the model. The factor scores for students, which emerged from the student survey, were therefore used as outcome variables in the multilevel models.

#### **Background variable**

A numerical measure of some educational or social factor which is supposed to be influencing the outcome variable, either positively or negatively. A number of background variables may be included in the model, and may relate to students, schools or other levels. Background variables may either be continuous or dichotomous. An example of the latter is an 'indicator' variable which has the variable 1 if the individual or unit belongs to a particular group (LEA maintained school) and 0 otherwise (non-LEA school). Most of the background variables used in the models derived for this study were dichotomous indicator variables.

#### **Coefficient**

One of the results of the modelling process is a coefficient estimated to each background variable which measures the strength of its influence on the outcome variable. It should be regarded as the rate at which the outcome variable increases per unit increase in the background variable. Indicator variables have coefficients which measure the average difference between being in the given group versus belonging to the

reference (control) group. Therefore a coefficient of 2.643 for sex indicates the average difference between boys and girls for the selected outcome variable.

### **Standard error**

Each coefficient or variance computed by the modelling process is an estimate of its corresponding 'true' value based on the data available, and is therefore liable to be in error. The model also computes a standard error for each estimated parameter which measures the amount by which it might be in error. As a rule of thumb, coefficients less than twice their standard error in absolute value are not regarded as significantly different from zero.

### **Residual**

The residual or error term in the model for an object at any level (for example, student or school) is the amount of the outcome variable which is not predicted by the overall mean or the background variables. In other words, it is what is 'left over' after the model has been fitted. Residuals sum to zero for objects at a given level, and tend to become smaller as more background variables are fitted.

## **3. RESULTS OF THE MULTILEVEL ANALYSIS**

In order to assess the ways in which student outcomes were related to the range of information, teaching and learning approaches and other influences to which young people were exposed, a complex set of variables needs to be examined. Young people came from a variety of home and school backgrounds, and had been exposed to varying extents to environmental education and environmental experiences, all of which could be expected to have an impact on their awareness of, attitudes towards and behaviour in, the environment. Since the data to which the research team had access was hierarchical (variables could be identified at distinct levels – school and student), it was therefore decided to use multilevel modelling to analyse the data.

In multilevel modelling, the process is begun by identifying an outcome variable (for example student attitudes or actions); then for each level defining the background variables that might be thought to influence that outcome. Regardless of the outcome variables that are selected, we can expect that there will be differences of outcomes at each level:

- ◆ **individuals** will be different from each other;
- ◆ individuals within one **school** will be **collectively different** from those in other schools; and

- ◆ individuals studying **individual subjects** will be **collectively different** from those not studying those subjects.

These differences can be measured in terms of the extent to which each outcome variable is conditioned by the background variables at each level. For example, the effect that the presence of a co-ordinator for environmental education is having on student action can be assessed through comparing the mean observed difference in the action scores of young people in schools with a co-ordinator with the expected means for all young people in the survey, taking into account the relevant background variables at school and student level.

By analysing the data in this way, we can see the overall effects of each of the variables and identify the variables which have a significant impact. However, it should be remembered that:

- ◆ No multilevel model is likely to include every possible variable. The ones which have been included here are those which are known from past research to be relevant to student outcomes (see Raudenbusch and Willms; 1991, Morris *et al.*, 1992 and Morris *et al.*, 1995) or have emerged as relevant in the case study visits.
- ◆ The models do not identify causality in a definitive way, but simply indicate significant factors which appear to bear some relationship to the outcomes. For instance, one of the findings of the modelling was that young people who were involved in environmental organisations were shown to be significantly more environmentally conscious and more likely to be involved in related action than others. What we cannot know from this is whether membership of an organisation was a key element in the development of the young people's environmental awareness, whether the young people became environmentally aware before joining an organisation and then become actively involved in recycling and/or conservation or whether such awareness and activity acted as a spur to joining a specific organisation.
- ◆ A multilevel model is only as good as our understanding of the educational processes at work in environmental education, and those presented here are, consequently, open to further refinement and development.
- ◆ The findings should, therefore, be regarded as indicative rather than conclusive since the numbers of students (428) on which the models were devised mean that the models are still fairly volatile.

Despite these caveats, the process is felt to be a useful means for linking outcomes to inputs and of identifying issues for more detailed investigation.

## 1. The outcome variables

In the models which were used in the research, five outcome variables were identified using a factor analysis of the student questionnaire. These included one overall factor and four sub-factors:

OUTCOME MEASURES FOR STUDENTS			
No.	Name	Range	Description
1	TOTFACT1	50-142	Overall environmental awareness (principal factor)
2	FACT1	68-140	Students' actions within the environment
3	FACT2	49-128	Students' concerns about the environment
4	FACT3	45-133	Students' attitudes towards the action that should be taken in the environment
5	FACT4	64-160	Students' feelings of personal influence in the environment

## 2. Background variables

### Student level

The range of variables, based on raw or composite data obtained from 428 students, included:

STUDENT LEVEL BACKGROUND VARIABLES			
No.	Name	Range	Description
1	SEX	0-2	0 = male, 2 = female, 1 = not given
2	BLACK	0/1	Ethnic category = Black
3	ASIAN	0/1	Ethnic category = Asian
4	OTHER	0/1	Ethnic category = Other
5	DOSCI	0/1	Studying science
6	DOGEOG	0/1	Studying geography
7	DOTECH	0/1	Studying technology
8	DOPSE	0/1	Studying PSE
9	AVAB	0-3	Average ability (based on each subject studied)
10	AVLIKE	0-3	Average enjoyment (based on each subject studied)
11	BELONG	0-2	2 = belonged to an environmental organisation; 1 = used to/plan to belong; 0 = does not and has not belonged to an environmental organisation
12	SCHINPUT	0-3	Mean level of information on the environment obtained from school (composite variable)
13	FAMINPUT	0-3	Mean level of information on the environment obtained from family/friends
14	MEDINPUT	0-3	Mean level of information on the environment obtained from the media (composite variable)

Ideally, in order to study the impact of different combinations of subjects on the student outcomes identified by the factor analysis (environmental awareness, actions, outcomes, attitudes and feelings of personal influence), and to avoid the problem of interrelatedness, a variable should be created for each combination of subjects. However, this would have meant the possible inclusion of 24 extra variables. Given the size of the dataset of students, this was not felt to be practicable at this stage, but would be done in any larger study (such as the proposed international comparison using the data collected in the Republic of Ireland).

### School level

These variables were obtained from 19 schools and were based on :

- ◆ raw or composite data from senior management questionnaires;
- ◆ three factor scores obtained from senior management questionnaires;
- ◆ data from each subject head's questionnaire, set to zero if the given student did not study that subject.

The table below sets out the range of variables used:

SCHOOL LEVEL BACKGROUND VARIABLES			
No.	Name	Range	Description
1	SIZE	420-1700	Number on roll in school
2	MET	0/1	Metropolitan LEA
3	GM	0/1	Grant-maintained school
4	IND	0/1	Independent school
5	CATCH	0-3	School location: inner-city to rural
6	INSDP	0/1	Environmental education in school development plan
7	COORD	0/1	Designated co-ordinator for environmental education
8	EEIMP	0-3	Importance of environmental education in whole curriculum (3 = essential, to 0 = not at all important)
9	INSET	0-2	Amount of INSET on environmental education (composite variable)
10	POLICY	0-5	Stage of environmental education policy (from 5 = dedicated comprehensive policy, to 0 = no policy)
11	STAFF	-2 to 2	Score for staff motivation and expertise (from +2 = strong positive effect in school, to -2 = strong negative effect in school)
12	IMPSCI	0-3	Importance of environmental education in science curriculum (3 = central, to 0 = peripheral)
13	CONTSCI	0-4	Environmental education content covered (0 = not taught, to 4 = extra content, over and above National Curriculum or GCSE, included)

*continued overleaf*

<b>SCHOOL LEVEL BACKGROUND VARIABLES</b> <i>(continued)</i>			
<b>No.</b>	<b>Name</b>	<b>Range</b>	<b>Description</b>
14	<b>EFFSCI</b>	0-3	Effectiveness of science in encouraging positive attitude to the environment (3 = very effective, to 0 = not at all effective)
15	<b>STRSCI</b>	0-2	Average constraints on environmental education in science (2 = a serious constraint, to 0 = not a constraint)
16	<b>IMPTECH</b>	0-3	Importance of environmental education in technology (3 = central, to 0 = peripheral)
17	<b>CONTTECH</b>	0-4	Environmental education content covered (0 = not taught, to 4 = extra content, over and above National Curriculum or GCSE, included)
18	<b>EFFTECH</b>	0-3	Effectiveness of technology in encouraging a positive attitude towards environmental education (3 = very effective, to 0 = not at all effective)
19	<b>STRTECH</b>	0-2	Average constraints on environmental education in technology (2 = a serious constraint, to 0 = not a constraint)
20	<b>IMPGEOG</b>	0-3	Importance of environmental education in geography (3 = essential, to 0 = not at all important)
21	<b>CONTGEOG</b>	0-4	Environmental education content covered (0 = not taught, to 4 = extra content, over and above National Curriculum or GCSE, included)
22	<b>EFFGEOG</b>	0-3	Effectiveness of geography in encouraging a positive attitude to environmental education (3 = very effective to, 0 = not at all effective)
23	<b>STRGEOG</b>	0-2	Average constraints on environmental education in geography (2 = a serious constraint, to 0 = not a constraint)
24	<b>IMPPSE</b>	0-3	Importance of environmental education in PSE (3 = essential, to 0 = not at all important)
25	<b>EFFPSE</b>	0-3	Effectiveness of PSE in encouraging positive attitudes to environmental education (3 = very effective, to 0 = not at all effective)
26	<b>STRPSE</b>	0-2	Average constraints on environmental education in PSE (2 = a serious constraint, to 0 = not a constraint)
27	<b>EEFACT1</b>	78-136	Importance of, and range of, activity in environmental education
28	<b>EEFACT2</b>	82-115	Stage in developing an environmental education policy
29	<b>EEFACT3</b>	83-113	School factor score 3: range and type of INSET
30	<b>CONS</b>	1	Constant

(Note that: The factor scores used, have, in all cases, been re-scaled to have a mean of about 100 and a standard deviation of around 15. Other variables have been created by averaging a set of questionnaire responses.)

The researchers were aware of some difficulties posed by the use of zero as both the default value for students and as a score for departments in a number of the variables described above. This procedure avoided the situation whereby a student who was not studying a subject would be linked to a lower value for that department on, for instance, the environmental education content of the subject, than a student who was studying with a department that was not providing any environmental education at all. However, it tended to equate a student not doing a subject with a low score for the department. The possibility of using negative values with some of the departmental data, so that 0 becomes the default score for students not studying the subject only, is being explored for use with the larger dataset which would be used in the proposed international comparison study.

### **3. The multilevel modelling process**

The process of determining a suitable model, that is, identifying a set of background variables which are all significantly related to the outcome and from which no significant variable is excluded, is quite complex and the final result may well not be unique. This is because many of the background variables could be quite strongly related to one another, so that isolating the ones which should be regarded as being part of the model and which should be excluded may be somewhat arbitrary. In order to reduce the risk of including spurious variables or omitting significant ones, the following procedure was adopted for this study:

1. The multilevel model was fitted to the data without any background variables (base case). This case identified the total variance at each level.
2. The student-level variables (SEX to MEDINPUT) were then added and the model was refitted. This demonstrated the extent to which the variance, at school and student level, was 'explained' by differences between individual students.
3. Variables which were clearly not significant were removed from the model, and it was then refined until those variables that remained were all significant (or very nearly so).
4. The school-level variables (SIZE to EEFACT3) were then added to the model, which was then refitted.
5. The non-significant school-level variables were then removed to get the most 'parsimonious' overall model. This model indicated the extent to which the variance, at each level, was 'explained' by differences between schools, departments and students. The remaining variance is likely to be the result of other, unidentified factors.



Only two levels were included in the model, with simple residuals at the pupil and school levels, although the latter included data obtained from individual departments within the schools.

Tables 1 to 5 show the results of this model-fitting procedure for each of the five outcomes, in terms of the coefficients for each variable in the final model and 95% confidence intervals for each coefficient. Related to each table is an estimate of the variances at school and student levels after fitting the model.

In the main text of the paper, those variables which proved most robust at all levels, are commented on. The tables included below, however, include all of the variables which were found to be significant in the analysis, but it should be noted that some of these appear to be interrelated with other variables or may be suspect in terms of their explanatory power.

**Table 1a: Analysis of Total Factor Score (TOTFACT1)**

Variables	Coefficient	Standard Error	Significant at 95% level	Low	High
SEX	2.643	0.6194	*	1.4290	3.8570
ASIAN	-4.573	2.349		-9.1770	0.0310
AVLIKE	4.648	1.163	*	2.3685	6.9275
BELONG	4.791	0.7821	*	3.2581	6.3239
SCHINPUT	3.699	1.026	*	1.6880	5.7100
FAMINPUT	5.867	0.9045	*	4.0942	7.6398
MEDINPUT	4.967	0.8327	*	3.3349	6.5991
EFFSCI	-5.992	1.484	*	-8.9006	-3.0834
EFFGEOG	1.935	1.343		-0.6973	4.5673
STRGEOG	-7.523	2.867	*	-13.1423	-1.9037
IMPPSE	1.382	0.8121		-0.2097	2.9737
IND	-11.73	4.036	*	-19.6406	-3.8194
INSDP	-5.549	2.584	*	-10.6136	-0.4844
COORD	4.598	1.711	*	1.2444	7.9516
STAFF	7.138	2.058	*	3.1043	11.1717
EEFACT1	-0.4392	0.1188	*	-0.6720	-0.2064

This run of the model indicated that there were a range of significant variables (at the 95% confidence interval) at both school and student level which were linked to overall environmental awareness. Differences between students in terms of sex, liking for subjects and belonging to an environmental organisation were all significant, as were differences between schools in terms of type, motivation and expertise of staff (related to environmental education) and the presence of a designated

co-ordinator. The existence of constraints within the geography department was significantly negatively linked to students' environmental awareness.

Some apparently significant variables, such as INSDP, clearly lacked explanatory power. For example, the finding that including environmental education in a school development plan is negatively linked to students' overall environmental awareness seems highly unlikely. Does it indicate that such a school is not yet doing any environmental education? Or is the variable interrelated with some other variable? When such statistically valid, yet unreliable, variables emerged, they were not given weight in the main text of the paper.

These variables effectively explained all of the variance between schools, but not between students, as the random variances indicate:

**Table 1b: Random Variances for Model 1 (TOTFACT1)**

Level of variance	Variance	Standard Error	Significant at 95% level	Low	High
School Variance	0	0		0.0000	0.0000
Student Variance	117	7.998	*	101.3239	132.6761

**Table 2** looks at the outcomes of the second model, which examined the variables that proved significant in relation to the environmental action undertaken by young people.

**Table 2a: Analysis of Factor Score 1 (Actions)**

Variables	Coefficient	Standard Error	Significant at 95% level	Low	High
SEX	2.753	0.6883	*	1.4039	4.1021
DOTECH	-8.864	2.202	*	-13.1799	-4.5481
AVLIKE	2.651	1.198	*	0.3029	4.9991
BELONG	4.772	0.8072	*	3.1899	6.3541
SCHINPUT	2.403	1.042	*	0.3607	4.4453
FAMINPUT	6.311	0.8976	*	4.5517	8.0703
EFFPSE	-5.567	1.642	*	-8.7853	-2.3487
STRPSE	11.83	3.602	*	4.7701	18.8899
COORD	6.637	2.066	*	2.5876	10.6864
EEIMP	-2.729	1.14	*	-4.9634	-0.4946
POLICY	-2.475	0.9996	*	-4.4342	-0.5158
STAFF	2.142	0.8625	*	0.4515	3.8325

As in Model 1, sex, liking of subjects and belonging to an environmental organisation are significant here, with staff motivation and expertise and the presence of a co-ordinator also linked to student action. Media input, unlike school and family input was not positively linked to action. However, there are some 'odd' results emerging here, such as constraints on PSE apparently being positively linked to action, or the existence of an environmental education policy being negatively linked. These findings merit further investigation but it is likely that there is an element of interrelatedness here, particularly since only 7% of the schools had a policy. As indicated in the discussion above, the model is illustrative, not causal, and can only reflect knowledge to date. Additional analysis, with a broader database, would be useful in assessing the reliability of some of these variables.

The random variances which emerged were:

**Table 2b: Random Variances for Model 2 (Action)**

Level of variance	Variance	Standard Error	Significant at 95% level	Low	High
School Variance	0.4548	1.767		-3.0085	3.9181
Pupil Variance	125.3	8.713	*	108.2225	142.3775

**Table 3: Analysis of Factor Score 2 (Concerns)**

Variables	Coefficient	Standard Error	Significant at 95% level	Low	High
SEX	-0.7017	0.645		-1.9659	0.5625
ASIAN	-6.898	2.604	*	-12.0018	-1.7942
DOSCI	-28.2	12.64	*	-52.9744	-3.4256
DOTECH	7.823	2.255	*	3.4032	12.2428
AVLIKE	3.267	1.239	*	0.8386	5.6954
SCHINPUT	2.6	1.139	*	0.3676	4.8324
FAMINPUT	3.452	1.012	*	1.4685	5.4355
MEDINPUT	3.453	0.9461	*	1.5986	5.3074
CONTSCI	-1.579	0.6055	*	-2.7658	-0.3922

It is interesting to note that none of the school-level variables (with the exception of the environmental education content of the science curriculum) are significant here. However, the perceived level of information from schools is as significant as that of family and the media.

The random variances were:

Level of variance	Variance	Standard Error	Significant at 95% level	Low	High
School Variance	0	0		0.0000	0.0000
Student Variance	154.6	10.57	*	133.8828	175.3172

Table 4: Analysis of Factor Score 3 (Attitudes)

Variables	Coefficient	Standard Error	Significant at 95% level	Low	High
SEX	1.451	0.6478	*	0.1813	2.7207
DOGEOG	2.534	3.924		-5.1570	10.2250
DOTECH	-5.502	2.653	*	-10.7019	-0.3021
AVAB	4.611	1.633	*	1.4103	7.8117
MEDINPUT	3.858	0.8705	*	2.1518	5.5642
IMPSCI	2.538	1.152	*	0.2801	4.7959
EFFSCI	-1.477	1.344		-4.1112	1.1572
EFFGEOG	3.797	1.841	*	0.1886	7.4054
STRGEOG	-13.26	2.845	*	-18.8362	-7.6838
IMPPSE	3.134	0.9755	*	1.2220	5.0460
EFFPSE	-4.263	1.651	*	-7.4990	-1.0270
STRPSE	7.964	3.406	*	1.2882	14.6398
CATCH	2.302	1.146	*	0.0558	4.5482

Both school- and student-level variables were significantly linked to student attitudes, although input from the media was more significant than input from either the school or their families.

The random variances were:

Level of variance	Variance	Standard Error	Significant at 95% level	Low	High
School Variance	0	0		0.0000	0.0000
Student Variance	144	9.844	*	124.7058	163.2942

Table 5: Analysis of Factor Score 4 (Personal influence)

Variables	Coefficient	Standard Error	Significant at 95% level	Low	High
SEX	1.517	0.6694	*	0.2050	2.8290
FAMINPUT	4.177	0.9816	*	2.2531	6.1009
MEDINPUT	1.907	0.9491	*	0.0468	3.7672
EFFSCI	-3.649	1.153	*	-5.9089	-1.3891
IMPGEORG	-3.904	1.501	*	-6.8460	-0.9620
EFFGEORG	5.83	2.041	*	1.8296	9.8304
STRGEORG	-7.177	2.916	*	-12.8924	-1.4616
IMPPSE	-2.945	1.018	*	-4.9403	-0.9497
EFFPSE	4.528	1.631	*	1.3312	7.7248
STRPSE	-8.107	3.519	*	-15.0042	-1.2098
EEFACT2	-0.1264	0.0552	*	-0.2346	-0.0182

Although some school-level variables and, in particular, the perceived effectiveness of the geography and PSE departments in encouraging positive attitudes, appeared significant here, young people's overall perceptions of the information they received from family and the media were more clearly indicated as significant.

The random variances were:

Level of variance	Variance	Standard Error	Significant at 95% level	Low	High
School Variance	0	0		0.0000	0.0000
Student Variance	157.1	10.74	*	136.0496	178.1504

Table 6 below summarises, for each outcome, the variances at the school and pupil levels, together with the reductions obtained by fitting background variables. The reductions are quoted at two stages: with student-level data fitted, and the full model with all significant school-level variables.

**Table 6: Variances at Each Level and Reductions due to Model-fitting**

Outcomes:	TOTFACT1	FACT1	FACT2	FACT3	FACT4
<b>Base Case:</b>					
School	14.53	21.59	12.88	13.04	17.07
Student	197.9	172.7	180.2	165.1	173.9
<b>With Student data:</b>					
School	5.11 (65%)	10.17 (53%)	2.83 (78%)	13.83 (-6%)	15.55 (9%)
Student	122.7 (38%)	126.1 (27%)	154.2 (14%)	154.2 (7%)	160.3 (8%)
<b>Full model:</b>					
School	0 (100%)	0.45 (98%)	0 (100%)	0 (100%)	0 (100%)
Student	117.0 (41%)	125.3 (27%)	154.6 (14%)	144.0 (13%)	157.1 (10%)

*(Note that: Values in brackets are percentage reductions in variance from base case.)*

Whereas all of the identified variance between schools can be ‘explained’ by the selected variables, the reduction in the variance between students indicates that there are a number of unidentified variables at work at both, possibly at both school and student level. These variables may be related, for example, to teaching and learning styles, to the maturation of students and to the differences in understanding concomitant with the introduction of factual or conceptual data. In the current study the following results emerged:

- ◆ Girls have significantly higher scores than boys in terms of their overall environmental awareness, the action they undertake, their attitudes towards future action and their feelings of personal influence;
- ◆ Pupils who belong to environmentally related organisations have significantly higher scores on overall awareness and are more likely to be involved in environmental action.
- ◆ Asian pupils had significantly lower scores on environmental concerns than other students.
- ◆ School, family and media input were significantly related to the student outcomes in most cases. However, media input was the only input variable significantly linked to the development of student attitudes towards environmental action and policy, while school input and family/friends input were the only input variables related to environmental action; the role of the media was not apparently as significant in prompting action as compared with promoting attitudes towards action.

The present study suggests that there is a great deal of scope for schools to extend their influence in environmental matters and the methodology used here indicates one way in which links between input and outcomes could be made. However, to reiterate the caveats made earlier, the models can only reflect what is known about environmental education and suggest further issues for study. The researchers feel that the models presented here would benefit from being used with a larger database and by the development of some more sophisticated measures of school input based on qualitative and quantitative data, in order to test the hypotheses further.

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## Green Attitudes or Learned Responses?

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Under Phase III of the *ESRC Research Programme into Global Environmental Change* (GEC), environmental education was highlighted as an area for research support. This report is one of a series of outcomes of a project which addressed one of the central aims of the GEC programme, 'Can people be persuaded to make changes in behaviour – through reducing consumption, recycling or conserving resources?'

The research drew on survey data from staff in 294 schools in England and Wales, interviews with staff in 40 schools, and semi-projective questionnaires administered to 428 young people in Year 11. It focused on the relative impact of school on:

- students' overall environmental awareness;
- their individual actions in the environment;
- their environmental concerns;
- their attitudes toward other people's actions;
- their feelings of personal power in the environment.

The main finding was that **schools' provision of environmental education was a key factor in developing students' awareness, raising concerns and promoting action**, although their role in shaping young people's attitudes towards policies and practices in the environment was less significant than that of the media.

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