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**Evaluation of Environmental Education
Programmes as a Means for Policy Making
and Implementation Support:
The Case of Cyprus Primary Education**

by

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**A thesis submitted for the degree
of Doctor of Philosophy**

**University of Warwick,
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Chrysanthi Kadji – Beltran

June 2002

DECLARATION

I declare that the material within this thesis has not been presented in any other theses. Chapters 4, 7 and 8 contain material, which has formed the basis for 4 conference papers, published in the conferences' proceedings and one paper approved for presentation on November 2002.

Kadji-Beltran, C., (2002) Considering the Teacher's Profile for Effective Implementation of Environmental Education, *2nd International Conference on Science Education*, Conference Proceedings, Cyprus Pedagogical Institute, 11-13 November 2002, Cyprus.

Kadji-Beltran, Ch., Barker, S. & Raper, G. (2001). Primary school pupils' awareness of environmental issues: The influences of teaching styles and activities. In Valanides, N. (Ed.). *Science and Technology Education. Preparing Future Citizens*, 1st IOSTE Symposium in Southern Europe. Vol.I-II, IOSTE, University of Cyprus, Ministry of Education and Culture, The Cyprus Pedagogical Institute.

Zachariou, A. & Kadji-Beltran, Ch. (2001). Alternative Methods of Evaluation in Environmental Education: The use of Portfolio and Story-line. In Valanides, N. (Ed.), *Science and Technology Education. Preparing Future Citizens*, 1st IOSTE Symposium in Southern Europe. Vol.I-II, IOSTE, University of Cyprus, Ministry of Education and Culture, The Cyprus Pedagogical Institute.

Kadji-Beltran, C., & Zachariou, A., (2001). Alternative methods of Evaluation in Education. The case for Environmental Education, *Conference on School Teaching and Learning in Primary Education*, Department of Education, University of Ioannina, Greece

Kadji-Beltran, C., (2000). The impact of an Environmental Education Programme, on children's environmental cognition and attitudes. In Valanides, N., (Ed.). *Proceedings of the 2nd Pan-Hellenic Conference on Teaching Natural Sciences and applying New Technologies in Education*. Department of Education, University of Cyprus

ABSTRACT

This investigation emerges from the awareness of the marginalisation environmental education faces and the need for the development of an effective policy for the implementation of environmental education in Cyprus. The purpose of the research study is to present, as an end product, information that would be useful in the formation of a National Programme for the implementation of environmental education in Primary Education in Cyprus. The thesis describes the current situation of environmental education and examines current practices.

Out of a limited variety of environmental education *programmes that currently run in* Cyprus Primary Education, the Eco-School project is taken as an example. This research study, firstly, aims to measure the success of the Eco-School project, by testing children's environmental cognition, awareness and action and comparing them to the environmental cognition and action of children in other schools outside the programme. It also attempts to reveal the factors that contribute to successful implementation of the project as well as practices that could be improved or avoided. The teachers' opinions are analysed both at organisational and personal levels. Since they are closely involved in any school innovative project, they should be given the opportunity to express their opinion and experience about the organisation of the policy, their expectations and the problems they foresee.

Briefly, the general research aims are to:

1. describe the current situation of environmental education in Cyprus;
2. obtain interested parties' opinions about the development of a National Programme for the implementation of environmental education in Cyprus Primary Education;
3. verify and evaluate the impact of the Eco-School project;
4. distinguish the factors that contribute to the successful implementation of an environmental education programme.

Finally the information obtained is the basis of a proposal model, which might facilitate environmental education implementation.

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CHAPTER 1: INTRODUCTION

1.1 Statement of the problem

The quality of life is directly dependent on the quality of the environment in which we live. Our immediate environment is a part of the global environment, each component of which, interacts, affects and is affected by all the rest.

Many environmental problems are of global concern and solutions demand co-ordinated international effort. This to some degree affects everyone: intergovernmental panels, governments, adults and children. Many strategies for addressing environmental problems highlight the need for everyone to learn about the environment and adjust their attitudes to a more environmentally friendly way of living (Rio Declaration, The Earth Summit, 1993). This forms the basis of sustainable development.

Attitude change requires the development of awareness that would lead to action; the development of informed awareness requires education. Environmental education serves this purpose: it aims to provide education, which encourages people to strive towards sustaining our planet and its resources for future generations (Palmer, & Neal, 1994). For children its goal is even more important since it is addressing the citizens of tomorrow.

Environmental education is now part of many curricula across the globe: U.K., Sweden, Norway etc. Its necessity has established it as an individual discipline employing a variety of theories and teaching approaches. Each country has its own

mechanisms depending on the educational system and other variables (e.g. social and political values, or other educational priorities).

For Cyprus, environmental education is part of the “Action Plan for the Protection of the Environment” set by the Ministry of Agriculture, Natural Resources and Environment as an important requirement of the general harmonisation and adjustment of the Cyprus legislation to the corresponding laws of the European Community. The statement indicates that:

“Environmental education should be introduced through every curriculum topic in Cyprus Education, giving special emphasis on the Primary and Secondary level of Education”

(Ministry of Agriculture, Natural Resources and Environment, 1996)

Although this implies an integrative approach, the Ministry of Education has, to date, made no special reference in the primary education curriculum to environmental education. Furthermore, there is no indication in any official document as to how it should be applied. The absence of a more solid National Programme for environmental education in Cypriot schools results in its marginalisation and probable absence.

The marginalisation of environmental education extends to the programmes of study of the teachers’ initial training, and although there are opportunities for in-service training, these are optional, limited and short-term. Therefore another problem of implementation is the lack of competent teachers to support it (Lahiri *et al.*, 1993:50). This is probably because environmental education, not as the mere part of ecology or science (Ministry of Education and Culture, 1996), but as the multidimensional area it is today (combining cognition from various disciplines,

attitudes and action), has only recently been introduced in Cyprus (Ministry of Agriculture and Natural Resources, 1996). It is a new discipline cross-curricular root, as discussed at conferences held in Stockholm, 1972; Belgrade, 1975; Tbilisi, 1977, etc. As most cross-curricular disciplines it has to compete for attention with other disciplines of a perceived “greater status” (Lahiri *et al.*, 1993; Papademetriou, 1998).

In order to overcome such problems, and achieve effective implementation, its introduction should be carefully studied and applied in the best way. This is an issue which initially requires a thorough background - literature review which will bring out the possibilities that exist. Environmental education is a discipline with particular characteristics and explicit requirements, which should be considered. There also exists the opportunity of studying the implementation methods used by other countries. Research investigation will provide a diagnosis of the current situation in Cyprus and an in-depth study of the practices employed in the country over the past few years.

1.2 Purpose of the research study

The main purpose of the research study is therefore to present, as an end product, information that would be useful for the formation of a National Programme for the implementation of environmental education in Cyprus Primary Education. A description of the current situation of environmental education in addition to the examination of contemporary practice forms the foundation for the research.

Out of a limited variety of environmental education programmes¹ that currently run in Cyprus primary education, the Eco-School project is taken as an example for two main reasons: Firstly, according to the Cyprus Pedagogical Institute's evaluation, the Eco-School project is successful (Kadji-Beltran, 1998). Secondly it has been steadily taken up by a considerable number of schools, becoming the most popular programme applied (43 primary schools in 2001). This research study, aims to verify the success of the Eco-School project by testing the participating children's environmental cognition, awareness and action and comparing them to the environmental cognition and action of children in schools outside the programme. It also highlights factors that contribute to the successful implementation of the project as well as practices that could be improved or avoided. The success of any educational initiative depends ultimately on the commitment of the teachers delivering it. Thus their opinions have been sought at both organisational and personal levels.

The general research aims are to :

1. describe the current situation of environmental education in Cyprus;
2. elicit views from interested parties on the development of a National Programme for the implementation of environmental education in Cyprus Primary Education;
3. evaluate the impact of the Eco-School project;
4. distinguish the factors that contribute to the successful implementation of an environmental education programme.

The main participants in the project are:

1. students from Eco-Schools and non Eco-Schools;

¹ All programmes applied in primary education are presented in chapter 5

2. teachers and school directors from Eco-Schools and non Eco-Schools;
3. National Operator of the Eco-Schools Programme;
4. government decision makers: General Director of Primary Education in Cyprus, Primary Science Inspector, INSET trainers and initial teacher training educators (University of Cyprus).

These, along with other interested parties not participating in the research, such as NGOs, could contribute in the development of a National Plan for the implementation of environmental education in Cyprus.

The specific research questions to be addressed are:

1. To describe the current situation of environmental education in Cyprus.

RQ1.1 What is the environmental education national policy followed by the ministry of education?

RQ1.2 How is environmental education currently practised through the curriculum?

RQ1.3 What environmental education initiatives are there in Cyprus primary schools?

2. To obtain interested parties' opinions about the development of a National Programme for the implementation of environmental education in Cyprus Primary Education.

RQ2.1 Which are the views of each of the interested parties on the national environmental education policy?

RQ2.2 How would the interested parties visualise a national environmental education programme / model?

RQ2.3 Which is the favoured environmental education teaching approach?

RQ2.4 Which role would each of the interested parties play in an effective implementation of a national programme?

RQ2.5 Which role would the NGOs play in a national environmental education programme / model?

RQ2.6 What is the extent of co-operation between government (Ministry of Education) and NGOs (Environmental Organisations)?

3. To evaluate the impact of the Eco-School programme.

RQ3.1 Is there a difference in environmental cognition and action between the Eco-School students and students in schools not participating in the programme?

RQ3.2 Can the Eco-School programme influence the environmental awareness of a student's family?

RQ3.3 Which are the students' attitudes towards the Eco-School programme?

RQ3.4 Have the students benefited from the programme? If so, how?

RQ3.5 Have the teachers benefited from the programme? If so, how?

4. To highlight the factors contributing to successful implementation of an environmental education programme.

RQ4.1 Which parts of the programme are motivating for the teachers?

RQ4.2 Which parts of the programme are motivating for the students?

RQ4.3 Which approaches and practices have been successful?

RQ4.4 Which practices are more effective for the inculcation of environmental attitudes?

RQ4.5 How is the programme evaluated?

RQ4.6 What problems exist during the implementation of the programme?

RQ4.7 How can teachers be supported?

RQ4.8 Which are the teachers' attitudes towards the programme?

1.3 Rationale of the study

Learning to care for our environment is becoming increasingly important to our quality of life and our future prosperity. Education is an important vehicle for achieving environmental awareness. In Cyprus, several good initiatives are already occurring in schools throughout the country (see Chapter 5). The increasing number of these initiatives highlights the general interest in the issue and emphasises that a well organised and co-ordinated policy for formal environmental education is indispensable for the substantial guidance and support of these initiatives. This research study will respond to this necessity. Its importance lies in its originality and the practical application it can have. Examining and evaluating current practices will provide useful information for the development of an effective plan for the implementation of environmental education in Cyprus.

The analysis of different models of environmental education from other countries will enable strengths and weaknesses of different approaches to be identified.

The ultimate aim is to develop a Cyprus Model which, if applied, will contribute to the «Development of a New Global Ethic», as described by Engleson *et al.* (1991).

1.4 Framework

The study is structured into nine chapters. The current chapter introduces the problem, the purpose of the research and the questions to be answered. It is followed by literature review chapters.

Chapter 2 presents, through literature, a review of environmental education and the pathway followed until it reached its contemporary form. It includes a study of the environmental ideologies that appeared over the years and the impact they had on the formation of environmental education.

Chapter 3, focuses on the implementation of environmental education, including both curriculum and school management issues. It explains how these two dimensions can result in a holistic approach to environmental education in schools and considers the environmental ethics within it.

Chapter 4 examines evaluation and assessment issues. It provides general information on educational evaluation and specific information on evaluation in environmental education. It also introduces some evaluation tools specially adjusted for environmental education.

Chapter 5 describes the current situation of environmental education in Cyprus. The information for this chapter was extracted through review of official documents of the Ministry of Education, as well as the National Curriculum.

Chapter 6 presents an overview of environmental education implementation in a variety of European countries.

Chapter 7 explains the methodology followed in order to find answers to the research questions. The methods and the research tools used are presented and justified according to the sequence in which they were applied.

The results of the research are displayed in Chapter 8. They are presented according to the research tool used. Information about the analysis is also provided.

Chapter 9, provides a general discussion and analysis of the findings and makes recommendations on the basis of the results with regard to implementation of environmental education in Cyprus.

CHAPTER 2: ENVIRONMENTAL EDUCATION AND EDUCATION FOR SUSTAINABLE DEVELOPMENT

2.1 Towards Education for Sustainability

2.1.1 Human - Nature Relationship

The human being is the child of nature and as such s/he is part of the Cosmos¹. This belief was held by many cultures and civilisations in the past and it generated their way of perceiving earth. In ancient Greece and Renaissance Europe, for instance, Cosmos was considered to be “*a living organism with a nurturing female earth at its centre*” (Huckle 1997: 5). The ancient civilisations had a sense of subordination to nature due to their appreciation of what the earth offered them. Their knowledge, emotions and aesthetic appreciation resulted in hymns and legends. (Lahiri *et al.*, 1993).

The importance of the environment is also emphasised by the oriental religions’ teachings of Buddhism, Jainism, Taoism and others, including messages about living harmoniously with our surroundings and preserving plants and animals. (Lahiri *et al.*, 1993:3) Any attempt to master or conquer nature is considered to be a distortion of human nature (Capra, 1976; Kabilisighn, 1988). Therefore, local wisdom was used to limit the non-sustainable use of resources and balance the human - nature relationship.

Doris D’ Souza (1997) explains that Indian tradition has always upheld the need for sustainable lifestyles. Evidence for this is found in scriptures and ancient monuments

¹ Cosmos is the world, in ancient Greek it used to mean jewel; valuable and beautiful

as well as elements of their culture. She refers to a national song that venerates Mother Earth:

*"I bow to thee Mother, richly watered richly fruited
cool with thee winds of the south,
dark with the crops of the harvests the mother!"*

(Thessaloniki International Conference Proceedings, 1997:308)

Nowadays, views about nature have become «human - centred» and «human - oriented». Modern Western perceptions of the nature - human relationship are therefore homocentric and scientific, considering nature largely as a world of objects, their social use being democratically regulated and distributed (Sterling, 1997). The mechanistic, scientific view of the world considers «*Earth to be dead and nature to be a machine that can be transformed, improved and managed in the human interest*» (Huckle, 1997)

Humans are considered to be superior to nature; they are not a part of nature. The human being is the manager and the exploiter.

Sterling (1990) sees two approaches in today's human - nature relationship:

- the **technocentric approach**, which supports the view that further scientific research will lead to a better understanding of environmental problems and hence will develop better technology and management strategies in order to find solutions;
- the **ecocentric approach** which considers it necessary to bring fundamental changes to human values and practices in order to establish a viable society.

This epistemological view was substantial for the massive technological progress of the contemporary industrial system, which took place at a cost. Based on the “*availability ethics*”, only now do we realise that “*the system which is consuming its environment eventually is also consuming itself*” (Marx in Wilden, 1997: 28), leading to a global ecological crisis.

The ecological crisis, however, is not the result of a technological crisis: technology cannot be blamed and neither can we deny that we have benefited enormously from its progress. There is no «good» and «bad» technology. There is good and bad use of it, either because of ignorance or because of greed. The ecological crisis is a crisis of “*Human maladaptive behaviour*” (Newhouse, 1990: 26). The notion of resource limitations and the necessity of a sustainable organisation of our welfare and production systems has not «*prevailed in society’s values*» and has not been “*inherited in its education*” (Holmberg *et al.* 1991:11), thus, the sense of people’s responsibility and stewardship towards earth and its resources has been neglected.

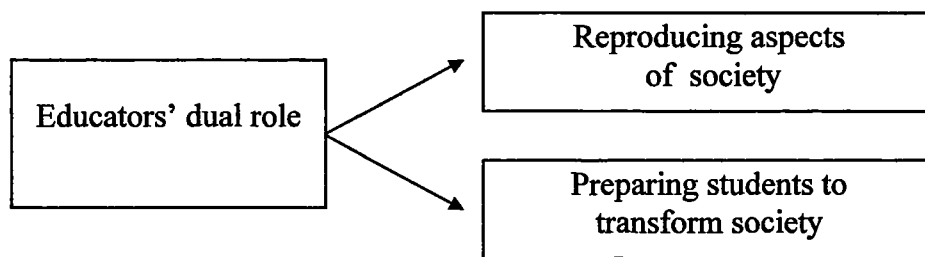
Technology may provide solutions to environmental problems (technocentric approach) but we can ensure its "correct" use and development only through forming environmentally aware, critical, conscious, participative and active citizens (the eco-centric approach).

2.1.2 The origins of Environmental Education.

The need for change and adjustment in education is constant because, as suggested by Papademetriou (1998), schools react and adjust their role according to society’s needs. Society is compared to a living organism that changes continuously and

reflects those changes in education. Education has the potential to bring social change and improvement as long as it manages to break through the “status quo” preservation mechanisms. In order to acquire an environmental orientation, educational systems should apply dynamic schemas that establish new environmentally oriented educational structure (Posh, 1994:27). As Federico Mayor (1997) sees it, education plays a dual role: reproducing the aspects of society and at the same time, preparing students to transform society for the future.

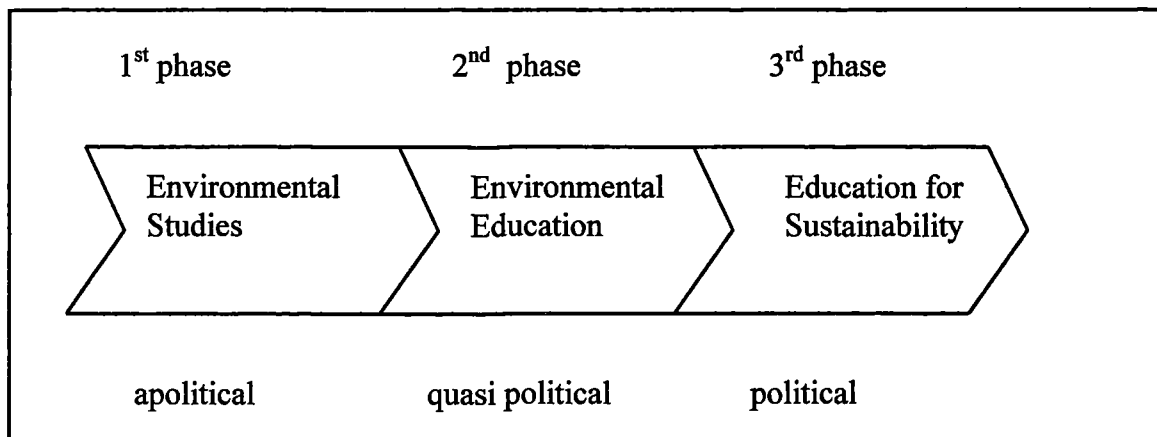
Fig. 2.1 The dual role of education (After Mayor, 1997)



Environmental education (today under the umbrella of Education for Sustainability) being part of the Educational System follows the “Education” - “Society” interaction and thus has undergone many changes and adjustments to take eventually the form it has today.

Following a chronological sequence, environmental education has developed from the apolitical perspective it had in the times of Sir Patric Geddes (1854 - 1933), through the quasi political conservation education (as the purposes of environmental education were defined in Keele University during a conference in 1965) to today’s challenging character of education for sustainability which is far from apolitical (Huckle J. and Sterling S., 1997)

fig.2.2 The chronological development of Environmental Education



Environmental education has its origins in subjects such as biology, science and environmental studies. In these contexts it is about getting to know the environment and understanding natural laws and has an entirely scientific and informative character.

According to Papademetriou (1998) at the end of the 19th century - beginning of the 20th century, the educational movements “Study of Nature” and “Agricultural Studies” appeared. They were both developed in USA and Europe. Despite the fact that two different terms were used, the two movements were identical as far as their aims, context and approaches were concerned. They both focused on providing opportunities for the student to work in nature, experience country life and through this, develop knowledge, awareness and skills of the environment. Clearly the development of these educational movements was based on naturalistic models, influenced by the environmental interest of the times towards the natural environment as well as Rousseau’s “*value of educating a child in the natural environment*”. The four stages/phases that constitute this period form the apolitical

phase of the development of environmental education. According to Kirk (1985) (cited in Lahiri *et al.*, 1993) these stages were:

- The Awareness Phase (1860 – 1890). This was the initial phase in which *“various powerful writers awakened many to recognise that man was not a single solitary figure above other living and non living systems, but rather an integral part of the system”*. (p. 4)
- The Preservation Phase (1890 – 1910). Again, writers popularised a need for the conservation of natural resources. Forests were not only considered to be sources of raw materials, but also resources for recreation, relaxation, research and study.
- The Nature Study phase. (1910 – 1932) The American Nature Study Society was established during this period. An understanding and appreciation of the beauty, the majesty and mystery of nature was promoted through materials – tools used by teachers and naturalists.
- The Education Phase (1937 – 1950) was marked by the development of the Civilian Conservation Corp. Young people were given the opportunity to learn and value the forests and woodlands. The importance of learning about the interrelationships of and interactions between living and non living things was highlighted and environment was used by teachers as an extension of their classrooms.

Papademetriou (1998) characterises the second half of the 19th century as a period when interest for the environment was very intense, attitudes such as appreciation of

nature's beauty, preoccupation for endangered species, conservation, bioethos etc., dominate. The development of these attitudes is connected to an awareness that the consequences of human actions not only reflect on nature but on the quality of life too. Industrialisation and "*imperialism over nature*" as Francis Bacon (1562 - 1626) suggests are being questioned. We may say that, at this stage, environmental education was not influenced by any political orientations.

Nevertheless, increasing environmental awareness had led to the establishment of various environmental societies, e.g. The Royal Society for the Protection of Animals (1824), The British Commons, Open Spaces and Footpaths Preservation Society (1865). In education, because of the recognition of the value of nature in children's education, the "Study of Nature" was established as an additional programme. At this point, though, all the movements that were established, apart from their environmental concern, also had political motives. As Papademetriou (1998) suggests,

"these movements both in the UK and the USA were connected to government policies aiming to constrain the migratory wave towards industrial centres..." (Papademetriou 1998: 24)

So environmental education, following the social demands, acquires a quasi political character and serves political and social purposes. The Study of Nature covered both Primary and Secondary Education, especially small countryside schools. This was succeeded by "Agricultural Studies" or "Rural Studies", a movement which developed during the 1920's and 1930's (Carson, 1980).

Agricultural studies appeared in the school programme, especially in the natural sciences. Nevertheless, due to competition with disciplines of higher academic

prestige (Goodson, 1983), along with the criticism it received for dictating “agricultural professions” to students of agricultural origins, Agricultural Studies was absorbed completely eventually, by Natural Sciences (such as biology and physics). Its aims were adjusted so as to contribute to a better general education.

During this second phase of its evolution, environmental education added to the initial study of the environment a new duty: “education for conservation”.

2.1.3 From the 60s to the present. The evolution of environmental education through international conferences.

The importance of the contribution of education to the conservation of nature and natural resources has been apparent for many years now and a distinct new subject has emerged.

The term environmental education appeared for the first time in Paris in 1948 at a meeting of the International Union for Conservation of Nature and Natural Resources.

The Commission on Education of the International Union for the Conservation of Nature and Natural Resources (IUCN) was established in 1949 (Lahiri *et al.* 1993). This organisation aimed at the promotion of environmental conservation education and for this purpose produced a number of publications and organised several conferences and symposia:

- Symposia on Conservation Education, Lucerne, Switzerland, 1966;

- Conference on Conservation on Renewable Natural Resources, Bariloche, Argentina, March, 1968;
- Conference on Environmental Education, Nevada, U.S., 1970;
- European Working Conference on Environmental Conservation Education, Ruschlicon, Switzerland, December, 1971, etc.

In the UK, the environmental education issue was raised during a conference at Keele University, 1965, which aimed to investigate the conservation of the countryside and its implications for education. At about the same time in the United States, environmental issues became a public concern, especially after the publication of Rachel Carson's "Silent Spring"³ in 1962. The awaking public awareness was intensified by the call of an International Conference on environmental education in Nevada organised by the International Union for the Conservation of Nature and Natural Resources. The findings of the Nevada Conference still influence the development of environmental education and its definition is accepted and used by the National Association of Environmental Education (NAEE) in England and elsewhere.

"Environmental Education is the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision making, and self formulation of a code of behaviour about issues concerning environmental quality". (IUCN, 1970)

³ Rachel Carson, in "Silent Spring" exposes the effects of the intensive use of chemicals. This book remains a classic statement which founded a whole movement. It describes how pesticides and insecticides applied without any control in farms, gardens, forests and homes will eventually contaminate our environment and destroy wildlife. Rachel Carson argues that the human being is only a part of the living world and the progressive poisoning he creates will eventually bring the catastrophe.

At an international level the interest in environmental matters was launched at the UN Conference on the Human Environment in Stockholm in 1972. A result of that was the creation of the UN Environmental Programme. Principle 19 of the Conference stated that: *“Education in Environmental matters for the younger generation as well as adults giving due consideration to the underprivileged is essential”* (UN Conference on Human Environment, Stockholm 1972)

Several Conferences were initiated after that and focused on environmental education. In 1975 an International Workshop on environmental education was held in Belgrade. It launched the International Environmental Education Programme (I.E.E.P.) and resulted in the first intergovernmental statement on environmental education. The objectives of environmental education, well summarised in the Belgrade Charter (as cited in Trends in EE, UNESCO, 1977: 28 and Lahiri *et al.*, 1993) were separated into six groups:

1. *Awareness: to help individuals and social groups acquire an awareness of and sensitivity to the total environment and its allied problems*
2. *Knowledge: to help individuals and social groups acquire basic understanding of the total environment, its associated problems and humanity's critically responsible presence and role in it,*
3. *Attitude: to help individuals and social groups acquire social values, strong feelings of concern for the environment and the motivation for actively participating in its protection and improvement*
4. *Skills: to help individuals and social groups acquire the skills for solving environmental problems.*
5. *Evaluation ability: to help individuals and social groups evaluate environmental measures and education programmes in terms of ecological, political, economic, social, aesthetic and educational factors.*

6. *Participation: to help individuals and social groups develop a sense of responsibility and urgency, regarding environmental problems so as to ensure appropriate action to solve those problems.*

A broader set of objectives (UNESCO, 1975) indicates that environmental education aims to:

- «1. Foster clear awareness of and concern about economic, social, political and ecological interdependence in urban and rural areas*
- 2. To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment*
- 3. To create new patterns of behaviour of individuals, groups and society as a whole towards the environment».*

(P.Neal & J.Palmer, 1990:5; J.Palmer & P.Neal, 1994:13; Lahiri *et al.*, 1993)

The same goals were also set in the final report of the Tbilisi Conference (October, 1977). The Brandt Commission covered the issues of poverty and economic development.

People started realising that development and environment conservation were two factors with reciprocal effects and that one should not be dealt with separately from the other. This issue was discussed by the UN World Commission on Environment and Development (WCED 1987), under the chair of Gro Harlem Brundtland, in Norway. The resulting report is called «Our Common Future». For the first time the term «Sustainable Development» appeared and was defined as:

«...the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Development + Conservation = Sustainable Development.»

(Our Common Future, Oxford University Press, 1987; Benedict, F., 1991)

The relation found between conservation and development was described by Giselle Vergnes - DGXI, European Commission, during an In-Service Training Programme for teachers, on Education and the Environment in Europe, organised by the Central Bureau (for Educational visits and exchanges, Council of Europe, 25 - 32 March 1996).

The relation between conservation and Development could be described as inversely proportional. That is for maximum development, we have no conservation and for maximum conservation development pauses.

An even more frustrating relation is the one shown by Fig.2.4 where for the same development (d_1), conservation (c_2) is even smaller than (c_1)

Sustainable Development aims to maximise both, introducing a new Development - Conservation relation. It is apparent that for the same development (d_1), conservation in relation A' is smaller than conservation in relation A and much smaller than A''.

$$c_2 < c_1 < c_3$$

Fig. 2.3 Conservation = $f(\text{development})$

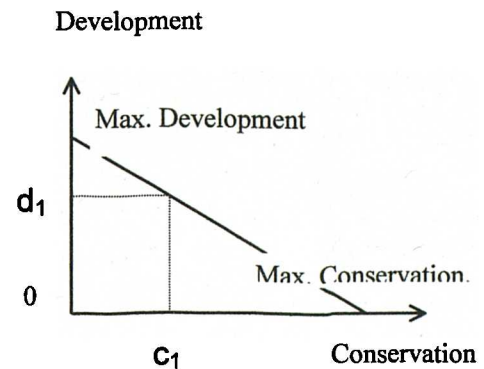


Fig. 2.4 Conservation' = $f(\text{development})$

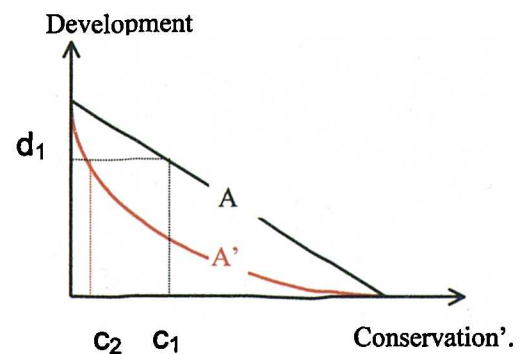
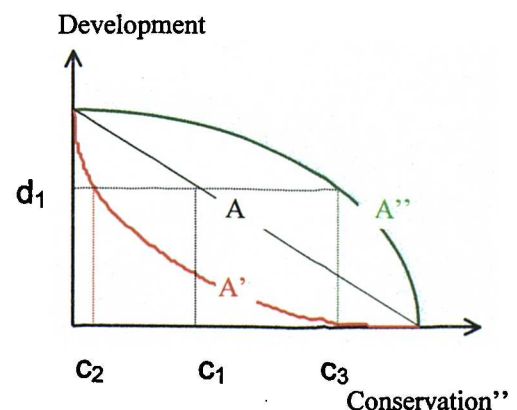


Fig. 2.5 Conservation = $f(\text{development})$



Relation A'' gives the maximum conservation having the maximum development and represents the relationship fostered by Sustainable Development.

The Report, «Our Common Future», (Faye, 1991) generated the commitment for a World Conference on Sustainable Development. The aim of the UNCED was:

"To establish a new equitable global partnership through the creation of new levels of co-operation among states, key sectors of societies and people ... to make agreements which respect the interests of all and protect the integrity of the global environmental and developmental system".

(Earth Summit 1992, Regency Press Corporation, London 1996)

As an outcome of the Earth Summit, 27 principles were developed through which Sustainable Development could be achieved. Two of them, (principles 10 and 21) also refer to Education as a means of meeting the aims of Sustainable Development.

Principle 10 states that Environmental issues are best handled by the participation of all citizens concerned. There should be:

«Appropriate access to environmental information held by public authorities,... an opportunity to participate in decision making process and ...states shall facilitate and encourage public awareness and participation by making information widely available» (Palmer 1998: 72).

Awareness and participation, however, require information. An uninformed person will find it difficult to participate and even more difficult or risky to make decisions. Consequently such a person will not be capable of resolving environmental problems. Finally information emerges from education.

Principle 21 states that:

“The creativity, ideas and courage of youth of the world should be mobilised to forge a global partnership in order to achieve sustainable development and ensure a better future for all.”

Apart from the 27 principles of the Rio Declaration, governments also agreed on a Plan of Action for achieving Sustainable Development, known as Agenda 21. It includes 40 chapters stating what nations are required to do, in respect of social and economic dimensions, conservation and management of resources for development, strengthening the role of major groups and the means of implementation. In 1991, five years after the Earth Summit in Rio, the world still had not managed to meet the goals for ecological and social change. The negative global ecological and social trends Rio addressed weren't effectively tackled.

The New York Conference (1997) made it clear that industrialised nations were reluctant to allocate more funds to developing countries for environmental protection and poverty alleviation. Additionally, most of the developing countries regarded their economic growth of higher importance than respect to environmental protection (Unmossing, 1997).

Therefore, one could conclude that it is very difficult for governments to help to create a better world. It is up to the individuals to take action and bring about change.

The resulting resolution adopted by the General Assembly (23 - 27 June 1997) emphasises that:

“A fundamental prerequisite for Sustainable Development is an adequately financed and effective educational system at all levels, particularly at the Primary and Secondary levels, that is accessible to all and augments both human capacity and well being ... Even in countries with strong educational systems there is a need to reorient education, awareness to widespread public understanding critical analysis and support for sustainable development. Education for a sustainable future should engage a wide spectrum of institutions and sectors ... and should include the preparation of sustainable development education plans and programmes”. Hopkins (1998)

The role and the importance of Education is emphasised throughout the literature (UNESCO 1977, Benedict, 1991, Mayor, 1997, National Forum on Partnerships, supporting Education about the Environment 1994, UNESCO 1998, UNESCO, UNEP, IEEP, Environmental Education Series 22. 1993). The following chapters aim to present the philosophy of environmental education and the progressive changes it went through to eventually constitute part of “education for sustainable development”.

2.2 From environmental education to education for sustainability: A transition

There is some consensus that environmental education is perceived as a means of dealing with many of the environmental issues the world is facing. It constitutes a fundamental part of the school management and educational ethos and as such it can fulfil its ultimate purpose by giving the students, through all areas of the curriculum, the opportunity to:

- learn facts about the environment and environmental issues;
- develop a respect for evidence by examining and interpreting the environment from a variety of perspectives (physical, geographical, biological, etc.);
- clarify their own values in relation to the environment and acknowledge that people hold different, equally legitimate points of view;
- take an active part in resolving environmental problems. (SCAA, 1996)

General aims of environmental education include:

«- The need to develop attitudes of care, curiosity and concern for the environment in such a way as to develop a sense of responsibility towards home, school and the community.

- The need to demonstrate to children the complex interrelationships between humanity and the environment and to give pupils the necessary skills to do these things». (DES 1986)

A similar aim was reported in the Draft Guidelines in the U.K. for the development of a policy for environmental education (1992), where it is underlined that environmental education should provide the opportunities for children to acquire the values mentioned above as well as knowledge, skills and commitment. Students should be encouraged to examine the environment from various perspectives: physical, sociological, biological, technological etc., and to be critical and interpretative. Finally, environmental education should aim to arouse children's awareness and curiosity about the environment and participate actively in resolving environmental problems.

Thus students will become *«environmentally knowledgeable, skilled, dedicated citizens who are willing to work individually and collectively towards achieving and maintaining a dynamic equilibrium between the quality of life and the quality of the environment»* (Engleson *et al*, 1991: 5)

Many of the aims and general ideas which emerged from the statement of the Tbilisi conference (1977) specify that environmental education should aim to offer lifelong education following an interdisciplinary and holistic approach. Environment is a multidimensional concept since it can be divided into social, moral, technical, natural and cultural environment and as such it should be seen as an entirety through which the human - nature relationship could be examined (overlap with DES, 1986, cited in Palmer and Neal 1994). Moreover environmental education should promote, through first hand experience, sensitivity, awareness, ethics and values among students and consequently lead to participation and active responsibility.

Engleson *et al.* (1991) categorise environmental education objectives in five groups: awareness, attitudes, participation, knowledge and skills. Nevertheless, others form wider groups so they can categorise the objectives into knowledge and skills objectives, and the objectives concerning attitudes and behaviour (Palmer and Neal, 1990, Council for Environmental Education, 1987):

-Knowledge and skills: for the children to develop a coherent body of knowledge, to be able to gather and evaluate information, appreciate interaction of environmental issues and eventually have the ability to bring about environmental change.

-Attitudes and behaviour aims refer to an appreciation of the environment, acquisition of an attitude of concern, participation in initiatives and decision making and also cultivation of one's critical spirit about personal environmental attitudes.

There is no distinctive border line between the categories of targets. This is why we find them organised in different groupings. Offering the children first hand

experience, for example, provides important knowledge and at the same time cultivates awareness and may lead to action.

Palmer and Neal (1994) proposed a model which illustrates these overlaps of the aims and at the same time organises everything within the threefold structure of environmental education, as it is reflected in the Tbilisi Conference Papers (UNESCO, 1977).

Education ABOUT the environment suggests basic knowledge and understanding of the environment and concerns values, attitudes and positive action for the environment. Education IN or THROUGH the environment suggests using the environment as a teaching tool emphasising inquiry, investigation and first hand experience. The nucleus of the whole "ABOUT- IN - FOR" approach is an individual holistic development, through knowledge and understanding of concepts, development of skills and attitudes leading to behaviour formation. It is clear that in this behaviouristic model «Knowledge → Attitudes → Behaviour», knowledge is a very important condition for the formative style of the specific approach.

Georgopoulos and Tsaliki (1998) support the view that the three folds of this model must be dealt with as parts of one approach. Overemphasising one of them, for instance acquiring knowledge and neglecting another, such as skill formation, devalues the holistic character of environmental education. Cooper, (cited in Georgopoulos and Tsaliki 1998) criticises the fact that very often the two dimensions (about and through) are being emphasised, and education FOR the environment which deals with attitudes, values and action for change, is neglected.

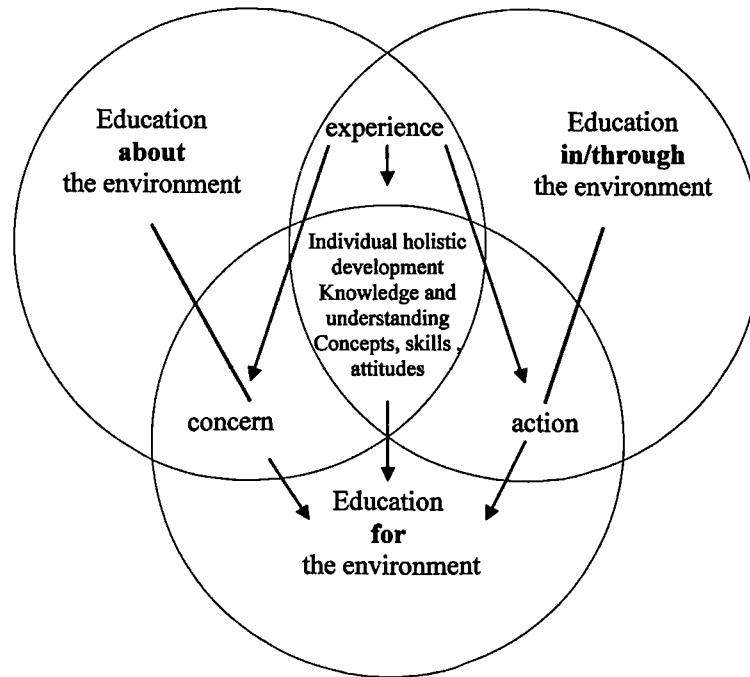
Fig. 2.6 The threefold structure of environmental education (*after Palmer & Neal, 1994*)

Fig. 2.6 is modified from Palmer and Neal (1994). It illustrates the overlap between education *ABOUT*, *THROUGH* and *FOR* the environment as in the original figure. The rotation though, shows, how easily the threefold structure of environmental education could be interpreted as a “one-fold” educational field where all dimensions, namely education *ABOUT* and education *IN*, end up serving the ultimate environmental education targets: values, attitudes and positive action *FOR* the environment. Learning *ABOUT* the environment brings out the concern which serves the purposes of education *FOR* the environment. The experience, gained from the cognitive part (*ABOUT*) and the contact with the environment (*IN*), arouses the concern and the will for action *FOR* the environment. The emphasis placed upon education *FOR* the environment also appears in official and national organisational documents which according to Uzzell (1999) attempt to define the aims and content of environmental education, such as the Council for Environmental Education (1987), Department of Education and Science (1988) and the National Curriculum

Council (1990). The focus of the majority of these documents has been the need to develop attitudes of care, curiosity and concern for the environment (DES, 1988).

Georgopoulos and Tsaliki (1998) claim that the meaning of "Education FOR the Environment" is not yet clarified. They support this view with Sterling's (1990) suggestion of the two "human - environment relationship" approaches: the technocentric and the ecocentric (chapter 2.1). They conclude that the educators may interpret "Education FOR the Environment" with respect to their personal ideological orientation.

Critiquing the threefold structure and principal focus of environmental education, Uzzell (1999: 400) argues, that, *"on the surface these seem to be laudable and desirable objectives meeting the need for environmentally aware and responsible youth. However a closer inspection suggests that with their emphasis on understanding, attitude and behaviour change at an individual level and the failure to recognise the social and political context in which attitudes are formulated and actions are undertaken, they inevitably miss important educational opportunities"*.

In order to avoid the 'individualisation trap', Uzzell (1999) supports an alternative perspective in which environmental education has the potential to provide learning, develop concern and find solutions. This can be achieved by 'action competence' which is a *"way of thinking about and taking people each stage of problem identification and solution generation"* (p.401). Action competence consists of eight dimensions:

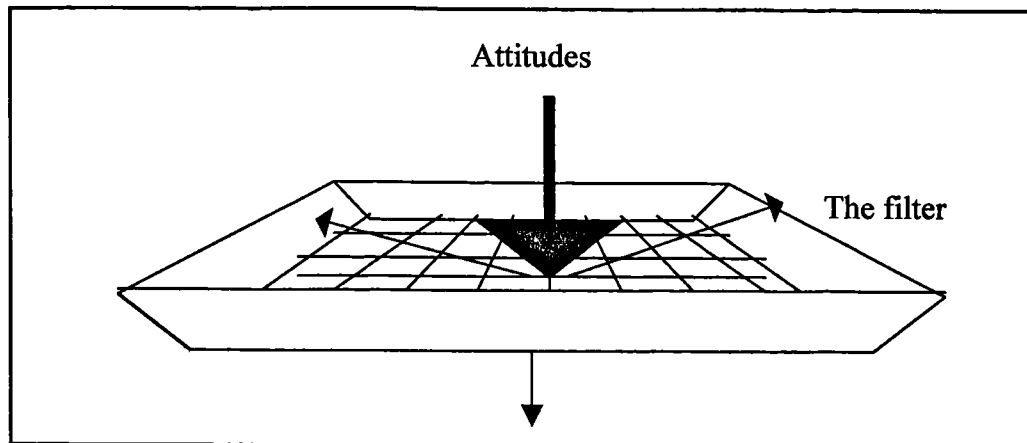
1. *Choosing the subject of concern...*
2. *Specifying the specific nature of the problem...*
3. *Identifying the causes and consequences of the problem...*
4. *identifying the relevant attributes and conditions to be changed...*
5. *identifying the action possibilities...*
6. *specifying constraints and barriers to change...*
7. *establishing priorities of action ...*
8. *selection of appropriate and sustainable actions.* (p. 401-402)

This procedure, possibly followed through a project, helps students obtain a better insight into problems.

Other critics of the threefold structure and its behaviouristic origins, Sverige *et al.* (1994) affirm that although «Knowledge → Attitudes → Behaviour» is the most common approach, there is no scientific research supporting its validity. The Swedish authors argue that a person's existing attitudes and values act as a filter and permit entry only to information of the same orientation. They illustrate their argument in a very realistic manner.

Fig. 2.7 shows that «*certain amount of knowledge passes the attitude filter while other knowledge is filtered out*». Sverige *et al.*, (1994), are supporters of confluent education. They distinguish four different elements which constitute this approach: Theory, Experience, Evaluation and Action.

Fig. 2.7 : The attitude filter (Sverige et al., 1994:20)



Theory involves traditional teaching, conveying information in the form of background data. It aims to help students acquire a «fundamental understanding as well as learning the terminology and key concepts». In order to achieve this, various forms of traditional teaching and learning activities must be followed, e.g. lectures and presentations, the study of literature, films, interviews etc.

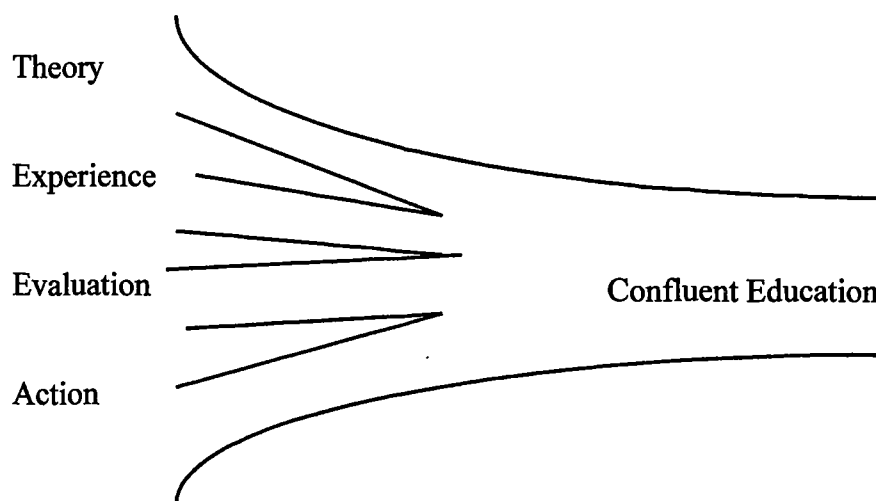
Experience, the second element, considers personal experiences and questions relating to the field of study to be of key importance. It aims to «utilise and incorporate children's and young adults' experiences and reactions to what they study». This can be achieved through «fieldwork, study visits, group discussions, dramatisations, reading, laboratory experiments, nature studies and creating a record of pupils' own experiences» (Sverige et. al., 1994: 20).

The third element is *evaluation*. It concerns «individual or group attitudes towards the subject of study». Education promotes self awareness and increases awareness of individuals' and groups' attitudes and values. Thus we «develop insights into the standards we live by, the way we act and the possible consequences of our actions» (Sverige et al, 1994:20).

Finally, *action* concerns the relationship between the «*theme of study, the individual and reality and how we affect this relationship by our own actions*». (Sverige *et al.*, 1994:21) In order to promote the ability and will to act, extramural activities such as interviews, exhibitions, study visits, demonstrations, letters to the press, publications of articles, are required.

We can distinguish that the “Theory” variable resembles, in context, techniques and aims to “Education ABOUT the Environment”, experience resembles “Education IN or THROUGH the Environment” and finally evaluation and action might constitute “Education FOR the Environment”. So, how is this approach different, to the behaviourist models? The reasoning behind this approach is that «*if attitudes and behaviour are to be affected, the approach and methods used to convey knowledge must involve the active influencing of attitudes and values, creating the ability and will to act*». (Sverige *et. al.*, 1994:21) Thus the difference lies in the time sequence of the activities’ delivery.

fig. 2.7: Confluent Education (After Sverige, *et al.* 1994)



Theory, experience, evaluation and action merge to form confluent education and all four elements function at the same time, whereas the behaviouristic approach

suggested an initial offer of knowledge that would later be enriched by attitude forming activities (as a result of the acquired knowledge) and eventually result in a behaviour change.

2.3 The effect of environmental and educational ideologies on environmental education.

The term environmental education has two dimensions, the environmental dimension and the educational one. Thus the ideologies which dictate the educational systems and environmental philosophy from time to time also influence environmental education as a topic.

2.3.1 Environmental Ideologies.

Environmental ideologies are connected to social, political and economic ideologies. The techno-centric and eco-centric approaches previously considered, constitute the two mainstreams of environmental ideologies. This division was suggested by O'Riordan (1982, 1985, 1989) as well as Sterling (1990). O'Riordan (1982 1985, 1989) also introduces subdivisions to each ideology respectively. As Georgopoulos and Tsaliki (1993) describe, according to eco-centrism, social relations cannot be separated from human - environment relations. This is because he envisages a decentralised society concentrating the power to the community. As an ideology, eco-centrism is opposed to materialism. Economic development is accepted when it aims to satisfy the basic needs of all people, especially the less privileged. For the human race to survive, both O'Riordan (1985) and Sterling (1990) support that

major radical social changes have to take place, which implies changes in ethos, way of life and political power.

Eco-centrism, according to O’Riordan, (1985) could be divided into two major branches. The first one is “*Deep Ecology*” (Gaeanism) based on bioethics.

Deep ecology accepts that ecological and other natural laws dictate human ethics. Earth and all its creatures are considered to be of equal importance and have every right to be undisturbed.

The second branch is “*regionalism*” (“mild technology”, eco-socialism). This branch of eco-centrism believes in human capacity to co-operate and develop self regulated societies based on sustainable use of natural resources and use of appropriate technology. Participation is important and it is considered to be both an educational and political function. “*Regionalism*” is actively involved in promoting the interests of minorities.

Technocracy is based on the **homocentric** view of the world, combined with an administrative approach to the development of natural resources and environment protection. Within technocrats we can distinguish the “optimist” part and the “administrative” part.

“Optimists” believe in the earth’s capacity for continuous provision and in the human capacity to improve its own destiny. Growth can be continuous. Humans will be able to substitute non-renewable resources and in general, every obstacle can be overcome with good will, inventiveness and creativity.

“Administrators” on the other hand believe a continuing economic growth on the condition that appropriate administrative practices and legislation will be applied. The use of natural resources must be controlled and effects on the environment, minimised. For administrators, there is no necessity for any political change.

The following table summarises the ideological structure of contemporary environmentalism as presented by O’Riordan 1985 (in Papademetriou, 1998: 100)

Table 2.1 The ideological structure of contemporary environmentalism (Papademetriou, 1998:100)

Eco-centrism		Technocentrism	
Deep Ecology (Gaeanism)	Regionalism (Eco-socialism)	Administrative	Optimistic
Belief in nature’s rights and simultaneous development of human and natural phenomena.	Belief in co-ordination abilities of society and in its capacity to be self sufficient, by using appropriate science and technology.	Belief in adjusting the evaluation and decision making mechanisms and structure for administrating environmental demands.	Managerial ability as well as belief in application of science and market capabilities.
Redistribution of power in a decentralised society based on the interconnection of environmental and social justice.		Continuation of present status quo in the existing structures of government power.	

2.3.2 Educational Ideologies

Papademetriou (1998) accepts Fien's (1993) categorisation of educational ideologies as the most appropriate for environmental education. This distinguishes three orientations: professional / neo-classic, liberal / progressive and finally socially critical orientation.

Professional / Neo-classic orientation considers school to be an institution which reproduces the existing *status quo* of social, political and educational structures. It aims to equip students with abilities and qualifications essential for their future work - role in the society. It is a teacher centred approach to education where the teacher is a "know all". Knowledge is objective and is offered through separate disciplines in fixed curricula thus it follows a behaviouristic theory of learning. Finally, evaluation is based on controlling the knowledge and skills taught.

The second orientation, **liberal/progressive**, sees education as a means of preparing students for life rather than work. Thus, it supports broad education with special emphasis in humanities, art, technology and natural sciences. A broad education will result in the development of autonomous persons. Through this orientation is recognised the need for negotiation of social issues that will reform society within the existing democratic structures. Both curricula and teaching approaches are open and emphasise practical and social knowledge. There is some flexibility, which offers options of interest to the students as well as participative learning through investigation.

Finally, the third educational orientation, **social criticism**, sees the members of the educational community as active members of the society. They can contribute to the

creation of a more just and democratic society by critically evaluating social problems and situations. This is a constant “action and reaction” between school and society which influences school and adjusts its functions to society’s needs. Social Criticism appreciates personal achievements. Yet it is very critical of the school conditions in which they were achieved.

Despite the efforts for equal opportunities in schooling, the socially privileged still benefit the most. Moreover, it is accepted that education cannot be ideologically neutral, and knowledge is not objective but socially structured. Decision-making in schools should be democratic and this is stressed by social criticism along with teaching and learning. The frame of learning disciplines is rather loose but all teaching procedures are well programmed and evaluated by teachers and students working together.

Nevertheless, being the “Force of the future”, education regardless of ideology, must be:

“A vital part of all efforts to imagine and create new relations among people and to foster greater respect for the needs of the environment.” (UNESCO and the government of Greece, Nov. 1997)

2.3.3 The reflection of ideologies in environmental education

Obviously the various environmental and educational ideologies have their influence on environmental education. Huckle (1983) has fused these ideologies with the environmental education approaches (Education ABOUT, THROUGH and FOR the

environment) and Fien (1993) has elaborated it even more. Papademetriou (1998) proposes a table to present this correlation:

Table 2.2 Approaches in EE and ideologies (Papademetriou 1998: 102)

EE Approaches	Environmental Ideologies + Educational Ideologies
Education ABOUT the environment	a) optimist + professional neo-classic b) techno-centrism + liberal / progressive
Education THROUGH / IN the environment	Eco-centrism + liberal / progressive
Education FOR the environment	a) eco-socialism + critical pedagogy b) deep ecology + liberal / progressive

Education ABOUT the environment covers the cognitive part: “*education about the environment: Basic knowledge and understanding of the environment*” (Palmer and Neal, 1994: 26)

It informs and offers knowledge about natural phenomena, procedures and environmental problems. Probably this is perceived as an offer of “objective knowledge” following the traditional educational systems. This explains why education ABOUT the environment was preferred by optimist and professional neo-classic ideologies. On the other hand, in more liberal educational systems, knowledge is not necessarily objective.

Education IN the environment requires the use of the environment as a teaching tool as well as outdoor teaching. “*Education IN or THROUGH the environment: using the environment as a resource with emphasis on enquiring and investigation and pupils’ first hand experience*” (Palmer & Neal, 1994:26) Knowledge is acquired through experience in real life situations, thus professional neo-classic educational philosophy does not reflect the necessities of this approach. A liberal / progressive system is the appropriate one along with eco-centric philosophy of the environment.

The educational philosophy that, according to Papademetriou (1998), better suits Education FOR the environment is critical, or at least liberal pedagogy. Probably this is because education FOR the environment is “*concerned with values, attitudes and positive action for the environment*” (Palmer & Neal 1994: 26). Social Criticism promotes action through critical evaluation and that inevitably forms values and attitudes, in order to lead to action.

The suggested typology, by Fien (1995) and Huckle (1983), of environmental and educational ideologies with respect to environmental education according to Papademetriou (1998:103), has only a theoretical value. She supports that it “*has a very limited potential for generalisation or hermeneutical and guiding model for the educational act in environmental education*”. She justifies this criticism by the fact that no educator identifies him/herself with one specific combination of these ideologies. Even O’Riordan (1985), who suggests the classification in the first place, suggests that in action, people’s environmental ideologies cannot correspond to one precise category. Moreover, any kind of stereotype forms borders to the educators’ interpretative approach to the theme.

For environmental education and education for sustainability (EfS), as also mentioned in page 13, there is a “*Fundamental prerequisite for an adequately financed and effective educational system at all levels*” (Agenda 21, in UNESCO and the government of Greece, Nov. 1997:21). It is suggested that there is a need to reorient education, awareness and training to increase widespread public understanding, critical analysis and support for sustainable development.

The necessity for educational change is also suggested by Huckle & Sterling, (1997:21)

“In the changing years of the 20th century an education that carries on its traditional role of replicating a modern society unquestioningly is no longer appropriate and that we urgently need to find new models and approaches from which to build while retaining continuity with existing good practice. EfS appears to hold this potential”.

The following section will deal with education for sustainable development and its environmental dimension as part of the emerging need for educational change.

2.4 Education for Sustainable Development

2.4.1 A challenge for Education in the 21st century

A definition of what Sustainable Development is was given in section 2.1.3 as it was stated in the document “Our Common Future” (Benedict, 1991). However, defining what Education for Sustainability, or Education for Sustainable Development is, appears to be a more complicated task. One might say that it is a reorientation of education towards more sustainable educational practices or a challenge for

education to confront the society's unsustainable structure. As Federico Mayor, (1998:1), mentions,

"The key to sustainable, self reliant development is education - education that reaches out to all members of society through new modalities and new technologies in order to provide genuine life long learning opportunities for all. We must be ready in all countries to reshape education as to promote attitudes and behaviour conducive to a culture of Sustainability"

The "reshaping" of education is also underlined by many others. The Rio Declaration, in Agenda 21, states that *"... there is a need to reorient educational awareness and training to increase widespread public understanding, critical analysis and support for SD."* (in Mayor, F.,1998). Milbrath (1992) (in Huckle & Sterling, 1997:21) recognises, that education is critical for promoting sustainable development and at the same time he states that the way educational systems function nowadays, train children to live in a world that cannot be sustained. Huckle & Sterling (1997) continue by commenting that:

"in the closing years of the 20th century, an education that carries on its traditional role of replicating a modernist society is no longer appropriate and that we urgently need to find new models and approaches from which to build while retaining continuity with existing good practice".

It appears that Education for Sustainability (EfS) holds this potential precisely because of its nature and characteristics. Huckle and Sterling characterise EfS as **contextual** in the sense that it has a meaningful and purposive context related to real life situations and experiences. It is **innovative** and **constructive** because, on one

⁴ Modernity according to Sterling (1997) p. 21, is the form of social organisation that now dominates

hand it is an entirely new topic and on the other, it builds up on other issues as well as previous knowledge and experience, thus “*retaining continuity*”(Huckle & Sterling, 1997). Because of this, it can also be characterised as **integrative** and **holistic**. Education for Sustainability can be **focused**, concentrated on one issue or a local issue and **infusive** if the issue is linked to the global reality. The process followed is always oriented towards the specific target and it is critical. Finally EfS is lifelong.

Papademetriou (1998) also discerns intrusive themes and the holistic nature of EfS and she also points out some pedagogical qualities, like active participation in the study, value development as well as future oriented. The pedagogical qualities that Huckle and Sterling (1997) identify also include co-operative learning, systemic thinking, ideology critique, creative thinking, communication skills, continuous learning and outdoors and community work.

All these characteristics justify the statement made by DfEE/QCA, on the report of the 14th of September 1998, (p.3), about education for Sustainable Development in the school sectors in the UK; “*Education for Sustainable Development enables people to develop the knowledge, values, (value development) and skills, to participate in decisions about the way they do things (active participation) individually and collectively (co-operative learning), both locally and globally (focused and infusive), that will improve the quality of life now without damaging the planet for the future (future oriented)*”

The difficulty in defining Education for Sustainability also lies in the influence and orientation the environmental ideologies pose. Huckle and Sterling (1997) provide a

most societies in the world.

table that indicates a critical and holistic form of EfS, necessary for encouraging a deeper response to Sustainability, considering the cultural and educational aspects that determine education for sustainable development.

Table 2.3. Rough map of Orientations and Associations (Huckle & Sterling, 1997:33)

Cultural Aspects	Modernity			Postmodernity
Political orientation development	New Right Centralist democracy	Liberal	(eco)Socialist	Green participative democracy
View of focus of change	Technical	Social	Political	Personal
Social environmentalism	Non Green or Technocentric			Deep green, ecocentric
Personal environmentalism	Egocentric			Ecocentric transpersonal
Environmental awareness	Eco-detachment	Eco-awareness	Eco-literacy	Eco-empathy/ participation
Cultural metaphor	Machine/ mechanistic			Gaia/ systemic
Values/ethics	Instrumental/ utilitarian, individualistic			Intrinsic instrumental balance, transpersonal; solidarity
Effect on people/nature	Fragmentation, homogeneity, uniformity, dependency			Diversity in unity, relative autonomy
Epistemology	Knowledge as information			Knowledge as wisdom
Thinking	Reductionistic, analytic, instrumental rationalist, abstract, dualistic			Holistic, systemic including non-rational, contextual, personal
Development model	Dependency	Inter-dependence		Autonomy/ integration balance
Sustainable development	Growth-centred development			People/ eco- centred development
Educational Aspects	Modernity			Postmodernity
Educational Orientation	Vocational/ classical, positivist	Liberal progressive interpretivist		Socially critical/ transformative
Education and environment	Education for environmental management: add to existing educational structures	Education for environmental interpretation		Education for sustainability: change in educational paradigm

Table 2.3 attempts to clarify the context of the EfS debate. It suggests the predominant relationship between different cultural and educational orientations and their sub elements. According to the table EfS could be part of “*a move away from the values and norms associated with modernity towards the alternatives associated with constructive post modernity*” (Sterling, 1997:32). A technocentric interpretation of sustainability is indicated. This interpretation is expected to dominate in the short term and reflect the predominant culture with a corresponding form of weak EfS or education for environmental management and control (Sterling, 1996:32). This education already exists in many examples of environment and development education.

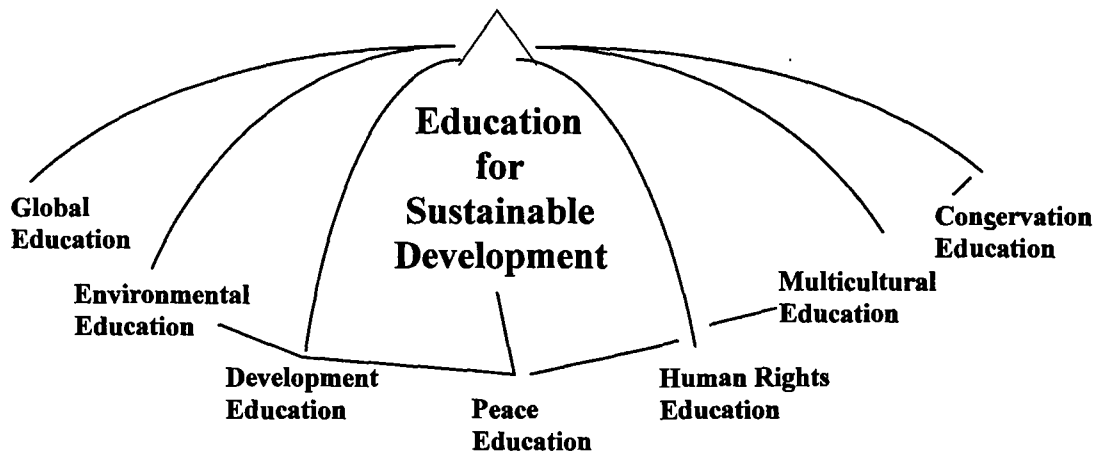
EfS aims concentrate on informing, cultivating awareness, changing values, developing skills and attitudes. Its context, according to Papademetriou (1998), is determined by the forty chapters of Agenda 21. She, as well as DfEE/QCA Report (key concepts), mentions, biodiversity issues, climate change, desertification, war, militarism, discriminations, renewable energy resources, the nuclear threat, human rights etc.

Huckle and Sterling (1997) see some of these as Sustainability values (e.g. biodiversity and social equity) along with eco-integrity, preserving natural capital, limiting natural resource use, qualitative development, pricing environmental values, ensuring efficiency, resilient economy and community participation. These global sustainability values are linked to personal and community values. In fact, the latter can ensure and support the former: The personal and community values mentioned are:

- the sense of responsibility to the environment, other people and the future;
- the will, knowledge and skills to turn responsibility into action;
- a positive response to change;
- the capacity to see links between individual and group actions, external events and other factors;
- a healthy scepticism and freedom to be creative;
- a sense of self worth combined with respect for other individuals and creatures (Huckle and Sterling, 1997:34).

All these characteristics could be housed in various “forms of education”, all of them being under the umbrella of education for sustainable development: Global Education, Environmental Education, Development Education, Peace Education, Human rights Education, Multicultural Education and Conservation Education.

Fig.2.9 Education for Sustainable development



Thus, education for sustainable development can develop eco-literacy and political literacy to full and active citizenship. Because of the variety of issues it deals with, EfS is very flexible and easy to integrate into a curriculum.

Huckle and Sterling (1997) emphasise the importance of the progress over the context and suggest a vertical progression in the curriculum and horizontal

integration. Finally it is recommended that sustainability themes should be reflected in any general curriculum regardless if it retains subject basis or not.

For the education for sustainable development content and values to be realised there are some very important prerequisites. The structure of the instruction, as mentioned by Pike G. & Selby, D. (1990), as well as Huckle and Sterling (1997), has to be coherent with the context presented. The teacher cannot teach about justice, democracy, equal opportunities, citizenship etc. in a “teacher dominated” class. Neither will enthusiastic, active and democratic citizens, emerge from such an environment. Moreover, the complexity and controversiality of EfS issues can be an additional “hold back” factor.

Papademetriou (1998) also sees the dangers of a political dimension of education for sustainable development. She underlines the risk for indoctrination, imposed by public and private carriers. Education is seen as a means for promoting ideas about sustainability and certain aspects of it can be over emphasised. She also foresees, as the case with environmental education, the danger of EfS marginalisation in favour of other traditional disciplines.

In order to prevent these problems and promote sustainability, Federico Mayor, (1998) suggests some changes:

- commitment by the society as a whole (industry, business, public, etc.);
- curricula that will empower citizens to think and work for resolving social and development problems (thus implying a curriculum reform);
- a structural reform, necessary where there is centralised mandating of courses and textbooks, so as to allow for local meaningful learning programmes to take place.

The centralised educational policies and curricula can be reformed and new ways of assessing the process and outcomes of learning should be devised.

From all the above points it emerges that *“for real sustainable development to become increasingly meaningful and mainstream rather than devaluated and marginalised education, in all its forms and in all sectors has a vital role to play. This requires fundamental change in education. We need an expanded, revitalised and purposive view of education as a whole”* (Huckle and Sterling, 1997) and as Kosko (1994), (in Huckle and Sterling, 1997) points out, *“you cannot learn without changing and you cannot change without learning”*. That is why education for sustainable development is probably one of the biggest challenges for Education in the 21st century.

2.4.2 The difference between education for sustainable development and environmental education.

As shown in Figure 2.9, environmental education constitutes only a part of education for sustainable development. It is considered to be the most appropriate area for promoting education for sustainable development and environmental education itself is reorienting its aims to focus on sustainability. The connection between the two was promoted by chapter 36 in Agenda 21 in the Rio Conference and as Federico Mayor (1997) points out, the contribution of environmental education can be enormous in establishing education for sustainable development only if the experience and valuable insight provided by it are taken into serious consideration for the development of the broader notion of education for sustainable development.

Yet how has education for sustainable development re-oriented the aims of environmental education and which elements has it added to its context? Papademetriou points out that the answer to that question depends on an individuals' perception of environmental education and education for sustainable development. As far as the aims, content and approaches are concerned she doesn't find any substantial differences between the two. Indeed, if we compare the holistic character, the curriculum formation and policy content that environmental education nowadays requires (as these are presented in the following chapter), we can see an enormous overlap between the two if not considering them to be identical. The only comment Sterling (1997) has about the issue concerns the threefold structure of environmental education. For education IN, ABOUT and FOR the environment, *"the first two still prevail"*. The reason for this is that *"they still relate to the dominant liberal education paradigm. For education for sustainable development, the meaning FOR the environment is emphasised and corresponds to a reductionist and transformative education paradigm"*. Fig. 2.6 in chapter 2.2 is modified, in order to illustrate this emphasis and the new dimension 'FOR the environment' acquired under the new view of environmental education.

2.4.3 Education for sustainable development in the Primary years.

As mentioned in the previous section a constraining factor for the introduction of education for sustainable development in schools is its complexity and sometimes controversy, so one might wonder if children can be open to such issues. Symons, (in Huckle and Sterling, 1997:58) supports the view that children face difficult issues in their everyday life so *"they are not prisoners of a fairy land"*. Instead he is underlining the importance of acknowledging children with these issues:

“The emphasis placed by education for sustainable development on equity, social justice and improvement moves environmental education into a more controversial arena, but no life style or educational system is value free... By avoiding controversial issues we reinforce the predominant values and perceptions, currently carried by our society which are not leading into a sustainable future and may be perpetuating inequity and injustice... Controversy is part of everyday life, children are faced with issues inside and outside the classroom. Learning to respond thoughtfully to issues is an important part of growing up and needs to be part of the school curriculum”. (Symons, in Huckle and Sterling, 1997:58)

Thus, education for sustainable development is suitable for use in primary education. The only variation (differentiation) suggested here is emphasis on different education for sustainable development aspects in each key stage. In the UK system, for KS1 (5 – 7 years) emphasis should be placed on strengthening feelings of self worth and developing skills of communication and co-operation. For KS2 (7 – 11 years) children can be exposed to more advanced cognitive development taking advantage of *“the great openness towards the world”*, their natural curiosity and acceptability to new ideas, qualities that are typical for their age. Finally the early years are a vital age at which children must be encouraged to hold more critical and questioning attitudes for receiving wisdom, provided and required by education for sustainable development.

CHAPTER 3: ISSUES OF IMPLEMENTATION

The creation and development of environmental education has been surrounded by excitement and enthusiasm, emerging from people's concern about the environment. It could be considered to be the only "event" in the history of education which caused an international consensus about its necessity (Wheeler 1985) and has developed in such a short time (Lahiri *et al.*, 1993)

This chapter will address ways of implementing environmental education in the school. It is divided in three parts. The first explicitly deals with ways of implementing environmental education in the classroom and the second with whole school policy. Finally the third, because of the importance given to the issue, is devoted to environmental ethics.

3.1 The classroom level:

3.1.1 Implementation models

The way in which environmental education should be introduced to schools is one of the most difficult problems of its implementation in educational systems. Various models have been developed, each one with both benefits and drawbacks. Each country should choose the one which is most compatible with its educational system to be effective. The classroom implementation models can be distinguished in two

general categories: the separate topic model and the cross-curricular, integrated models.

Introducing environmental education as a **single subject** implicates having an additional topic in the school programme. Papademetriou (1998), strongly criticises this model since it is difficult to fit into the already overloaded school timetable.

Moreover, as a separate subject it will take only a few teaching periods per week. This, along with the inevitable comparison and competition with “established” disciplines (such as languages and mathematics), will result in the depreciation and marginalisation of environmental education.

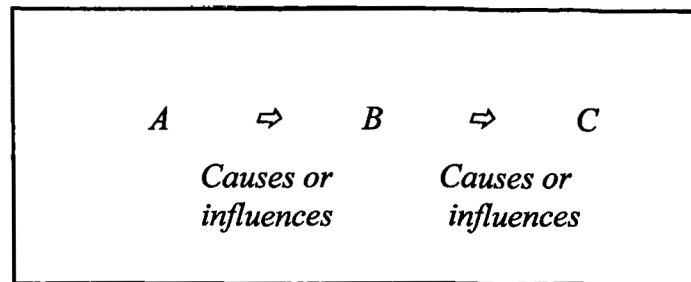
The “separate topic model” does not have a holistic character either. Environmental education has a holistic character in the sense that it seeks to change minds; promoting more awareness, greater understanding and critical reflections on one’s own and others’ values about an issue, through presenting to the person various of its dimensions.

“Holistic education is concerned with educating the ‘whole person’, by developing the mind, body and spirit. It is also about understanding ourselves and our place on the planet, about recognising that we are connected to every other form of life and that the nations and peoples of the world are intricately bound together in one system”. (Sterling and Cooper 1992: 90)

Sterling and Cooper consider this to be an unending process and they find several methods to help people *“achieve new perspectives and alter their personal ‘world view’”*. Based on system ideas they attempt to work on the two main constraints in order to achieve a more holistic understanding.

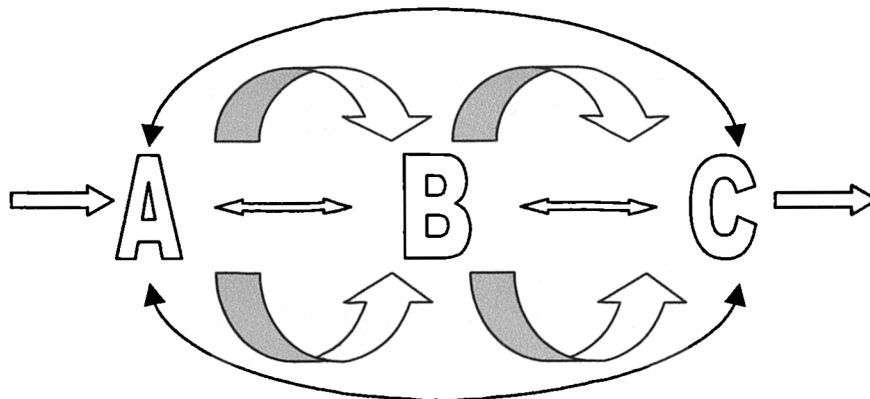
The first problem is the complexity of the environmental problems and the ways they are described and analysed. For this purpose, most of the time is used linear logic. It is very common with the “single subject model”. By using it the teacher risks presenting to the students only a part of the information.

Fig. 3.1 Linear Logic (Sterling and Cooper, 1992:94)



Sterling and Cooper (1992) believe that linear logic is over simplistic and it provides only a partial view of the issue. Understanding a multifactor problem containing many dynamic inter-relationships is very difficult. *“A holistic approach is needed - one which attempts to look at the problem as a whole”*.

Fig. 3.2 Multifactor problem (Sterling and Cooper, 1992: 94)



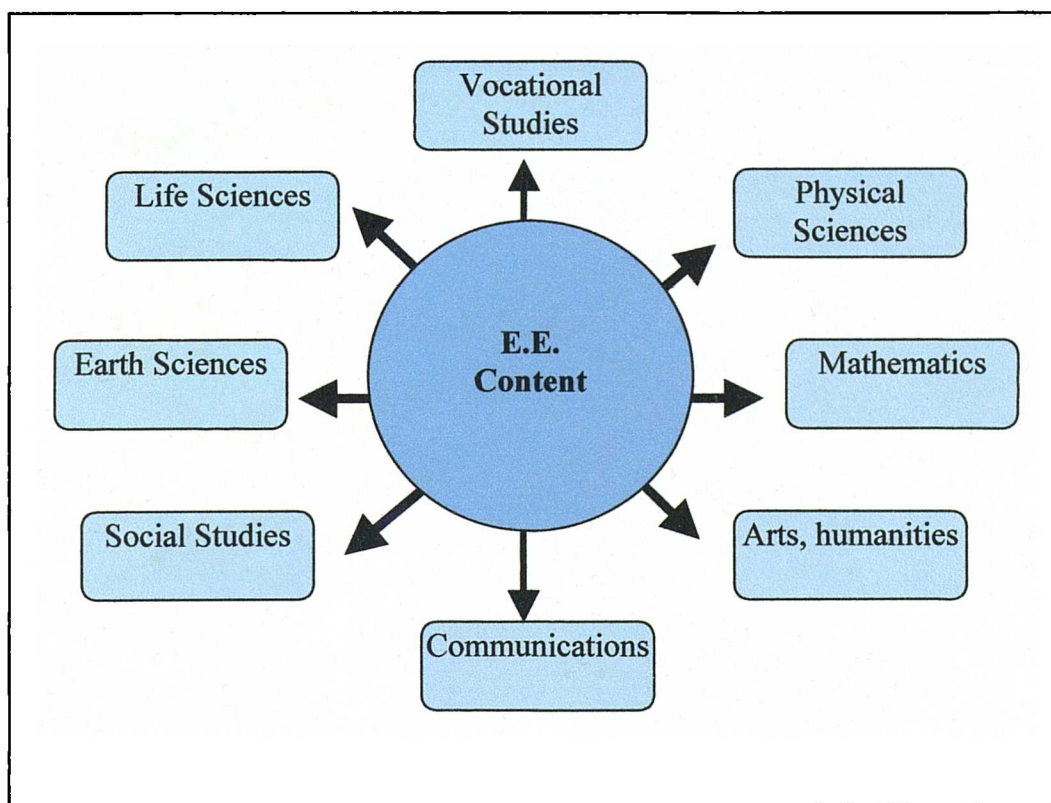
The cross-curricular integrated models are designed to follow the philosophy of the holistic approach:

The **thematic approach** (topic work) deals with only one environmental (or any other) issue. It may be seen through various disciplines and provide a global concept of the specific issue, but it does not constitute a complete environmental education teaching model since it doesn't sufficiently cover the environmental education context. A thematic approach is usually applied through projects. It can be most beneficial if used to supplement other teaching strategies. Kilpatrick (1951) (in Theophilides (1997)), suggests that the "project method" poses a problem for the student to resolve and in this way it develops a desire of reaching the solution and "filling up the gap". Thus the student's actions are intentional and meaningful (since they are working on a solution to a specific problem) and they are motivated for action.

Multidisciplinary and **Interdisciplinary** approaches constitute complete models for environmental education implementation. Both of them present environmental education content through a range of disciplines, contributing, in that way, to its holistic character. The difference between the two approaches lies in the organisation of the matter, either by means of infusion through the curriculum, or by the formation of a single subject.

A Multidisciplinary approach presents environmental matters through a range of disciplines (infusion) (UNESCO, UNEP, IEEP, Environmental Education Series 22., 1993). Environmental matters are distributed and presented through the various curriculum subjects.

Fig.3.3 A Multidisciplinary approach to environmental education (infusion)
(Lahiri *et.al.*, 1993;49)



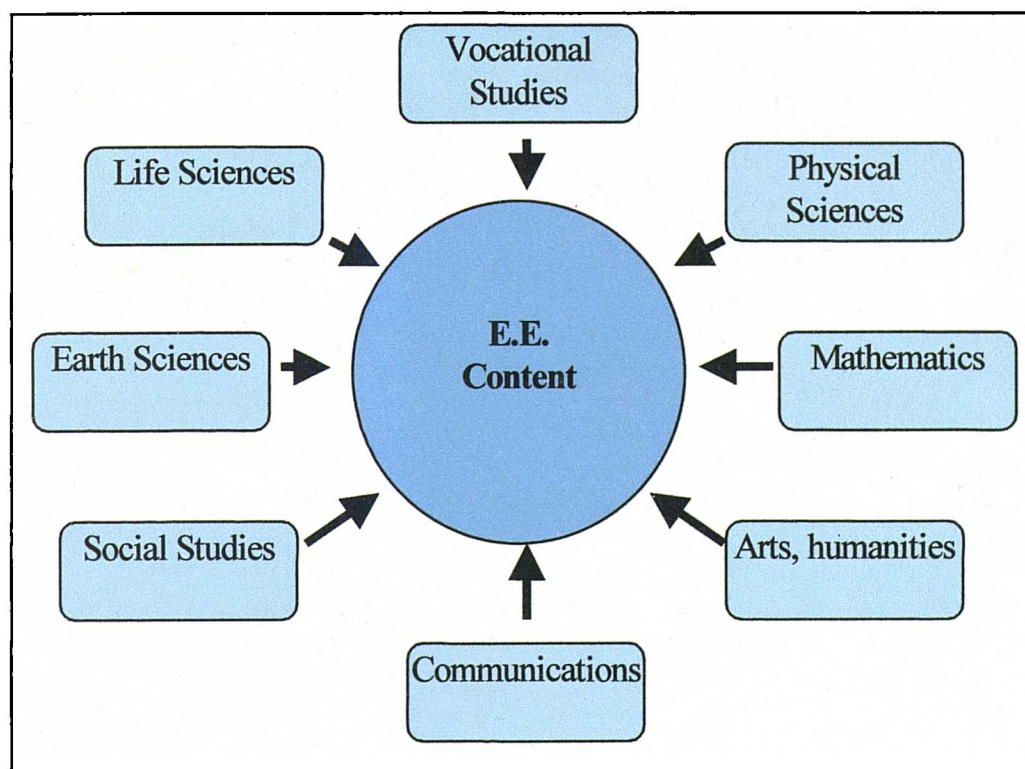
Entwistle (1970) (in Theophilides, 1998:15) states that “*environment is presented to the students through various disciplines parted and unconnected. Knowledge and skills remain isolated in different “departments”... knowledge exists in unconnected packages and students have difficulties in understanding the environment as a unity*”.

This happens because the teacher deals with only a few factors of the issue, (the ones connected to his/her discipline) in isolation from the others. Sterling and Cooper (1992) describing this method as one of the holistic approach methods, comment that the learners “*will gain only a partial or worse distorted understanding of the issue*”.

The problem of the lack of curriculum coordination is resolved by the interdisciplinary approach which does provide the links between the disciplines. Within the interdisciplinary approach the content of the teaching becomes unified by using matter

from various disciplines simultaneously and forming a single subject within which
“Distinct subjects are abolished and replaced by an interdisciplinary form of work, i.e. activities which relate to many disciplines at the same time” (Theophilides 1998, p.13)

Fig.3.4 An Interdisciplinary approach to environmental education (single subject)
 (Lahiri et.al., 1993;49)



Environmental education “fuses” the disciplines in an organised and connected way, to help students conceive a global image of the issue. In this case, the environmental (or sustainable) part of the context of various disciplines, joins to form the multi-dimensional profile of the environmental education issue (otherwise, the various disciplines contribute to environmental education formation).

We can and should form curricula that will provide opportunities for the student to place environmental education (or Education for Sustainable Development) in the

proper and meaningful perspective. Warren Flint⁵ (1999) referring to interdisciplinary education in sustainable development (through science) suggests that *“the goal is to teach the future professionals the real need for continued examination of linkages among economic, social and environmental issues in achieving a sustainable global society through science”*. This will make students able to take more informed decisions.

As Theophilides (1998) suggests, an interdisciplinary approach helps children learn, without cutting them off from real life, but providing them with opportunities to learn THROUGH life, through the environment, ABOUT life and finally FOR life⁶.

Although the interdisciplinary approach has many benefits as a model for the implementation of environmental education, it still has some constraints. Sterling and Cooper (1992: 95) point out that *“if the teacher deals with many factors at once, and their interrelationship, the learners may be stressed and confused by the amount of information and complexity”*.

Papademetriou (1998) also expresses her fears about this method. She points out that the “diffusion” of environmental education in the disciplines (co-ordinated/ interdisciplinary, or not/ multidisciplinary) endangers the status of the subject and may lead to its devaluation.

All advantages and disadvantages of the two environmental education implementation models are summarised by Hungerford & Peyton.(1986:14-15), in the following table.

⁵ Five E's Unlimited, <http://www.eeeee.net/fi00021.htm>

⁶ This, is compatible with the three-fold nature of EE, EE is Education About the environment, through the environment and for the environment.

Table 3.1. Interdisciplinary Vs Multidisciplinary (infusion) formats for environmental education: Advantages and disadvantages.

Considerations	Interdisciplinary (Single Subject) Characteristics	Multidisciplinary (infusion) Characteristics
1. Ease of implementation	Easier to implement as a single subject if time permits in the curriculum; teacher training is less of a problem.	Requires that more teachers be trained; greater coordination of the curriculum necessary, requires less time/content in the existing curriculum.
2. Teacher Competencies	May require fewer teachers but with more in depth training in EE. Thus teacher training is less demanding in terms of teacher numbers but more demanding in terms of level of competencies required.	Requires that all teachers from all disciplines be competent to adapt and/or use EE materials although perhaps not to the same depth as in single subject approaches.
3. Demand on Curriculum load	Requires addition of this discipline to an already crowded curriculum.	May be effectively implemented with minimal demands on existing curricular load.
4. Ease of Curriculum Development	Components easier to identify and sequence	Components must be effectively identified sequenced and accommodated by the existing curriculum.

Considerations	Interdisciplinary (Single Subject) Characteristics	Multidisciplinary (infusion) Characteristics
5. Evaluation	A comprehensive evaluation is much easier to accomplish in a single subject curriculum.	Comprehensive evaluation difficult due to the number of variables involved.
6. Age level appropriateness	May be more appropriate at secondary than elementary levels. For some types of EE goals may be essential at secondary and tertiary levels.	Appropriate at all age levels with some exceptions at secondary and tertiary levels.
7. Effectiveness in teaching for transfer	More difficult to use in effectively teaching for transfer. Requires special efforts to do so.	Teaching for transfer is inherent in this approach when properly used. Infusion permits decision making to take place in other disciplines in an environmental context.
8. Ability to provide in depth coverage for environmental issues	Budget consideration entirely dependent on the nature of the course being developed. A highly sophisticated course demanding many field excursions or laboratory equipment could prove costly.	Monetary considerations very dependent on the nature of the curriculum being developed. Fund required could be greater than in a single subject curriculum due to numbers of learners involved across numerous grade (age) levels.

Nevertheless, the good planning of the teacher, and his/her careful selection of teaching approaches and activities, can ensure a successful implementation. Reinhold (1990) (in Sterling and Cooper, 1992:95) advances a number of ideas to help the teacher resolve the interdisciplinary approach problems and achieve the desired holistic view:

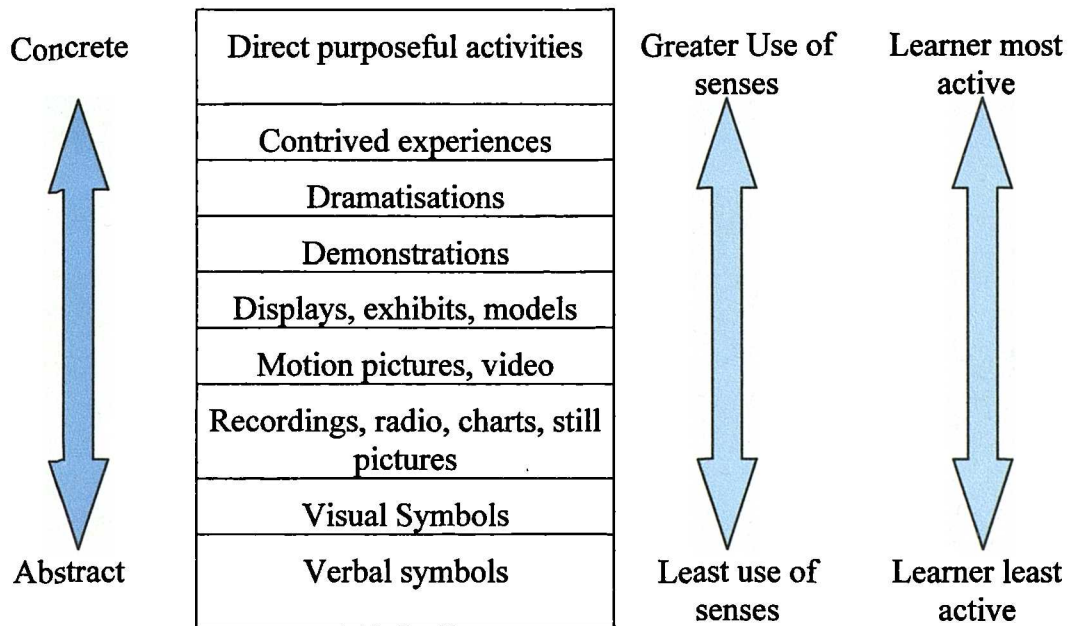
- *“Expand your variety of teaching methods and means of expression. This will increase the number of ‘ways in’ to and views of the issue.*
- *Take risks to help open up new ways of looking at things...*
- *It is normal practice for education to look at the small local examples of a problem or system ... this can often help us understand the bigger example such as the national or global picture...”*

Thus the teacher should carefully select the teaching approaches and tools to be used.

3.1.2 Approaches to teaching and learning.

Engleson *et al.* (1991) present several types of educational experiences for the teacher to select and help students learn about the environment. Some of these teaching approaches are abstract and symbolic whereas others are direct and concrete. The more concrete and specific the activity, the more active the learner is and the greater use they make of their senses. Edgar Dale (1969) (in Engleson *et al.* . 1991, p.42) represents these approaches hierarchically in the following figure.

Fig. 3.5 Approaches to teaching and learning



“Direct Purposeful experiences are those in which the learners have an opportunity to use their senses, hearing, tasting, seeing, touching and smelling - to build up wealth of meaningful information” (Engleson, *et al.*, 1991). They are direct and purposeful with real educational value. One of the activities of this group is fieldwork. Fieldwork indeed maximises the opportunity for learners to feel, react emotionally to the experience and develop awareness and sensibility.

The term “field study” stands for all the work held outside the classroom. It may take place on a regular basis, serving specific aims and intentionally be incorporated in various classes. It doesn’t have to be far away, even the school environment may offer opportunities for outdoor study (Barker *et al.*, 1994). This activity is very important for the holistic approach to environmental education: it gives importance and meaning to the content of learning, because it makes connections with real life situations and real

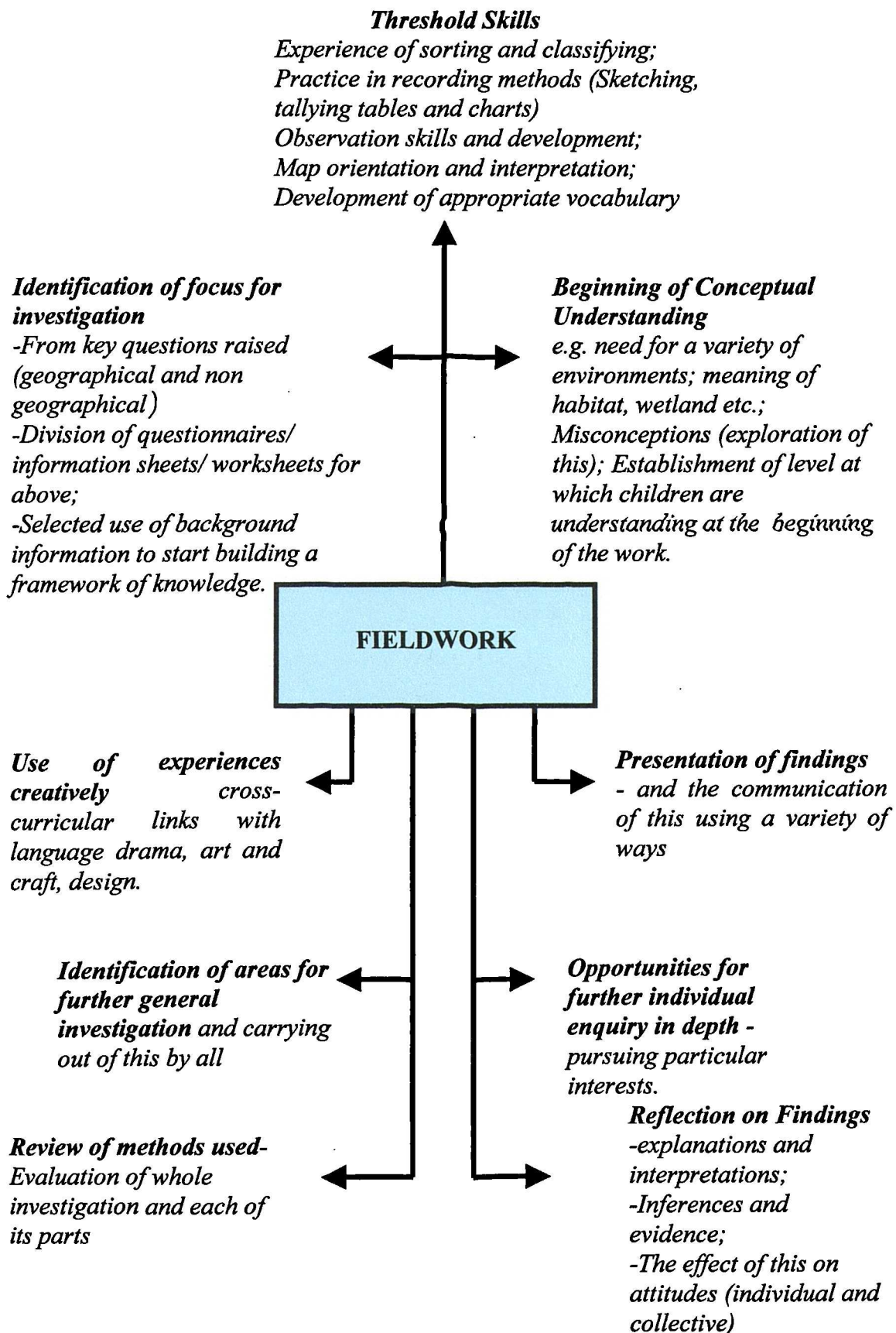
people. Students observe, write, analyse, present and explain their investigations, discuss and listen about their work.

“...all developments in education demand that pupils have first hand experience of real people, real situations, real action and real places. Fieldwork provides this opportunity. Living in today’s challenging world demands skills such as observation, keeping records, problem solving, decision-making, communication and co-operating. Fieldwork develops all these skills.”

(Geographical Association, 1992, in Palmer and Neal, 1994:95)

Fieldwork may find its place within interdisciplinary approach and through projects. Barker *et al.*, (1994) present the conditions for and results of fieldwork within a project.

Fig. 3.6 Fieldwork Project (Barker et al., 1994:8)



Learning through nature, not necessarily by means of field study, is also emphasised by Sverige *et al.*, (1994:23-24), by highlighting the benefits that can be extracted from such an approach. From their discussion emerges a “staircase model”, a non age-related model, which highlights how children and adults can develop an awareness of nature and environment.

Fig. 3.7 The stair-case model

Teacher	Recognise as a teacher that nature and not the course book in the classroom offers the best source material.
Teacher & student	Find numerous opportunities to exploit nature as source material in a range of different subjects.
Student & teacher	Learn to understand how nature functions and how humans have affected and continue to affect it. Involve recurrent excursions into the immediate environment.
Student	Establish familiarity with immediate environment. Key elements: exercises, training the senses, exploring nature, basic outdoor rules, learning to recognise traces of human presence in nature.

“Contrived experiences are edited to omit certain elements of a real experience and thus make it easier to understand. The editing may reduce the size or complexity, or both, of a real life situation.” (Engleson *et al.*, 1991: 42) Special visits belong to this category of activities, since most of the time they are focused on one of the elements and serve a special purpose. An example that Engleson *et al.* use is the visit to an aquarium: *“...an aquarium may contribute greatly to understanding the ecology of a*

pond... Nevertheless, they insist on also providing a first hand experience of the 'real thing'...” but the real thing should also be experienced.

In the same way that special visits focus on certain elements, simulation activities reproduce a simplified version of real phenomena, events or procedures (which might be social, political, economic and biological), thus providing a clearer focus on the aims of the activity. According to Katsikis (1992: 23), during a simulation both children and teachers participate taking over “roles” which simulate real life situations. This involves active participation and decision-making. A simulation is based on a problem and is more suitable for multidisciplinary approaches. Finally Katsikis (1992) states that a simulation is a “dynamic activity” dealing with changing conditions and requires flexibility of thinking and answering. Moreover we might consider modern computer simulations as a further enhancement of contrived experience activities.

In the first two approaches to teaching and learning, direct purposeful experiences and contrived experiences, the student makes the greatest use of his/her senses and is most active. In some situations though, it may be impossible for first hand experiences to be provided, nevertheless we can still ensure an active participation of the student and a solid end of the activity.

“Dramatised experiences can help children experience ideas or events that they cannot experience first hand. Dramatisations, like contrived experiences omit some of the unimportant and confusing elements of a situation and stress the significant ideas.” (Engleson, 1991: 43)

Katsikis (1992) suggests that role-play is one of the problem solving methods where a *“selected real life situation is dramatised in order to bring out the emotions and feelings of the participants”*. The student may have to deal with controversial issues but in the end s/he will *“develop a sympathetic understanding of other people by gaining new insights into their own lives”*.

Inquiry method as well as controversial issues may take the form of role-play. A decision-making or ethical query is posed for the student to solve or debate. Role-play may indicate that the student stands for someone and has to act in a relevant way. This brings up the need for good and wider information and good knowledge of the issue. In this way the student becomes an *“active and creative individual with the will and ability to seek knowledge and self development”* (Sverige *et al.*, 1994: 44).

Problems investigated through role-play and controversial issues are usually open ended, they have more than one answer and more than one possible solution. The role of the teacher here is to supervise, support, encourage and guide. Most importantly teachers should be flexible and sensitive to other viewpoints, able to interpret and fulfil the needs of the students.

Environmental games and dramatisations are equally creative and participative activities. Sophia Gardelli (1988) (in Katsikis, 1992:25) suggests that *“EE aims at creating aware, responsible, co-operative and active citizens”*. The students must have first hand experiences in order to acquire personal understanding and a critical view of situations and phenomena. As mentioned before this is not always possible. For Gardelli (1988), environmental games are another solution to this problem.

“Environmental games connect indoor activities with events that occur outside in grown ups’ world”. These games take into consideration the variety of elements that constitute the environment and try to “reproduce” the complexity of environmental problems by bringing up the values, interests and attitudes of various social groups. Environmental activities should not simply be “pleasant breaks” but also be part of a well-organised teaching programme.

After dramatised experiences, Edgar Dale (1969) (in Engleson *et al.*, 1991), suggests **demonstrations**. He defines them as *“visualised explanations of important facts, ideas, processes or techniques generally done by a person before a group”*. The reasons for which a wide number of students cannot be involved might be safety reasons, time limitations, or lack of materials.

A good presentation may include many of the teaching techniques already mentioned, such as dramatisation, or the usage of models as well as less “learner active” techniques, such as displays and exhibits.

Motion pictures and video compress both time and space and omit unnecessary and unimportant material. It concentrates on the selected key points. For that purpose they should be carefully chosen.

Recordings, radio, charts and pictures may clearly transmit a message to people who cannot read. Nevertheless, very little physical activity is involved and they can become abstract approaches. Finally the most abstract approaches are the ones which make use only of visual and verbal symbols, e.g. a red cross representing a hospital is a symbol and signs used by the formula $E=mc^2$ are verbal symbols.

3.1.3 Organising the Curriculum

Designing an effective and comprehensive curriculum is a complicated and difficult task even when the goals and objectives are commonly accepted (Volk, 1993:46). In a field, such as environmental education, where controversial issues exist even within its philosophy and definition, designing a curriculum is even more difficult (Volk, 1993).

Acknowledging that there are a number of objectives on which environmental education focuses, Volk (1993) considers as the ultimate objective *“the development of a responsible individual and societal behaviour”* (p.46). For the achievement of this goal, Hungerford & Volk (1990) recommended six critical components to be considered during the planning of educational programmes in order to be effective in changing the learner’s behaviour:

- *“Teach environmentally significant ecological concepts and the environmental interrelationships that exist within and between these concepts;*
- *provide carefully designed and in depth opportunities for learners to achieve some level of environmental sensitivity which will promote a desire to behave in appropriate ways;*
- *provide a curriculum that will result in an in-depth knowledge of the issues;*
- *provide a curriculum that will teach learners the skills of issue analysis and investigation as well as provide the time needed for the application of these skills;*
- *provide a curriculum that will teach learners the citizenship skills needed for issue remediation as well as the time needed for the application of those skills and;*
- *provide an instructional setting which will increase learners’ expectancy of reinforcement for acting in responsible ways i.e. attempt to develop an internal locus of control in learners. (Hungerford & Volk, 1990)*

Other aims which, according to Volk (1993), should be included in a curriculum design for environmental education are:

- ecological literacy in order to facilitate sound environmental decision making;
- environmental sensitivity, which refers to “*an empathetic view of the environment and its problems*”(p.49);
- in depth knowledge of the issues that implies not only learning about a variety of environmental issues, but also considering the implications and consequences of these issues;
- issue investigation skills that would allow active involvement of the students in the investigation of environmental issues and result in their responsible citizen behaviour;
- citizenship skills “*are those skills that individuals can use to help solve environmental issues*” (p.50) and contribute to responsible environmental behaviour;
- a person will engage in environmentally responsible behaviour if they have a feeling of effectiveness, *locus of control*. The locus of control could be internal, in which case the person feels that s/he has a measure of control over what happens. In the case of external locus of control the person believes that control over what happens is beyond his/her power and therefore s/he is powerless to change the society. This person will therefore not act in a citizenship dimension.

After the investigation of the aims that educators should consider in curriculum planning, suitable teaching approaches must be considered. In education there is no “right or wrong” approach to teaching and learning. The variety of activities

mentioned before serve various approaches and various aims. The selection of the approaches to be used is usually very flexible in order to satisfy various criteria:

- the teaching style of the educator
- the discipline in which the environmental education is going to be infused
- the aims set
- the age of the children
- the environmental education issue

For environmental education though, whichever approach or combination of approaches is utilised, *“first hand experiences of the environment are at the forefront of teaching and learning”* (Palmer and Neal,1994).

The same degree of flexibility, though, should not exist when organising the context of environmental education to be taught. A model for teaching and learning should be formed in order to ensure continuity of the teaching matter and adequate coverage.

Palmer and Neal (1994: 37) suggest a very helpful framework when planning topics, which consists of two mutually dependent components. This can be expressed as a matrix in which the vertical component corresponds to the core and foundation subjects and the horizontal component corresponds to the cross - curricular theme of environmental education.

The task of preparing such a matrix becomes easier if the teacher first analyses the components of environmental topics, key issues involved and knowledge and skills to be developed (see fig.3.8). It is a very useful method of working if the teacher wishes to support continuity and coverage as mentioned before. Nevertheless, the mere construction of a matrix or a working scheme, is not enough for ensuring the

two. At this point the urgent necessity for an environmental education syllabus appears in order to define the elements and components of environmental issues. Most curriculum disciplines (e.g. mathematics) have their teaching matter defined and organised for every age group. This may be part of a syllabus and/or the curriculum.

Fig. 3.8 Model for teaching and learning

	Curriculum Disciplines			
Environmental education issues	Science	Geography	History	Mathematics
Waste	Damp places and the consequences	Damp places and the consequences	Waste management in the past	Problem solving
Water	Water Cycle	How water affects a country's climate	Water supply network during Roman times.	Monitoring water consumption

Environmental education in most countries' curricula is simply mentioned through some guidelines and approach or teaching suggestions. There is no official document that presents every environmental issue that should be learnt by the student. This gap is one of the most important reasons for environmental education devaluation.

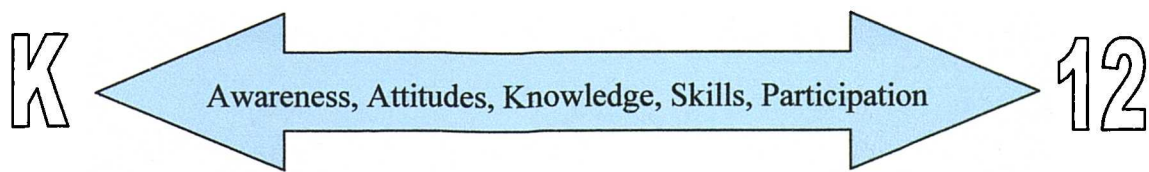
A well-organised curriculum may prevent many problems from appearing. Apart from ensuring adequate coverage it can distribute the environmental matters to the appropriate age groups. Engleson *et al.* (1991) suggestions can find their application. The authors saw a high correlation between the Piaget's, Stage's and Epstein's and Toepfer's brain growth periods. Applying their findings to

environmental education objective categories (chapter 2) they come up with a table presenting the changing degree of emphasis in each objective category.

Fig. 3.9: Grade level emphasis on EE objective categories (Engleson et al. 1991: 9)

Level	Major emphasis	Minor Emphasis
K – 3 (5-9 years)	Awareness Attitudes	Knowledge Skills Participation
3 – 6 (9-12 years)	Knowledge Attitudes	Awareness Skills Participation
6 – 9] (12-15 years)	Knowledge Skills Attitudes	Awareness Participation
9 – 12 (15– 18 years)	Skills Participation Attitudes	Awareness Knowledge

Fig.3.10 Age and objectives



Another issue is time organisation. If delivered as a cross curricular topic, what is the most appropriate time - moment of the school programme for environmental issues to be presented? The best solution to this problem is perhaps the environmental education syllabus/ curriculum itself, or even the whole curriculum. If an environmental education curriculum is available every environmental issue/topic mentioned should point out the topics from other disciplines with common ground

(matter overlap) or vice versa. For example when a maths teacher is consulting the curriculum about teaching exponential increase, one of the teaching suggestions could be to make use of the phenomenon of bioaccumulation as context to some of the problems the teacher may use. At the same period of the school year other disciplines may have to deal with chapters mentioning the same environmental issue (e.g. science). In this way, time and timing problem no longer exist because the curriculum itself has predicted it. This method is of course the most appropriate and matching for coordinated multidisciplinary approach.

A teacher that has chosen to deal with environmental issues through a thematic - topic approach might find the block timetable method more convenient. Timetable blocking can involve the blocking of a few days or weeks which will be devoted to studying one or more issues through detailed planning of cross curricular work.¹

Palmer and Neal (1994) mention a school that blocks timetables one afternoon a week for the 4th grade (10 year olds) and a different one for the 5th (11 year olds) grade for the whole school year, for cross-curricular topics. This method of time organisation probably tends to establish environmental education as a separate subject of the curriculum which is not taught all year long to all classes.

Conclusively it is clear that the way environmental education is currently addressed in many countries is less than satisfactory. This is exacerbated by the lack of a clearly defined environmental education syllabus and its well organised absorption by the

¹ the combination of cross curricular and fieldwork is called course study (Palmer and Neal, 1994, p.85)

curriculum because of poor (as far as environmental education is concerned) school textbooks, lack of control, inspection and assessment.²

3.2 Whole School Policy

Fien J. (1999) *et al.*, mention two reasons for a whole school approach: the first reason is that every teacher is responsible for infusing environmental education into their teaching in order to help students to live and work towards a more sustainable environment for all. The importance of integrating environmental education in all curriculum subjects is also highlighted by the Tbilisi declaration (1978):

“EE is not to be added to educational programmes as a separate discipline, or programme of study but as a dimension to be integrated into them. EE is a result of reorientation and re-articulation of the various disciplines and various educational experiences (natural sciences, social sciences, arts and letters, etc.) providing an integrated perception of the environment.”

Learning in a classroom or even learning out in the open during a class is one thing but making a way of life out of what one learns is another. What children learn in school will be of little use if they do not see it happen in real life, if they do not learn to live by the “rules”³ the classroom lessons try to show them, and finally if they do not see their teachers living by the same rules:

“Young people cannot be expected to value the environment if it is obvious to them that it is not valued by the school. It is therefore important that schools should practice what they teach about the

² Issues of assessment and evaluation will be presented in chapter 5

³ Not in the sense of obeying commands, but rules they set for themselves out of respect for others and for nature.

environment...” (CEE 1995, develop an environmental policy; a call for action for schools, RSPB)

This is precisely the second reason for whole school approach. Fien *et al.*, (1999:2) suggest that a whole school approach “*relates to things students learn from non formal aspects of their experiences in school. It is important that schools operate as a sustainable environment in their consumption and use of resources and management of waste products. In this way they can reinforce the knowledge, values and action objectives of EE being taught as part of the formal curriculum*” (module 2).

Whole school policy can also take the form of an environmental education programme. Its application can result in a number of benefits for the achievement of environmental education aims. The results of research carried out in the United States was reported during the inter-regional workshop in Athens, (MIO-ECSDE, 1995: 19), by Knapp, supporting the view that traditional educational model Awareness - Attitudes - Behaviour does not work for large numbers of people. “*In order to change learner behaviour in the environmental arena, we must provide an educational climate that provides two things, (1) puts the learner into a situation where he psychologically owns the issues – ownership, and (2) provides the learner with the skills needed to empower him to take positive action – empowerment.*” Such an empowerment and ownership can be developed during an environmental education programme. However, as Knapp (1995) observes, very few countries have introduced into schools environmental education programmes which involve students and use a research scope and sequence. A whole school policy – programme is required for that purpose. In most environmental education programmes the students

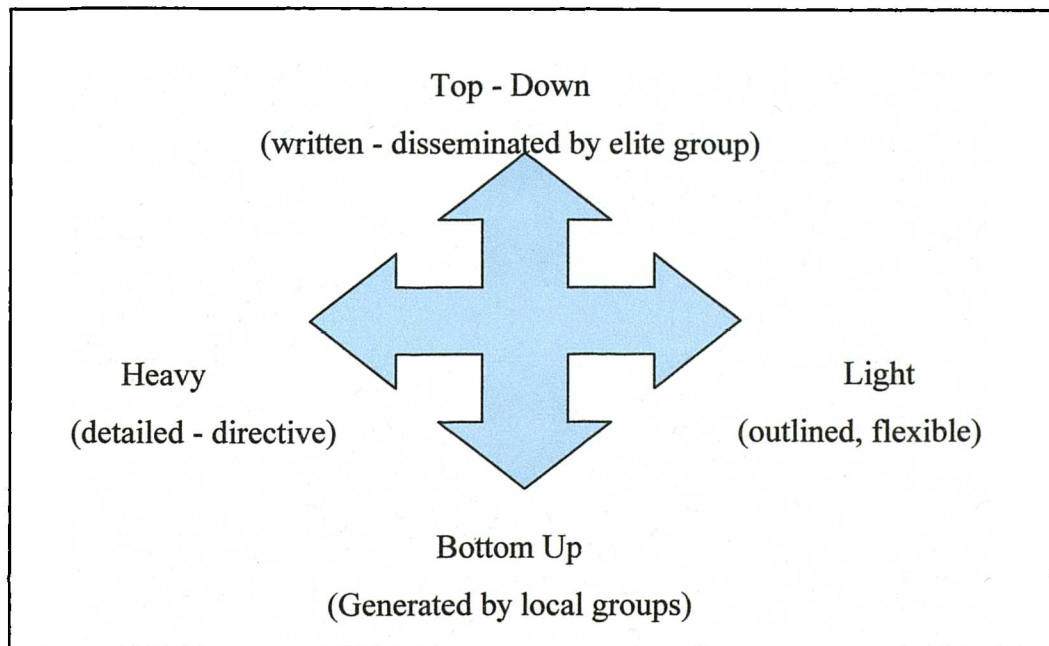
simply receive incidental exposure to environmental issues (Knapp, 1995). Furthermore there remains a worldwide shortage of teachers competent enough to incorporate the environmental dimension in educational programmes (Knapp, 1995).

The necessity for whole school environmental policy is evident. Countries signatory to Agenda 21 produce national plans for sustainable development (local agenda 21) and require means of supporting these plans. Environmental quality becomes a common concern and gradually educational systems respond to this social demand by introducing whole school environmental policies. Nevertheless, the official national plans may be dictating the kind of environmental school policy.

Sterling (1997:199) discerns two strategies: the instructive and the constructive. For the instructive strategy, the tools of the public policy are not only education, but legislation and incentives too. It is a “*top to bottom*” process since all decisions and plans are taken by specialists (top) and expected to be applied by the public (bottom). The public is the recipient of a message, knowledge and information in order to acquire awareness and change of his/her behaviour. Change is fast when it occurs but also shallow and temporary. Education in this case is not very flexible and takes the form of “*education about sustainability*” only as directed - detailed (heavy) by the decision makers at the top.

The second strategy “*constructive*” concentrates on an environmental policy that is negotiated, owned and enacted at local level. Participation builds ownership and generates meaningful action. The role of the centre is facilitation. In this case change is slower and more difficult to achieve but deeper and more lasting:

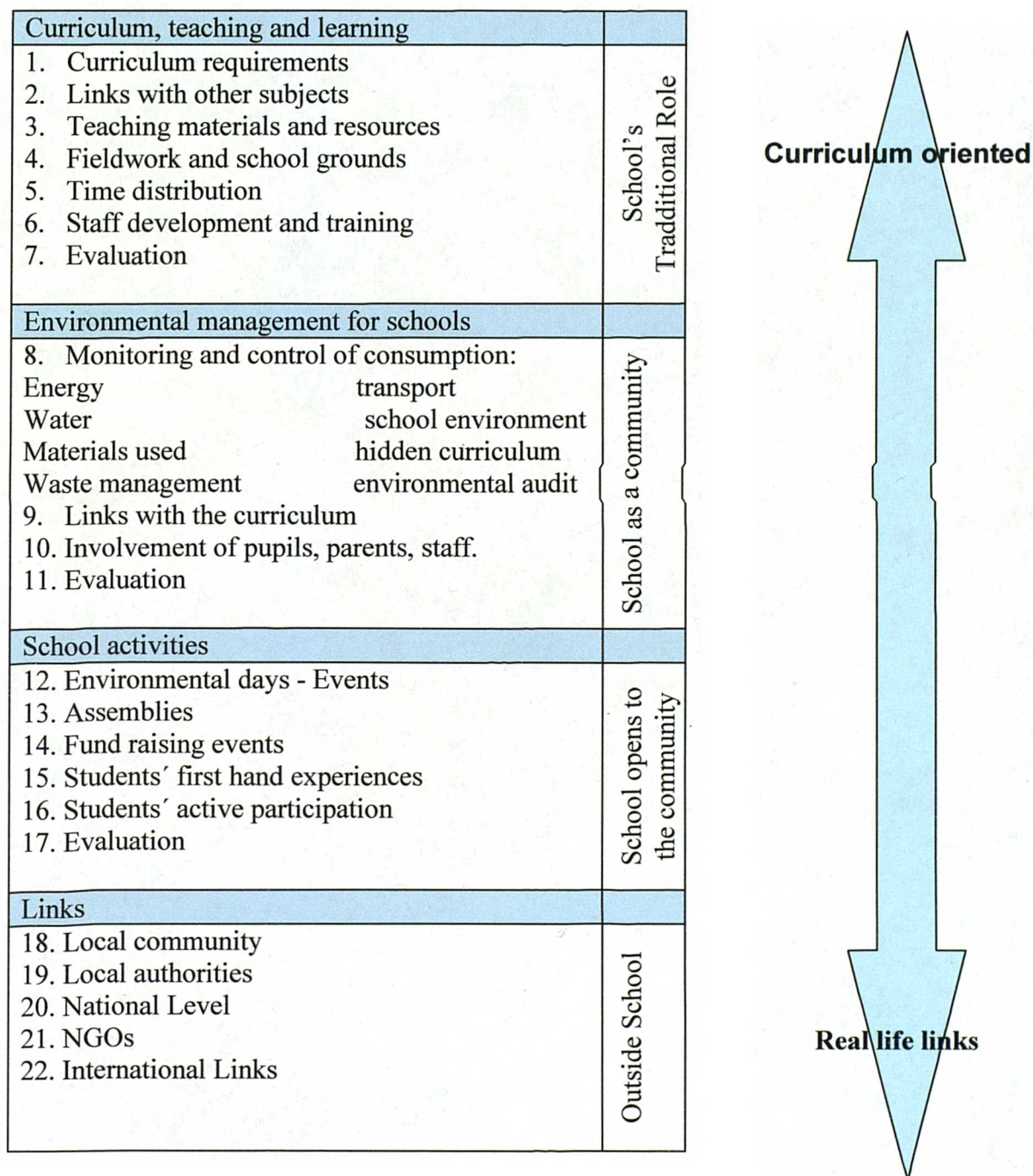
Fig.3.11 The spectra of strategy styles: (After Huckle and Sterling, 1997)



For schools, this strategy tends to be light, they may only receive outlined instructions and guidelines upon which to base their own personalised policy. Following a democratic spirit and responding to the school's particularities and needs, they construct their whole school's environmental policy.

A whole school policy that, apart from the curriculum, includes the teacher's role model, the hidden curriculum and every aspect of school life in general, seals the consensus between theory and real life. It may seem complicated but the environmental policy will guide the school for a successful implementation of an environmental education programme. In an organised way, it includes aims, objectives, methods of teaching, time arrangements, content (knowledge, understanding, skills, concepts, attitudes), resources and organisation of materials, assessment, record keeping and evaluation, policy for developing and maintaining the school and its grounds as an environmental resource, policy for fieldwork, etc.

Fig. 3.12 Whole School Environmental Policy



The figure above, attempts to present all these parameters in an organised and schematic way. A whole school policy is a document where all these factors must be delivered. According to CFEE (1995)

“an environmental policy for the whole school is not a recipe for increased work for teachers, either through increased curriculum content or administration. Rather it provides a focus and brings many aspects of school life together.”

3.2.1 Curriculum, Teaching and learning.

The policy document on curriculum, teaching and learning must accommodate all the factors mentioned in the diagram: curriculum requirements, links with other subjects, etc. Palmer and Neal (1994) suggest that each school is unique and for this reason a fixed model for primary schools is not appropriate. Instead of that, some guidelines which could form the basis for the establishment of such a policy might be more useful and effectively accommodate the factors mentioned.

1. *Aims*
2. *Objectives*
3. *Methods and timing*
4. *Content, knowledge, understanding, skills and concepts*
5. *Resources and organisation of resources*
6. *Assessment, record keeping and evaluation*
7. *The school as an environmental stimulus*
8. *Other matters*

(Neal and Palmer, 1990: 43)

The aims and objectives of environmental education are presented in chapter 2. When deciding on the issue, the teacher has to take into account the experience and special needs of individual pupils and be explicit about continuity and progression. Objectives should also involve local environmental matters.

The teacher has a huge variety of methods from which to choose and there are many solutions to organising the time. Neal and Palmer (1990) plea for flexibility, so that

the approaches used and the time arrangements made will “*serve and not master the teaching situation*”.

“*The environmental policy statement of content, is very much conditioned by the detail of the curriculum statements*” of the various subjects. Neal and Palmer (1990) suggest that it is not possible to specify in detail environmental education content for all subjects, but the content of the particular subject should be treated in a way that contributes to the aims and outcomes of environmental education.

Resources and organisation of resources.

This part of the environmental policy statement should describe the resources available to the school and the community and indicate the appropriate age level with which to use them. These might be parts of the school grounds, or environmental centres, or institutions in the area. Having all these resources listed makes it easier for students and teachers to take advantage of all opportunities. Assessment, record keeping and evaluation must take into consideration the broad national framework for assessment and testing. For England and Wales this framework includes three interrelated components:

1. *Attainment targets for knowledge, skills and understanding expressed in up to 8 levels in the core and foundation subjects as a basis for assessing and reporting on pupil's performance,*
2. *A combination of “external” and “internal” assessment. The external task is by means of nationally prescribed Standard Assessment Tasks (SAT's): the internal task is assessment by teachers themselves.*
3. *The use of assessment results and outcomes both “formatively” to help teaching and inform decision making about next stages of a*

pupil's learning and also "summatively" to provide information to parents and other interested parties about children's progress.

(Neal and Palmer, 1990: 89)

Every one of these assessment components can be broken down into numerous factors that require separate and specialised evaluation methods. Issues of assessment and evaluation will be presented in the fourth chapter.

The school as an environmental stimulus

The school grounds, decoration and the building itself may be a stimulus for learning. The teacher should be aware of the teaching opportunities the school grounds offer and make use of them. Of course the improvement and enrichment of the school environment should be examined by the "Environmental management for schools" part of the whole school environmental policy document.

Other matters that this document may include are the issue of the teachers training on environmental matters and staff development. A teacher training exercise is vital for the success of a school policy. It may serve as the initiation of a debate on environmental education as a cross curricular theme and stimulate environmental awareness of each subject department. This communication and debating between the teachers can encourage co-operation between the subject departments and result in a very important step for the implementation of a whole school environmental policy: the establishment of a co-ordinator⁴ and his or her role.

Of course the training⁵ will be such that it satisfies the needs of the school. It may be designed to contribute to the preparation of the whole school environmental policy,

⁴ Co-ordinator and his/her role is presented at the end of this chapter, page 92.

⁵ Either school based staff development or package courses.

or focus only on some of its dimensions (e.g. curriculum or environmental audit etc.). (Palmer and Neal, 1994:233)

3.2.2 Environmental Management for schools

For a school that might want to test its degree of “environmental friendliness”, Krysia Baczala (1992:6-7) suggests that:

“ If there was a scale that measured the environmental performance of a school, neutrality might place a school in the middle. An absence of EE in the curriculum and an apathy towards energy efficiency, litter, etc., would indicate a below average performance where the school as an establishment might be doing actual harm to the environment. A school that had eliminated all harm from its working practices, which had actively built EE in its curriculum and which was improving the environment by planting trees for example, might be considered to be doing a good job.”

Environmental Management for Schools is the part of the policy that begins to link the theory offered through the curriculum, classroom teaching and learning, with real life situations and practical activities. It is the part that gives meaning to the knowledge acquired and facilitates the most important of the environmental aims: awareness and action. Thus the school not only is but also looks “greener”. The factors that Environmental Management for Schools deals with are various. NAEF’s (1992) booklet, “Positive Action, Ideas for enhancing the environmental performance of your school” (Kent County Council) suggests some:

- Positive purchasing is an excellent way of “pre-cycling”, i.e. trying to buy things that will minimise the quantity of waste produced. Schools might also consider

using recycled goods and buying local products so as to minimise transport cost, save energy and prevent pollution.

- Resource management and recycling can ensure that the right materials are collected for reusing or recycling and that they are stored in the right way. These could be photocopy paper, used on both sides or as scrap paper, old envelopes being reused etc. The provisions of this kind, as well as saving water and energy, not only “protect the environment” but also benefit the school financially.
- Water efficiency makes sure that no water is wasted by checking on the taps, the tubes and generally the plumbing system of the school. Students must also acquire “water awareness” and try not to waste water. Monitoring the meter rates can tell how much water is spent and may also reveal any leaks (if the meter indications move during holidays) and may accurately show how much water was saved.
- Energy efficiency, like water, aims at cutting down the energy consumption (so as not to have energy losses on one hand but be comfortable on the other), This may be achieved by setting the right temperature on the thermostats, proper insulation, low energy bulbs, etc.
- Finally maintaining “Green school grounds” is an important factor, both educationally and practically. Planting trees for instance provides shade and at the same time offers experiences of “wildlife habitats” to the children.
- Composting diminishes significantly the volume of waste and provides good quality fertiliser. Well designed “Green school Environments” constitute

learning stimulus and continuously offer new experiences. The grounds can be used for outdoor study, or additional experience and observation for the consolidation of a lesson.

Now, how does a school achieve all these? The role of the policy document is precisely to ensure that step-by-step the school will ascend to higher levels of the environmental performance scale. As with the curriculum policy document, this can also have a general framework. An important condition is of course the general agreement and will of both teachers and students, to work for obtaining a “green school”.

For the Environmental Management for Schools, it is important to consider the uniqueness of the school, its special features and requirements. An **environmental audit** can provide an evaluation of the school condition. It will indicate where the school needs to be improved and provide information for an effective action. It may take the form of a questionnaire, a checklist or a table to be filled with the useful data. The findings of the audit are carefully evaluated and the policy, or action plan, is organised according to them. The aims of the action must be realistic on one hand, but not very easy to achieve or over optimistic on the other. Very ambitious aims may lead to failure and disappointment and aims too easy to achieve are like “mockery”.

For the achievement of every one of the aims, appropriate and effective activities have to be chosen and a time framework should be agreed upon. Teachers and as many students as possible should be involved, and the practical or financial assistance of the parents is of course always welcome. For better co-ordination and effectiveness, all players can be organised in committees and choose a co-ordinator,

whose role is invaluable from the very beginning of the formation of a policy for “greening the school”.

The implementation of the audit findings and the monitoring of the performance of the policy have to be registered in a record keeping system so that progress can be examined. Krycia Baczala (1992) p.24, discerns an observable change as:

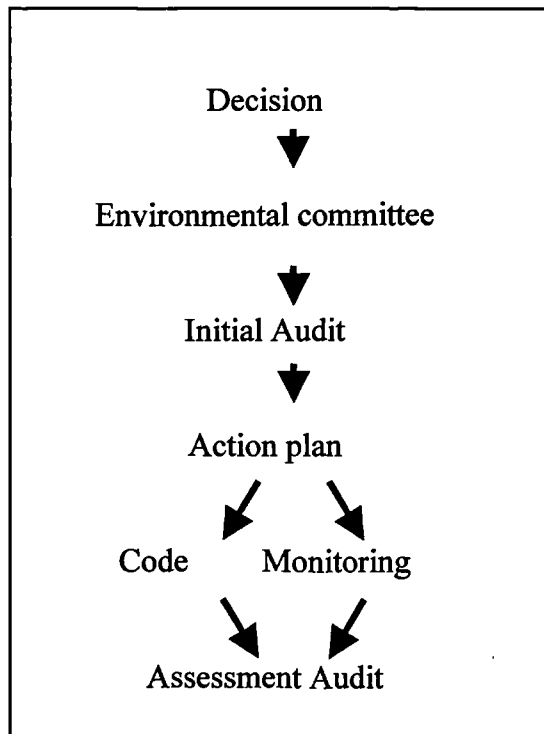
1. *Physical: The school may now have a recycling centre, an EE resource area and trees it did not have before etc.*
2. *Procedural: The staff and pupils use the outdoor environment more often and to better purpose, there is more evidence of EE being built into topic plans, EE upgrades appear regularly on the agenda for staff meetings, there is a student environmental council*
3. *Attitudinal: Litter is not dropped, water and energy are not wasted, and children are more aware of the nature and potential of their surroundings and the need to care.*

Change and especially attitudinal is assisted by “codes” (e.g. Eco-Schools’ Eco-Code, for environmentally friendly behaviour; McLeish, 1996) or charters (Baczala, 1992: 27) with advice or rules available, obvious and accessible for everyone in the school. These “Code Points” may be about keeping the school grounds free of litter, or saving energy by switching off unwanted lights. As we can see it is important that they are brief, clear, realistic and of course have children’s consensus or even better, are written by children.

The final evaluation will indicate success or failure. Another environmental audit could be an effective evaluation tool and in the case of failure to reach the goals it may highlight the problems and help in revising the targets.

Success should be celebrated in order to give satisfaction to the ones that have worked on it, energy to continue and stimulate more people (both students and teachers) to join in!

Fig. 3.13 Planning and implementing environmental management for schools



3.2.3 School Activities - Events

School activities and events can very easily be linked to a school's environmental policy and assist in its successful implementation. School evenings or days devoted to the environment can be used for auditing or school grounds improvement. Assemblies can announce every successful step in the application of the action plan and promote the messages that the policy aims suggest. Very creative ways can be used to achieve this: singing, theatrical activities, pictures, and exhibitions.

Fund raising events can be a practical application of reusing and diminishing waste since old unwanted things from every student's house can be provided. This can be

combined with other artistic school activities, such as presenting a theatrical play, art exhibition, dancing and music. The money raised from the bazaar can be used for improving school grounds or can be donated to environmental organisations. For these activities to succeed the participation and co-operation of the students is required.

3.2.4 Links

A whole school environmental policy should always include links and co-operation with parents' associations, local authorities, NGOs, National and International environmental networks, etc. In many ways these links constitute the opening of the school to the society.

The involvement of the parents can be a way of informing them of the environmental messages of the school policy. In that way we achieve environmental education for the parents and at the same time ensure coherent environmental education at school and at home, for the children. It also can have very practical benefits for the implementation of the policy. Parents can offer their professional assistance or simply their help for the improvement of school grounds. They may also provide financial aid or any other kind of help: participate in committees, help with school activities, etc.

Local authorities can contribute substantially to the improvement of school grounds and the implementation of the policy by providing assistance. As Palmer and Neal (1994: 143) mention, "*...are all available for professional exploitation in the case of furthering a policy*". Most importantly they can help, from the beginning of the planning of the policy, since they can offer information and consultancy about the

local agenda⁶ followed. Furthermore they can show local environmental problems to the school and receive, in return, the school's assistance to address those problems. This provides valuable first hand experience and opportunities for action.

The whole school environmental policy should also include links with local educational authorities and centres. Teachers can enrich their activities by using these centres and their resources. School based staff development programmes may be specially designed in order to meet with the school's needs. Another option is to attend small courses or training on environmental issues, provided by these centres mentioned. Similarly, teachers can organise special visits for their students to these places, for special educational programmes for children.

NGOs can be special places to visit or find resources but they can also more actively assist the environmental policy of the school. They influence the development of the *"adjectival education, the teaching methods and content"* (Huckle and Sterling 1997: 42) and *"finance radical innovative approaches"*. According to the same authors *"each NGO has focused on providing a methodology and content designed to create an awareness of the organisation's concerns"*. Focusing facilitates the effectiveness an NGO programme can have on education. Their targets may refer to focusing on specific environmental problems, e.g. birds or endangered species, but sometimes the targets of the NGOs may be ideologically or value oriented.

"Using education to challenge, can alter social values and attitudes and thereby socio-economic systems and move them towards an alternative set of attitudes and systems, - particularly if these are preconceived- possess enormous issues of acceptability from teachers,

⁶ Local Agenda 21, according to Agenda 21, The Earth Summit, Rio 1992

school managers, parents and the local and central government.”

(Huckle and Sterling, 1997: 46)

Thus a school should be cautious with respect to which organisation it will be linked and to what extent. Most organisations have specific agendas or stated points of view which can be checked by the school so as to avoid indoctrination. Nevertheless, in most cases the organisations' interests are the welfare of nature and the promotion of internationally accepted sustainable development. Having expert personnel, they may provide “pre-constructed” but flexible environmental programmes for schools, making things much easier for implementing a complete and effective environmental policy, and at the same time they constitute another link between school and real life.

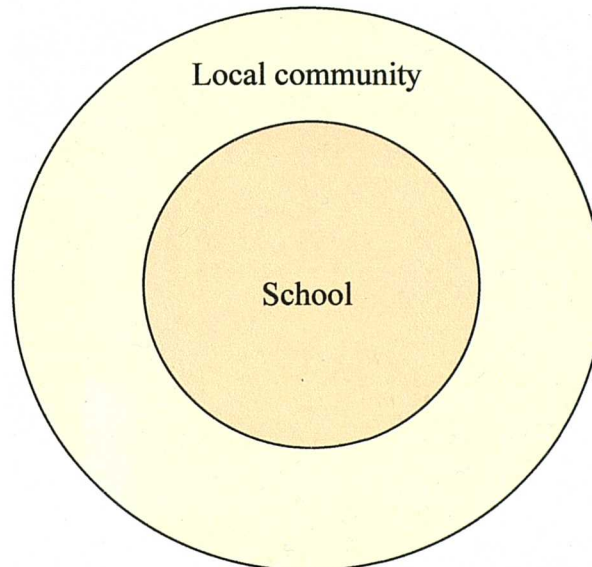
Big international organisations may provide programmes that establish “international links”; many schools from many countries may be participating in the same project and have the opportunity for co-operation and communication by distance (email, mail, telephone, etc.) as well as visits and student and teacher exchanges.

School and local community relationship was studied by Uzzell (1999) as a response to the need for developing an action competence approach to environmental education in order to set environmental problems in their larger social, economic, political and cultural context. Action competence facilitates participation and change. Nevertheless, Uzzell (1999) discerns four different models of school and community relationships:

Model 1. The school as an isolated island: is the model where environmental education is only conducted in the classroom and deals with existing problems of society. Children do learn about environmental problems through newspapers and

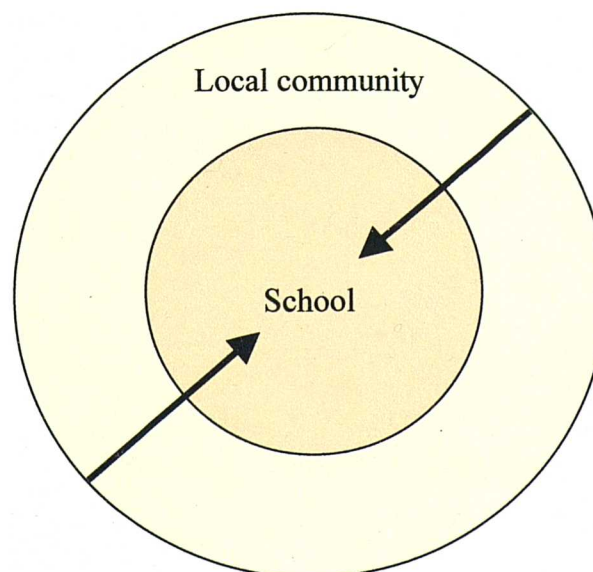
can engage in action possibilities through role play for instance. Schools however do not work with the local community.

Fig. 3.14 Uzzell's Model of the school as an isolated island (1999:409)



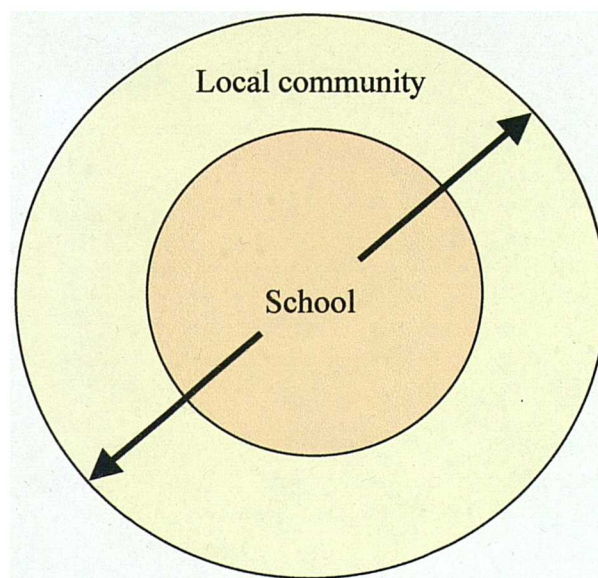
Model 2. *The local community invited into the school.* The second model is characterised by a partial opening of the school to the community, by inviting for instance community members into school, to improve the quality of the subject content and to make it more authentic.

Fig. 3.15 Uzzell's Model of the Local community invited into school. (1999:410)



Model 3. The school as guest in the local community. This situation is characterised by a partial opening between the school and the community. Students address their activities to the local community in an attempt to work on and influence conditions which they have explored theoretically in their classes. In this way, the author points out, there is greater authenticity than the previous two models, but the movement is unilateral from school to local community.

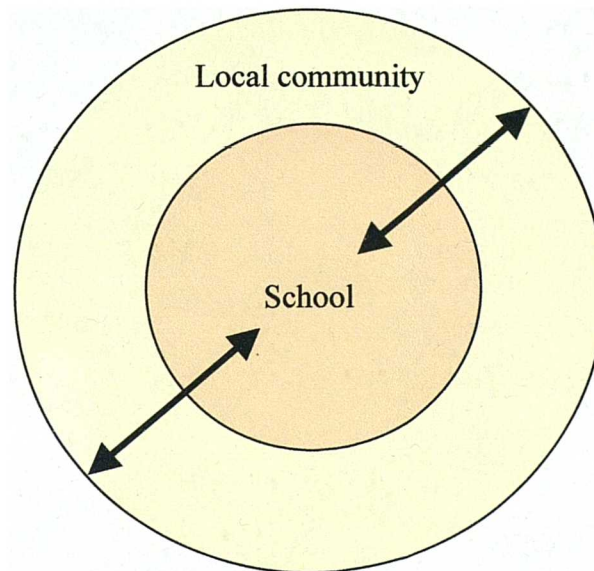
Fig. 3.16 Uzzell's Model of the school as guest in the local community. (1999:410)



Model 4. The school as social agent. The fourth model recognises that the barriers between the school and the local community should be permeable: community members are present in the school and the pupils are active in the local community. Uzzell (1999) supports that “*not only do these situations develop action possibilities, but they also develop concrete actions in the local community: either direct or indirect*”. The schematic representation of the fourth model as presented by Uzzell has no variation from the representation of the second model. Nevertheless, Fig. 3.17, introduces a slight modification which could more clearly show an important change

between models 2, 3 and model 4: the reciprocal communication and contribution of school and community.

Fig. 3.17 Uzzell's Model of the school as local agent. (1999:411)



This model could also be called 'dialogue model' as the barriers between school and community are broken down by communication and 'dialogue'.

Inserting this form of environmental education within a whole school programme can encourage the development of action oriented strategies to solve real environmental community problems and therefore help the children gain a clear and full understanding of how the natural, social, cultural and political environments operate in practice.

3.2.5 The role of the Co-ordinator.

The key factors for success for every school programme, project or policy are good organisation, communication and co-ordination. A facilitator or co-ordinator is

therefore crucial. As with any school development project the first task is the preparatory stage. From the very beginning the co-ordinator must create a spirit of co-operation and support among colleagues as well as create expectations, ambitions and commitment (Wood *et al.*, 1998).

Neal and Palmer (1994: 111) point-out that “*genuine innovation does not happen, unless personal commitment to ensuring success is built into each individual*”. A most important condition is of course the close co-operation and agreement with the school director. The director must be actively involved in order to emphasise the importance of the project and reinforce the co-ordinator’s efforts.

For these reasons, Neal and Palmer, (1990) consider as parts of a co-ordinator’s profile the ability to relate to people, to be sympathetic to their ideas and ideology, to be a good listener and to be leading by example. The co-ordinator must be a hard worker, willing to attend courses, represent school and play a major role in out of school activities. Finally as co-ordinators of an environmental programme they should be environmentally aware, with high environmental consciousness. The role of the co-ordinator includes responsibility for policy planning and its implementation. Neal and Palmer (1990), distinguish several categories of tasks for which the co-ordinator is responsible:

- 1) Teacher appreciation: by means of a two way process – from the co-ordinator to the teacher and from the teacher to the co-ordinator. Mutual respect guarantees smooth and successful collaboration.
- 2) Pupil involvement: Pupils have natural curiosity and interest in environmental matters, so they would be happily involved in a programme and at the same time, they gain valuable first hand experience. Teachers should not

underestimate the potential of even the youngest children, to deal with complex environmental issues, as long as they present those issues in an understandable way.

3) Pressures on the curriculum: Neal and Palmer (1990) suggest that the co-ordinator's prime task is to "*ensure that EE does not lead to excessive extra pressure*", otherwise teachers may lose their interest and commitment. The co-ordinator must assist in the integration of environmental matters in the whole curriculum and provide information. S/he is responsible for the organisation of the policy document on the curriculum.

4) Methods, approaches and assessment: Here the co-ordinator also becomes a consultant, since s/he indicates to the staff environmental education approaches, the methods of teaching and learning which can be employed, and the way in which assessment of progress can be made.

5) Beyond the school: The co-ordinator is also responsible for the part of the policy that deals with school's links with "real world". S/he will make the necessary contacts with local authorities, environmental centres, will involve parents, consultants, governors, industry representatives, local experts, etc. Probably s/he can establish co-ordination with other schools. If possible, the co-ordinator also creates links with national and international organisations.

6) In-service training: is important for building up the teacher's confidence. The great majority never had a formal training of environmental education thus it is important that the co-ordinator tries to compensate this lack.

7) Record keeping, finally, provides a picture of the whole progress. Data can be provided either by student or school records, or both. The co-ordinator has to co-ordinate and supervise the process and perhaps improvise a system for recording all information.

A co-ordinator's role is thus both indefinite and very difficult. That is why Palmer and Neal (1994) try to divide the responsibilities into a number of group tasks. They believe in the existence of a co-ordinator uniquely responsible for cross- curricular issues accompanied by a wider group of co-ordinators (committee for co-ordinating

cross-curricular themes), and a general environmental education co-ordinator with her/his “committee for co-ordinating environmental education”. Following the same logic it would be practical to assign a different co-ordinator for every part of the whole school policy so as to have a fair distribution of responsibilities.

- Curriculum co-ordinator with a group of teachers representing every year (y1, y2, etc.)
- Environmental audit co-ordinator
- Environmental management co-ordinator
- School activities and links co-ordinator.

The curriculum co-ordinator may be responsible for the effective implementation of the tasks that Neal and Palmer (1990) call “*pressures on the curriculum*” and “*methods, approaches and assessment*”. The environmental audit co-ordinator could be responsible for organising the audit as well as the record-keeping task. The environmental management co-ordinator would take decisions about the supplies the school will use, as well as their management. They would also organise the “reducing, re-using, recycling” policy of the school. In addition to finding buyers for the recyclables collected they could perhaps also find funds for any school improvement works. Fund raising could also be part of the school activities and links co-ordination through extracurricular evening activities. Nevertheless, their prime role is to promote a system of information and communication with all school players (e.g. through regular assemblies), during which decisions about the policy and most importantly, successful efforts would be announced. The same, or perhaps another co-ordinator, can take over the “public relations” role, establishing the various links between school and the community, other schools, national and international organisations, etc.

This could be the structure of an environmental committee, reporting to the general co-ordinator, the person responsible for the implementation of the whole school policy.

3.3 Environmental Ethics

“Our species is the outcome of two distinct but interacting evolutionary processes. Biological evolution and cultural evolution” (UNESCO, 1977:13)

While biological evolution takes millions of years for the slightest change and adoption, cultural evolution is characterised by an increasing rate of change. All *“social evolution”* is so fast that it does not allow any time for thinking, judging and evaluating what happens, it gives no time space for *“ethics evolution”*. Aldo Leopold (1933) (in UNESCO 1977:15) distinguished three stages in ethics evolution.

1. Relationships between individuals

2. *“Later accretions dealt with the relationship between individual and society”* (e.g. Christianity and democracy)

3. Finally, Aldo Leopold would expect an *“ethic dealing with man’s relationship to land and to the non human animals and plants grown upon it”* and, disappointed, he underlines that *“the land relations is strictly economic entailing privileges and not obligations”*. Although there still exist *“uncivilised”* or *“underdeveloped cultures”* and tribes that have managed to reach the third stage of ethics evolution, our *“modern and developed society”* relates to earth in the way that Aldo Leopold described.

People are accepting and adjusting to everything new technology and progress have to offer without assessing it. They do not consider what might be the best use of the new “invention”, which benefits can be drawn out of it, and which are the consequences, if any, and for whom? Critical thinking, questioning and behaviour *are* based on an individual’s personal code of values and ethics as well as society. One may perceive something as good, if it agrees with her/his value code and vice versa. (Sverige *et al.*, 1994) On the other hand our “value code” is formed through personal questioning, social observation and critical thinking. No matter which of the two comes first, undoubtedly both need reinforcement, which can be achieved through education.

Environmental values education responds to the necessity of assisting the “formation” of new professionals which will respect nature by value reinforcement.

As in education or environmental issues separately, educational process for environmental ethics is based on a corresponding ideology. Papademetriou (1998), mentions two environmental ethics ideologies, the homocentric and the biocentric.

1. With “*homocentric environmental ethics*”, duties with respect to the natural environment are exclusively determined by obligation towards others. The phrase, “*the earth, on which we live was not inherited by our ancestors but borrowed by our children*” (Papademetriou, 1998) fully agrees with this philosophical approach as it underlines our duty for delivering to our children the same, or even a better quality world to live in. It is of course a very noble thing to do, but obviously the motives emerge from what better serves humans, without valuing non-human life. Endangered species, for example, have to be protected, not because we respect that

form of life but in order to give the future generations the opportunity to enjoy those species, or perhaps use them for scientific or medical purposes for the benefit of humanity.

2. Biocentric ethics emerge from the perception that we recognise the value in all beings, whether humans or not, but do not consider their utility to society.

The end of both ideologies is likely to be the same, but they are mobilised by different motives. These motives (and hence the environmental ethics ideologies) are usually determined by politically oriented environmental ideologies with a direct influence on the educational ideology.

So although “*dictation from above*” may not allow dilemmas as far as ideology is concerned, education does face other serious questioning and dilemmas.

“Should education teach specific values, attitudes and behaviour patterns? What about the methodologies used and their effectiveness?” (Papademetriou 1998, p.108)

Various authors (Knapp, C., 1983; Caduto, 1983; Sterling, 1993; Sverige *et.al*, 1994) have tried to define the precise values that education approaches, and they have significant number of overlaps. In a general gathering one can find: 1. Inculcation, 2. Cognitive moral development, 3. Value analysis, 4. Value clarification, 5. Action learning, 6. Laissez faire, 7. Confluent education and 8. Behaviour modification.

3.4.1 Inculcation:

According to Knapp (1983), “*inculcation is a process in which students are asked to accept particular values by reasons of authority and tradition*”. Caduto (1993)

characterises those values as “*chosen values*” towards which the learner is shifted by means of a “*few major methodologies: ...moralising, modelling, positive and negative reinforcement and role-playing*”.

- Moralising simply consists of telling a learner what is right or wrong, either directly (e.g. rules of behaviour) or through indirect comments.
- Modelling has profound effects because learners (no matter if they are a heterogeneous group) follow the leading example of a prototype (teachers, parents, etc.). Knapp (1983) also sees the “*model role*” a teacher might have and clarifies that it may either be part of a hidden curriculum where the teacher is unaware of the example he/she sets, or it could be intentional. Nevertheless, modelling has limitations in that “*human models have varied widely and some models demonstrate a set of inconsistent values*”.
- Positive and negative reinforcement follows the behaviourist system of reward and punishment.
- Finally, for role playing, Caduto (1983) suggests that the learner should adopt and defend a specific point of view.

Values are too subjective to be taught and too personal to be inculcated. Yet inculcation as a method can be justified because:

- “*Inculcation occurs implicitly whether or not is a planned form of values education*”
- *There are certain value standards in society , culture and religion*

- *Certain basic values must be instilled in individuals if continuity to culture is to be ensured*
- *Young people who are not yet morally autonomous (up to about 11-12 years) must be taught the ideal values of society in order to begin forming an ethical system on which to base value judgements upon reaching moral autonomy” (Caduto, 1983: 15)*

3.4.2 Cognitive and moral development

Cognitive moral development is defined by Knapp (1983) as a method based on identifying a universal and sequential stage development of values and designed to lead students to more complex and higher levels of moral reasoning. Papademetriou (1998) uses the same terminology and logic to define “Kohlberg’s approach”. She states that the Kohlberg approach promotes mental development towards higher levels of moral development. It also promotes and supports a naturally matured and ethically oriented way of thinking. The principal instructional techniques for Knapp (1983) involve the development and discussion of “*moral dilemma stories which present conflicts of moral values: fairness, justice, equity and human dignity*”. Papademetriou (1998) also suggests role-play and simulations.

3.4.3 Values analysis, according to Caduto (1983:16), applies the scientific logical thinking of the Socratic method of investigation to the study of values. “*Its main objective is to help learners apply this form of investigation to values exploration and decision making in their lives.*” Obviously, and as Knapp (1983) suggests, this approach focuses upon analytical and logical thinking and rational deductive methods to investigate social values.

Value analysis exercises consist of 6 basic steps (Caduto 1983:16)

- ⇒ *“Identifying and clarifying the value question*
- ⇒ *Assembling (gathering and organising) facts*
- ⇒ *Assessing the truth of these facts*
- ⇒ *Clarifying the relevance of these facts to the value question*
- ⇒ *Arriving at a tentative value decision*
- ⇒ *Determining whether or not the decision is acceptable”.*

3.4.4 The Values Clarification approach focuses mainly on the process of valuing rather than the specific content of the values (Knapp, 1983, and Caduto, 1983). According to Knapp, (1983) it aims to help students *“become aware of personal values in which they have relatively free choice”*. In order to do that, Knapp (1983) suggests specially designed teacher structured exercises which help students examine what they prize and, if appropriate, lead to public affirmation. Students are encouraged to explore some alternative and associated consequences as well as to act thoughtfully. Caduto (1983) proceeds with further clarification of the issue and defines three steps to the process of value analysis.

- Choosing: 1. Freely
 - 2. From alternatives
 - 3. After thoughtful consideration of the consequences of each alternative
- Prizing 4. Cherishing being happy with the choice
 - 5. Being able to affirm the choice publicly
- Acting 6. Doing something with the choices
 - 7. Repeating the choice in the same pattern of life.

3.4.5 Action learning. The action learning approach focuses on out-of-classroom and community-based learning. Individuals and groups have the “*opportunities to act on personal values in the context of real issues and problems*”. (Knapp, 1983: 24)

3.4.6 “Laissez faire”, as an approach to values education, is quite flexible and free, allowing the individual to form an opinion and an attitude on the issue according to any experiences that might appear.

3.4.7 Confluent Education, as defined by Sverige *et al.* (chapter 2) appears to have much in common with **Behaviour modification** as described by Knapp (1996). Both aim at attitude change and both observe a failure of the traditional educational model to achieve it (Knowledge – Attitudes – Behaviour for the former and Awareness – Attitude – Behaviour for the latter). Confluent Education engages a simultaneous use of theory, experience, evaluation and action for attitude change whereas Knapp proposes a list of imperatives for the environmental education instructor, to help learners change environmental behaviour in a positive and responsible way. Two examples of activities tested by Knapp (1983) for their effectiveness on behavioural change were:

“The issue investigation and action model, in which the student learns how to identify environmental issues, write research questions focused on them and obtain information about issues using secondary sources. After having completed the investigation the students learn the major actions of citizenship action, analyse the effectiveness of individual actions versus group action and develop issue resolution action plans which are at the end evaluated against a set of criteria designed to assess the social, cultural and ecological implications of this action.

The extended case study model, in which the students learn most of the skill mentioned in the other model, except that they do so focused on a more specific issue or issue group chosen in advance by the class or the instructor. This model was proved to be less powerful than the previous one.”

CHAPTER 4: EVALUATION AND ASSESSMENT ISSUES

So far a holistic approach to environmental education which examines its integration in all aspects of school life and operation has been taken. The same approach is used in this chapter in order to analyse and examine the methods used for the assessment and evaluation of all facets of environmental education; as part of the curriculum planning and design as well as a distinct curriculum programme.

4.1 Clarification of the terms

Assessment and evaluation and comparable terms are often interpreted differently by the various investigators. Marcinkowski (1993) begins his paper on assessment in environmental education precisely by clarifying these terms. He begins by stating that measurement could be a process, which according to Payne (1992:9) is the systematic collection, quantification and ordering of data, but also, measurement could be a product if it is interpreted as an observation presented in quantitative terms. Thus measurement is both “*a systematic and quantitative form of data collection*” (Marcinkowski, 1993). Tests can be used as a measurement tool; they can measure a wide range of traits or attributes and the observations obtained by a test constitute the score.

“Assessment is a purposeful data collection process that is broader than both measurement and testing but does not include any decision or judgment process.” (Marcinkowski, 1993:145). It is associated with qualitative forms of data collection including direct performance, practical and authentic assessment (Worthen, 1993:145) as well as needs assessment.

Measurement and assessment are often associated with quantitative and qualitative data collection respectively, while evaluation is the process of delineating, obtaining and providing useful information for judging decision alternatives. It is the process of assessing *“the relevance of the input, impact and efficiency of a system through the measurement of output ... it is used to measure the achievement of learners through outcomes which are reflected by changes in their behavior”*. (UNESCO / UNEP, 1992)

According to Scriven, (1967) *“Evaluation is the methodological activity that consists simply in the gathering and combining of performance data with a weighted set of criterial scales to yield either comparative or numerical ratings and in the justification of: a. The data gathering instruments; b. The weightings; c. The selection of criteria”*. Evaluation is considered to be formative when it provides continuous feedback on the educational act. Thus it can be most helpful when developing a curriculum since it can verify the content validity, usability, materials, etc. Summative evaluation can *“assess the merit of curricula once they have been developed and put in the market.”* (Scriven, 1967) or any other educational programme.

Scriven (1967) also discerns several types of evaluation. *“Amateur evaluation”* constitutes self-evaluation and is in contrast with *“professional evaluation”*. *“Intrinsic evaluation”* deals with the qualities of a teaching instrument whereas the *“pay off evaluation”* examines the effects of the instrument. Finally evaluation is considered to be *“goal free”* when the evaluator is ignorant of the programme’s goals and searches the programme’s effects. Alternatively we have *“goal based evaluation”* that is when the evaluator is aware of the programme’s goals and investigates whether or not they have been met.

Thus evaluation could take a number of forms according to the approach followed. Stufflebeam (1967) suggests that evaluation could be identical to measurement or to judgement or have an experimental design. Each case has its advantages and disadvantages.

Fig. 4.1 Advantages and disadvantages accruing from different traditional approaches to evaluation (Stufflebeam et al., 1971:15)

Approach	Advantages	Disadvantages
Evaluation is identical to measurement	Builds directly on scientific measurement movement. It is objective, reliable. Data are mathematically manipulatable. Norms and standards emerge.	Narrow instruments focus. Inflexibility because of time and money to produce new instruments. Judgements and criteria for making them are obscured Non-measurable variables are eliminated or labeled unimportant.
Evaluation is identical to judgement	Easy to implement. Brings all variables into consideration. Takes experience and expertise into account. No time lag while waiting for data analysis.	Dictated mainly because of ignorance or lack of sophistication. Questionable reliability and objectivity. Not susceptible to ordinary scientific prudential measures. Ambiguous data and criteria. Difficult generalization.
Evaluation is identical to experimental design	High degree of integration with the instructional process. Data available on both student and curriculum. Possibility of feedback. Objective referent and built in criteria. Possibility for process and product data.	Places evaluation in technical role, focuses narrowly on objectives. Elevates behavior as the ultimate criterion of every educational action. Focuses on evaluation as a terminal process.

Nevertheless, why do we evaluate? Why do we assess?

4.2 Educational Evaluation

According to Wilke (1994) assessment serves a number of purposes. As a large and profitable business for established companies it serves economic objectives. Testing is also an inexpensive and efficient means for meeting state mandates. The assessment of educational programmes can help the selection, appraisal and clarification of goals, objectives and instructional materials, verify the integrity and sequencing of contents as well as plan, direct and improve instruction. It also determines what students have learned, how they perceived, reacted to and have been influenced by their experiences. The assessment of instructional programmes provides information concerning the needs, opportunities and problems within the area served by the programme. It can help guide or improve a programme. Needs assessment can identify and qualify needs of the learners, the instructors, the programme itself, the community and other entities, whose interests are served by the programme. It is extremely important to assess the objectives and goals of a programme as well as its instructional planning (learning theories, content selection and organization, learning resources and environments), the instruction strategies and learning activities and finally the learning outcomes.

Wolf (1990; 62) places the value of evaluation in the fact that it provides five major classes of information:

1. The initial status of the learners; descriptive information about who they are (age, gender, background etc.) as well as their proficiency on the learning issue.

2. The learners' performance and intended changes after a period of instruction.
3. Execution of treatment.
4. Costs.
5. Supplemental information on opinions, reactions and views of the learners, teachers, administrators and parents as well as information on learner's performances, other than the ones specified by the objectives of the programme.

This information is critical for effective and successful instruction.

4.3 Curriculum Evaluation

"Curriculum evaluation refers to the process of studying the merit or worth of some aspect or the whole of a curriculum. The focus of curriculum evaluation could include curriculum and / or student needs, curriculum design, instructional process, material used in instruction, objectives for students' outcomes, student progress through the curriculum, teacher effectiveness, the learning environment, curriculum policy resource allotment and the outcomes of the instruction". (Sanders 1990; 163)

The definition given for curriculum evaluation makes obvious its purpose and value as an indispensable part of the educational process. Evaluation can report and quantify the quality of education and it provides useful information to the decision makers and policy makers. In this way it facilitates the improvement of education. For the teacher it constitutes an invaluable tool that can describe the effectiveness of the approaches and activities they use and the degree of impact these factors have on the students' cognition, attitudes and action. Nonetheless, curriculum evaluation can be

limited due to time ~~constrains~~ and access to the students as well as by the complexity of measuring or describing some of the factors mentioned above. Classroom process or instructional experiences for instance may have different meanings for different students so their evaluation is constrained.

Curriculum inquiry forms several paradigms which influence curriculum evaluation. The first paradigm considers the classification systems of the positions on curriculum theory and practice. (Shubert, W.H., & Shubert, A.L., 1990)

1. Paradigm as classification systems: Positions on curriculum theory and practice have been categorised by various investigators in different ways.

Eisner (1985) discerns five basic orientations of the curriculum:

- A) Focus on the development of cognitive process;
- B) Academic rationalism;
- C) Personal relevance;
- D) Social adaptation and social reconstruction;
- E) Curriculum as technology.

Pinar (1975) discerns only three categories of curriculum developers and theorists: the traditionalists, the conceptual empiricists, and the reconceptualists. Shubert (1986) mentions the intellectual traditionalist which constitutes a knowledge – cognitive approach to the curriculum, the social behaviorist which represents the curriculum's ability to teach behaviors valued by society and the experientialist curriculum category in which value lies in the experience that emerges from the personal interest.

Kliebart (1986) defines four historical categories, the humanist, the social efficiency advocates, the developmentalists and the social meliorists. Similarly, Miller (1983) states the behavioral, social and cognitive process as curriculum orientation and adds subject discipline orientation, developmental, humanistic and transpersonal orientation.

The variety of categories of major viewpoints or lines of thinking in curriculum classification systems could be interpreted as unwarranted relativism of the field; other way be confusing or lead to oversimplified lines of demarcation (Shubert and Shubert 1990). On the other hand, Shubert & Shubert, (1990:160) admit that *“uncertainty can be seen as a symbol of maturity that acknowledges a pluralistic universe, rather than immaturity that expresses itself in the false security of clutching to the one idea known well”*.

2. Curriculum paradigm as assumptions about enquiry.

Shubert & Shubert (1990) state that while classification systems directly speak to substantive positions on curriculum matters, indirectly, they imply the need to investigate alternative forms of curriculum inquiry. The forms of inquiry are susceptible to conceptual changes in scientific inquiry systems. *“When any system dominates, the rules of scientific inquiry are governed by certain presumptions but as anomalies increase that cannot be explained by the prevailing system; a reconceptualisation is required”* (p.158). Therefore a new paradigm is formed and the system continues.

Three paradigms of curriculum inquiry were developed by Schubert (1986):

- the *empirical analytic* model, which is of technical interest. It reflects a positivist view of science and the social organization of hierarchy in the work place; this

mode of rationality accepts social reality as it is. As a curriculum inquiry model it tends to be rather theoretical and operates exclusively by inductive and hypothetical – deductive methods of inquiry (Scwab, in Schubert & Shubert, 1990);

- the *hermeneutic* paradigm focuses on the interpretation of the curriculum context, practice and discourse. Hermeneutic inquiry is practical and has the potential to revive the curriculum from the rather theoretical state of the empirical analytic model;
- the *critical inquiry* serves the interest of emancipation. Its mode of rationality assumes the necessity of critical theorizing of economic, political and cultural contexts influencing the curriculum and encourages practitioners to engage in critical praxis.

Each paradigm of curriculum inquiry can be interpreted with respect to interests served, kinds of organizations used to serve those interests and models of rationality manifest in each paradigm. Considerable variation exists within each paradigm or type of science (inquiry) (Shubert & Shubert, 1990).

3. The final curriculum paradigm distinguishes the dimensions that define the Curriculum.

Tyler's paradigm for curriculum work has the most widely used set of principles in curriculum today (Shubert & Shubert, 1990). Tyler (1949) distinguishes these dimensions in the following categories: purpose; learning experiences or content; organization; and evaluation. The four categories can be employed for analysing the curriculum, determining purposes, learning experiences, organization and evaluation

for a given curriculum. The knowledge sources emerge from the students themselves, the subject matter and society.

A more elaborated definition of the curriculum dimensions was presented by Taba (1962). Initially a needs diagnosis is required. This will provide the information necessary for the formulation of objectives. The content is then selected and organised in order to provide a selection of learning experiences for the best achievement of the objectives. Finally the 7th phase is the determination of what and how to evaluate.

Paradigms can be viewed as dimensions that define the curriculum and provide a framework of study of curriculum or student needs, design, instructional processes, materials and objectives. The process of studying the merit or worth of the curriculum and its facets concerns curriculum evaluation (Sanders 1990).

4.4 Curriculum Evaluation models.

Wolf (1990, 62) discerns two forms of curriculum evaluation: the first one aims at the evaluation of *curriculum products*: (the course of study, syllabi, textbooks, etc.), and the second evaluates *curriculum programmes*.

Sanders (1990:168) uses the same categorisation and expands on each of them. For curriculum product evaluation he suggests the use of specific external criteria for the examination of the adequacy of the curriculum product. Evaluation criteria for a specific discipline verify the consistency with the approach, the adequacy of the objectives, the content and methodology.

A curriculum programme is considered to be the complex set of interactions between a given instructional programme and its settings. Alkin (1990) presents four models for the evaluation of curriculum programmes.

- *Measurement outcome oriented evaluation (Tylerian Evaluation Model).* The Tylerian Evaluation model is oriented towards measurement outcomes, as a governing basis for the conduct of evaluation. Its ultimate purpose is the determination of whether a given curriculum programme achieved its intended purposes. Nevertheless, the criticism received by this model (Alkin, 1990) refers to the omission of the consideration of unintended effects of the curriculum or learner variables.
- *Research and methodology oriented evaluation.* This model employs research and methodological approaches for evaluative purposes. It includes the experimental research methods format and it also makes use of qualitative and descriptive data.
- *Values oriented evaluation.* The primary concerns of this model are values. Scriven and Eisner (in Alkin 1990:168) consider that the evaluator should be primarily responsible for making value judgements. Stake (1994) supports that these value judgements can be deducted through relevant data. Wolf (1988) poses an interesting question about the issue: “*Can one single evaluator fairly consider and judge the views of all sides*”? Expanding on this statement one could observe that not only the employment of a number of evaluators could provide more effective evaluation, but more important is probably the employment of a number of evaluation tools and approaches. The chapter on alternative evaluation in environmental education makes use of this reasoning.

- The last model mentioned by Alkin (1990) is the *Decision Oriented – User oriented evaluation*. The product of this concerns decision makers and other users of evaluation information.

The Curriculum programme evaluation models presented here can be employed for the evaluation of all complex interactions between a given instructional programme and its settings. Applied in environmental education they can provide information in significant areas of the field:

- the effectiveness and achievement of environmental education programmes (Tylerian Model).
- areas of improvement within an environmental education programme, highlighted by research (research methodology oriented).
- evaluation of environmental attitudes or awareness, on environmental issues of values conflict; controversial issues (values oriented).
- User oriented evaluation could be specially designed and serve policy-making and programme development purposes.

In this study they will provide guidelines for the research structure.

4.5 Evaluation in Environmental Education.

As a distinct discipline, environmental education differs from other disciplines, such as language teaching, or mathematics, both on the approaches it makes use of, and most importantly on its aims and holistic philosophy. Environmental education focuses on inculcating and forming attitudes and values which help to develop an environmentally aware citizen. Evaluation is an important element of environmental

education. Yet, as Marcinkowsky (1993; 146) points out, environmental education uses evaluation less frequently than traditional subjects. Benedict (1991; 84) justifies this, since:

“the students’ acquisition of knowledge within the usual disciplines can be evaluated by traditional examination methods. It is more difficult however, to evaluate whether the students have achieved the cognitive goal of more holistic understanding of issues. Exams must be based on holistic concepts.”

Expanding on why evaluating environmental education is a task to avoid, Raptis (2000:187) observes that the evolution of evaluation in environmental education is characterized by *“lack of strictness, which rarely offers substantial information for the improvement of the action”*. The vagueness and confusion can be explained by the complex and multidimensional nature of environmental education emerging from the following elements:

- Its interdisciplinary character (Lahiri, 1992);
- The broadness of its targets, which not only cover cognition but also the cultivation of abilities, values, attitudes as well as the development of strategies, and participation mechanisms for action and resolution of environmental problems;
- The variety of teaching approaches and activities that expand outside the classroom limits (UNESCO – UNEP, no9.);
- The principal target which stresses the development of positive environmental attitudes: an element difficult to measure and evaluate through the traditional evaluation instruments (Palmer and Neal, 1994);
- The fact that the environment is an important part of social action and part of every student’s personal experiences;

- The new roles determined for educators and students: guide to the educational procedures for the former and active partnership to it by the latter. (Zachariou and Kadji, 2001)

One other factor leading to marginalisation of evaluation in environmental education concerns the lack of understanding of the benefits that an organized evaluative procedure can offer:

- The improvement of the educational approaches and activities of the curriculum
- The acquisition, by the student, of cognition development skills, as well as value examination, and practical action skills.
- The reinforcement and support of the Curriculum so that it can be developed according to the environmental education. (Grover, 1991).

Evaluation of environmental education should be based on its philosophy and general framework. It requires the use of procedures and tools that would satisfy the unique elements of environmental education. The nature of the environmental education curriculum is one of the factors that should be taken under consideration. Since the goals of environmental education are important in preparing environmentally conscious and concerned citizens, its evaluation should therefore be goal oriented. As environmental education targets are broad they do not only cover cognition but also skills, values, attitudes as well as development of strategies and participation mechanisms for action and resolution of environmental problems. It is indeed problem centred, community based, value oriented, lifelong, interdisciplinary, holistic and environmentally learner directed (UNESCO / UNEP 1992; 130). Consequently the educational approaches and kinds of activities it uses require different evaluation tools.

UNESCO UNEP (1992) suggests a number of evaluation tools suitable for different evaluation purposes in the context of environmental education. Oral or written *tests* could be used for the evaluation of knowledge and awareness. The test questions may be criterion referenced or situation based. They might have matching structures, and be suitable for measuring the learner's understanding of relationships between structures and their respective functions. Structured questions can assess the understanding and knowledge gained. Essay type questions can evaluate the awareness of sequential development of an issue.

An evaluator can also make use of *records*, e.g. reports, case studies, fieldwork, experimental investigations and assignments, in order to evaluate learner's academic gain, both in terms of knowledge and simple manipulative skills.

Continuous observation of the learner's behaviour as an evaluation tool can be used to evaluate the learner's attitudes, value alteration and environmental action. *Reporting* can also assist the collection of evidence about the actions of learners related to the environmental areas.

Attitude change and environmental awareness is the primary objective of Environmental Education (Lahiri, 1992) and it constitutes the facet most challenging to evaluate.

Attitudes can be defined through the essential features that characterize them:

1. The preparation or readiness for favourable or unfavourable responses;
2. Preparation organised through experience;
3. It is activated through the presence of all objects and situations with which the attitude is related. (Allport, 1935, in Anderson 1990: 368)

Similarly Fishbein and Arjen (1975) describe attitude as “*learned*” and that “*it predisposes action and such actions are consistently favorable or unfavorable toward an object*”.

Attitudes are related to peoples’ feelings and emotions. These characteristics place them in the affective domain and relate them to some of the other elements of the domain. According to Anderson (1990, 369)

- i. Attitudes are connected to **emotions** since they can be defined as a complex of feelings, desires, fears, convictions, prejudices... that give a person readiness to act.
- ii. A person clearly possesses a particular affective characteristic, only if s/he responds with **consistency** to a number of actions challenging that characteristic/ attitude.
- iii. Attitudes, emotions and feelings are directed toward some **target**; an object, a situation, an idea, etc.
- iv. **Direction:** Emotions and attitudes can be directed towards, or away from the target. In this way people according to their attitudes are prepared to approach or avoid the target.
- v. **Intensity** refers to the degree or strength of a person’s emotions.

Thus, based on these characteristics, Anderson (1990:370) defines attitude as “*a moderately intense emotion that prepares or predisposes an individual to respond consistently in a favourable or unfavourable manner when confronted with a particular object.*”

Measurement of attitudes is difficult since attitudes are not easily quantifiable.

Anderson (1990) describes three techniques for measuring attitudes:

1. Scaling techniques are methods that can enable inferences to be made, based on the people's responses to a series of statements or adjectives;
2. Observation allows inferences to be made from individuals' overt behaviors;
3. Individuals physiological responses, such as pupil dilation, respiration, heart rate, etc.

The most appropriate tools for the evaluation of attitude change in environmental education, according to UNESCO / UNEP (1992, p.135), are observation and inquiry. Observation should be continuous rather than having the short-term summative evaluation characteristics. It is valuable because it involves the community, elders, parents, other teachers, and sometimes even fellow classmates. It is best for the teacher to carry out him/herself the observation. The recording could be facilitated by the use of behaviour charts. Nonetheless, in some cases, not even that can be of much assistance if the number of children is too large or the time limitations too narrow. The people mentioned could be involved in the task and can reinforce the teacher's observations by reporting on the child's attitude change as they observe it outside school.

The mere assessment and evaluation of knowledge has to be reinforced with the provision of feedback and information for support and improvement.

Inquiry can obtain information about attitude change by interviewing the student, the parents or other community members.

4.6 Using alternative forms of evaluation for evaluating Environmental Education.

In the field of environmental education, school reality faces new demands and expectations, oriented towards the promotion of environmental information and “*dynamic environmental qualities*” (Posh, 1994:21). In order to satisfy this demand, decision makers have to reconstruct and reorganize school structure and procedures and adjust them to the wider environmental education philosophy.

Many schools have applied this new educational structure by reorienting their general school policy (curriculum and management) according to environmental education demands: promotion of environmental knowledge, skills and abilities that will lead students to environmental awareness and action for the solution of environmental problems. The organization and selection of educational approaches, methods, context and teaching material to be used for that purpose, poses a critical question about their effectiveness and appropriateness. Thus the planning of an educational programme not only requires the determination of specific aims and targets, the choice of context and general outline, but also the inclusion of an evaluation plan.

Schools are the microcosm of society and through the curriculum they reflect the ideologies of the political and social status quo. Consequently, evaluation usually conforms to the same social characteristics: it is often limited to marking and ranking as a response to the necessity for preparing working potential for the work market. Evaluation is degraded to a simple tool for gathering information about the student’s cognition. Attitude changes acquired during educational procedures are usually

overseen. Furthermore the current evaluation framework lacks the potential for formative evolution. It thus cannot fully support the reviewing, the improvement and the reorientation of the Curriculum according to the new facts and demands of society.

For the case of environmental education evaluation is oriented towards three essential axes:

- The improvement of communication among the educators and between them and the students along with the exchange of environmental experiences.
- Producing knowledge about the environment through environmentally oriented actions.
- The application of dynamic schemas that establish new environmentally oriented educational structures (Posch, 1994:27).

The fact that evaluation is an important means for diagnosing the acquisition of abilities and positive environmental attitudes and actions was also stressed during International Conferences, along with the establishment of the theoretical and methodological framework of environmental education: *"...educational change is indispensable, for the facilitation of the incorporation of environmental education in the educational systems. It must be supported both by the experience and by their evaluation in order to improve the decisions taken on the educational policy."* (Hellenic Association of Environmental Education Educators, 1999:36)

The importance of evaluation in environmental education has been stressed, since its first presence in education, as a potential means for support and improvement, which could assist its expansion. Evaluation is even more important for environmental education because *"expectations here are greater as compared to those of*

curriculum in particular discipline” (Lahiri, 1993:125). Nevertheless evaluation is still marginalized and still not explicitly defined and introduced in environmental education. The inability to define the characteristics that evaluation should have is a result of common obstacles; lack of time, complexity, as well as difficulties emerging from environmental education's special characteristics such as interdisciplinarity and the evaluation of attitudes, actions and ethos.

The mere assessment and evaluation of knowledge has to be reinforced with the provision of feedback and information for support and improvement. The new, holistic role of evaluation cannot function solely through the “*evaluative judgment*” of the educator, but it also requires the involvement of the student as an important contributor and participant of the educational process. Evaluation is an important variable in the environmental education structure and as such, it is based on its philosophy and general framework. Thus it demands the use of procedures, other than the traditional ones.

Evaluation tools which have the potential and the flexibility to adjust to the topics' and the persons' particular needs, could be used as a response to the special character of environmental education evaluation. These tools should incorporate elements fit for the evaluation of environmental education variables such as student personality and behavior.

This conclusion emerged from the examination of the general procedure of educational evaluation and the necessity for the initiation of new evaluation mechanisms that would facilitate the renewal of the traditional educational instruction. In particular, it is necessary to highlight the facts that:

- The evaluation of attitudes is a very difficult task given that: “we are not in the position to present a firmly established educational method of their measurement” (Decorte, 1990:303). The issues emerging from attitude evaluation do not only involve the difficulty of the creation of attitude measurement tools but also the inability of examining their duration, too.
- Environmental actions are loosely evaluated through students’ written reports about their behavior change along with some lists describing the programme’s positive and negative elements (Raptis, 2000:193).
- Educators often interpret the concept of evaluation as a tool for “selection and categorisation” which, in the school reality, occurs during the summative cognition tests the students are subjected to.

Evaluation cannot escape from this established outline and cannot respond to its real character, unless it becomes reconstructed and reshaped into a more flexible holistic and participatory function. This can be facilitated by new educational contexts: environmental education could create suitable conditions for the creation of measurement tools, able to provide to the educator the ability to offer students feedback about the issue studied. It has a positive impact on student’s self image and learning attitudes. It also constitutes a means of testing the effectiveness of the teaching approaches and materials used.

4.6.1 Evaluation tools for Environmental Education

The tools used for the student evaluation in environmental education must be reliable, objective, valid and practical for gathering information, in order to evaluate:

- The knowledge and understanding of environmental issues, concepts and problems
- The students' emotional conditions, their attitudes and values
- Their skills for research, experimentation and communication
- Their abilities for decision making, and active participation privately or in groups, for the protection of the environment (UNESCO, no26.)

Values oriented evaluation is probably the most appropriate evaluation model to be used for environmental education evaluation since its primary concern is values. The evaluator makes value judgements (chapter 4.4) through relevant data and a number of evaluation tools and approaches.

Zachariou and Kadji, (2001) suggest two such evaluation tools, the Portfolio and Storyline approach which, precisely because of their broadness, can offer a vast variety of possible uses and can be considered to be two very important tools for the evaluation of the elements marginalised in the educational procedure. Both tools can:

- Ensure the application of the environmental education principles: holism, globality and interdisciplinarity.
- Establish and reinforce cooperation and interaction in the teacher – student relationship.
- Provide opportunities for initiatives and experiential learning.
- Be flexible and powerful with respect to the studied issue.
- Include numerous other research and evaluation tools along with teaching methods, in order to respond to the specific issue's demands.

4.6.1.1. Educational Profile: Portfolio

“Profiles are a means of recording the outcomes of education in the form of a comprehensive statement referring to the range of a pupil’s educational experience, competencies and interests” (Kant & Orr, 1990:420). They developed as a result of teachers’ dissatisfaction with current systems of examination that only provide a limited picture of the student’s academic ability and were initially intended to be used for employment seeking. They are considered to be a means of overcoming many of the constraints imposed by schools and public examination systems (Kant & Orr, 1990).

Portfolio (profile scheme), is an evaluation tool that promotes effective learning and responds to the evaluation needs beyond the bureaucratic mechanisms and measurement scale based evaluation systems. (Lyon, 1998:20) It is an innovation for education, since it includes students’ activities and projects both from school and personal work outside school.

According to Kant & Orr (1990) the profile schemes in operation are:

- The Record of Personal Achievement (RPA) and Record of Personal Experience (RPE). In this form of profile scheme, students record in their own file their individual curriculum vitae of their last two years of compulsory schooling. *“The intention is that through this recording they will develop personally and also reveal qualities, attitudes and values through describing their school and leisure pursuits”* (p. 422). The scheme is supposed to be open to all students.
- Another version of the Personal Achievement Record (PAR) includes the idea of the self evaluation of the student along with a section on personal interests and

out of school activities. It also includes details on courses attended, examination scores and a competence breakdown of a number of skills, such as language skills, mathematics skills, etc (p.422).

Profile schemes could vary according to several detailed arrangements. It could start with a student - teacher review of the targets that should be met during the study and end with the students' decisions on the activities and projects that will be presented in the portfolio. These could be projects about the topic, photograph collections, diagrams, reports, research projects, and even dramatised presentations.

The important issue about using portfolios for evaluation purposes is that evaluation can easily acquire qualitative character and also includes elements of self-evaluation, recognition and acknowledgement of self-value. Students become actively involved in what they learn and they are responsible and in control of their education. They have the opportunity for cognitive development as well as personal and social development. The communication with the educator, for evaluation purposes, can provide a holistic image of the student by revealing all his/her qualities.

4.6.1.2 Story line

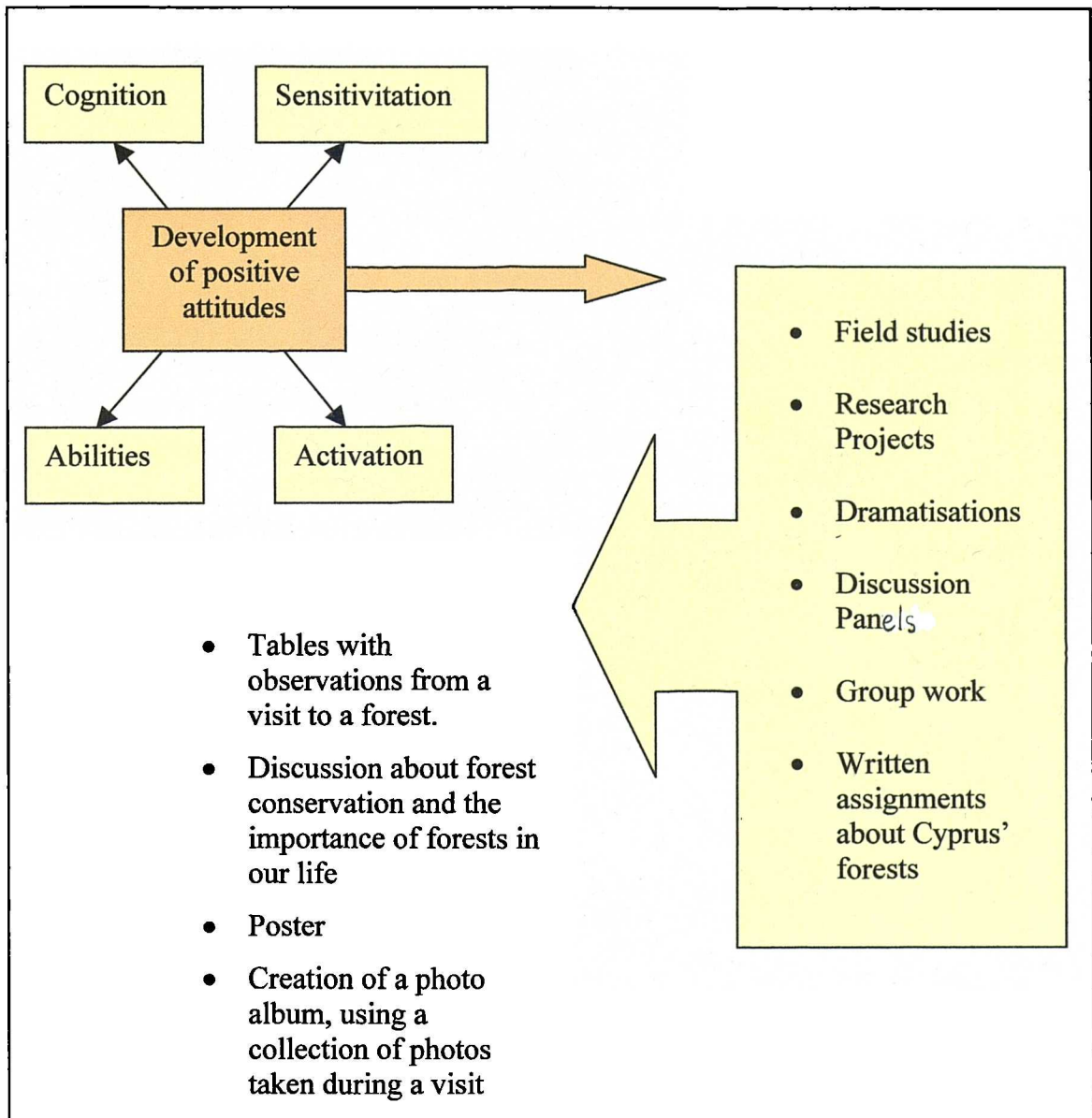
Story line constitutes the connection between a series of episodes within a narration line resulting in a story. Investigating an issue by means of the storyline approach requires target specification in order to organise the materials and resources to be used. There are several investigations that examine the effectiveness of the specific teaching method, which have revealed that it provides students with opportunities for skill development and active participation for the environment. (Heliopoulou, 2000)

In Story line, similarly to portfolio, the educator can use many of the common evaluation tools, such as the interview and questionnaire, in order to diagnose students' level of knowledge and experience on the topic as well as the modification of their initial position and attitudes about the topic. According to the group's potential and the way the teaching of the issue evolves, the teacher can also introduce more tools that s/he considers appropriate for the development of skills, decision making and students' initiative. Activities such as dramatisation, role-play and panel discussions provide the students opportunities for expressing their feelings and ideas as well as behaving and acting in a real life context. These cannot be provided within the traditional educational framework. The educator, on the other hand, can observe the student and in this way develop a holistic view of the students' abilities and qualities beyond the measuring moulds of usual evaluation.

It is important that the educator, regardless of the tool used, has in mind a specific procedure which will facilitate the structure of an evaluation model. Initially s/he has to define and fully clarify the environmental issue to be studied and determine the aims and targets to be attained. These along with the careful organisation of the teaching procedures ensures a successful implementation of the issue and consequently the construction of an effective evaluation model.

Focusing only on the student evaluation and based on the values oriented evaluation model, Zachariou and Kadji (2001) developed two example models presented by the following diagrams, that make use of the two evaluation tools.

Fig.4.2 Determining the teaching material and the criteria for the selection of the work to be included in the portfolio. (Topic used for the example: Cyprus forests).



The portfolio model begins by setting the ultimate environmental education aim, which is the development of positive attitudes, through knowledge, sensitivation, skills, abilities, and active participation. These can be achieved through several activities and assignments that could be included in the portfolio. Zachariou and Kadji (2001), suggest field study activities, research projects, dramatisations and debate. In a specific context these suggestions could focus on written assignments,

tables with observation data, organisation of debates, posters, photo albums, depending on the issue studied.

Fig. 4.3 Development of the Storyline model (Bell, 1999).

Topic: Getting to know Cyprus' forests				
Targets	Questions	Episodes	Activities	Resources – Material
The aims concerning the topic are made explicit here and they are developed according to the needs of the topic stated in the curriculum.	Questions posed here are intended to assist and guide the construction of the episodes according to the targets set.	The episodes organized are connected.	Dramatisations Role play Excursions Field studies Interviews Acting games Simulation games	Community involvement Access in various resources: books, charts, maps, pictures, archives...) Discussions Cooperation with specialists

The storyline model starts by setting specific targets on the subject. Posing some questions relevant to the targets will assist the creation of the episodes. The episodes make use of activities that employ several resources and materials. Episode activities could be dramatisations, role-play, excursions, field study, interviews, acting games and simulation games.

Storyline's potential as an evaluation tool lies in the fact that through the scenaria set by the children, and especially activities such as the dramatisations and simulations, the teacher – evaluator can easily observe and evaluate both children's initial attitudes towards the issue, as well as any attitude change.

The final evaluation of the issue can be based on a number of important questions.

- Were the targets achieved?
- Were a variety of teaching activities and methodologies used?
- Was the nearby environment used for teaching purposes?
- Can there be observed any change in children's attitudes and behavior after the completion of the programme?

4.6.2 What should be evaluated?

Environmental education planning and application can be distinguished in 3 levels:

Level 1: Educational authorities.

Decision makers and policy makers belong on this level. They are the ones who set the Educational Policy and establish the Curriculum. They could form a committee responsible for the decision of the aims and targets, context, tools and approaches to be used for the implementation of environmental education, a trial of all these dimensions should be implemented before addressing them to schools.

Level 2: School Management and Educators

On the following level belong the ones who apply the policy and the curriculum. Depending on how concentrative an educational system is, they could provide the initial level with feedback on the instructions they receive.

Based on the instructions they receive, they have to infuse the environmental dimension in school life. This is applied in two dimensions of school life, the formal curriculum application and all other environmental dimensions that might emerge from the school life.

Level 3: Students

Finally, all this procedure is received by the student, whom we expect to have acquired environmental cognition, skills and attitudes and developed actual commitment and active participation in the solution of environmental problems.

The evaluation of the student level could provide the teachers with useful information about the way they delivered the information to the students both through the formal and non formal curriculum, as well as the ability to evaluate the entire structure: aims and targets, context, tools and approaches, dictated to them by level 1. The environmental education application structure can be most effective when the information sent from the students to the teachers is also received by the policy and decision makers.

Evaluation in environmental education should be carefully planned and the development of an evaluation scheme could ensure that appropriate weight is given to different evaluation tools according to the specific topic and instructional objectives. Most evaluation models concentrate on the evaluation of the curriculum or the student. In order to establish a global evaluation of environmental education, all its dimensions and levels should be considered.

CHAPTER 5: ENVIRONMENTAL EDUCATION IN CYPRUS

PRIMARY EDUCATION

Introduction

The Cyprus educational system is exceptive and flexible and according to Maratheftis (1992: 11) it emerges from the broader system, the hypersystem of the Cypriot society. Thus it is interconnected with other systems such as the church, political parties, parents' associations, and other associations and organizations. Each of these society facets promote their own aims and philosophy through the influence they exert upon education. The evolution of the educational system follows the evolution of the Cypriot society and the targets and values it cultivates reflect the society and the demands of its elements.

Maratheftis (1992: 12) supports the view that society as a hypersystem influences the Cypriot educational system:

- structure, school types and managerial structure;
- aims and targets (e.g. civil education, humanistic and professional orientations, etc.)
- means and tools which will facilitate the implementation of the targets, and this because the means and the tools depend on the society's prosperity.

This chapter will examine the educational system's response to the social demand for environmental education. Through the National Policy; the action plan for the environment, by the Ministry of Agriculture, Natural Resources and Environment, it will highlight from where the demand for environmental education emerges. The educational reforms and policies of the Ministry of Education will show the

Educational System's response to these demands. According to the needs of this study, the chapter will focus on primary education policies, facts and programmes.

5.1 National Policy for the Environment.

The Cyprus national framework of action for the protection of the environment fostered by the Ministry of Agriculture, Environment and Natural Resources is a plan which aims to achieve compatibility between Cyprus legislation on the environment and that of Europe. There is a special reference in it concerning Education:

«Environmental Education must be incorporated in every topic of our Curricula with a special emphasis on primary and secondary education.» (Ministry of Agriculture, Environment and Natural Resources, 1996)

The achievement of this mandate requires the full cooperation of the Ministry of Education and Culture through the introduction of environmental education in every school. The study of the educational system and the curriculum can reveal the Ministry's response to this demand.

5.2 Cyprus Educational System

The educational system in Cyprus is organised in four levels. Pre-primary, primary, secondary and higher education. Figure 5.1 shows the organization of the system.

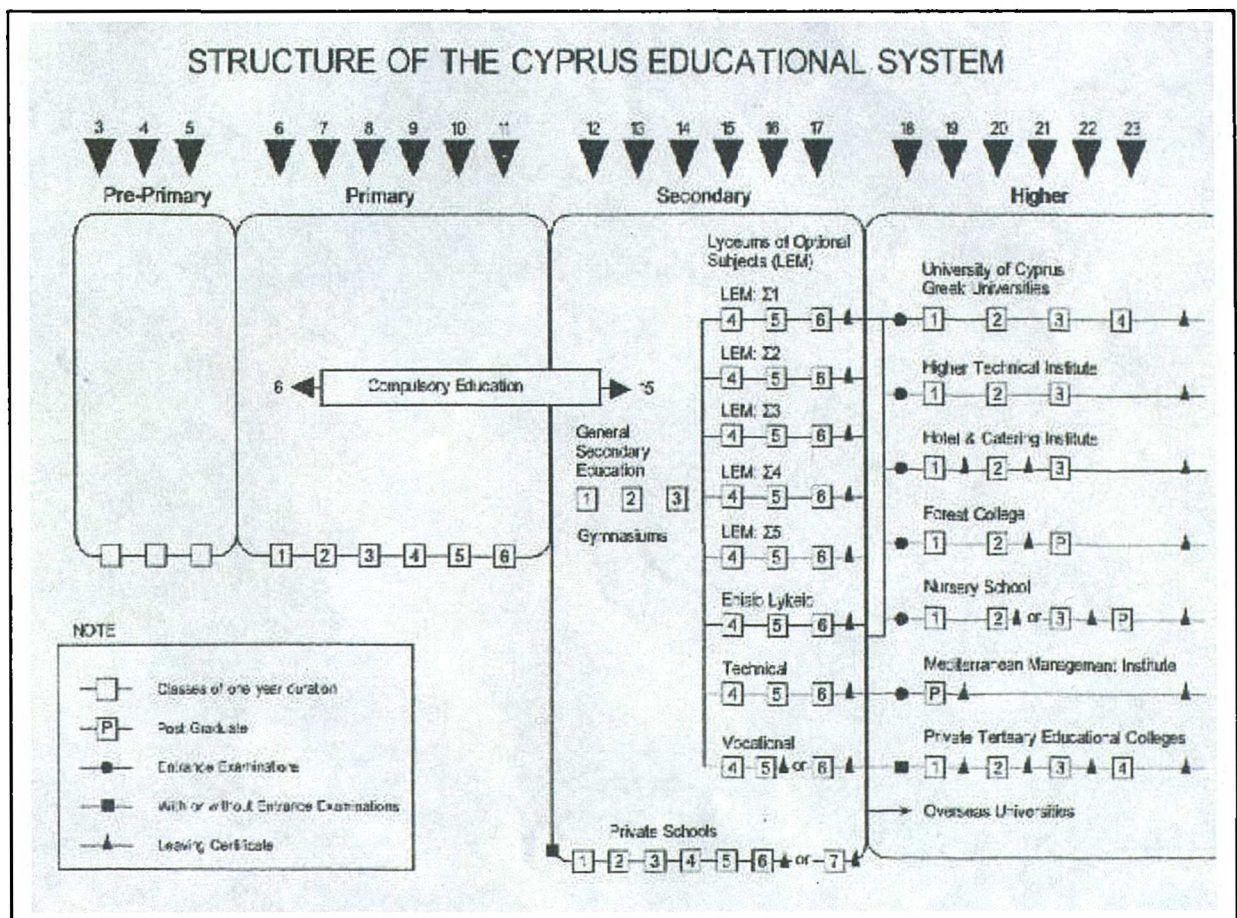
Primary Education is free and compulsory. According to the regulations, schools function in every town or village, wherever there are more than 15 students. They receive children from 6 to twelve years old. In general, all six grades in primary education form one school. Where the number of students is too large the school is divided in two cycles, the lower primary and the upper primary, with different school management and sometimes completely separate buildings.

Compulsory education extends for the first three years of secondary education. Upper secondary is not compulsory but offers the option of vocational and technical training.

Tertiary Education (18+ year olds), does not really include environmental education Programmes. In the *School* of Education Syllabi (University of Cyprus, 1999, 2000, 2001), a course on environmental studies was occasionally offered to the education students. The course's existence depended on the availability of funds and its content on the individual trainer who taught it.

The Ministry of Education provides INSET for primary school teachers, on environmental issues on an optional basis. There are two primary education seminars, one is specially designed to support the Eco-School environmental education programme, which will be presented further on in this chapter, and another seminar, on environmental education general framework, theory and practice. These are organised and delivered by the Pedagogical Institute of Cyprus.

Fig. 5.1 The educational system of Cyprus (from Ministry of Education and Culture, 1996)



The general principles, aims and objectives of Cyprus educational system are to “promote the development of free and democratic citizens with a fully developed personality, being mentally and morally refined, healthy, active and creative citizens who contribute generally with their work and their conscientious activity to the social, scientific, economic and cultural progress of our country and to the promotion of cooperation, mutual understanding, respect and love among individuals and people for the prevalence of freedom, justice and peace”. (Ministry of Education and Culture, 1996: 12)

One of the primary education goals is the qualitative improvement of education. One of the ways of achieving this improvement as stated by the report (1996: 12), is through “subjects for the promotion of the European dimension concerning Health

Education and development of Environmental Consciousness". This could be perceived as a response of the Ministry of Education and Culture to the Ministry of Agriculture's demand for emphasis on environmental education in primary education.

5.3 Environmental Education through the Primary Education Curriculum

A new curriculum for all subjects of primary education was introduced in 1992 and was revised in 1994 and 1996. One of the major goals of the 1992 curriculum is the study of the environment. The 1996 report states that, the children are *"helped to live their environment thus becoming able to understand, describe and love it. ... This awareness and positive attitude will help them to proceed to the understanding of other places and the world in general"*. (1996: 36)

The revision of the curriculum in 1994 and 1996 took place in order to make the transition from primary to secondary education easier for the students. Some environmental orientation also appears in the introductory note of both the revised versions through the basic educational aims.

"Primary education within the 9 year programme of study has a basic aim: to organize, ensure and offer to all children, regardless the age, gender, origins, social background and mental abilities, opportunities for: ...

- *Developing positive attitudes towards learning, social encounter, struggling, focusing on humanistic values, respect of the cultural heritage, valuing the aesthetic beauty, creativity and finally love for life and nature and sensitivitation on issues of conservation of the environment.*” (National Curriculum 1996, 1994).

The programmes of each discipline are in accordance with the general aims, so in most cases an environmental facet can be distinguished in each discipline. The following information on each discipline is extracted from the National Curriculum (1996).

Language:

Most of the aims of this discipline can be achieved through texts of environmental context. Some of these aims are:

Table 5.1.a Listening and verbal expression aims in language teaching

-Listening and verbal expression aims	
Yrs 1 and 2:	Discuss with their teacher and fellow students, exchange information and participate in activities; play creative and self created roles from everyday life, stories and talks, etc.
Yrs 3 and 4:	active participation in group discussions; critical listening and free expression of their opinion when necessary; simple interviewing skills for gathering information from people;
Yrs 5 and 6.	coordinate a discussion and be able to note the key issues and reach conclusions; team planning, application and presentation of an activity (show, experiment...).

Table 5.1b Study Skills and source use aims in language teaching

-Study skills and source use.	
Aim: The students should acquire study skills which will help them use sources, cross examine and validate information.	
Yrs 3 and 4:	Find information on the same issue from various resources;
Yrs 5 and 6.	use dictionaries, encyclopedias, newspapers, magazines, catalogues, in order to find the information they need.

Mathematics:

Targets:

- Discover in the environment, close or distant, natural or artificial, mathematical relations on quantities, distance, length, and be able to record them using symbols;
- be able to explain basic mathematical concepts using real life situation experiences acquired during free or planned situations (shape, length, width, height, distance, symmetry, equity)... in such a depth and extent according to the child's level of mental development;
- be able to enjoy the rhythm, the clarity and harmony of mathematics, see their connection and justify their importance in the contemporary world.

Social Studies:

The objective of the social studies is to study people's life in the society with interdependence and interaction with the natural and artificial environment.

Aims:

- Developing love for the environment and willingness to conserve and enrich it;
- expressing practical interest for social problems and active participation in social life;
- ability for developing free debating and communication;
- ability for taking advantage of experiences and knowledge beyond the immediate environment;
- ability for critical evaluation of situations and phenomena.

Science:

All targets in science either contain an environmental dimension or they can be achieved through an environmental context. Some of the general aims of science are:

1. The development of investigative spirit and scientific approach for tackling problems;
2. acquisition of scientific knowledge in order to help the children understand themselves as well as the world around them;
3. develop attitudes and appreciation for the environment and actively participate in activities which will contribute to its conservation and improvement.

From the specific science units, some good examples which facilitate environmental education are:

Table 5.2 Environmental Issues in Science Curriculum

	Plants	Animals	Ecology
Year 1	Plant types (fruit, decorative, forest etc.)		
Year 2	Vegetation influencing factors	Differences and similarities among animals	
Year 3	The importance of the plants.	Protected animals of our country (study of the moufflon, golden eagle, green turtle, and hare)	Food chains and interdependence between living organisms.
Year 4	Forests and their importance, endemic species and rare plants of Cyprus		
Year 5	Roots, shoots, leaves, transpiration.	Categorisation of animals: mammals, birds, fish etc.	Keeping school grounds tidy
Year 6			Water pollution

English:

In the same way as in Greek language classes, foreign language teaching could be obtained through texts of environmental context.

Art:

Aim of the art classes is to enrich students' life with aesthetic experiences, emotion and pleasure by satisfying their needs for exploration, study and discovery of the world around them and of themselves.

Design & Technology:

The aim of these classes is to familiarize the children with situations connected to the environment in which they live and help them investigate it by using knowledge acquired in various disciplines. Children should develop their creativity and ability to design and construct objects, invent and execute practical ways for problem solving and improving current situations.

Geography:

Aim:

To help students know human beings and their problems in connection with the environment where they live and understand the powerful interdependence and man's influence on the environment due to contemporary technological achievements.

Targets:

-To study the natural and man created environment of our country and distinguish these elements from their dynamic interdependence. Develop environmental awareness;

-respect and conserve our cultural heritage;

-understand the influence exerted on humans by the climatologic conditions and soil morphology;

The entire context of geography can be environmentally expanded.

Home Economics:

Aims:

-Students should learn about the diversity, the value and the properties of various goods in order to be able to act as informed consumers and use them correctly and safely;

-home Economics context includes general environmental issues too.

Study of the Environment:

Aim:

-Study of the environment aims to create the appropriate learning environment in order to help the students understand their environment, whether man made, cultural or natural; understand the influence and interdependence of people on their

environment and help them develop the attitudes needed to be incorporated in the environment successfully.

Targets:

-Acquire experiences and concepts relevant to the area where they live, neighbouring places and areas they visit (mountains, plains, sea, forests, rivers, etc.) and mention cases of human intervention on the environment for the improvement of their personal lives (streets, dams, bridges...);

-know various plants and animals of their area, take care of them and explain, using examples, the interdependence amongst them and man;

-students should realize the importance of the natural environment, become environmentally aware, conserve and apply basic principles such as grounds tidiness, animal care, plants and respect and care for the school and public grounds;

-participate in social activities.

Religion education:

Aims:

-Respect the value and importance of religious monuments of importance;

-understand the message emerging from the customs and culture of the orthodox religion

History:

Aims:

-Love and respect our cultural heritage and contribute to its conservation and development of a “healthy” national identity;

-become aware of the interdependence and interaction between historical facts and other elements, such as geographical position, geological conditions, economy, human factor, etc.

The environmental dimension in Cyprus’ *primary education curriculum* might appear through environmental “hints” and opportunities through the programmes of study. Nevertheless, the term Environmental Education is not made explicit and does not appear in any official documents or books that reach the teachers, such as the curriculum.

Other cross-curricular subjects, such as health education and “den xehno” (study of the Turkish occupied part of Cyprus), do make their appearance in the curriculum. It is made explicit what their context is, which their general aims and targets are and cross-curricular approach is explained. The question at this point is, if environmental education is of “primary importance” in our education, as stated in the ’92 Curriculum and introduced through the ’96 action plan, why doesn’t it clearly appear in our curriculum? Moreover, why aren’t there any efforts for producing and providing materials and aids to facilitate the incorporation of the environmental dimension in teaching?

5.4 Environmental Education Mandates

A close study of the “environment” documents in the official archives of the Ministry of Education (Non Published Ministry Records: File on Environment) can also provide an image of the attention and level of promotion environmental education actually receives in our schools.

The file included the studies of individual teachers on environmental matters, some articles and a copy of the Belgrade chart and the proceedings of student conferences organized by schools.

An intensive attempt for the introduction of environmental education took place in 1987 through a mandate sent to all schools, accompanied by a study performed by one of the district inspectors, Mr. Tsindis (1987). His study underlines the necessity for establishing environmental education in schools in order to tackle the “environmental crisis” through creating environmentally aware citizens. The importance of education in environmental education is also highlighted. The school has a significant role to play both through the curriculum and through the teachers’ attitudes on the issue (Tsindis, 1987). As part of the curriculum, environmental education is distinguished as a separate discipline which is fused with the entire curriculum. The study continues with a brief presentation of all chapters and units of all disciplines, which contain an environmental dimension, in that year’s curriculum.

The teachers attitudes towards environmental education was an important issue for Tsindis because many educators had not acquired a clear understanding of the term. So he had to clarify and define the term as well as state the basic targets of the environmental education programme.

Tsindis gives a homocentric approach to the issue, since for him *“environmental education should stress that only the human being amongst other beings can make decisions which can have short and long term impacts on the environment”*. Based on this aspect he believes that it is the adults’ and the children’s responsibility to realize which are the consequences of their actions. In order to achieve that, the basic aims of an environmental education programme should be:

- The development of knowledge and understanding of the interdependence of living organisms among themselves and with their environment,
- The development of environmental awareness in the children in order to realise the responsibility for the individual’s actions. Make it comprehensible that “chain reactions” in environmental degradation can be triggered even by seemingly harmless interference with the environment.
- The development of problem solving skills and decision making based on the careful use of documentation and scientific knowledge.

According to Tsindis (1987), these targets should affect the entire curriculum.

As a methodological approach he rejects inculcation and supports that the success of an environmental programme depends on the person’s free acceptance of the attitudes and values, through study and personal evaluation of the available information. Only then will s/he decide on his/her personal behavioural code. At this point the *“conflict issues”* and the controversial character of EE is also highlighted.

Finally the study makes special reference to the teachers’ role, stressing that the teacher should *“take advantage of every opportunity for environmental education s/he encounters, should seek for resources, material and information, should*

organize the entire school life in a way that cognition and experiential learning is promoted. On contradictory issues, s/he should neither take position nor be indifferent but should help the children develop their observation skills and abilities for data handling. The family should also be involved in order to better achieve the cultivation of environmental attitudes in the children”.

It is obvious that this was a quite important study that provided the teachers with a lot of information. Unfortunately, it was a briefly considered attempt and it eventually remained in the “environment file”.

After that, what appeared next were some letters, in 1997, from individuals and environmental organizations, which either gave the Ministry suggestions or asked for information on the issue. This was repeated in 1998, with the addition of some official correspondence concerning the introduction of some environmental education programmes in primary education. Those were “Chrysoprasino fillo” and Eco-Schools.

5.5 Environmental Education programmes in Cyprus Primary Education.

All environmental education programmes that take place in Cyprus are optional. Some of them are coordinated by the Ministry of Education and some others by NGOs. The Ministry of Education welcomes the NGOs assistance on the issue and facilitates the programme’s application in schools.

Such programmes are applied in both primary and secondary education. In primary education, currently only two major programmes are applied, the Eco-School Programme and “Chrysoprasino fillo”. Smaller programmes that run in primary education are the “small seed” and a programme on forests. A very limited number of schools participate in the programmes and they are mainly coordinated by the Ministry of Education. Secondary education participates in both the programmes mentioned and additionally implements the programme Young Reporters for the environment. There is no direct progression of these programmes, originating from primary – secondary school cooperation. Any progression and linking of primary – secondary work is organised by the programme operators.

Since the study focuses on primary education, at this point only the 2 broad scale programmes applied in primary education will be presented. Special emphasis will be given to the Eco-School Programme, since it is the programme used in the investigation.

5.5.1 Eco-Schools

Eco-School programme is a programme established by the Foundation for Environmental Education in Europe (FEEE). Each participating country has a National Operator who is responsible for the application and the dissemination of the programme. Usually National Operators are NGOs and environmental organisations. The National Operator in Cyprus is CYMEPA (Cyprus Marine Environment Protection Association).

The programme aims to raise students' awareness of Environmental and Sustainable Development issues through classroom study. It provides an integrated system for environmental management of schools using priority issues, such as water, waste and

energy during the first years of the programme's implementation. Schools that have completed the suggested topics have the flexibility to move on to different areas such as transport, health, nature and biodiversity. A key objective is to reduce schools' impacts on the environment by encouraging children themselves to take action. The programme extends learning beyond the classroom and develops responsible attitudes and commitment both at home and in the wider community (FEEE, 1999). Schools with high achievement in the programme receive the Eco-Schools green flag, an award recognized and respected as an eco-label for environmental education performance.

The programme was designed to promote environmental awareness and action as part of school life and students' ethos. It is a very flexible programme. Different schools can design different activities and follow a completely different implementation path. It is important to stress that the programme's purpose is not to reward specific physical improvements in the school, e.g. the construction of a pond, but its purpose is to cultivate attitudes.

The Eco-School programme is a long term programme. The prize in Cyprus schools is renewed every year. The awarded school receives a green flag with the eco-label. It also receives a document and a logo (seal) which can be used with the school's official documents.

The Eco-School programme provides the school with:

- Opportunities to use topics from the curriculum in order to influence school life on environmental issues;
- opportunities to cultivate decision making skills;
- materials and ideas for activities and assignments;

- links with other schools in Europe;
- a respected award;
- opportunities for local and national publicity;
- possibilities for saving money.

Moreover, the programme demands:

- the support of the school management and the local authorities;
- willingness to involve children in decision making processes;
- active participation of the staff;
- willingness to adopt a long term path for change.

The programme follows four implementation stages:

Stage 1: Registration: The school's enrollment requires the agreement of the school management and the rest of the teaching staff. To support the implementation, the Ministry of Education and the Pedagogical Institute have organized a series of seminars specially designed to provide information and practical suggestions for the programme. A school can participate in the programme only if at least one or two members of the staff have received the training. These can become the programme coordinators and inform the rest of the school staff on:

- the benefits the school can gain from the programme;
- the seven programme elements, which will be explained in the process;
- the programme's flexibility;
- target setting;
- long run programme objectives;
- programme's ability to facilitate planning and implementation of an environmental management and environmental education policy for the school unit.

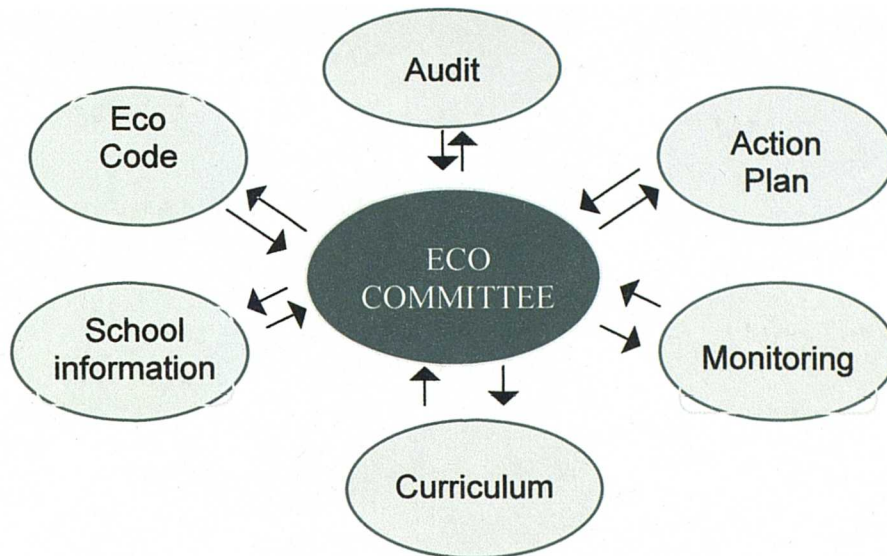
If the idea for school enrollment in the programme is globally accepted by the school, then the following step is the registration of the school in the programme, with the national operator.

Stage 2: Programme Implementation: The aim of the programme is the transition from environmental awareness, cultivated through the curriculum, to environmental action by the school community to the broader community. This could be achieved through:

1. Eco-Committee: This constitutes the programme's moving power and monitors the application of the implementation process. The ideal committee should constitute students, teachers, non-teaching staff, local authorities, parents and school management. Local environmental organization members could also be involved. This committee aims to:

- ensure the application of the other six elements;
- give responsibilities to the children and make them feel that their aspect is heard and respected;
- listen to all committee members' opinions;
- ensure the continuation of the programme;
- link the school management with the local authorities.

Fig. 5.2 The Eco-School Programme plan (McLeish, 1996)



The committee can be formed in several ways, depending on the children's ages and abilities. It could be formal or informal. Whatever form it takes, it must represent all interested parties and record all meetings and decisions.

2. Environmental Audit: The first thing in any environmental improvement programme is to know the current situation. This should be assessed so as to be able to set effective and realistic targets as well as to measure the achievement levels. It is extremely important to involve the students at this point.

The "Environmental Audit", includes a checklist. It can be adjusted according to the areas' needs and the school's needs, or it can be distributed to the various classes and divided into various issues.

3. Action Plan: The Action Plan, constitutes the nucleus of the Eco-School's work. It is a series of specific and carefully planned targets, which will assist in the environmental improvement of the school. The targets should be realistic and whenever possible, they should be connected to the curriculum and the general aims of the year.

4. Monitoring and Evaluation (Diary keeping and monitoring progress):

Monitoring and evaluation provides the Eco-School results with validity and reliability since it continuously provides evidence of the fulfillment of the targets. The progress is continuously controlled. The monitoring programme is based on the action plan. Students are encouraged to take responsibility for the monitoring activities as a way of reinforcing their awareness and to help them improve their attitudes. Finally it is the programme's policy to "celebrate for the achievements and demonstrate the success". In this way both students and teachers, as well as everyone who has worked for the programme, will feel rewarded for their efforts.

5. Curriculum links: The basic principle that supports the Eco-School Programme is that the classroom teaching of the environmental matters, must influence the general way of action and behaviour of the school unit.

6. Information and involvement: The local and the school communities should be informed about and involved with the programme's activities and achievements. This can be achieved by signs in the school grounds, assemblies, school newspaper, exhibitions, school projects and children's work in general, as well as with the assistance of the media: radio or TV. Another informative activity is the survey. A questionnaire can give information about people's ideas but can also change people's ideas.

The organisation of an "action day" for the entire school unit which involves the local community can benefit both sides. The school community can receive both practical and financial support.

7. Eco-Code: This is a statement of the targets which reveals the commitment of the school unit to environmentally oriented action. The code statements must be specific and applicable. Each statement should describe a specific action that a student could do. Moreover, it should be continuously kept up to date.

It is important that the students feel that they have a say in the formation of the code, otherwise they may ignore it. The code could be discussed in the classroom and be formed by students' suggestions. It could even be published in the local press.

Stage 3: Assessment and Award.

Evaluation Criteria: The seven elements presented above, constitute the Eco-School Programme. The school is evaluated only if the school itself decides that it is ready to be assessed, so they invite the national operator evaluation. The evaluators use the seven elements as criteria for the evaluation.

Eco-School committee: It should be constituted by teachers, local authorities representatives, and non teaching staff.

Environmental Audit: At this point it is important to involve the students.

Action Plan: The action plan should also include a time schedule.

Monitoring and evaluation: It is important that the monitoring involves students.

Information and dissemination: All students should be aware of their commitment and their responsibility towards the Eco-Code.

Eco-Code: The Code should be continuously displayed in striking places for the students and the visitors to see.

The evaluation application requires the completion of a form and answering the 12 following questions which should also provide evidence of children's participation.

1. Who sits in the Eco-Committee and how does it function?
2. How was the environmental audit organized?
3. How were the Action Plan targets decided? (include a copy)
4. To what extent have you achieved the targets set?
5. How do you monitor and evaluate progress?
6. Write down the number and ages of the children involved in curriculum activities and information about the issues covered.
7. Describe your school's action day.
8. How was the community informed about the schools ecological programme, and how did they react?
9. Describe any contact the school had with the broader community (assistance, publicity, financial support...)
10. Please provide the Eco-Code and describe the way it was set.
11. How did the Eco-School Experience help your school?
12. Feel free to provide any other information you consider important.

(McLeish,1996)

Stage 4: Reward Renewal

Every year the school must renew the award by providing evidence on the maintenance of the previous years' achievements and the new achievements obtained.

Programme benefits

One of the greater benefits of the Eco-School project is the potential it has to establish links between schools on a national and international basis. The programme constitutes an ideal way of learning about other cultures too. The moment that a school is declared Eco-School, the school is entitled to ask to be linked to another Eco-School.

Environmental Management for the School. The Eco-School programme is capable of involving the entire school unit during the development of an environmental policy.

The Programme started in the school year 1997-8 in Cyprus. Although the programme is now open to any school which might want to participate, in the first year of application, which was considered to be pilot programme, the schools were intentionally chosen by the school inspectors, according to the experience they had with previous programmes. As a means of supporting the programme, the Ministry of Education through the Pedagogical Institute, organised a series of seminars specially designed and directed to Eco-School teachers. The programme began with the participation of primary schools only. In order to be more easily managed and effective it was decided to start with the priority issues and focus on a different one each year. The first topic studied was water, as a response to the prolonged drought on the island and was seen as a top priority issue. The following year the programme focused on waste management, then energy and in the fourth year again on water. Repeating the water issue was necessary because the programme expanded dramatically to schools since the first year of its application so most of the participating schools had not applied the topic water. At some point, schools will

freely decide the topic on which they will focus, since there is now some experience on all topics. Each year, however, the programme operator and partners (Pedagogical Institute) try to introduce a new topic. For the next year, it is already planned to introduce biodiversity education, and there is already prepared special material and teachers handbook, to supply schools with and use during the seminars.

The programme has also expanded into secondary education. The following table shows the number of schools enrolled each year, the number of schools finally awarded and the topic of the year.

Table 5.3 Eco-School Programme Participation and awarded schools

YEAR	TOPIC	PARTICIPATING SCHOOLS		AWARDED SCHOOLS	
		Primary	Secondary	Primary	Secondary
1997 – '98	Water	16	-	12	-
1998 – '99	Waste	25	-	22	-
1999 – '00	Energy	37	10	35	7
2000 – '01	Water	43	14	35	8
2001 – '02	Biodiversity				

5.5.2 Chrysoprasino fillo

“Chrysoprasino fillo”, stands for green – golden leaf, and is a phrase from a song about Cyprus: golden and green because of nature’s colours in summer and winter. It is an environmental education programme, run by the Cyprus Ministry of Education in collaboration with Ministry of Education in Greece. Both primary and secondary schools participate. Nevertheless, only a limited number of schools can participate each year. In primary education only 2 schools currently implement the programme. The reasons for this are probably limited funds and limited support from the coordinators.

Schools from both Greece and Cyprus take over research projects on issues decided by each school. Each school also forms volunteer groups which are responsible for the implementation of the research and meet outside school hours. This could be another reason for the limited involvement of schools in the programme. Schools are designated by the two Ministries, which may not want to coordinate many projects at the same time.

CHAPTER 6: ENVIRONMENTAL EDUCATION IN EUROPE

Introduction:

International Conferences such as the Tbilisi declaration (1977), the Earth Summit, Rio (1992) with Agenda 21, etc., highlighted the urgent need for environmental concern and a more sustainable way of life.

Agenda 21 (Baines, J., 1996) suggests effective ways of achieving more environmentally friendly ways for development and specifically to address various development factors.

Chapter 36 is devoted to Education:

“Education, including formal education, public awareness and training should be recognised as a process by which human beings and societies can reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. While basic education provides the underpinning for any environmental and development education, the latter needs to be incorporated as an essential part of learning. Both formal and non-formal education are indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. To be effective, environment and development education should deal with the dynamics of both the physical/biological and socio-economic environment and human (which may include spiritual) development, should be integrated in all disciplines, and should employ formal and non-formal methods and effective means of communication.” (Report of the UN Conference on

environment and development, Rio de Janeiro, 3-14 June 1992. A/Conf.151/26 (Vol. III)).

All participating countries agreed on producing a Local Agenda 21, based on these guidelines, but according to local problems and needs. This national strategy (Local Agenda 21) has to be promoted by the country's educational system. Thus every country produces its own national environmental education strategy. Ministries of Education in the European Union, agreed to promote environmental education (Papademetriou, 1998) and committed themselves to:

- Promoting environmental education in all educational sectors;
- issuing documents that make public the environmental education policy followed in their schools;
- considering environmental education aims when planning their curriculum programmes;
- highlighting environmental education through initial teacher training as well as through in service courses;
- providing suitable educational aids to schools. (Council of Europe, 1988)

In response to this commitment, many initiatives took place on governmental levels (Papademetriou, 1998). Nevertheless, these initiatives, include many programmes that take place on an experimental basis and involve only a limited number of children (Vincent, 1992). Vincent (1992) stresses that environmental education reinforcement in initial teacher training is advancing very slowly and in-service training cannot respond to the increasing need for trained teachers. Moreover, limited sponsoring results in limited provision of educational aids and support, a fact that does not facilitate the environmental education implementation. Finally, the

definition of the aims of the new discipline, the lack of evaluation and the complexity of the new environmental problems, pose another implementation problem. Therefore, environmental education implementation should no longer be on an optional basis, but should become part of the official programme of study, in agreement with the particularities of the national educational systems and traditions of each member country (Vincent, 1992:14)

As Eusebio Murillio Martilla (1999) points out during the European conference on environmental education (*Policies and implications for Sustainable Development, European Policies on Education for Sustainability*), “*the community’s environmental policy has progressed from curative action to a greater emphasis on prevention of damage to the environment and to the actual orientation towards achieving sustainable development*”.

The objectives of the Community policy are:

- “*Perceiving, protecting and improving the quality of the environment*
- *Protecting human health*
- *Prudent and rational utilisation of natural resources*
- *Promoting messages of international level to deal with regional and world-wide environmental problems.*” (Murillo-Martilla, 1999)

In order to meet these objectives, according to Murillo Martilla (1999), the community is prepared to contribute to the exchange of information regarding the initiatives taken and to the organisation of events or environmental education training.

It carries out projects on:

- basic and continuous training;
- development of specific curricula and teaching modules;
- design testing and evaluation of teaching materials with a European dimension;
- networking and organisation of meetings of key partners.

As far as curriculum organisation and the integration of the environmental dimension into the educational systems is concerned, the European Union supports “*the integration of environmental education at all stages of the system by means of full integration into disciplines. For whole school policy, they point out the necessity for a modification of the school agendas in order to allow for a new environmental (or Educational) approach*”. (Murillo-Martilla, 1999)

The factors that constitute and determine a strategy (national or international) are two: the policy followed for the organisation of the curriculum (separate approach or integrated approach: multidisciplinary and interdisciplinary) and a concentrative (top - bottom) or flexible (bottom - up) whole school policy.

In general, the whole school policy is rather flexible (within a national policy). Nevertheless the curriculum organisation is what determines the particularity of a national policy. Having as a criterion the position of environmental education in the Curriculum, Leal Fillo (1992) discerns two groups of countries within the European Union; countries of which the educational systems incorporated environmental education as part of their programme of study and countries where environmental education is not yet part of the Curriculum, but they promote it in other ways. For the development of clear Policy on environmental education, countries of the second group, or countries where environmental education has a similar status (e.g.

Cyprus) could find support in the existing policies and curriculum documents.

This chapter presents national policies for environmental education in European countries, organised according to the curriculum policy arrangements.

Table. 6.1. Curriculum organisation for environmental education

Curriculum Organisation for Environmental Education		
Cross Curricular – Integrated		Separate Subject
Interdisciplinary	Multidisciplinary	
Norway	Spain Denmark	Netherlands
Sweden , Scotland		Finland

6.1 Cross Curricular - Integrated approaches

6.1.1 Interdisciplinary approach.

6.1.1.1 Norway

The official document Norway has produced is titled “*Strategy for Environment and Development in the Education Sector*”. It is a complete document, presenting and analysing every facet of environmental education implementation, covering from general policy to specific curriculum issues. It begins by presenting the evolution of the topic in Education for the last decades along with International Co-operation.

Table 6.2. The evolution of environmental education in Norway

1971	Environment and nature were required topics in primary and lower secondary education
1974	Upper secondary education shall promote ecological understanding and international co - responsibility.
1971 - 77	Research project by the Pedagogical Research Institute, <i>EE in primary and lower secondary education</i> .
1983	WCED (World Commission for the Environment and Development)
1987	"Our Common Future"
1988	Parliamentary White Paper " <i>On Environment and Development</i> " (one of the instruments is that over a period of time all teachers will be offered in-service training in EE).
1986	The OCED programme, "Environment and School Initiatives" (ENSI) started.

The United Nations Environmental Education programme: IEEP

IEEP developed at the same time as the work going on in Norway and Nordic countries (1974 - 1977). Many people participated in both programmes, thus inevitably many Norwegian efforts derive directly from the goals and strategies recommended by UN:

- * *"To foster clear awareness of and concern about economic, social, political and ecological interdependence in urban and rural areas.*
- * *To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect the environment*

- * *To create new patterns of behaviour of individuals, groups and society as a whole towards the environment.*” (Royal Norwegian Ministry of Education, Research and Church affairs, 1995:5)

What has been achieved. Challenges for the 90's.

Environmental education requires a different organisation of the school functions and at the same time it sets down the need for a continuous updating of the instruction. The main challenge, though, has been and still is *“to provide favourable conditions for training which gives pupils and students knowledge, attitudes, and abilities which enable them to take a standpoint and contribute to solving the environment and development problems”*. (Royal Norwegian Ministry of Education, Research and Church affairs, 1995:6)

Investigations have shown that only the most interested teachers offer their pupils this kind of instruction, also revealing that it is difficult for schools to implement environmental education on a permanent basis.

In 1993, KUF¹ arranged an evaluation seminar at BØ in Telemark in which the goal was to identify problems that a school has when implementing environmental education and to identify necessary changes in the school as an organisation in order to enable implementation and training for environmental development in line with the UN goals. The problem areas identified at the seminar determine the choice of subordinate goals in the Norwegian environmental education document.

Obligations and instruments

Official documents.

The educational system is given a clear mandate to provide instruction which contributes to sustainable development. In the report of the World Commission for the Environment and Development (WCED), the role of the teacher is described as crucial in bringing the report to people: the teacher has to “*contribute to establish a system of education which gives learners knowledge, attitudes and skills, making them take a standpoint and contribute to solving the environmental and development problems...* ”.²

For the introduction to the core curriculum for primary, lower secondary and secondary education, “*education must promote democracy, national identity and international awareness. It should advance solidarity with other people and develop mankind’s common milieu, so that Norway can become a creative member of the global society*”.

Responsibility for reaching these aims, is distributed between national and local levels, through steering instruments:

- *Statutes and regulations;*
- *national curricula;*
- *evaluation and reporting;*
- *school management and training for school leaders;*
- *centrally initiated research and development work;*

¹ KUF: Ministry of Education, Research and Church Affairs.

² Parliamentary white paper nr. 46 (1988 - 89), On environment and Development

- *pre-service and in service training for teachers;*
- *budget allocations.*

As far as the curriculum is concerned,

“The National Curriculum defines the goals and gives a framework for the contents of the instruction. The core curriculum emphasises instruction on environment and development and describes a set of principles that are important in the context of EE:

- *working methods that activate and challenge the pupils’ imagination and creativity,*
- *interdisciplinary co-operation and holistic knowledge,*
- *use of the local community as a teaching area,*
- *emphasis on ethical issues,*
- *evaluation methods that can take into account a broad concept of knowledge”* Royal Norwegian Ministry of Education, Research and Church Affairs (1997).

The document also refers to training of pre-school teachers, teacher training, vocational teachers’ training, adult education, in universities and colleges, etc.

Research, particularly *“environmental research is designated as a high priority area”*. (Royal Norwegian Ministry of Education, Research and Church Affairs, 1997).

Main goal, programme areas and subordinate goals:

The main goal of the programme is:

“An educational system that contributes to sustainable development by the following means:

- *the participants are active and themselves gain knowledge through the collection, creation, structuring and communication of new facts about interactions in nature and between nature and society;*

- *all pupils and students are given the opportunity to experience nature and to recognise the beauty and value of nature;*
- *all pupils and students develop a sense of identification with other peoples and with the common environment for life, have solidarity with the world's poor and exhibit a feeling of responsibility for the future."*

(Royal Norwegian Ministry of Education, Research and Church affairs, 1995:10)

Subordinate goals for various programme areas

- * *"Competence raising: Those responsible for instruction and training are capable of providing qualitatively good education for Sustainable Development".* (Royal Norwegian Ministry of Education, Research and Church affairs, 1995:11)

1. Division of responsibilities

- *National Educational Offices:* communicating the objectives of the competence building, ensure that municipalities develop plans, administer applications for funds and report to the ministry of education.
- *Local county and municipality:* ensure competence building plans made at schools and enable the implementation of the plans.
- *School:* To develop plans for competence building for the teaching staff and employees, develop environmental education projects in co-operation with students, highlight the goals of environmental education in the training given.

2. Environmental programmes: *"To implement environmental programmes at various levels that support local school authorities and schools in giving action oriented instruction on environment and development."*

3. Research and development work: *“To obtain greater knowledge about organisation and activities that promote good environmental education through experience gained in experimental activities within selected research areas”*.
4. Co-operation with other actors: *“A closer and more committed co-operation between school, other public sectors and non governmental organisations, involved in education and research on environment and development”*.
5. International co-operation on environment and development: *“Participate in international events, exchange of experiences, with the intent of contributing to improved quality of training on environment and development both in Norway and other countries, and to contributing to the development of new knowledge and exchange of research results in this field”*.
6. Evaluation and reporting: *“Up to date overviews of the quality and extent of work with environment and development in education sector are to be available.”*

6.1.2 Multidisciplinary approach.

6.1.2.1 Spain

Information about “knowledge on natural, social and cultural environment” in Primary Education in Spain is provided through the document “Educacion Primaria: Conocimiento del medio natural, social y cultural” (Eurydice, Ministry of Education and Culture, 1997).

This document clearly states the multidisciplinary character of environmental education. Each curriculum discipline contributes to a better understanding and explanation of the issue, each from its own special perspective. Primary education still

lacks an epistemological basis for the introduction of a scientific discipline. Nevertheless an integration approach is possible.

The Ministry of Education (1997) has also provided the “Base document for the elaboration of the white book for environmental education in Spain”³. It is an open and participative document, widely debated, aiming to promote and develop environmentally friendly activities among people and social groups, as a response to Agenda 21, chapter 36, recommendation for application of strategies at local level, in order to promote and develop environmental education.

The first part of the document is devoted to the theory and philosophy of environmental education. It analyses what environmental education is, how it is defined by the UN conference in Stockholm, how it was defined now and a historical view of the topic.

Environmental education in Spain evolved through three periods; it appeared at the beginning of the seventies and it was institutionalised on the eighties. The reorientation of the educational system in Spain (Jimenez-Aleixandre, 1994), initiated in the nineties, introduced environmental education as an interdisciplinary subject, intending to highlight environmental issues in all curriculum disciplines creating therefore a critical movement. As a result quality environmental education programmes and activities were formed, accessible for everyone. Nevertheless it had a limited reach to the target groups and a limited contribution to giving solutions to environmental problems.

The white book aims to blast a new impulse:

³ The document's form was finalised and is available in Spanish, on line:
<http://www.mma.es/educ/ceneam/blanco/blanco.htm>

- a. Progressive extension of environmental education combined with society and different vital contexts;*
- b. Environmental education orientation towards better knowledge of the social environment, detection of problems and discussion of the possible solutions;*
- c. Co-ordination and concentration of public and private sector, through networks;*
- d. Inclusion of environmental education in all environmental initiatives;*
- e. Participation of civilians in all environmental initiatives.*

Basic Principles:

1. involve all society;
2. wide and narrow focus;
3. critical and innovative thinking;
4. promote participation;
5. co-ordination and collaboration with agents;
6. guarantee the necessary resources.

Objectives:

1. Promote the knowledge and understanding of factors and environmental procedures;
2. Facilitate the learning of environmental problems;
3. Make citizens capable of using strategies for obtaining information and critical analysis of environmental questions;
4. Develop environmental ethics, according to attitudes and values;
5. Motivate people for active participation;
6. Help people acquire critical thinking for evaluating and integrating values;

7. Make possible the development of behaviour and abilities, for the resolution of environmental problems;
8. Extend the practices and sustainable life styles.

Instruments:

Information and Communication, Formation and Capacitation, Participation, Investigation and evaluation

Frame of Action:

The frame of action for environmental education is related to values education, consumer education, training for employment and continuous education of the staff, security and health in working areas, as well as the education and development of the citizens for active participation. In the second part of the “White Book”, the frames of action for environmental education are analysed.

The community is the 1st factor taken into consideration and it includes a geographical variable (neighbourhood, district, municipality...), the inhabitants, and the social system by which these factors are organised. People should receive formal or non-formal education so as to be able to promote environmental education and organise initiatives to succeed that. Therefore it is essential to involve citizens and communities. The second factor refers to General and Autonomous Administration.

The third is devoted to the Educational System. The document points out the necessity for an open and flexible curriculum for pre-primary and secondary education up to university degrees. Environmental Education should be incorporated cross-curricularly along with health education and consumer education. Moreover it underlines the importance hidden curriculum plays.

The fourth factor refers to Companies and Syndicates and the fifth refers to the means of communication.

6.1.2.2 Denmark

In the Denmark status report (Enemaerke, 1994 in Papademetriou 1998), environmental education is not a separate discipline but is promoted through curriculum disciplines; particularly biology, geography and natural and social sciences. The approaches followed vary because of the lack of clear definition of environmental education for the educators.

The official document of Denmark titled *"A Green Approach to Education and Training in Denmark. Situation Report after five years of a green approach to education and training"* (1998) illustrates that significant progress has taken place since Enemaerke's comments. The document begins by presenting the environmental education background.

A green approach to Education and Training in Denmark - Challenges and vision for the future.

Background.

The work for an environmental policy was initiated by the 1993 Minister of Education, Mr. Ole Vig Jensen and the working group he set for building ideas on *"how a green approach could be built into all relevant courses of education"*. The "green approach" was a recurrent element of that time's government and the same line is still followed by the current government: *"the environment is still given a high priority by the Danish Government"* and this not only for education but as a national action plan for the protection of the environment.

At the beginning of 1995 the following formal announcement was made: *“A green way of thinking is to be integrated into the teaching of all subjects and all levels of the education system. It is absolutely necessary if future generations are to be given a solid foundation for relating to and acting in accordance with nature”*. According to the policy, children are to be given knowledge and understanding of and respect for nature at an early age. Young people and adults are - on the basis of exact knowledge and skills - to continue to have an attitude and a possibility to do their share towards ensuring an efficient management of nature and the environment. Thus, in order to fulfil this, the forms of environmental education are changing:

Table 6.3. Environmental Education Reorientation in Denmark (Breiting, S., 1997)

Previous forms of EE	The new generation of EE
Aims	
Change of behaviour	Further development of competence to act
Characteristic aspects	
We (environmentally conscious adults and teachers) know the best solution to the environmental problems	All people must be involved in decisions concerning the solution of environmental problems (democracy)
We must stop or delay the development	There are many possible directions for the development
Environmental ethics	Ethics concerning decent behaviour towards other people now and in the future
The science subjects as the most important subjects in EE	The arts and social sciences subjects are just as important as the science subjects in EE
Experiences in nature are of central importance to EE	Social experience is important
The health concept is not prominent in EE	The health concept is given a central place in EE
Focus on different values	Focus on conflict interests

Challenges and strategies:

Increasing human activities have *increased human impact in the environment*. The size of the *problem* is debated, and many people are committed to taking environmental considerations. Nevertheless there is a great deal of *impotence in the environmental area* and this is the result of *uncertainty and lack of insight*.

Alternative strategies exist for containing environmental problems, such as legislation. Another strategy is strengthening the individual commitment and responsibility. Apparently this strategy is relevant when the green approach is integrated into teaching.

A green approach to the courses of Education

The idea is that the individual schools, courses of education and training and subjects are to fill in and adopt to this framework in a relevant way. The characteristics of the Green approach are roughly:

- a green approach in a meaningful way;
- deal with environment, nature and democracy;
- integrated into all courses of education and subjects where it is considered to be relevant;
- include organisation and management within the environmental area;
- school years is the time to work with the green approach to form the right attitudes to future generations;
- knowledge ⇒ skills ⇒ attitudes ⇒ awareness ⇒ PARTICIPATION (Ministry of Education of Denmark, 1998).

Aims and means

The aim of the National policy is to create environmentally aware citizens. The prime target group points at children and young people *“as heirs and future managers of nature and the environment”*. Adults and adult education will bring up a *“green qualitative improvement”*. (Ministry of Education of Denmark, 1998).

There are several ways of promoting the green approach in education and training. The document mentions some of them:

- *“by mentioning the green approach at an overall level in aims, clauses, etc.*
- *by integrating the green approach into courses as one or more independent subjects within the environmental area*
- *by introducing the green approach as elements or modules in subjects or courses for instance as interdisciplinary theme teaching, or*
- *by complete (new) green courses of education”* (Ministry of Education of Denmark 1998).

Situation report for the green approach to education and training 1998

A green approach via the revision of acts and orders pertaining to the existing courses of education: The green approach has been incorporated into all relevant existing courses, into their *aims clauses*. The focus is still *on incorporating the green approach into the annual plans of schools* and other educational institutions as well as into the teachers' daily teaching:

For Primary Education (Folkeskole) the aims laid down in the Act (Folkeskole Act 1993) suggest the integration of a green approach into a great part of the school's subjects and obligatory topics. Environmental education is not considered to be a

new obligatory topic since the green approach is incorporated in all topics by adding the necessary descriptions in the aims of the subjects. The same general aim is applied for General vocational upper secondary schools. For adult education the aim is to *“strengthen the green aspect through integration into existing courses and new green courses, e.g. biology, science, geography”* (Ministry of Education of Denmark, 1998).

Results: Good as well as bad:

The application of the Folkeskole act brought about some very interesting results:

“Experience shows that the following areas may be problematic, when you work with environmental education in the Folkeskole:

- *to achieve a high degree of subject relevance in the project apart from the purely natural sciences relevance;*
- *to create coherence with other activities both pedagogically and in relation to the subject;.*
- *that the course is drowned in problems and heavy responsibilities;*
- *to avoid moralisation and indoctrination;*
- *to integrate practical activities into the course;*
- *to avoid that the pupils end up being action paralysed and with an attitude in the manner of “I suppose it will be all right and there is nothing we can do about it anyway on our own”;*
- *to discuss environmental issues which are close to the pupil’s own everyday life for instance that his or her father is working in a chemical company.”* Ministry of Education of Denmark (1998).

Apart from the feedback on problems, the experience gained from the first years’ activities show ways to make the participants desire to learn and participate more.

What pupils appreciate more in environmental education:

The pupils generally appreciate the following important characteristic features of environmental education, if the projects do not take too long:

- *to work with real problems which also concern people outside school*
- *to work in groups with freedom to organise their work and get ideas for investigations, etc.;*
- *to have an influence on the actual teaching of the class in relation to the aims, contents, organisation and the actual form of the teaching;*
- *to be respected for the work they do both by the school and people outside the school;*
- *to achieve some form of “professionalism” in some of the things they are able to do;*
- *to have their self esteem strengthened in the class;*
- *to live up to the expectations set for the class or the group of people outside the school;*
- *to learn something from the teaching, which gives them a greater confidence in their own influence;*
- *to work with questions which concern them existentially and which seem to be of importance to their future;*
- *to meet adults outside the school;*
- *to experience institutions and environments outside the school;*
- *to have the opportunity to do something for the solution of or reaction to environmental problems;*
- *to work on an interdisciplinary basis, where methods, approaches, views, general knowledge and investigations of “reality” are integrated in a useful way for acquiring new knowledge and insight which seem useful and meaningful;*
- *to get the opportunity to elaborate on impressions both intellectually and emotionally;*
- *to meet inspiring people and views.* Ministry of Education of Denmark (1998).

6.1.3 Cross Curricular - Integrated approaches: Integrated Approach.

6.1.3.1 Sweden

The official document of Sweden is a memorandum issued by REGERINGSKANSLIET, Ministry of Education and Science, Stockholm, Sweden.

Current Situation

The Sweden memorandum focuses mainly on Education and Learning for Sustainable development in Sweden, mainly for formal Education below university level. The Central Government supports and promotes the development of teaching of the subject.

Further training for teachers

Programme Objectives and Syllabuses are being revised in order to introduce new objectives in some of the programmes (*e.g. Electrical Engineering programme*).

Attention is also paid to the further training of the teachers in environment and natural sciences. Teachers must receive training in basic skills and continuously update their knowledge. For that purpose, the creation of a one term full time further training programme in natural sciences, technology and environment for teachers, was proposed (Parliament, 1999).

The Green School Award.

The Green School Award is devised as an excellent way for stimulating education for a sustainable society. The ordinance was launched by the government, in September 1998 and it empowers the National Agency for Education to confer the

Award upon pre-schools, state schools, independent schools and national boarding schools. *"To achieve the award, school pupils and staff must work together so that emphasis in teaching and other activities is placed on the creation of an ecologically sustainable society."* (Ministry of Education and Science, 1999:3). The National Agency will require teaching on the environment to integrate theory with practice including both the school environment and the local community. Outdoor activities should be integrated with other activities and there should be a cooperation with environmental organisations. Schools should begin their work on qualifying for the award during the 1998 /99 school year. Participation in the scheme is voluntary but the aim is that all schools should be involved.

Further training at public authorities and elsewhere

Further training responds to the challenge for a changeover to ecological sustainability by combining the process with measures to improve the economy and provide jobs. This demands broad participation by all interested parties within society.

General Introduction

"Education is directed towards Sustainable Development which includes economics, environment and social issues. Education for sustainable development is thus a broader concept than EE which focuses on protection of and care for the environment." (Ministry of Education and Science, 1999:5).

Policy:

Swedish efforts to improve the environment have long focused on the sustainable development perspective. The government has set three objectives for ecological

sustainability: protection of the environment, efficient use of resources and sustainable supply. Education and the creation of know-how for sustainable development must be aimed at people of all ages, from pre-school to middle aged people and pensioners. In this respect, children are of particular importance because they act as “ambassadors of sustainable development” influencing the attitudes of their parents and also because they must adopt a more responsible lifestyle as adults.

Content - Design:

The content / design of the environmental education policy includes survival issues, ethical, philosophical, cultural and scientific aspects, patterns of production and consumption, etc. This aims to equip pupils in order to be able to act for the achievement of sustainable development. It also provides them with incentives for changing their patterns of consumption and help them to draw conclusions so that natural resources may be protected, taking account of the global economy and desire to pressure regional cultural heritage.

Methods:

Education for Sustainable Development makes use of methods that do not always belong to a teacher's normal repertoire, e.g. thematic and problem oriented teaching methods, as well as Information Technology and communication techniques.

Formal Education

Teaching of basic environmental issues begins at day-care centres and pre-schools. Proper theoretical and practical teaching is given at compulsory school level: sustainable development is combined with other subjects (in primary and Secondary), and along with this there is an effort for incorporating an ethical

approach, too. Importance is also given to school grounds and the outdoor environment.

Sustainable Development in National Curricula.

The decision making on the aims of education come from government and Parliament. Municipalities are responsible for ensuring that schools function within this framework. Finally, schools and teachers decide on the teaching methods.

Non formal education - popular education:

In order to enable people to influence their life situation and become committed to participation in the development of society, the government gives state grants for popular education at folk high schools and adult education associations.

Higher Education and Research

Universities and Colleges should promote ecologically sustainable development by means of education and research.

Evaluation:

The document also includes an evaluation of Education for Sustainable Development with the following findings:

- The politicians and civil servants' active engagement in the development of local supportive structures for teaching in schools will achieve broad implementation of sustainable development ideas.
- Education for sustainable development highly depends on the teacher's enthusiasm.
- It is easy to impart to pupils a sense of commitment to environmental issues.

- There is a necessity for a purposeful and broad programme of further training on environmental issues and sustainable development for active teachers.
- One of the most effective ways of reaching adults and persuading them to take active steps to achieve sustainable development is by cultivating a strong commitment to the environmental dimension at school on the part of children and young people.
- Teaching at schools belonging to networks tends to involve the local community more.

6.1.3.2 Scotland

The official document of Scotland for Environmental Education is a part of the “Curriculum and Assessment in Scotland: National Guidelines”. It is a booklet entitled “Environmental Studies (5 - 14) and begins by presenting the Environmental Studies rationale.

Rationale: The scope of Environmental Studies.

The environment as it is reflected in these guidelines, encompasses all the social, physical and cultural conditions which influence or have influenced the lives of the individuals and the community and which shape or have been shaped by the actions, artefacts and institutions of successive generations. At a more immediate level, this definition includes everyday curricular experiences through which the pupil’s knowledge of the environment develops.

The place of Environmental Studies in the Curriculum:

- Environment provides a context for learning
- Pupils should understand their environment

- The environment is important

Aims of Environmental Studies

Provide through studies' programmes:

- knowledge and understanding
- skills
- informed attitudes

Five Components of Environmental Studies:

- Science
- Social Subjects
- Technology
- Health Education
- Information Technology

“There is frequently a confusion about the difference between environmental education and environmental Studies. Environmental education is concerned with the interaction between people and the environment. It seeks to promote concern for the needs of environment and action to conserve and improve it. Environmental Studies plays a major part in EE by giving pupils the knowledge and skills to understand and interpret the environment.” (The Scottish Office Education Department 1993).

Environmental education and the Strand “Developing Informed Attitudes”

“In this document environmental education is treated as an approach which permeates much of the curriculum content of environmental studies. It should be built into a wide variety of topics in science, social subjects and technology...”

environmental education is not confined to the environmental subjects which are considered in these guidelines, but occurs throughout the entire curriculum.” (p.5)

The main aim of environmental education is to provide the basis for people to make informed decisions about their own behaviour. It does this by using knowledge and understanding of the environment to build up positive caring attitudes through focusing on problem solving, decision making and practical action to improve the environment. It is important that schools adopt a whole school approach to environmental education so that there is consistency across the different stages of the school.

6.2 Separate Subject approach

6.2.1 Netherlands

There are two types of Attainment Targets for primary Education:

The cross-curricular attainment targets and the specific subject matter.

For the cross-curricular attainment targets, the aim of education is a broad development of the pupils: their emotional and cognitive development, the development of their creativity and the acquisition of social, cultural and physical skills (Netherlands Eurydice Unit, 1999).

The cross-curricular attainment targets are grouped around the following themes:

1. Attitude to work;
2. working according to a plan;

3. use a diversity of learning strategies;
4. self image;
5. social behaviour;
6. new media;

The Specific Subject matter is divided in the following areas:

1. Languages: Dutch language and Frisian language
2. English language
3. Arithmetic - Mathematics
4. Orientation on man and the world: Geography, History, Society, Technology, Environment, Nature study
5. Physical Education
6. Art Orientation: art, music, drama and the promotion of the use of language.

Environment and Nature Study are part of the broad subject area: Orientation on the Man and the World and belong to the specific subject matter area.

“The Environment, Characterisation of the field”

With environmental education an attempt is being made to encourage children to take care of their environment. They will develop these feelings in immediate contact with others and nature. In addition, children should be aware of the principle of justice: share and share alike. Children learn to distinguish between various perspectives and interests. They like to take up a particular viewpoint based on standards and values. This will enable them to make conscious choices with respect to nature and environment issues with which they are faced. (p,18)

Attainment Targets

The students should be able to:

- explain the interaction between man and the environment and give examples;
- deal with nature in a caring manner and are able to make choices in which the environment plays a vital part;
- develop ecologically sound behaviour;
- deal carefully with food, paper, water, waste matter, energy;
- give examples of how people deal with the above

“Nature Study”, Characterisation of the field.

The aim of nature education is the confrontation with the animate and inanimate world. Pupils acquire experiences with organisms, materials, objects and phenomena. Nature education is organised in such a way that the children are given the scope to explore nature. By investigation they try to find answers to the questions they formulated. Starting with the involvement with things around them, their understanding of relationships in the real world will increase.

Content is determined by reliability and by the relationships people have discovered in it. Nature Education provides a basis for an explanatory attitude and an awareness of care and responsibility for fellow human beings and nature.

In Activities for Nature Studies, outdoor work plays an important role. In nature study an attempt is being made to find a balance between the structure of the programme and things for which children have a spontaneous interest.

Attainment Targets

Domain human beings, plants and animals

(A.T. 30) Place plants and animals in a systematic classification according to their age. Identify common plants and animals from their region. Look after plants and animals.

(A.T.31) Give examples and characteristics of organisms adapted to their environment.

(A.T. 32) Mention several ways in which organisms reproduce. Describe the structure of plants and their functions. The role of organisms in food chains, Domain materials and phenomena.

(A.T. 33) Investigate phenomena (light, sound, force, heat)

Investigate the characteristics of various resources of energy and indicate the sources used for heating, lighting and movement.

(A.T. 34) Describing the weather (using aspects of precipitation, atmospheric pressure. Wind direction, cloudiness, temperature and be able to read a weather report (for their age).

(A.T. 35) The pupils should know that the earth is part of our solar system and orbits the sun together with other planets. Using this information, pupils should be able to explain some natural phenomena, including at least the rhythm of day and night and the change of seasons.

6.2.2. Finland

The official document of Finland is titled “Framework Curriculum for the Comprehensive school” prepared by the National Board of Education (1994). Here, environmental education is included as a separate topic in the curriculum.

It is stated that for school and curriculum planning it is important to crystallise a set of values concerning man’s relationship with himself, with other people, work, society, religion, culture and nature as well as keep in mind the youth’s picture of the world in its entirety.

Curriculum and school planning will promote Sustainable development by striving ^{and} towards aiming for it. “...*The aim is to produce all around well being in a more equal manner for the entire globe*”.

The role of environmental education in Finland’s Curriculum is precisely to further Sustainable development along with protecting biodiversity:

“Environmental education should help students:

- *sensitively experience nature and cultural environment*
- *understand human dependency on natural resources*
- *act responsibly and in a just way*
- *discuss conflict matters*

School Practice and class studies

- *promote student’s ecological life styles and*
- *positive image of the future”* (National Board of Education, 1994).

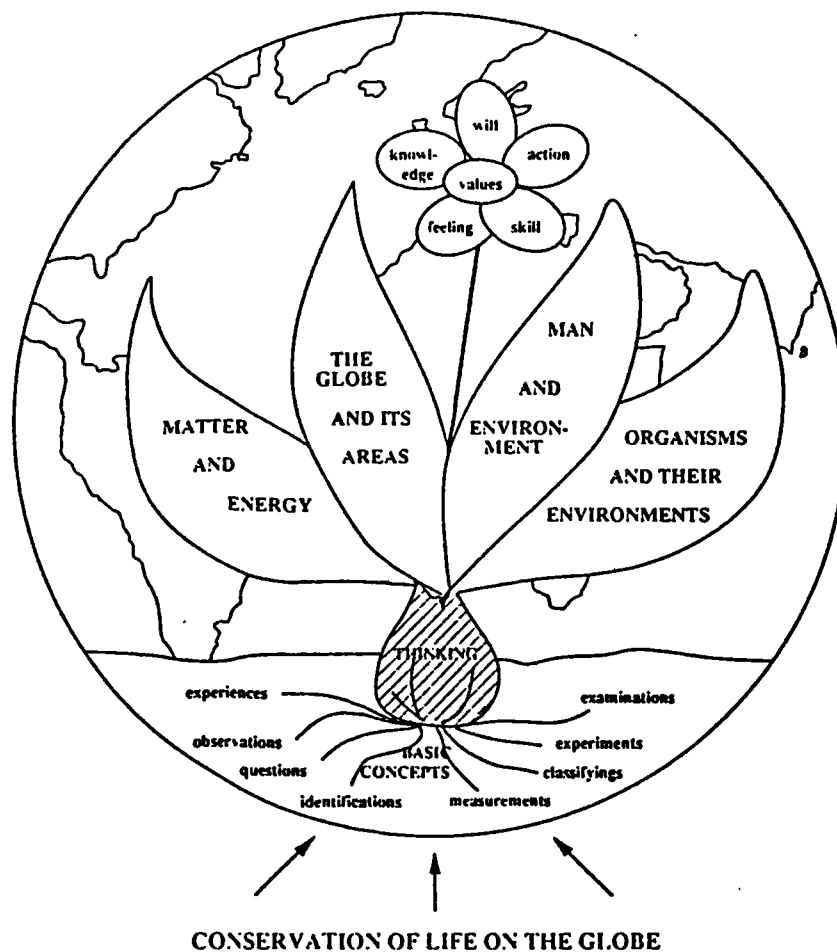
Environmental and Natural Studies:

(Biology, Geography, Environmental Studies, Civic Studies)

Environmental and Natural Studies observes nature and man and their interaction. Its purpose is to familiarise the students through their natural curiosity with simple scientific research methods (experiments, observation, simple measuring - tests, questions, conclusions, describing results) and develop natural scientific thinking.

Another aim is to help students learn about themselves as a part of their immediate community, people - humankind, parts of the globe, nature, culture and thus acquire a cultural identity.

Fig. 6.1. The different areas of Environmental and Natural Studies
(National Board of Education, 1994).



6.3. An overall view.

The following table (p.191) summarises the data obtained through the documents provided by Euridice and some other resources on each of the countries examined.

The document steering instruments form 16 categories of information provided in the documents, concern the issues covered by the national policy of environmental education.

Review of the current situation refers to the assessment of the country's previous and current situation on environmental education, on which the policy is based. It is important to clarify the foundations on which to construct a policy and the acknowledgement of the current situation makes a good start for effective policy making.

Environmental education support (theory and content) refers to background information on educational approaches and philosophy of environmental education for the teacher's use as well as its context.

Statutes and regulations (goals – objectives) include all goals and objectives of the environmental education policy concerning the attitudes that are required to be developed, information to be supplied, ethical issues etc.

National Curricula refers to the way environmental education is implemented through the curriculum and prerequisites the existence of distinct guidelines on the issue, within the national curriculum.

Table 6. 4. Policy documents of the European Countries studied.

Document steering instruments	Norway	Denmark	Spain	Sweden	Scotland	Netherlands	Finland
Review of current situation.	✓	✓	✓	✓	*	*	*
Environmental education support (theory)	*	*	✓	✓	✓	*	*
Environmental education support (content)	*	*	✓	✓	✓	✓	*
Statutes and regulations (goals – objectives)	✓	✓	✓	✓	✓	✓	*
National Curricula	✓	✓	✓	✓	✓	✓	✓
Evaluation and Reporting	✓	✓	*	✓	*	*	*
School management – Whole school approach	✓	*	✓	Vague	✓	*	✓
Research	✓	✓	*	✓	*	*	*
Pre-service	✓	Vague	*	✓	*	*	*
In-service	✓	Vague	*	✓	*	*	*
Budget allocations	✓	*	✓	✓	*	*	*
Agenda 21 Consideration – Sustainable Development	✓	*	✓	✓	*	*	✓
NGOs, Private Sector	✓	✓	✓	✓	*	*	✓
Local Community involvement	✓	✓	✓	✓	*	*	✓
Incentives	*	*	Vague	✓	*	*	*
Status	Compulsory	Compulsory	Compulsory	Optional	Compulsory	Compulsory	Compulsory

*. Not mentioned in the specific document.

Evaluation and Reporting concerns any systems or methods employed for the evaluation of the implementation and reporting mechanisms. Evaluation in environmental education is a marginalized issue (see chapter 4) and this is also obvious in the table. The only case where evaluation and reward take place is the case of Sweden, fact that constitutes a **motive** for participation since the Green School Award is not an imposed programme. It would be interesting to investigate the percentage of school response to the programme in order to understand whether the award is a sufficient motive and if this method of implementation is more effective than the compulsory implementation.

School management – Whole school approach states the necessity for whole school involvement and the integration of the environmental facet in every dimension of school activities.

Research helps to support the creation of a policy since it can extract useful information from all involved parties.

Pre-service and in-service categories, refer to the initial training of the teachers and continuous training provided to them. The successful implementation of any educational policy requires informed and trained teachers.

Budget allocations are concerned with financial provisions for the development of support and provision of any resources required for the implementation of the policy.

Agenda 21 Consideration – Sustainable Development indicates a consideration of Agenda 21 instructions and Sustainable Development principles, in the development of the policy.

NGOs, and the **Private Sector** have a crucial role to play in the implementation of any Environmental Education Policy, as allies that provide financial or expert support.

Local Community involvement gives the opportunity to the school – society opening by establishing a reciprocal way of message communication.

Status of environmental education concerns its compulsory or optional implementation in the country's schooling.

CHAPTER SEVEN: METHODOLOGY

7.1 Introduction

This chapter presents the methodology employed, the decisions taken concerning the research instruments and their justification. Strategies for the selection of the participants are also presented.

The research methodology addresses all those involved in the Eco-School programme in addition to those involved in decision and policy making. Their contribution to the investigation is crucial to gain a holistic view of the situation for environmental education in Cyprus and the Eco-School programme.

The relevant educational authorities and decision makers consist of the Ministry of Education, the University of Cyprus and the National Operator for the Eco-School Programme. The Ministry of Education and Culture has the information required about the National Policy on environmental education (Ministry of Agriculture, Environment and Natural Resources, 1996) and the Curriculum settings: aims, targets, context, approaches (Programme Development Department, 1996, 1994). The University representatives provide information about their participation in the Eco-School programme, as well as information about the initial teacher training on environmental education issues. The National Operator explains the structure of the programme, the regulation of its application and their role as an NGO in the implementation of environmental education in the school. Views on practical implementation of environmental education are obtained by schools: by both questionnaire and interviews with school management, teachers and students themselves.

The specific aims of the research study and the research questions were presented in the first chapter. Nevertheless a brief reference to the research objectives was considered to be useful for an understanding of the rationale behind the methodology.

The purpose of the research study is to present, as an end product, information that would be useful for the formation of a national programme for the implementation of environmental education in primary education.

With this in mind, it begins by describing the current situation of environmental education and examining the current practices. Out of a limited variety of environmental education programmes that currently run in Cyprus primary education, the Eco-School project was investigated for two main reasons: according to the Pedagogical Institute's evaluation (Kadji – Beltran, 1998) it is successful. Secondly, the Eco-School programme has been expanding steadily, becoming the most popular programme applied.

The general aims of the research study are:

1. to describe the current situation of environmental education in Cyprus;
2. to obtain interested parties' opinions about the development of a National Programme for the implementation of environmental education in Cyprus Primary Education;
3. to verify and evaluate the impact the of the Eco-School project;
4. to distinguish the factors that contribute to the successful implementation of an environmental education programme.

7.2.1 Type of Research followed.

Educational research methods can be descriptive and qualitative in order to facilitate an interpretation of the issue under study. For Best (1970), descriptive research is concerned with

“conditions or relationships that exist; practices that prevail; beliefs, points of views or attitudes that are held; processes that are going on, effects that are being felt; or trends that are developing. At times descriptive research is concerned with how what is or what exists is related to some preceding event that has influenced or affected a present condition or event”.

Since an objective of this study is to find out *what is and what exists that affects* the particular case of the Eco-Schools and environmental education in Cyprus, the research method chosen is a descriptive one. The path to finding out the *what is and what exists that affects* would have to go through an evaluation process in order to determine the *“impact of social interventions such as new teaching methods innovations in parole, and a wide variety of such programmes”* (Babbie 1992:346). This clarifies that this research is **Evaluation Research** or **Programme Evaluation**. In Evaluation Research a variety of methods are appropriate (Babbie, 1992:346).

The method primarily employed by the project is a **survey**. Cohen and Manion (1994) define survey as an instrument to:

“gather data at a particular point in time with the intention of describing the nature of existing conditions or identifying standards against which existing conditions can be compared or determining the relationships that exist between specific events”.

This definition implies that the survey is the most suitable research method for the achievement of the project's central aim. *A description of the nature of the existing conditions, the identification of standard, and the relation between specific events* (Cohen and Manion, 1994) can be invaluable information for policy making. Research tools such as semi-structured interviews, self administered questionnaires with a performance test on cognition, awareness and attitude scales, postal questionnaires, are all used as part of the survey. Each tool collects some information leading to a general image of the issue under investigation. Evaluation information can take many shapes and can be presented in several ways. As Alkin *et al.* (1991:271) mention:

"it might include quantitative test results, accounts of interviews,.. Perhaps the most important points to make are that (a) quantitative outcome data are not the only important information produced by evaluation ... The evaluators' qualitative observations about programme processes communicated in a conversation with the programme director at midyear just might turn out to be the most important and influential information transmitted during the evaluation".

Therefore the search for more detailed answers to some of the specific research questions required the employment of another descriptive research method: the **case study**.

Three case studies were chosen for these purposes: a thorough examination of three diverse Eco-Schools was undertaken. The schools varied in the evidence of environmental achievement (in the environmental cognition and action test). The three case studies gathered the information required to justify the difference in their performance and discover the elements that promote better achievement.

Stenhouse (1988) distinguishes four styles of case studies: the ethnographic, the evaluative, the educational and the case study in action research. The three case studies conducted in this research served both evaluative and educational purposes. Evaluative cases study is defined as, *“a single case or a collection of cases is studied in depth with the purpose of providing educational actors or decision makers with information that will help them to judge the merit and worth of policies, programmes, or institutions”* (Stenhouse, 1988:50). The educational case study, on the other hand, is concerned with the understanding of the educational action (Stenhouse, 1988:50).

The distinguishing features of a case study are principally the objects that are to be explored (in this case the school unit), rather than the methodological orientation used in studying it (Stake, 1994: 236). Therefore, according to Hitchcock and Hughes (1995:316), the case is paramount and eventually determines the research design and the writing form. The major characteristic of a case study is that it focuses on a particular incident (in this case, the environmental achievement). It evolves around the in-depth study of a single event or a series of linked cases over a period of time. This is precisely why the case study was employed to collect data in this research. In particular it addresses questions such as: *Research Question 2.3: Which environmental education teaching approach would the interested parties recommend for environmental education implementation?*

These case studies have some of the characteristics highlighted by Hitchcock and Hughes (1995:317), notably:

- A concern of the rich and vivid description of events within the case (s);

- an internal debate between the description of events and the analysis of events;
- a focus upon particular individual actors and their perceptions;
- a focus upon particular events in each case;
- the involvement of the researcher and a way of presenting the case which is able to capture the richness of the situation. (p.317)

For several investigators the case study is a feature of qualitative research (Hitchcock and Hughes, 1995) as well as a combination of both qualitative and quantitative (Cohen and Manion, 1994). The three case studies in this project used the qualitative approaches of document analysis and interviews.

Triangulation of the data collected and the number of methods used has also been employed. As Denzin (1988) mentions, multiple triangulation which consists of data triangulation and methods triangulation, together with theory triangulation and investigator triangulation, results in more valid and reliable results. Burgess (1983) refers to the multiple triangulation as 'multiple research strategies' to describe the use of diverse methods in tackling a research problem. This research study employs Denzin's (1988:511) definition of triangulation, which is *"the application and combination of several research methodologies in the study of the same phenomenon"*. Throughout the research project the researcher is the sole investigator and answers the research questions based on the above to minimise other variables.

7.2.2 The combination of quantitative and qualitative research methods.

The triangulation methods explain more fully "*the richness and complexity of human behaviour*" by studying it from more than one standpoint and by doing so it makes use of both quantitative and qualitative data. The combination of quantitative and qualitative data - gathering approaches is the most appropriate for ensuring quality in research. Literature Review reveals a long lasting argument between quantitative and qualitative approaches (Miles and Huberman, 1994, Borg and Gall, 1989, Cambell, 1985).

Hammersley (1992) is more positive with respect to this combination and supports that the researcher's decision should depend on the nature of what is described, and on the resources available; "*not on the ideological commitment to one methodological paradigm or another*". Similarly, Miles and Huberman (1994: 40) argue that "*we have to face the fact that numbers and words are both needed if we are to understand the world*". Therefore, the issue is to make appropriate decisions as to which, when and how to combine qualitative and quantitative methods and data.

The combination of quantitative and qualitative methods and subsequent data has the advantage that one can support and verify the other, augmenting the validity and generalisability of the results. Through triangulation one can complete the other by providing additional information and further detail. The results of one method can influence the design of another since it may reveal unconsidered issues which require further investigation but with a different approach (Rossman and Wilson, 1984, Oppenheim 1992). On a similar theme, Firestone (1987) suggests that

quantitative studies persuade the reader through de-emphasising individual judgement and stressing the use of established procedures, leading to more precise and generalisable results.

Brannen (1992: 4) refers to the combination of quantitative and qualitative techniques and suggests that:

"...where the research issue is clearly defined and the questions put to respondents require unambiguous answers, a quantitative method such as a questionnaire may be appropriate. By contrast, where the research issue is less clear-cut and the questions to respondents are likely to result in complex, disruptive replies, qualitative techniques such as in depth interviewing may be called for".

This research study was applied in two stages, combining two different research designs (survey and case study) and engaged both quantitative and qualitative research tools. Although it is not possible to draw a well defined border line between the tools and the approaches, the survey employed mainly quantitative and the case studies employed qualitative research tools. Table 7.1. presents the methodology that was followed for each stage.

Table 7.1. The Methodological Plan of the Research Study

METHOD	RESEARCH INSTRUMENT	TARGET GROUP
Pilot survey	Questionnaire 1 (Cognitive, environmental action and attitudinal questions) Questionnaire 2 (Informative and exploratory questions – combination of closed and open questions)	Students (40 from pilot Eco-School) Teachers (10 from pilot Eco-School)
Research Method 1 Survey	Questionnaire 1 (Students Cognition and action test and programme attitude) Questionnaire 2 (Informative and exploratory questions – combination of closed and open questions) In depth interviews (semistructured informative and exploratory questions)	All 5th year students, from 7 randomly selected (stratification) Eco-Schools and 7 schools outside the programme (intentional selection) (Ntot=673) All teachers in the 14 schools (N=78) 3 INSET trainers (In Service Training, Pedagogical Institute) 2 Initial teacher Trainers (University of Cyprus) 2 Teachers having certain experience of the programme. 1 Ministry of education (science inspector) 1 National Operator (9 survey interviews)
Research Method 2 Case Study	In depth interviews (semistructured informative and exploratory questions) Document analysis	Teacher Co-ordinators and school directors from the 3 experimental schools taken as case studies. (6 case studies interviews) Study of the 3 ecoschools' evaluation reports and action plans. (three reports)

A diagrammatic representation of the research application illustrates the sequence and the time of application.

Fig. 7.1. Time order and application time of the research stages

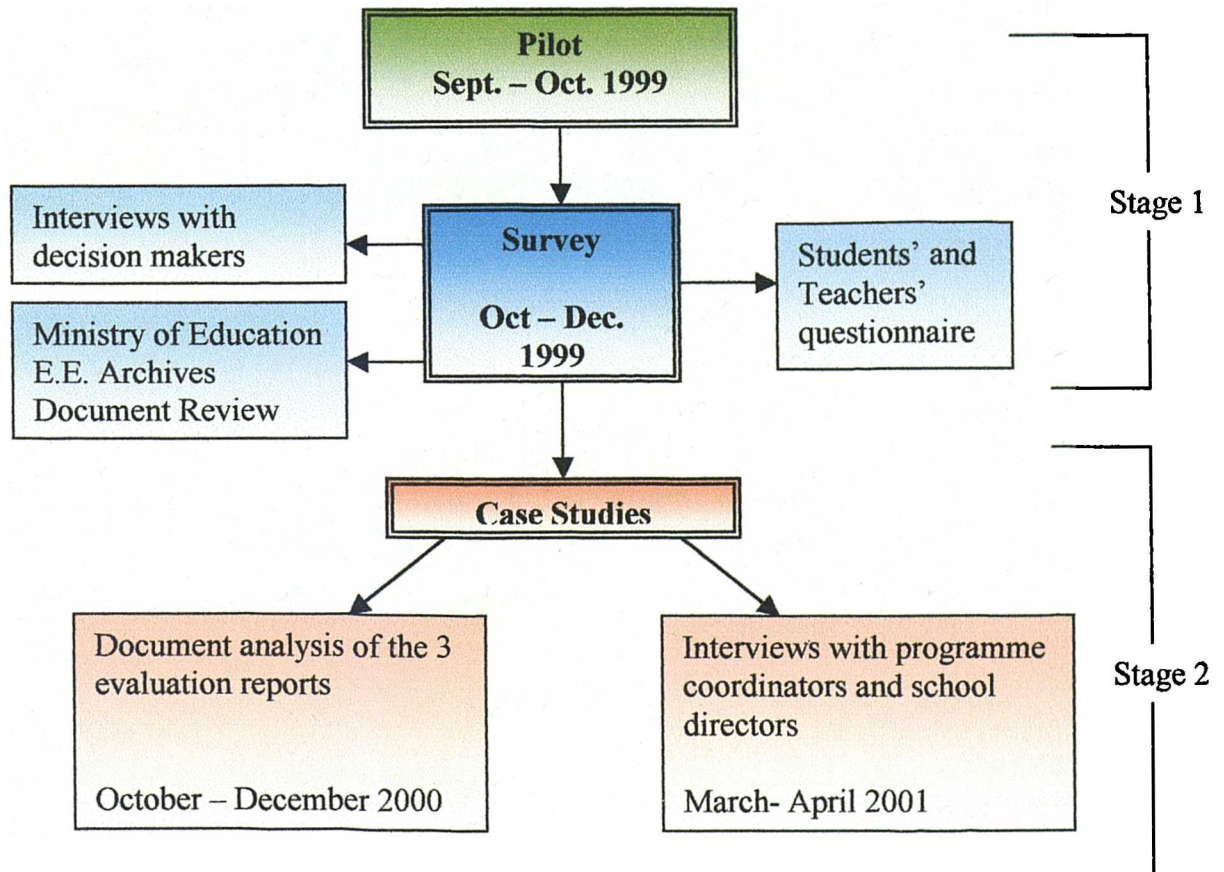


Table 7.2. presents the two main research methods used and the tools employed on both occasions. The numbers indicate the research questions and the repetition of one number in more than one tool represents a triangulation of the data. A more comprehensive table combining all research tools and all research questions, clearly illustrating the triangulation plan is presented in the appendices (Appendix I).

Table 7.2. Research tools employed and their relationship to research questions.

Research Method	Research Tool	Research Question
SURVEY	Student Questionnaire	3.1, 3.2, 3.3, 4.2, 3.4.
	Teacher Questionnaire	1.2, 2.3, 3.4, 3.5, 4.1, 4.3, 4.6, 4.7, 4.8
	Interviews	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 4.5, 4.1
CASE STUDIES	Document Analysis	4.2, 4.3, 4.4
	Interviews	2.1, 2.2, 2.3, 2.5, 3.2, 3.3, 3.4, 4.1, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8

Research question 1.2 is investigated by the teacher's questionnaire and survey interviews. It is further considered through document review and the Primary Education Curriculum and presented in chapter 5 of literature review.

7.3. Description of the study.

7.3.1 The sequence of the survey events.

School Selection - Sampling

The schools that participated in the survey were selected using a combined random stratified selection and intentional selection. The technique of stratification generally provides increased precision in sample estimates (Ross, 1988:530). It uses probability sampling and at the same time it requires that the population is divided into subpopulations / strata. The random sampling is conducted independently within

each of the strata. At the time of the research planning and application, the number of Eco-Schools in Cyprus was 24. One school was used for the pilot study. Subsequently it was removed from the Eco-Schools population. The 23 remaining schools were divided into different categories: large schools (more than 6 classes) or small schools (less than 6 classes), which could be urban schools or rural schools (Large Urban, Small Urban which do not exist, Large Rural and Small Rural). The names of the schools were put under the three possible categories and the sample was chosen according to the category's population number. Seven was a convenient number for the sample since it was representative of the Eco-School population. The random stratified sampling was operated using SPSS (Statistics Package for Social Studies) and secured the representation of all categories in the sample and gave them the weight which corresponded to them.

Table 7.3. The schools' sample

School Category	Large Urban		Large Rural		Small Rural	
	Eco	Non	Eco	Non	Eco	Non
Number of schools in the sample	4 + 4		2 + 2		1 + 1	
TOTAL	8		4		2	

Since the schools would be compared, the selection of the schools outside the programme had to ensure that apart from the programme itself, the matching schools shared as many characteristics as possible. The selection of these matching schools was intentional, with the assistance and advice of teachers and school inspectors from the area. The matching schools had very similar sizes (number of students and

number of teachers). As far as logistically possible, matching schools were neighbouring schools, which received children from the same area, therefore their families are more likely to have similar socio-economic and educational background.

School Entry Permission.

In order to carry out research in the survey schools, permission had to be asked and granted from the Ministry of Education. A letter seeking approval was directed to the general director of Primary Education in Cyprus (Appendix II).

Application

The order of application and use of each research tool was very important in this project, since the results obtained from one tool would inform and guide the creation and refinement of the next, either for completion or verification of the information collected. This chapter describes and justifies the sequence followed. The selection of each tool, its creation, description and purpose in the project will be explained in detail further ahead.

The research project started with the survey. The first tool used in the survey was a questionnaire for the students (Appendix III) and a questionnaire for the school staff (management and teachers)¹ (Appendix VI). The main objectives of the students' questionnaire, were:

- to construct an environmental education score for the school;
- to combine a cognition test and environmental action measurements;

¹ In Cyprus, school management (school manager and sub-directors) is also part of the teaching staff. It simply has limited teaching periods in order to respond to the management duties.

- to compare schools enrolled in the programme and schools outside the programme.

The comparison would reveal any impact the Eco-School programme had, since the selection of the schools minimised the impact of other variables on the results. The students' questionnaire was self-administered to the students by the researcher; the students had to answer it on the spot and submit it within an allocated time. In this way the questionnaire had an almost 100% response, except for a negligible number of students who were absent.

The teachers' questionnaire gathered information to help interpret and verify the students' questionnaire results, by giving indications of the level of environmental education incorporation in the lessons and in school life as well as teachers' commitment and willingness to contribute to environmental education. Sufficient copies and envelopes were given to the school management by the researcher during the visit to the school and the school director was responsible for the distribution collection and mailing of the questionnaires back to the researcher.

The survey was used to construct a ranking of the Eco-Schools. This was based on the students' performance in the test. The data was then examined to determine what constitutes best practice.

Three case study schools were selected: i.e. the school that achieved the lowest score, a school with an average score and the school with the highest score. The evaluation reports of the schools, sent to the National Operator, were scrutinised. These reports provide a detailed description of the programme's activities and organisation and the scrutiny was analysed by means of document analysis (Appendix VIII). Interviews

with the school management, the programme co-ordinators, other teachers and the National Operator of the programme gave further information.

Representatives from the Ministry of Education, University and teacher trainers were also interviewed, but this information was quite independent and did not require any sequence restrictions. These interviews responded to the survey targets so they became a qualitative insert in the survey methodology plan.

7.3.2 The pilot study

Planning and applying a pilot study of the research tools ensures that they will be more effective when used during the actual research. For example it is possible to estimate the time required for the completion of the final questionnaire, it tests the size of the questionnaire and enables the investigator to decide whether to shorten it or not, it tests the clarity of the questions and checks their sequence (Wolf, 1988:480). A pilot study was carried out for both the teachers' and the students' questionnaires as well as the interview's common agenda.

The school used for the pilot study questionnaires was selected with the assistance of the National Operator. The main objective of the pilot was to test all the parameters mentioned above. The criteria for the selection of the pilot school were:

1. average sized school (6 classes of 30 students: 180 students);
2. sub-Urban so as to cover as many common urban/rural schools' characteristics as possible;
3. average Performance;
4. Eco-School (so as to be able to test the entire questionnaire both for the students and for the teachers).

The Eco-School proposed by the National Operator for the pilot was a sub-urban school, in a large village community quite near the capital city. According to the school director, the students' performance was slightly below average standards. Thus the way these students answered the pilot questionnaire would determine its final form.

The questionnaire distributed to the schools outside the programme and the one used in Eco-Schools are exactly the same, except for a last additional part which is only directed to the Eco-Schools and invites students to assess the programme. Since the pilot school was an Eco-School, it could examine the entire questionnaire. Therefore, it wasn't necessary to test the questionnaire with a school outside the programme.

A trial interview was conducted in order to check the structure and organisation of the interviews and determine if they met with the requirements of the research project. It also gave the researcher the opportunity to practice the social interactive skills necessary for the kind of interview chosen. (Powney and Watts, 1987:127). Precisely for the latter, the interviewee chosen was a colleague who was familiar with the Eco-School programme and interviewing techniques.

7.4 The Research tools used in the Survey.

7.4.1 The Questionnaire.

Rationale of the method

The questionnaire as a means of gathering data is one of the most commonly used methods of inquiry in educational research. This is because it is easy to administer, quick to prompt and inexpensive. It can obtain responses of both factual and

attitudinal information which can be easily tabulated and handled (McKernan, 1998). Normally the information is quantifiable and obtained from a large sample. Nevertheless this does not ensure that every one will respond (especially on a mail questionnaire) or will respond honestly. Moreover, the analysis could be time consuming (McKernan, 1998).

The disadvantages of a questionnaire are few if the questionnaire is well structured and the questions carefully expressed. More responses can be obtained if the questionnaire looks easy and manageable. A compressed layout is discouraging whereas a larger questionnaire, which leaves sufficient spaces for questions and answers, can be more attractive (Cohen and Manion, 1994: 96, Babbie, 1992:152).

Therefore the investigator should limit the questions or items in a questionnaire to variables of primary interest. Each question should be explicitly or implicitly connected to a research question or hypothesis (Wolf, 1988:479).

Appearance

Both the questionnaires used in this study follow the guidelines of appearance (Cohen & Manion, 1994) on size and density. The students' questionnaire is spread and limited to 6 pages for the Eco-Schools and 4 for the schools outside the programme. This was especially important since children would have limited experience of answering a questionnaire. The teachers' questionnaire is more condensed but the pilot indicated it was clear and easy to answer.

Design and layout.

According to Wolf (1988), a well-designed questionnaire is highly deceptive. It contains clearly stated, well-drawn questions, exhaustive response options and there is a natural flow to the questions that encourages the respondent to complete the questionnaire.

Tick boxes in questionnaires are familiar to most respondents, even to children since they quite frequently come across exercises and tests which follow that format. Most of the closed questions in both the questionnaires used either boxes or tables where a number of questions were combined. These kinds of questions are described by Babbie (1992) as matrix questions and are considered to have a number of advantages: they use space efficiently; they are more easily and quickly completed by the respondents; more easily coded and increase the comparability of responses given to different questions.

Question Order and Questionnaire Body

The questionnaire was accompanied by a cover letter which indicated the name and affinity of the researcher, the research purpose and its importance. This helped to ensure confidentiality and emphasised the importance of the respondents' role in the research. Since all questionnaires were personally administered (students) and delivered (teachers) by the researcher, all these factors were stressed orally as well. The respondents were informed that the results would be given to them if they wished.

Completing a questionnaire can be seen as a learning process in which the respondents become more familiar with the task as they proceed (Cohen and Manion, 1994:97). Therefore, particularly for the students' questionnaire, special care was

taken so that initial questions were simple (personal profile description) and contained a familiar answering form, the middle section contained the more difficult questions and the last part, questions about their personal or family habits. In the case of the Eco-School pupils', the last part of the questionnaire was formed by personal opinion and experience of the programme questions, which were very likely to maintain their attention to the end.

The students' questionnaire was clearly divided into 4 parts:

A: the descriptive (name², class, school, gender, mother's profession and father's profession);

B: the cognition test;

C: the environmental action questions;

D: Eco-School experience and evaluation.

The last part was only administered to Eco-School children.

The teacher questionnaire also had a cover letter attached in order to explain the purpose of the survey to help encourage teachers to answer it. The questionnaire started with simple descriptive questions about gender, education, working experience, position in the school, education and classes taught. The second part specifically asked about lessons and activities used by the teacher. The last questions required personal judgement and opinion. The final part of the teacher questionnaire, part 3, was directed exclusively to the Eco-School teachers and included questions through which the teachers evaluated the programme and described their opinions of it.

² Anonymity issues will be discussed further ahead in the chapter about students' questionnaire .

Apart from the difficulty level, another factor which was considered when ordering the questions in the questionnaires, was the relation between the questions and how one could influence the answer of another (Babbie, 1992:156). The questions in the questionnaires were ordered in an attempt to have the least impact on answering later ones.

Content of the questionnaire: The variables examined.

In the preparation of the questionnaire considerable emphasis was given to ensuring that each question or item would directly or indirectly serve a particular research question.

Student questionnaire

Fig. 7.2 Research questions and questionnaire questions on student questionnaire

RESEARCH QUESTION	Questionnaire Reference
RQ 3.1 Is there a difference in environmental cognition and action between the Eco-School students and students of programme non-participating schools?	All part B and C
RQ 3.2 Can the programme influence the environmental awareness of the student's family?	C4.1 – 4.6, D3
RQ 3.3 What are the student's attitudes about the Eco-School programme?	D2, D5, D6.
RQ 3.4 Have students been benefited by the programme? How?	D5
RQ 4.2 What motivates the students?	D7

Teachers' questionnaire

Fig. 7.3 Research questions questionnaire questions on teachers' questionnaire.

RESEARCH QUESTION	Questionnaire Reference
RQ1.2 How is environmental education currently practised through the curriculum?	B1
RQ2.3 Which environmental education teaching approach would the interested parties recommend for environmental education implementation?	B5
RQ3.1 Is there a difference in environmental cognition and action between the Eco-School students and students of programme non-participating schools?	B3
RQ3.4 Have students been benefited by the programme? How?	C2
RQ3.5 Have the teachers been benefited by the programme? How?	C6, C7
RQ4.1 Which factors motivate the teachers?	B4, B6, C6.
RQ4.3 Which successful practices have the teachers employed during the programme?	B2
RQ4.6 Which problems arose during the implementation of the programme?	C5
RQ4.7 Which factors can support the teacher's task?	B6, C3
RQ4.8 Which are the teachers' attitudes towards the programme?	C4

The types of questions used and their coding.

In both students and teachers questionnaires, Likert-type scale statements were employed to determine opinions and attitudes (Likert, 1932). According to Anderson (1988:427) "*Likert scales consist of a series of statements related to a person's attitude towards a single object*". This enabled the respondents to express their opinions, ideas and feelings on a scale related to the issues concerned, in a natural way (Cohen and Manion, 1994). Moreover, the use of the above scale enhanced both the validity and reliability of the questionnaire since a statistical check became possible.

Most of the questions were closed, so as to help the respondents answer easily and quickly. Closed question data are easier to codify and analyse. Each question had either a simple numerical answer or a set of alternatives to choose from, e.g.

Fig. 7.4 Student questionnaire: Question C1: An example of a closed question.

1. How do you get to school in the morning? Put ✓ next to the ONE, most common method you travel.

<i>On foot</i>	
<i>by my parents car</i>	
<i>By car, with neighbours</i>	
<i>by bus</i>	
<i>on my bike</i>	

In the second (test) part of the students questionnaire, there were some open ended test questions, the responses to which would become quantifiable converting the correct answer into a number (score), which had an numerical (score) value.

Some open-ended questions were used in order to give respondents the opportunity to freely state their opinion and feelings. The questionnaires (pilot and final) that were administered to the students and teachers are presented in Appendices III , IV , and V.

A. Student Questionnaire

The students -participants.

The questionnaire was administered to children of the 5th year of primary schools. The children of that age (10 year olds) are expected to be capable of filling in a questionnaire and taking a test because they should have long developed reading and writing skills. As far as the programme is concerned, the children from Eco-Schools will have participated in the programme for more than a year at least, with the

likelihood of being influenced by it. The questionnaire was administered during the 1st semester of the school year (1999 – 2000) so that their age could be considered to be representative or close enough to the age range of the school.

The students' questionnaire was self administered by the researcher and thus ensured a response of nearly 100% of the students' sample. The total number of answered questionnaires was 675.

The students' questionnaire content

The questionnaire was divided into 4 parts. All students had to answer parts 1,2,3 and part 4 was directed only to the Eco-School students. Part 1 asked for personal information. Personal characteristics were gathered in order to create the students' profile and give the opportunity, during the results analysis, to compare independent variables, such as gender, socioeconomic status of the family, students general achievement, with dependent variables, e.g. student's environmental cognition and action. Maintaining anonymity is an ethical issue, but the pilot study showed that identifying the students was necessary for practical reasons; having the name of the student, the researcher could find the students' achievement grade from school documents and check the parents' profession. Once all questionnaires were completed and submitted, the achievement grade of the student was added, with the permission of the teacher and the school director.

The parent's profession was also checked from the child's registration file in the school. Many children could not state their parents' profession themselves therefore this process was indispensable. In order to compensate for

the lack of anonymity, the children were assured about confidentiality and that the results of the questionnaire would only be seen and processed only by the researcher; not even their teacher was allowed to see how they answered the questions. They were also assured that this questionnaire – test would by no means affect their school grades. The researcher simply asked the children to help to find out what children of their age knew about the environment. The results, once ready, could be announced to them if they wished.

The school name was required so as to allow comparisons between the schools. The class – group was also requested, for keeping collected questionnaires in order and also seeing if there were any substantial differences among classes in the same school. Such an event could show the importance of the teacher. Gender was also recorded to see if this independent variable has any impact on children's environmental cognition, attitudes and action.

The parents' profession would verify the existence of homogeneity in educational and socioeconomic background indicating the compatibility of the two groups (Eco-Schools and schools outside the programme). This information was coded according to a scale from 0 – 6. It progressively represented the socioeconomic and educational status of the parent's profession, the level of professional responsibility as well as the increase in the family's income. The scale, was developed by a research group in the Department of Education of the University of Cyprus and was initially used in the research paper by Georgiou S.N., (1999). Using a very large sample, it combined three individual scales; one for educational, one for economic and one for social status respectively, in order to result to one single scale, sensitive to all three factors. Georgiou (1999) used this scale to examine parental attributions as predictors of

involvement and influences on child achievement. The scale was suitable for the current investigation too, since its coding system, reflected the economic, educational and social status of each profession too, providing a complete educational-socio-economic profile of the student's parents. The scale used as follows:

- 0: unemployed, housekeepers
- 1: non-specialist workers / employees (e.g. a factory worker)
- 2: specialist workers with limited responsibility (e.g. a plumber employee)
- 3: technical professions and specialist professions with certain level of responsibility (e.g. a self employed plumber)
- 4: university graduates at jobs with limited responsibility (e.g. government employees or a bank cashier)
- 5: university graduates self employed (e.g. an engineer)
- 6: university graduates with high prestige professions or management positions (e.g. a university professor, or the manager of a big company)

Parts 2 and 3 of the questionnaire were 'a test'. Part 2 examined "environmental cognition" and most of the questions presented there were related to the science curriculum, so all children should be informed about them (Cyprus flora and fauna, solid waste management...), thus making the comparison fair. The questions outside the curriculum had to do with serious environmental problems about which everybody should be informed: global warming, ozone depletion, environmentally friendly energy sources, recycling etc. (Lahiri *et al.*,1993, Aldrich-Moodie & Kwong, 1997). The term bioaccumulation, presented in the pilot, was eventually removed,

because it was apparent that none of the children were familiar with the term. The total score a student could obtain in this part of the questionnaire was 24.

The types of questions used in the second part of the questionnaire were mainly matching questions, and completion questions. The matching questions could have the form of two columns where terms from one column would be matched with statements from the other. It was apparent that close-ended questions help the respondents to answer easily apart from enabling a straightforward statistical analysis of the data.

The completion questions required information or justification of an issue. Initially the pilot questionnaire offered the student a number of opportunities for presenting his\her answers. Nevertheless it was observed that the students tended not to write very much, so the spaces to be filled were reduced. This also reduced the size of the questionnaire, without removing important questions.

Part 3, “environmental action”, compared children’s action on specific environmental issues (recycling, transportation to school, pre-cycling,³ etc.) The maximum score was 6.

Attitude scale questions were not used in part 3 of the questionnaire. Furthermore, inferring attitudes from measurable responses, such as direct observation of behaviour, is often difficult to achieve. The use of statements of intention as good predictors of behaviour are frequently used, by attitude measuring research (Dillon & Gayford,1997). Nonetheless, it is also admitted that results emerging from attitudes scales are the expression of verbal behavior (Likert,1932:32). Where verbal

reactions, related to the issues in reference (environmental issues), are sought, attitude scales can be very useful: however, in which degree does verbal commitment reflect actual commitment and action? In this part of the questionnaire environmental attitudes were not measured using attitude scales, since:

- attitudes do not always reflect a person's real behaviour: *"an individual's behavioural intentions are influenced by other factors such as social norms and perceptions of personal control over a given situation"* (Dillon and Gayford, 1997:285);
- It is quite common to answer this type of question according to what the student is expected to answer, (McKernan, 1988) with respect to *"society's value system"* (Bogner & Wiseman, 1997:54).

On the other hand, attitudes find their expression in action and interaction among people (Tikka, Kuitunen & Tynys, 2000: 12). Therefore measuring the actual commitment of the students through real action and the impact of the Eco-School programme on the students' family through family action could also provide a reflection of the attitudes developed.

Attitude scales can be an effective tool for measuring accurately the pupil's attitudes and interest in environmental issues (Likert, R, 1932, McKernan, 1998:123). Questions about actual events and activities are more straightforward and likely to elicit erroneous responses. The responses to the part 3 questions were grouped, converted to numerical values and obtained the students' environmental action score which was a quantitative reliable comparison tool (Borg and Gall, 1989:432) and

³ Pre-cycling is a term used for the environmentally aware consumer who chooses products with no

could indirectly define students' attitudes too. Therefore, action questions can be more objective, for comparison purposes.

A completion question about what the child's family does about environmental issues such as energy saving and recycling, was presented in part 2 (before the children went through part 3) so as to reduce bias. An explicit question about copying or assisting the application of the environmental action plan at home was exclusively directed to the Eco-School students in order to see their level of school – family communication. The question sequence also gave the researcher the opportunity to cross-examine the answer of the two questions.

The types of questions used in part 3 were mainly multiple-choice questions. The student, out of a number of choices given, could pick the most environmentally friendly, e.g. C3 (Fig. 7.5).

Fig. 7.5 Students' questionnaire question C3

3.1 You fancy a cold juice to drink, which would be your choice if your favorite drink was available in the following forms:

Can	glass bottle	Carton	Plastic bottle

3.2 Justify your choice: by marking only one reason.

<input type="checkbox"/>	Because it doesn't break	<input type="checkbox"/>	Because I can use it again
<input type="checkbox"/>	Because it can be recycled	<input type="checkbox"/>	Because it disintegrates (absorbed by earth)
<input type="checkbox"/>	Because I like it better	<input type="checkbox"/>	Because I can compress it and make it occupy less space.
<input type="checkbox"/>	Because	<input type="checkbox"/>	

This is a two-part question. An environmentally responsible answer to question 3.1 would be given 1 point. The justification given by the student should again match with the material chosen. Environmentally friendly justification of their choice received 2 points. For example the matching of the aluminum can with the first or third option would not receive any points, whereas if it were matched with option 4 it would receive 2 points. In the pilot questionnaire this was a completion question. It was expected that it would be better to leave the answer open for the student to answer unbiased. Nevertheless the pilot study produced many blank spaces since many children avoided answering an open question. So the variety of the limited answers given formed the options of the final form of the question.

The 4th part was directed only to the Eco-School students and asked for their opinion, attitudes and evaluation of the programme. Attitude scale questions were used at this point since no comparison would take place from this point onwards. Most questions in this part were Likert type questions (strongly agree ... disagree), (Likert, 1932) with a few 1 – 3 scale questions (always, sometimes, never). As Borg and Gall (1989:432) mention, *“...a questionnaire dealing with attitudes must generally be constructed as an attitude scale and must use a number of items... in*

order to obtain a reasonable picture of the attitude concerned". These questions were given the form of a table –matrix questions, for easier grouping, answering and coding.

Questions D1, D2, D4 indicated the student's participation level in the project. A few were multiple-choice questions and the children stated whether or not they wished for the continuation of the programme through a yes/no question.

Student questionnaire data analysis

In order to check the children's achievement individually on each test question or their opinion about the Eco-School Programme, descriptive statistics were operated using the statistical package of SPSS (Version 10). More specifically, the mean, standard deviation, frequencies and percentages were calculated for each variable/question.

Inductive statistics was used for more detailed study, in order to find any correlation between the 3 factors (cognition, environmental awareness - action and school – family communication) and the other variables stated (chi - square test and f test). Only the statistically significant results were used and presented ($P \leq 0.05$).

The use of multiple regression analysis also resulted in many interesting outcomes.

Inductive Statistics and regressions were operated by means of the statistical package SAS.

Issues not covered by the student questionnaire

There is a vast volume of questions that could have been used to test children's environmental cognition. Many of the questions used were part of the science syllabus, so that the test would be fair and could be answered by all the children.

B. Teachers' Questionnaire

The pilot teacher questionnaire did not change form, since the feedback from its administration was positive; it was answered, almost completely by everyone in the pilot school and it was not considered to be too extensive.

The teacher - participants

The questionnaire was delivered to all the teachers in all the 14 sample schools at the time the student questionnaire was administered by the researcher. The school director was responsible for the questionnaire's administration to the teachers, its collection and return to the researcher.

Teacher questionnaire content

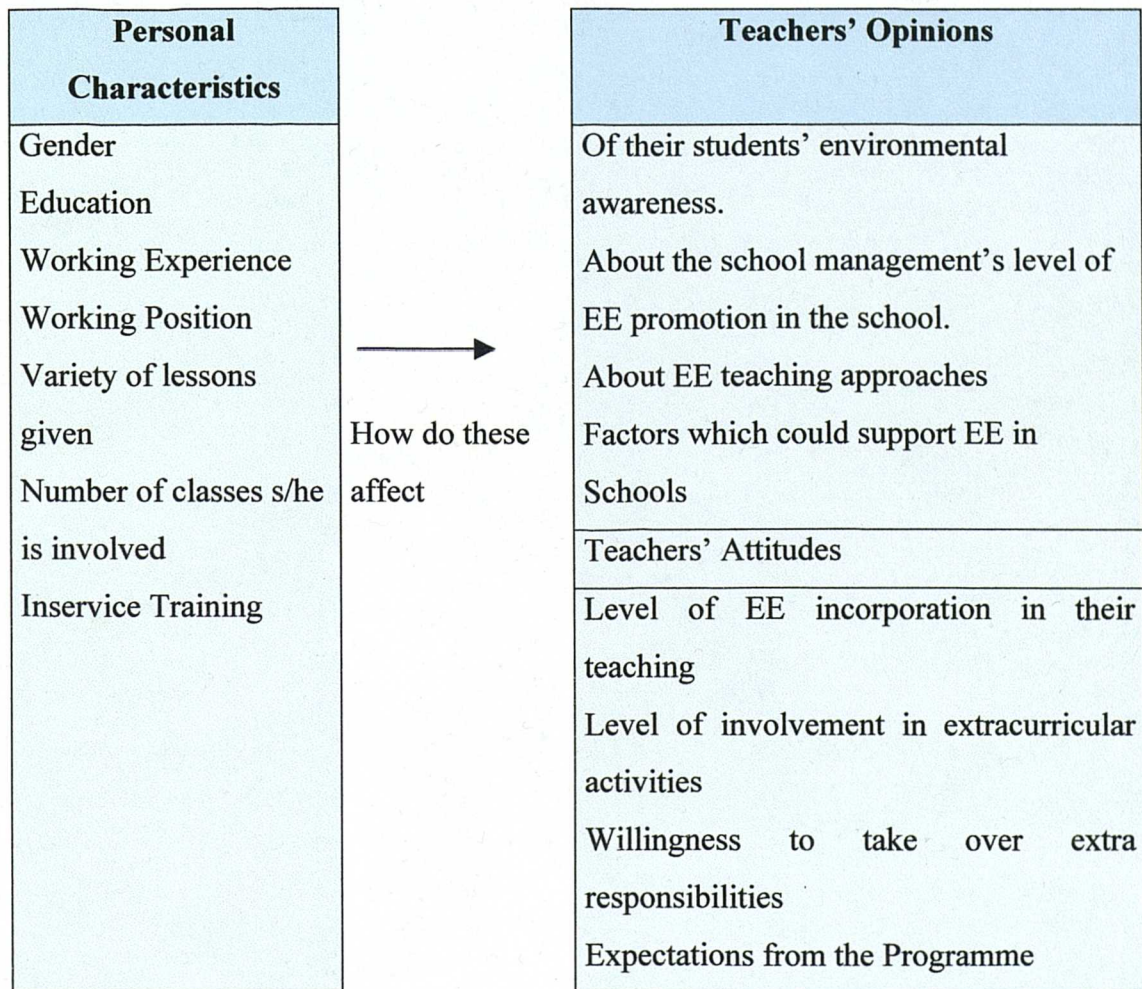
The purpose of this questionnaire was to provide the researcher with information on specific issues concerning the teacher's attitudes and opinion about environmental education and its policy as well as their opinion and their level of involvement in the environmental education programme.

Attached to the questionnaire was a cover note that explained to the teacher the purpose of the study. It stressed the importance the consideration of the teacher's opinion has, and encouraged him/her to answer the questionnaire. Detailed

information about the researcher's name, property and contact address was also provided for the teachers that might be interested in learning about the results of the research. The questionnaire was anonymous and therefore confidential.

The first part of the questionnaire formed the teachers' profile, the second part was addressed to all teachers and the last part involved exclusively the Eco-School teachers. The questions asked for information on the teachers' opinions and attitudes over certain issues and these were examined in association with the teachers' personal characteristics. The following diagram presents the theoretical framework of the questionnaire with the dependent and independent variables examined.

Figure 7.6. The variables examined in the questionnaire



Personal information was mainly obtained by closed multiple-choice questions (QA1, QA2, QA3, QA4, QA5, QA6, QA7).

Part B used Likert – type questions in order to investigate the level of environmental education incorporation in the teachers' teaching, his/her degree of involvement in extracurricular environmental school activities, and therefore their attitudes towards environmental education. Teacher's opinions were also asked about policy formation with specific questions on implementation methods and curriculum issues (QB5, QB6). The questions also asked personal issues, then classroom, school management and national issues (Ministry of Education and policymaking).

The final part of the questionnaire was directed towards the Eco-School teachers only and was formed by Likert type questions and a (✓) question where the teacher had to mark from a long list of possible responsibilities, the ones s/he took over. The number of statements marked (✓) indicated the level of involvement in the programme. Part C examined the cooperation between the staff, problems encountered during the programme application, teachers' expectations from the programme, and their level of satisfaction. Finally the teachers were asked to state with a yes/no answer, if they wished for the continuation of the Eco-School programme.

The following table illustrates the issues covered by the teachers' questionnaire.

Table 7.4. Structure of the teachers' questionnaire

PART A		PART B		PART C	
Personal Details	Q	Environmnetal education issues	Q	Eco-School issues	Q
Gender	A1	EE incorporation in teaching	B1	Personal improvement	C1&3
School working	A2	Class involvement in EE	B2	Students improvement	C2
Education	A3		B2	Personal involvement	C4
Experience	A4	Extracurricular school activities	B2	Programme obstacles	C5
Position	A5	Class' environmental attitudes	B3	Programme gains /attitudes	C6&7
Class responsibility	A6	EE promotion by school management	B4		
Topic Responsibility	A7		B5		
EE training	A8	Ministry of Education and the National Policy on EE.	&6		

Teacher questionnaire data analysis.

As in the case of the student questionnaire, to get an overview of the teachers' opinion on all the questions asked, descriptive statistics were operated using the statistical package of SPSS (mean, standard deviation, frequencies, percentages) (Appendix VI).

The relationship between personal characteristics or work circumstances and variables such as teachers' willingness for involvement in an environmental education programme, was investigated using SAS by operating multiple regression and Anova tests. An independence test was also operated in order to ensure that the sample used was free of bias.

7.4.2. The interview as part of the Survey

As mentioned by Radnor H.A. (1994: 13) *"the interview is an interactive human encounter in which someone seeking information is supplied with it by another"*. Therefore the interview was chosen as part of the survey in order to gather information on the situation of environmental education in Cyprus in terms of National Policy, teacher training, as well as about the Eco-School Programme. *"Using the interviews, the possibility for understanding latent, underlying or non-obvious issues is strong"* (Miles and Huberman 1994:10). Qualitative interviewing is a way of finding out what people think or feel about certain issues. The nature of this thesis combines the quantitative part of the survey and the survey interviews, with the qualitative part of the case studies in order to create an overall picture of the issue under study.

Although qualitative, the number of interviews presented here, were considered as part of the survey since the semi-structured interview is one of the tools that can be used during a survey. The interviews also provided any information missing from the questionnaires particularly on policy and training issues. Each of the interviewees in the survey interviews, had a distinct characteristic/property, was unique in type and served a different purpose by providing a different aspect on the same issue.

The type of the interviews and the selection of the interviewees

Interviews have the benefit of being inexpensive, data rich, stimulating to the respondents and providing immediate individual responses that can be investigated on the spot. Depending on the strictness of the design, an interview could be structured, semi-structured or un-structured (Radnor, 1994:13, Denzin and Lincoln, 1994:361).

A loose, semi-structured interview was used for this investigation, in order to let people talk freely about the issues introduced by the researcher. There was a “proposed agenda” to be followed but it was flexible enough to change order or accept any new issues introduced by the interviewee.

The figure below presents the survey interviewees and their circumstances, and justifies their selection by presenting research questions and some other issues that only they could analyse because of their experience or special knowledge.

Fig. 7.7 Survey interviews and links with research questions.

Interviewee	Information Provided for Research Questions and special issues.
Primary Science Inspector	RQ1.1, RQ1.2, RQ2.1, RQ2.2, RQ2.3, RQ2.4, RQ2.6, RQ4.1
Pedagogical Institute INSET trainers	RQ1.1, RQ1.2, RQ2.1, RQ2.2, RQ2.3, RQ2.4, RQ2.5, RQ2.6, RQ4.1, RQ4.5.
National Operator	RQ2.5, RQ2.6, RQ4.1, RQ4.6, RQ4.5
University representative in the Eco-School Board – Committee	RQ1.1, RQ1.2, RQ2.1, RQ2.2, RQ2.3, RQ2.4
Environmental education trainer (university external associate)	EE module during initial teacher training. Description.
Teacher 1	Which factors might lead a programme to fail? RQ2.1, RQ2.3, RQ2.5, RQ4.1
Teacher 2	Unbiased description of the programme by a non participant observer. RQ1.2, RQ2.1, RQ2.3.

The INSET trainers' interview was a group interview, which means that all three trainers were present during the interview. The purpose of the group interview was exploratory and used the brainstorming group interview type (Denzin and Lincoln, 1994:364) with its informal form and loose structure. *"The group interview is essentially a qualitative data gathering technique that finds the interviewer directing the interaction and inquiry in a very structured or very unstructured manner depending on the interview's purpose; exploratory, pre-testing questionnaire questions, wording. Measurement scales..."* (Denzin and Lincoln, 1994:365).

The interviewees gave general information about the programme, their experience and their attitudes, as well as more specific information on the topic with which they worked.⁴ They were brought together so as to create a more stimulating discussion and opportunities for bringing up more issues. The fact that they had a common property and responsibility towards the programme ensures that their simultaneous presence would not prohibit, but would enhance the discussion.

As Van Dalen (1979:159) argues, in a group interview *“the participants may not only present a wide range of information but also help one another recall, verify or rectify items of information”*. This enabled the researcher to gain as much information as possible about the INSET course and its importance in the programme. Fontana and Fery (1994: 364) refer to the group interview as a *“systematic questioning of several individuals simultaneously in a formal or informal setting”*.

The group interview technique was not used for any of the other interview cases, either because the interviewee's role in the programme was unique, such as Ministry Decision Makers or the National Coordinator, or because it would have been more useful to cross-examine their answers. Speaking individually they would not be affected by others' opinions and be more sincere and straightforward. For example a school teacher in the presence of the schools' director might not feel free to comment on the latter's role and contribution in the programme.

⁴ As indicated in the review of literature, the Eco-School programme focuses on a different topic each year. The INSET specially designed for the programme includes training on general EE issues as well as on the specific issues. One trainer is responsible for each topic.

Content of the Survey Interviews: The Agenda

According to Robson (1993:34), *“when you know what you are after, there is no reason not to plan in advance how to collect information”*. The interview agenda that is presented here for each of the interviewees was prepared in advance, breaking the subjects into specific answerable parts (Rubin and Rubin 1995). Many questions were directed to all interviewees, forming a common interview agenda. A limited number of distinct questions were addressed to different interviewees according to their properties and special knowledge. Nearly all the questions are open-ended and require high personal involvement of the respondent in the issue to be answered. Fielding (1993:137) argues that *“the questions should be as open ended as possible in order to gain spontaneous information about attitudes and actions”*.

Moreover, some interview questions were similar to questionnaire questions, in order to obtain in depth information on the issue (e.g. teachers’ opinion on the most appropriate educational approach) and others intended to double check the questionnaire results.

Fig. 7.8.1 Interview Agenda Ministry of Education Representatives

Interviewee	Interview Agenda
Ministry of Education Representatives:	
Primary Science Inspector	<p>What policy does the Ministry follow on environmental matters?</p> <p>Which method of integration do they favour?</p> <p>To which degree do they consider environmental matters when writing textbooks?</p> <p>Is there any sort of evaluation of EE at schools?</p> <p>How does evaluation of environmental aspects of disciplines outside science occur?</p> <p>What position does the Ministry take with initiatives like Eco-Schools, coming from the private sector?</p> <p>What other private sector initiatives on EE are taking place?</p> <p>Would they use a private sector programme nation-widely as a part of Ministry's National Policy of EE?</p> <p>Are they planning an EE National Policy, which could be organized, directed, monitored, assisted and evaluated by the Ministry of Education?</p>
Pedagogical Institute (PI) INSET trainers	<p>Comments on Eco-Schools programme</p> <p>Comments about the teachers attending the seminars: how enthusiastic they are ...</p> <p>Content and aim of seminars</p> <p>Which are their impressions after visiting the schools for the evaluation?</p> <p>Did they see applications of what they taught?</p> <p>Comments on Ministry's Policy on E.E.</p> <p>Which form do they think a national policy of E.E. for primary education, should have if it were fostered by the Ministry?</p> <p>What opportunities does P.I. offer to the teachers for in service training on environmental education?</p> <p>How big is the response?</p>

Interviewee	Interview Agenda
University of Cyprus	
University representative in the Eco-School Board – Committee	<p>Is environmental education included in the initial teacher training?</p> <p>In which form? Is it taught through science education for instance?</p> <p>What is the content of the course?</p> <p>Is it an optional course for every year?</p> <p>Do you have any data on the students' response to the course? How many students normally attend it? Is it popular?</p> <p>How is it assessed?</p> <p>Is there a written test?</p> <p>How about the course of EE?</p> <p>What is the content of the EE courses? (teaching approaches suggested, background philosophy of EE, holistic approach etc...)</p> <p>What is the role of the University of Cyprus in the Eco-School Programme?</p> <p>Please comment on the context of the Eco-School Programme.</p> <p>What is your opinion on the evaluation process of the schools?</p> <p>What is your opinion about the environmental education Policy of the Ministry of Education?</p> <p>How would you introduce and implement EE in schools?</p> <p>Should EE incorporation be optional or obligatory in school curricula?</p> <p>How will the teacher be facilitated to use this approach in class?</p>
Environmental Education trainer (university external associate)	<p>What is the initial training the university offers on EE?</p> <p>Is it compulsory or optional? If optional, does it have a lot of response?</p> <p>Duration, ways of evaluation, content</p> <p>Comments on Eco-Schools programme</p> <p>Suggestions for the ideal way of introducing EE in Cy primary schools</p>

Fig.7.8.3 Interview Agenda: National Operator

Interviewee	Interview Agenda
National Operator	
NGO National Operator Director	<p>How did CYMEPA get to be the national coordinator of Eco-Schools in Cyprus?</p> <p>How did the Ministry of Education respond?</p> <p>Which is their ultimate target within the programme?</p> <p>Which are the programme's aims?</p> <p>How cooperative did they find: the ministry, PI, school heads, teachers, students?</p> <p>Why do some of the schools fail?</p> <p>The percentage of schools in Cyprus that successfully complete the programme and win the award is strikingly higher than in the rest of Europe. Why?</p> <p>How is the evaluation conducted?</p> <p>Programme's achievements</p> <p>Are there any benefits for the teachers?</p> <p>Is there any cooperation with Europe and Greece?</p> <p>Eco-Schools number is increasing, would they make it nationwide?</p> <p>Which would be the needs in such a case?</p> <p>How well informed do they find the Cyprus teachers to be on environmental matters?</p> <p>Make a general assessment of the work done so far.</p>

Fig. 7.8..4 Interview Agenda: Survey Teacher1

Interviewee	Interview Agenda
Programme experience	
Teacher 1 (negative experience)	Comments on Eco-School project and the way it was applied in the school Why interviewee's school failed to participate? The role of the school head The role of the teachers What should the Ministry of Education do about EE (ministry's responsibilities on the issue)? His idea of the ideal way of introducing EE in Cy primary schools

Fig. 7.8.5 Interview Agenda: Survey Teacher2

Interviewee	Interview Agenda
EE outside the programme	
Teacher 2	Level of EE integration in their classes Difficulties encountered Any initiatives taken Background knowledge on EE Opportunities at work, for getting informed about the issue Their opinion on how a national policy for EE should be structured

Beyond special issues that concerned only the specific interviewee, a common part of the agenda was designed for both the survey interviews and the case studies.

Fig 7.9 Common interview agenda.

- How was the Eco-School programme introduced in schools?
- How were teachers motivated in order to participate?
- Cooperation between the involved parties (school, National Operator, Ministry of Education , Pedagogical Institute, University, and within the school: management, programme coordinator, teachers, students, parents' association and local authorities.)
- The role of each involved party.
- Overall assessment of the Eco-School programme.
- Which is the Ministry of Education's role concerning the establishment and/or application of EE policy in primary education?
- Which teaching approach do you consider to be the most suitable for Cyprus to use in order to introduce EE in schools?
- Teacher training information.

Interview procedure

All interviews took place after telephone communication with the interviewee. The initial contact consisted of explanations about the purpose of the research and the interview in particular. It also assured confidentiality and the anonymity of the interviewees. In the cases where anonymity was impossible to maintain (e.g. the national operator, or the science inspector, interviewees with a unique property), the interviewees were aware of the fact and consented on providing an interview under their official role. As for the teachers and school directors, anonymity was easy to maintain. The information would not be used for any purposes other than the specific research project so this also ensured confidentiality.

The respondent's contribution to the research was emphasised in order to encourage them to participate. All the participants were willing. The interviewee chose the time and place and the interview took place in natural settings (the interviewee's office and in one case, the researcher's office). This made the interviewee feel more comfortable and confident.

The questions were based on the pre-arranged agenda, although the interviewees were free to introduce any new issues emerging from the question. A benefit of the semi-structured interview is that it permits the collection of non anticipated data. Follow up questions were used in order to provide researcher, with more in depth answers.

The researcher attempted to create a friendly and relaxed atmosphere by being flexible, objective, empathetic, persuasive, trustful and most important, a good listener. The purpose of the interview was explained at the beginning of the session. In all the cases the researcher taped the interview using a small diskette recorder, with the interviewee's consent.

Written notes were not taken although some verbal expressions (such as laughs or hesitation) were noted but not analysed.

The researcher also used prompts in order to help the respondents express themselves (opinions and feelings). The conversation started with the easiest questions and progressively went on to the more difficult and sensitive questions, which demanded personal expression of feelings. For instance, some interviews would start by the interviewee being asked about the start of the programme and move onto questions about work distribution and peer collaboration.

The sequence of question - asking is of great importance and enables the researcher to gather valid, reliable results in order to answer the research questions. Even the manner in asking each question, the tone of the voice and the whole atmosphere in which the interview was conducted, proved to be important. "*The interviewer's art consists in asking the questions properly and intelligibly, in obtaining a valid and meaningful response, and in recording the response accurately and completely*" (Powney and Watts, 1987: 179).

Data analysis of the survey and case studies' interviews.

Analysis is the detailed examination of the database that ensues from single or multiple interviews (Powney and Watts 1987:146). It was decided not to use computer software for qualitative data analysis for the following reasons:

- i. the amount of data is not enormous, since it depended on a specific and structured agenda;
- ii. the common themes covered by the data were manageable;
- iii. the researcher could handle the data in a more logical way since she had a good overall view of the research questions and the underlying theory.

The researcher was aware of the limitations of the interview method, due to the bias danger that exists in the interpretation of the results (Powney and Watts, 1987:36,44).

The structured questionnaire administered during the survey and the common agenda included in the interviews would allow a triangulation of the data gathered. The triangulation of methods and data enhances the validity and reliability of the results.

Conscious effort and use of certain methodological procedures to limit the bias as much as possible were performed.

The data analysis procedure for all 13 interviews was based on the pre-arranged agenda as shown above. This pre-set common framework formed the basis for qualitative analysis; the themes which emerged from the data formed the questions themselves. The precise procedure followed in analysing the interviews was as follows:

- 1) transcription and translation from the tapes;
- 2) a check of the transcriptions against the tapes;
- 3) double reading the transcriptions in order to identify the «themes» - the main categories of the data;
- 4) identification of the 'themes';
- 5) identification of any new 'themes';
- 6) identification of the sub categories that form each theme;
- 7) 'Concept mapping' every issue coming out of the transcriptions in order to identify relations between the categories and sub categories.

Transcription

“Given that a transcription cannot represent everything featured in the original spoken language, it follows that any transcription is an interpretation by the transcriber of what is being said. What is written down is inevitably selective”

(Powney and Watts, 1987: 143)

Using the taped- interviews, the effort was to transcribe not only the literal statements but also any possible non-verbal communication recorded on the tape (hesitations, laughs, pauses, etc.).

The analysis of the interviews that followed aimed at reducing data into a 'manageable' form. The analysis is largely dependent on the following:

- purpose of the research - research questions;
- purpose of the specific interview within the research;
- the interview approach that was followed.

A sample interview transcript is presented in Appendix VIIIb with the analysis of the specific case. Sending back the interview transcripts to the interviewees would have given them the chance to enrich their statements and enhance the reliability of the data (Cohen and Manion, 1989, Miles and Huberman, 1994). The transcripts, nonetheless, were not sent back to the interviewees in order to save time and also because the transcription was done in English which is not the first language of the interviewees.

Identification of themes

The transcripts were carefully read more than once, in order to identify the themes or major categories. Since the interviews were semi structured, the themes were mainly categorised according to pre-planned interview questions. However, because of the flexibility of the agenda, several other themes that were not identified prior to the data gathering appeared.

Identification of 'categories' within the 'themes'

Each theme that was identified contained different categories or issues according to the way in which each respondent interpreted each theme. In the ~~previous~~ pages in this chapter, each case-interview is presented in the figures 7.8.1-7.8.3, which shows both the themes and the main categories within each one. It is important to note that in each case, the themes are the major categories that emerged from the literature and the prior analysis of the research. However, the categories vary from case to case.

Data display

In order to have a clear idea of the data reduction, different tables for each category, were prepared. Miles and Huberman (1994: 93), refer to building the display format by saying that *"it can provide a good thumbnail sketch of the change process for use in the final report"*.

7.5. The Case Studies

The three case studies were organised and selected according to the results of the survey. A qualitative case-study approach of each of these three schools gives information on the importance and effectiveness of factors such as teacher, teaching styles, classroom activities and whole school activities. The research instruments used in this case was the document analysis of the three schools' annual evaluation report (1999/ 2000) and interviews with school managers and programme coordinators.

7.5.1 Document Analysis of the Evaluation Reports

The document analysis of the evaluation reports was another research tool used during the research project as a means of data gathering prior to the teachers and directors' interviews. Questions might emerge from the results of the analysis or from not well-specified data, which the researcher could clarify during the *case studies*. McKernan (1998) considers document analysis to be suitable for use at the exploratory stage of a project.

This method has the advantage that the data collected can establish retrospectively the facts, so although the document analysis took place one year later than the questionnaire administration, the documents used were the ones corresponding to the previous year. Despite literature (McKernan, 1998) which accounts for document analysis as a method which sometimes has the risk of providing biased or inaccurate accounts, the information provided by the documents was reliable and credible as the report required evidence for each statement it included. Any inaccuracies were investigated by the researcher during the interviews.

The purpose of the analysis was to gather information about the factors that might promote a programme's successful implementation and the inculcation of environmental awareness in the children:

RQ 4.3 Which successful practices have the teachers employed during the programme?

RQ 4.4 Which practices can be more effective for the inculcation of environmental attitudes?

The research questions were analysed to more specific questions for the document analysis:

1. Do the following factors affect the programme's successful implementation?
 - a. teacher cooperation and participation;
 - b. student participation;
 - c. local community involvement;
 - d. local authority involvement.

2. Is the inculcation of environmental attitudes and understanding of environmental issues influenced by:
 - a. whole school activities;
 - b. age group activities;
 - c. indoor activities ;
 - d. outdoor activities?

Three evaluation documents were analysed for that purpose: the document submitted to the National Operator for Eco-School evaluation from the school which achieved the best results in the survey (School A), the school with average results (School B) and the school with lowest results (School C). The National Operator was very cooperative on the issue and provided the documents for the researcher. The documents are not confidential and occasionally are used as examples of good practice to new schools enrolling in the programme.

Documents' content

Three documents were analysed. The evaluation report submitted from school A (best score), school B (average score) and school C (lowest score). All documents follow a common agenda: the answers to 12 questions sent to schools by the National Operator. In addition, schools may include other elements to support their answers, such as copies from children's work, parts from school's diary, photos, curriculum links, material for activities, school correspondence etc.

Analysis was organized into two levels: The 12 common questions and any additional information provided (photos, assignments, diary etc.)

Most of this extra material simply added volume to the document (e.g. school B document). Where this material was useful and reinforced the 12 questions, it was considered as part of the answer and completed its data.

The 12 questions are:

1. Which people constitute the Eco-Committee of the school?
2. How was environmental audit organized?
3. How were the action plan targets decided?
4. To which level have you advanced with the target attainment?
5. How do you monitor and evaluate progress?
6. Write the number and ages of the children involved in activities through the curriculum and information on the topics covered.
7. Describe your environmental action day.

8. How was the community informed about the Eco-School Programme and how did they respond?
9. Describe any contact your school had with the wider community (aid, publicity, financial support).
10. Please include your Eco-Code and describe the way it was composed.
11. Has the Eco-School Programme experience helped your school in any way?
12. Other comments.

Analysis of the documents

The analysis of the documents was qualitative as only three documents were used. The documents were simply compared according to the 12 questions as well as the 4 criteria already mentioned. The results of the analysis are presented in chapter 8.

7.5.2 The case study interviews

The type of interviews and the selection of the interviewees

As with the survey questionnaires, the case study also made use of a loose, semi – structured interview style precisely because it allows people talk freely about the issues introduced by the researcher. Again there was a “pre-planned agenda” but it was flexible enough to change order or accept any new issues introduced by the interviewee. The case study interviews lasted longer than the survey interviews. The shortest took 30 minutes whereas in some cases it took 1 hour.

The table below presents the interviewees, their characteristics and the common agenda they were presented with.

Table 7.5. Case Studies' Interviewee's Profile

Interviewee	Position	Experience	Gender	Education
School 1 School Director.	Director	Approx. 25 yrs.	Male	MEd
School 1 Prog. Coord	Sub Director	Approx. 20 yrs.	Male	BEd
School 2 School Director.	Director	Approx. 30 yrs.	Female	MEd
School 2 Prog. Coord	Teacher	<5 years	Female	MSc
School 3 School Director.	Director	Approx. 35 yrs.	Male	BEd
School 3 Prog. Coord	Teacher	<5 years	Male	PhD stud.

Fig.7.10. Case Studies' interview agenda

Case Studies Interview Questions
Q1. Do you know how the participation decision was taken?
Q2. How was the work distributed?
Q3. Which is the role of the headmaster in the programme?
Q4. Are there any classes that you observe to be more devoted than others to the programme?
Q5. How did you involve the children in the programme?
Q6. Do you observe that the age of the children affects their involvement degree in the activities?

- Q7. Did you come across any difficulties during the implementation of the programme?
- Q8. How did you resolve the problems?
- Q9. Comment on your cooperation with the rest of the staff and with the school management.
- Q10. Comment on your cooperation with the parents; parents in general and the parents' association.
- Q11. Did you also cooperate with the local authorities, the municipality of the area in particular?
- Q12. How about the cooperation with the national operator?
- Q13. With the PI?
- Q14. You have many times mentioned the eco committee, who participated in it?
- Q15. How were the participating children selected?
- Q16. How often did you meet?
- Q17. Do you think that the programme had any effect on the students of your class?
- Q18. Why do you think that?
- Q.19 Through your conduct with the parents, have you observed any messages of the programme received at home too?
- Q20. As an educator now, can you please comment on the programme's structure?
- Q21. What kinds of activities did you use with your class?
- Q22. In which disciplines did you manage to introduce the environmental dimension?
- Q23. Is there any discipline which you consider more difficult to incorporate E.E.?
- Q24. Have you noticed any kinds of activities from the ones you did with your class, to be more effective in cultivating attitudes and environmental awareness?
- Q25. Do you know which is the policy followed by the ministry of education as far as E.E. is concerned?
- Q26. How about the role of the ministry on E.E.?

Q27. How easy is it for the teacher to incorporate the environmental dimension in his teaching?

Q28. Is there anything that could help the teacher include the environmental dimension in teaching?

Q29. Which approach do you consider to be more appropriate to the nature of E.E.?

Q30. So, in order to finish, can you make an overall assessment of the programme?

Some sensitive issues were examined through the interviews instead of the questionnaires. The familiarity of the researcher with most of the interviewees helped ensure their trust. Thus the interview was considered to be a research tool that would enable the interviewees to *“go further in our confidence ...We are also likely to become more forthcoming when we think that our information is going to make an improvement...”* (Powney and Watts, 1987:40).

Fig. 7.11. Issues not covered by the questionnaire

Issues not covered by the questionnaire	Reasons
1. The role of the coordinator	Sensitive issue that needs in depth analysis and open ended questions. It was included in the interviews and school management and programme co-ordinators were asked about the issue.
2. Activities used by the teachers for inculcating environmental awareness	All the answers on the issue could not be predicted (in order to make it a closed ended question). Moreover it is more likely to get more valid answers from an expert (e.g. programme coordinator).

Interview procedure

The procedure followed for conducting the case studies' interviews and their analysis was identical to the one followed for the survey interviews.

7.6. The researcher's role

The researcher acted as an external investigator, a surveyor, and an interviewer who examined the programme under study in order to determine the factors that influence the successful or unsuccessful practices of implementation, or the teacher's role in it. In no case did the researcher act as an evaluator, despite this being evaluation research since this attitude might be intimidating or even produce biased data.

Although the researcher is directly involved in the programme, and familiar with all the programme actors, it was not difficult to act as an 'outsider investigator' because she is not involved in the school application phase. This way, a high degree of objectivity was accomplished, while remaining neutral by being free of shared interests.

The age and position permitted the researcher, particularly during the interviews, to be a trustee of the teachers (and directors) and at the same time an understanding associate of the decision makers. The researcher could be seen as an "insider investigator", being an employee of the Ministry of Education and Culture in Cyprus; a teacher herself and now an in - service teacher trainer. This was not as much of a problem as it appeared to be, since, by being an insider, a 'rapport' with the people researched was established and information was easily gained both from policy makers and the teachers themselves.

Throughout the research project the researcher had to take over a variety of roles according to the project's necessities at each of its phases.

I. Literature Review

At this stage all the available resources were used in order to gain and present a substantial amount of relevant literature. This was done mainly in the early stages of the study but also went on throughout the process; it enabled the acquisition of a profound view of the topic under investigation, and provided specific ideas about a methodological procedure appropriate for use in this study. Books, articles and electronic references (Internet, and databases BEI and ERIC) were also used for the above purposes.

II. Preparation of the instruments

For the preparation of the survey instruments the researcher used the background information gained by the literature review and together with the data from the pilot questionnaire constructed the survey questionnaires and interviews. A literature review on methodological approaches was again considered during the case study document analysis and the analysis results contributed enormously to the creation of the interview agenda. The literature review had been useful and guiding during all the stages of all the instrument preparation.

III. Data gathering

Here, the researcher acted as an external investigator, seeking data from the respondents. At the survey stage, it was easy to keep as objective a role as possible, since the whole procedure was based on the mailed return of the questionnaires.

However, during the interviews, like every interviewer, the researcher could not be completely neutral, since she was actively participating, prompting, asking and on some occasions was even asked questions. The use of a semi-structured interview enabled the minimisation of the threat of subjective influence and bias. Careful presentation, a sensitive, methodical and structured way of approaching the participants, as well as attention to the pre-organised agenda, added to the successful gathering of rich data.

IV. Presentation of the results

The presentation of the results was done either by computer software (for the quantitative part of the research) or through a specific coding scheme (for the qualitative part of the study). Results are presented according to the research tool used. In the case of the interviews, where part of them was considered to be survey interviews and the other part case studies interviews, a common analysis was held and therefore the results are presented for all the interviews together. In the cases where there is triangulation of the data, one finding is reported and the other mentioned. (The latter is reported under the heading of its research tool.)

In order to make the presentation clearer, in several cases results are presented through tables, bar charts, pie charts, and graphs.

CHAPTER 8: RESEARCH FINDINGS

This chapter presents the research findings in the same order as the methodology. Initially, the results of the survey are presented: the student questionnaire, followed by the teacher questionnaire analysis, and a triangulation analysis of some related questions from both the questionnaires. The results from the survey interviews' analysis, are presented with the case study interview results since it is the same research tool shared by two research methods. The common agenda results are presented and where applicable, the additional information obtained. Along with that, the Case study results present the findings obtained through the document analysis of the Eco-Schools' evaluation report.

Table 8.1. indicates the size of the sample used by each research tool.

Table 8.1. Sample size of each research tool used

Research Method	Research Tool	Sample size
SURVEY	Student Questionnaire	673
	Teacher Questionnaire	78
	Interviews	7
CASE STUDIES	Document Analysis	3
	Interviews	6

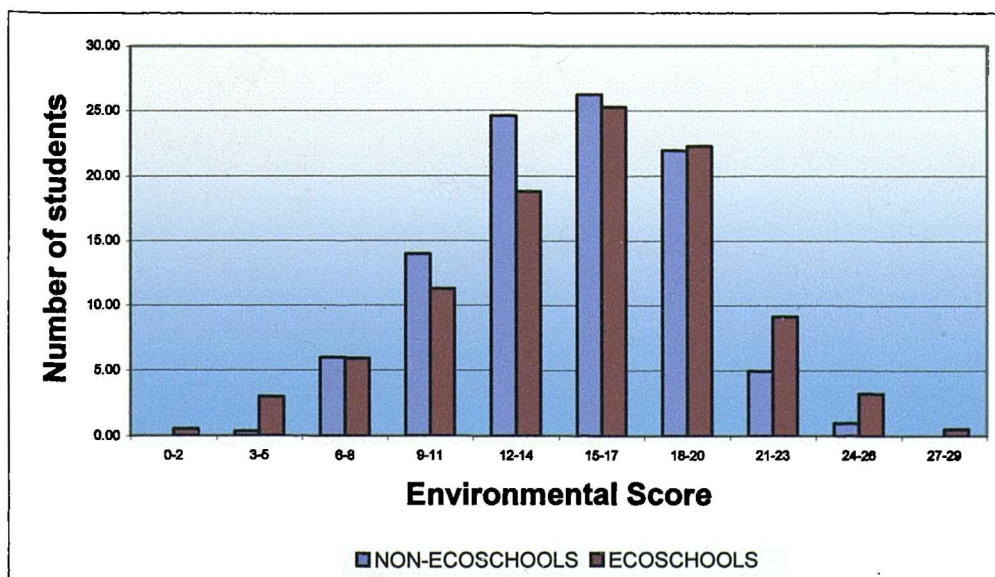
8.1 The results from the Survey Questionnaires

8.1.1 The Students' questionnaire

The results from the students' questionnaire are presented following the sequence of the research questions covered by the questionnaire and not the questionnaire questions as several questions' results would be relevant when investigated with respect to other questions. Nevertheless the descriptive results from each question are presented in the Appendix VI.

The overall score for each student was obtained by calculating the sum of the scores obtained in each question of the test (parts B & C of the student's questionnaire). Maximum total score was 30 (each question's score is indicated in the student's questionnaire, Appendix III). There is a normal distribution for the overall environmental score for each student in both cases. Eco-Schools' distribution has a positive skew (slightly situated on the right), indicating the achievement of a slightly higher environmental score.

Fig. 8.1. Non Eco-Schools and Eco-Schools Environmental Score distribution



The research questions answered by the student questionnaire were:

RQ 3.1. Is there a difference in environmental cognition and action between the Eco-School students and students of programme non-participating schools?

RQ 3.2. Can the programme influence the environmental awareness of the student's family?

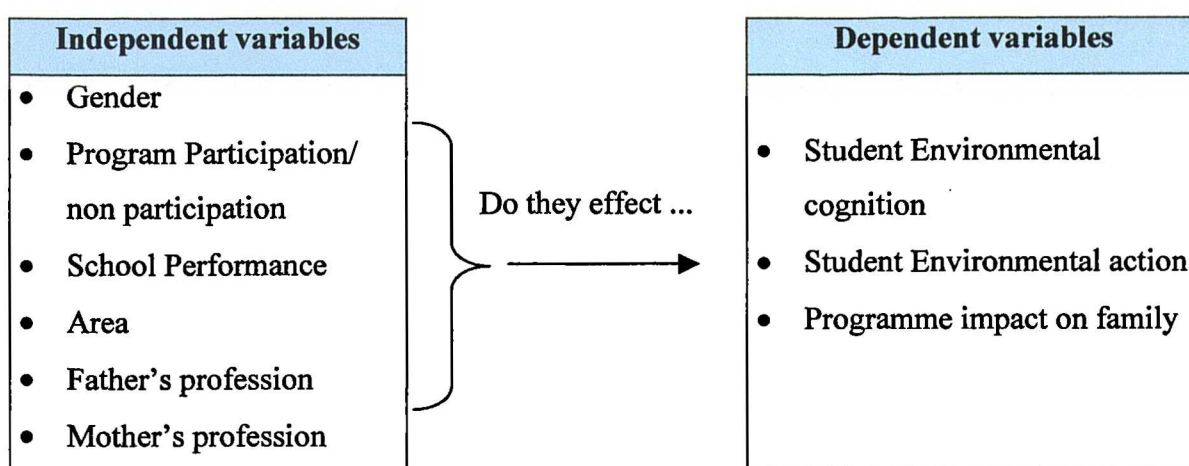
RQ 3.3. What are the student's attitudes to the Eco-School programme?

RQ 3.4 Have students been benefited by the programme? How?

RQ 4.2 What motivates the students?

Answers to Research Questions 3.1 and 3.4, considering whether the school was a programme participant or not, were examined with respect to other independent variables, such as gender, school achievement, parents' professions (educational and socioeconomic background) and district/ area where they live.

Table. 8.2 The relation between independent and dependent variables

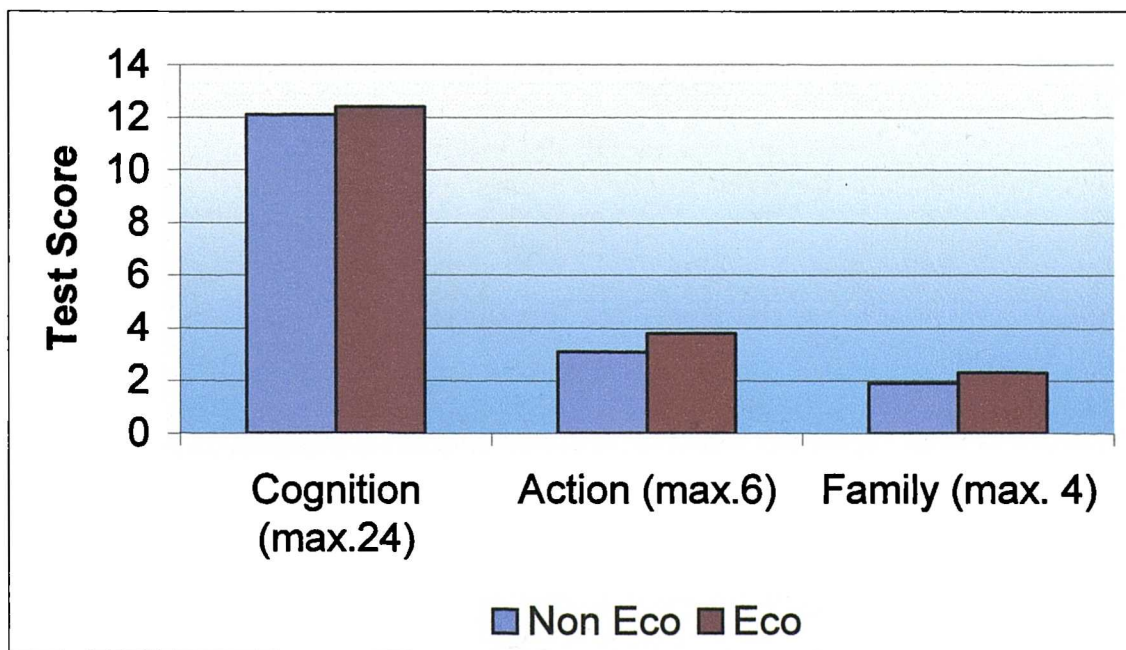


Inductive statistics (X^2 test and f test) were used in order to find any correlation between 3 factors: cognition, environmental action and programme's impact on family, and the

other variables stated. Only the statistically significant results were used and presented ($P \leq 0.05$).

Gender had no influence on the way the questionnaire-test was answered. Neither was there a statistically significant difference in environmental cognition among Eco-School students and students from the schools outside the programme (RQ 3.1). Nonetheless, Eco-Schools' average on the environmental cognition part of the questionnaire was slightly above the average obtained by non participating schools (fig. 8.2).

Fig.8.2. Students' environmental cognition, action and school impact on family in Eco-Schools and non-participating schools.



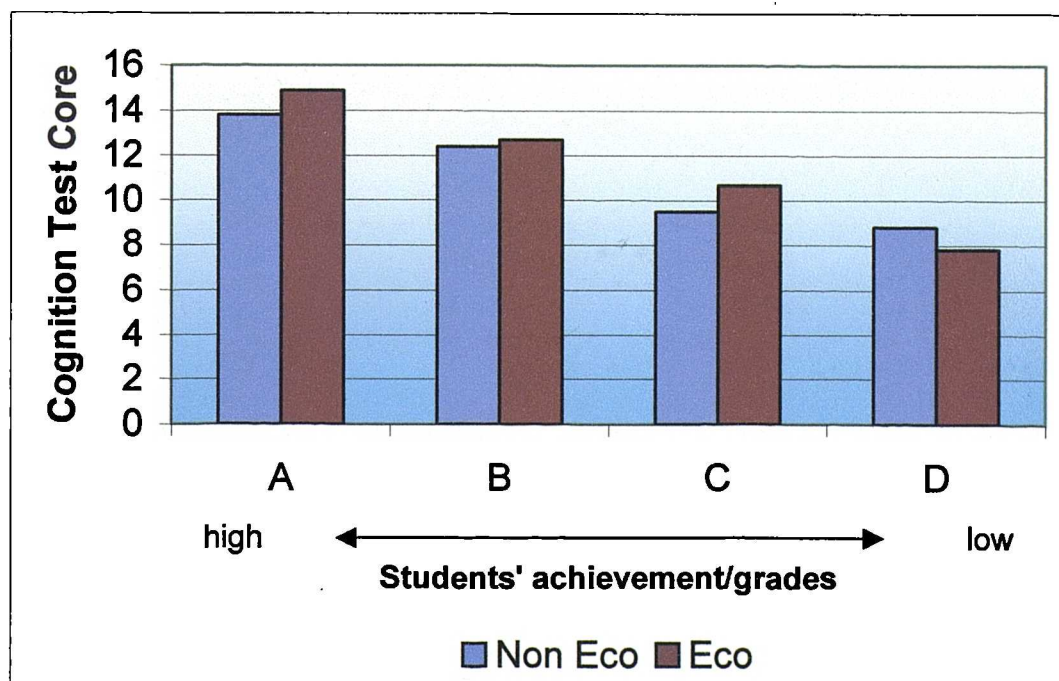
The second justification is the time period of the application of the research. It took place during the 1st semester of the school year when children had not yet been thoroughly involved in the programme. This could be a limitation of the research, nevertheless, assuming that the programme is applied by the entire school, as it should,

the 5th year students should have had experience of the programme from the previous year.

The programme also appears to facilitate the transmission of environmental messages from the school to the family. This is achieved through the students as well as through the close cooperation that schools should have with the parents in order to meet with the programme's aims¹ (active participation of the parents). As a result a school achieves an "opening" for reciprocal communication with society.

The next factor that was examined was students' performance. This affects the acquisition of environmental cognition and action, as well as the communication level between school and family (Fig. 8.3., 8.4 §8.6)

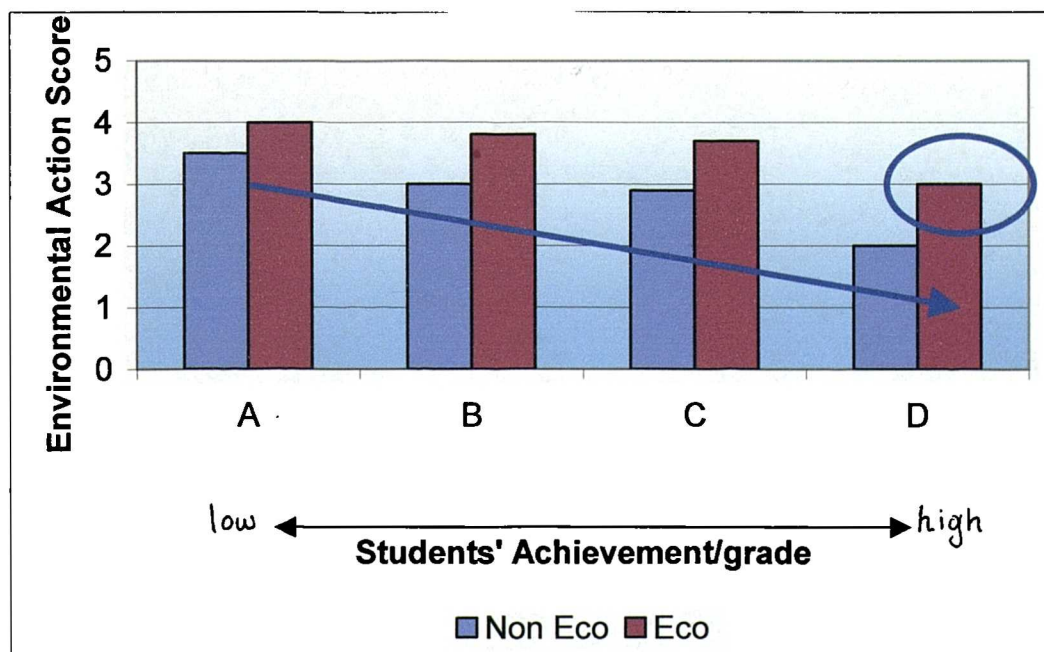
Fig 8.3. Student's school performance and environmental cognition score in Eco-Schools and non participating schools.



¹ Programme's aims were presented in chapter 5.5.1

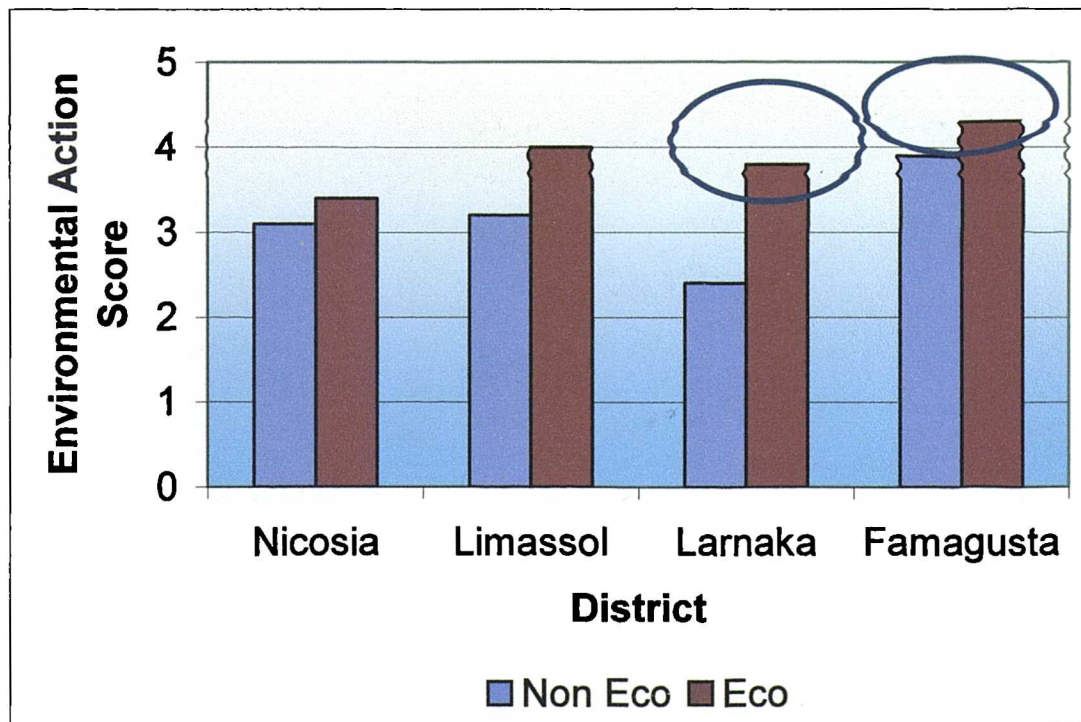
In all three cases, (cognition, action, communication) the score in the test obtained by the non participating schools was proportional to the students' performance at school, as shown in fig. 8.4 by the trend line: the higher the school performance, the higher was the score on the cognition and environmental action questions. The effect of the environmental programme, as deduced by the results, diminishes the differences, especially in environmental action (and therefore attitudes) where the least able students (school grade: D) had the maximum progress (highlighter in the graph by an ellipse). Specifically, students with performance D improved the environmental action test score by 1,0 (16,6%), students of C and B improved by 0,8 (13,33%) and top students with school achievement A improved by 0,3 (8,3%) indicating that the programme has a greater impact on low achievers. The maximum score one could achieve on action questions was 6.

Fig.8.4 How the Eco-School Programme affects the student's environmental action, with respect to their school performance. (max. Score 6)



A comparative study of the environmental action of the students of the various districts showed that Famaghusta schools (both Eco and non Eco-Schools) have managed to cultivate a greater degree of environmental action and therefore awareness in their students compared to other areas on the island (Fig.8.5). This is perhaps because Famaghusta is a semi-rural area, and a great percentage of the population holds farming or land cultivation occupations. For the action score, the most significant difference between participating and non-participating schools was observed in Larnaka².

Fig. 8.5 How the programme affects the students' environmental action with respect to their district?

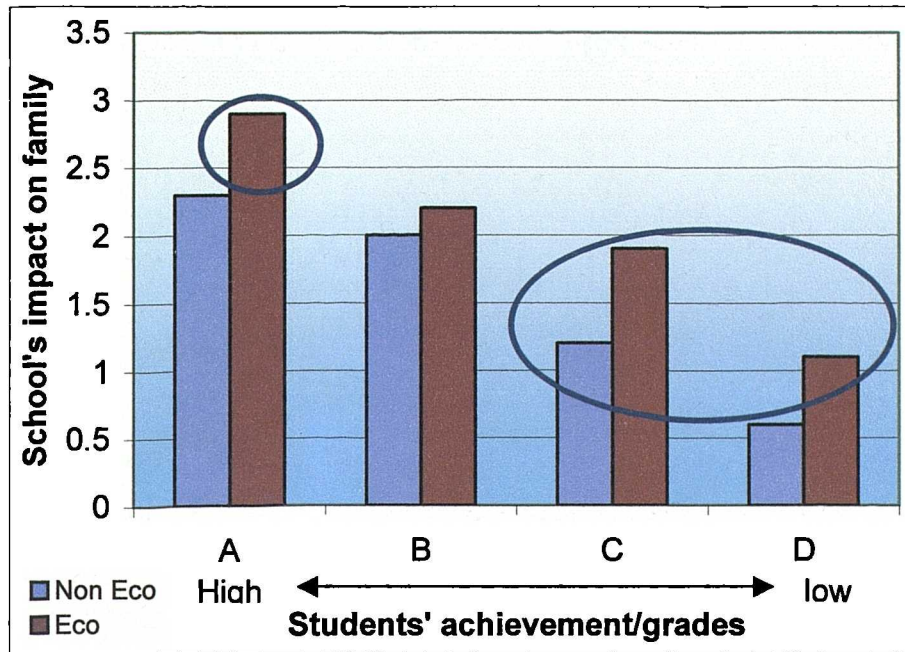


² The variation of the schools performance on attitude change will be investigated in the following steps of the research, through interviews with the teachers and content analysis of the school assessment report.

A comparison of the degree of communication between school and the family shows that communication seems to be more effective in Limassol and Famaghusta areas. This is probably due to the good coordination and communication among all schools of Limassol and their common efforts in involving parents in common school activities, as extracted by the interviews. Limassol was the only district where all Eco-Schools held common regular teachers' meetings on their own initiatives and organised common curricular and extracurricular activities. Limassol had organised an environmental activities' day on the town's quay for all parents and students of the district's Eco-Schools. Moreover, as the National Operator mentioned during the interview, "... *Limassol! It becomes a battlefield! The Limassol teachers organise common meetings of all the Eco-School coordinators of Limassol every 15 days*", pointing out the competitive and at the same time collaborative spirit of the schools of this district. In both districts, schools had organised parent-involving activities such as fairs (evidence for these comments emerge from interviews with National Operator, teacher interviews and document analysis of the Case Study taken from Famaghusta).

The impact on family by the programme though, appears to be related to student achievement. The higher achievement students tend to communicate school events and messages to their families better than their classmates. The programme, on the other hand, seems to motivate more the low achievement students to communicate programme messages to their families more than the average performance students (Fig. 8.6)

Fig. 8.6 School's impact on the family with respect to students' general achievement in class.



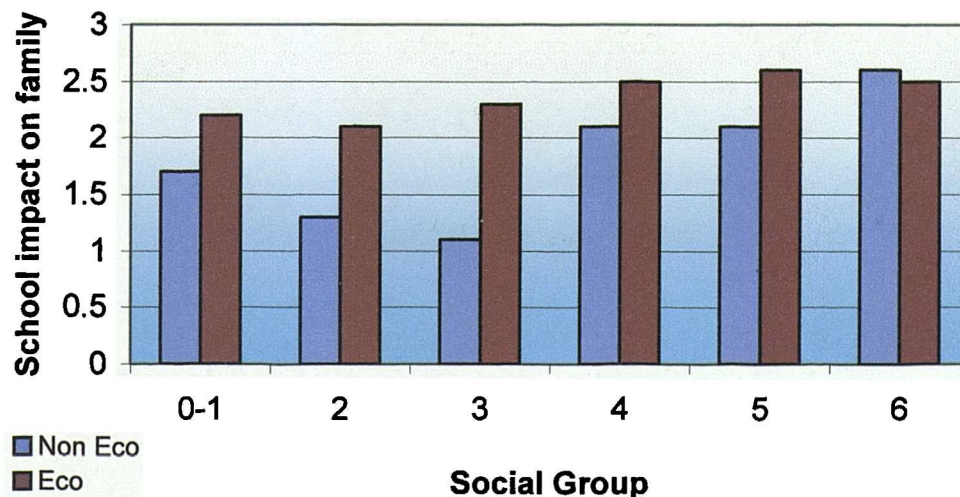
In this case, especially for the low achievers, the programme functions as a new bond which encourages school and family communication and cooperation.

An important result is the relation that appears to exist between the father's profession and the student's acquisition of environmental cognition.

The environmental cognition of the student is proportional to the father's professional scale - level. The higher the father's profession, the better informed is the student on environmental issues. The mother's profession did not have any effect on those variables. The influence of the social level of the father's profession on the degree of

communication between school and family is also important. The results show that while the “lower” social groups (1,2,3) of the *non* Eco-Schools have a limited degree of communication with school, the corresponding social groups in the *participating* schools have a significantly improved level of communication reaching the high level communication (Fig. 8.7.)

Fig.8.7 How the Eco-School programme influences the level of communication and message transferring from school to the family, with respect to their socioeconomic background



- 0: unemployed
- 1: unspecialised worker
- 2: specialised worker
- 3: specialised worker with certain responsibility / self employed
- 4: university graduate employee
- 5: university graduate employee: administrative position
- 6: university graduates in managerial positions and high prestige professions.

Figure 8.7 illustrates that socioeconomic groups 1,2 and 3 form a wider group and 4, 5, 6 another one.

Research questions 3.3 and 4.2 only concerned Eco-School students and therefore the searching for answers involved only the 4th part of the students questionnaire, which was directed to Eco-School students only.

Attitudes about the programme.

RQ 3.3: Which are the students' attitudes about the Eco-School programme?

The students' attitudes were extracted through a number of questions about their degree of involvement in the programme and attitude scale statements. According to question D1, 21,7% of the children that completed the questionnaire are members of the environmental committee. This percentage would correspond to a number of 6 children in a class of thirty, which is about the size expected for a class's environmental committee.

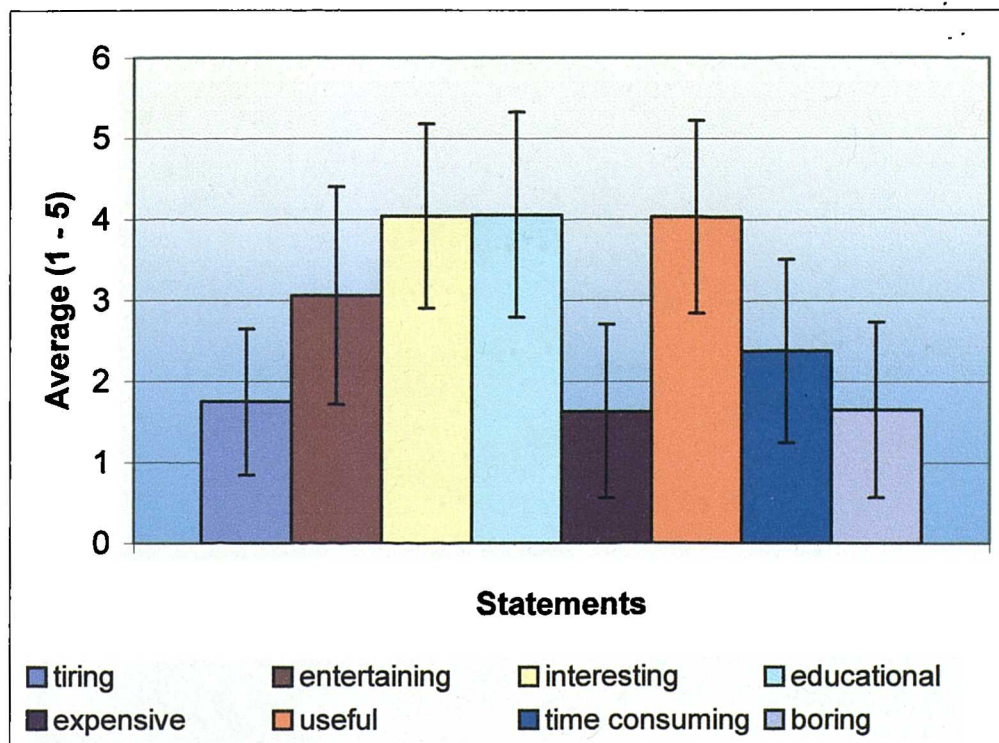
Level of involvement:

Question D2 was a detailed list of possible tasks; environmental programme's duties for a student to perform. It appears that each student is responsible for at least 2 tasks out of the 10 listed (average=2,31 and Standard Deviation=2,1). The two most popular tasks were classroom and school grounds cleaning (65,4% and 44,3%), and the least popular were the monitoring activities: electricity consumption 7,2% and recyclable materials 6,6%. A quite significant percentage of students stated that they apply many of those

activities (or equivalent) at home with their families too (72,1% some of the activities and 15,4% all the activities).

The following graph shows the average of students' attitudes and opinion about the programme, using a 1 - 5 scale where 1 :not at all, 2: a little, 3: quite, 4:very and 5:extremely, as well as standard deviation (Fig. 8.8.).

Fig. 8.8. Students' attitudes and opinion of the programme



Students clearly get sufficiently involved in the programme and have good attitudes towards it, since they find that it is very interesting, very educational and very useful. This fact is reinforced by 96% of the students who indicated that they wished for the continuation of the programme.

RQ 4.2 “What motivates the students?” was investigated through a group of statements of programme activities or events which were likely to motivate student participation. These statements used the same scale as the previous question. What motivates the students the most is the award (Mean:4,2 and S.D. 1,2). The fact that their efforts will be rewarded and recognised makes them work harder. The second most motivating activity were the special visits (Mean: 3,9, S.D. 2,4). Special visits offer first hand experiences, and therefore promote experiential learning. According to literature, (Knapp, 1995), experiential and action learning are the most effective approaches for attitude inculcation.

The importance of the special visits and practical activities was triangulated and will be further supported during the presentation of the results obtained by the document analysis of the evaluation report and the teachers’ interviews. Most of the interviewed teachers observed a more significant attitude impact on their students after a special visit, than with any other activity.

“Q. Have you noticed any kind of activities, from the ones you did with your class, to be more effective in cultivating attitudes and environmental awareness?”

A. Yes. The visits, the visits and the invited speakers, the fact that responsible people, specialists, with experience came to speak to the children... it is something of a different status to have an operator from the electricity authorities explaining to them (the children) the same things. Children face that person in a different way ... during a visit, I noticed that when we left, the water treatment plant for instance, where they had heard about the importance of the water, they were “AAAhhh!!!!” amazed and

excited. "We must be more careful, take care of the water", ..." (School 'C' Coordinator)

Since one of the programme's aims is the communication of the results, schools are encouraged to employ mass media for this purpose (television and press). These were activities which the students stated that they enjoyed quite a lot ($X=3,52$, $S=D1,5$ and $X=2,98$ and $SD=1,4$ respectively).

Particularly motivating appears to be the practical use of waste for creative constructions ($X=3,5$ and $SD=1,4$), a fact that indicates the importance of practical hands on activities and participative learning. The fact is reinforced by statements made during the interviews: *"... Generally, the more practical the student's participation, it is widely accepted that it has a greater impact on his behavior"* (School B Coordinator).

8.1.2 Teacher Questionnaire

The inappropriateness of the moment of administration in some schools (December) (Cohen and Manion 1994: 97) resulted to a response percentage lower to the one anticipated. (~50%: 78 questionnaires out of 161 teachers) Nevertheless it was an acceptable number (78).

Analysis of the teacher questionnaire was performed using SAS and SPSS statistical packages. Initially an independence test was applied to verify that the sample used was not biased. Indeed, the sample was neither gender biased, nor was there any education biases between the Eco-School teachers and the non-participating schools' teachers. In all three cases, the association x-square was below 2, which makes the test significant.

Description of the sample

Seventy three percent of the sample was women and 27% was men. The sample was not gender biased since, both the Eco-Schools sample and the non-participating schools sample, have a similar proportion of male and female teachers. From all the samples, only one person (1,28%) was a graduate of the old teacher's college, which offered only 2 years of initial training. Seventy four percent of the sample graduated the Pedagogical Academy of Cyprus which offered 3 years of training. The Academy graduates were offered an additional year of training by the university of Cyprus and Greek universities, for obtaining the BEd, so it was not surprising that 78,9% of the sample stated that they have a BEd. Fifteen percent were qualified with an additional postgraduate degree in education. The same proportion in the teachers' education was also observed in the Eco-Schools sample and the non-participating schools. Therefore, there was no bias in teachers' education either.

Working experience was grouped in four categories according to the years of service each teacher had. Considering the sample size and the common group characteristics (inexperienced teacher, young experienced teacher, experienced teachers and mature teachers), irregular intervals were used in order to have each age group evenly represented.

Table 8.3 Teachers' working experience

Number of Years of service	1 – 5 years	6 – 10 years	11 – 20 years	More than 20
% (n=78)	24,05%	25,32%	21,52%	29,11%

Working status representation in the sample was:

Table 8.4 Teachers' working position

Job Title	Classroom teacher	Sub director	School manager
% (n=78)	81,01%	12,66%	6,33%

Another independent variable which is important to present is the amount and source of environmental education received by the teachers. Nearly 49 % stated that they did not receive any environmental education training during their initial teacher training. A quite high percentage also stated that they did not attend the optional INSET courses offered by the Pedagogical Institute on environmental education (80% stated no). Other environmental education seminars organised by NGOs were still poorly attended by this sample, (75% stated no). Finally, 96,25% of the teachers stated that they are not registered with any environmental organisations.

In part B, of the teacher questionnaire, question B1 investigated the level of environmental education integration in the curriculum subjects, using a 1 – 5 scale where 5 is the maximum integration level and 1 is the minimum, provided that the teacher teaches the subject³.

³ One teacher does not necessarily teach all subjects in his/her class. Some discipline teaching can be interchanged between teachers or distributed by the headmaster, according to staff's specialisations and preferences. So a teacher that is specialised for instance in geography and does not like teaching music, can have another teacher giving music classes in her class and she could give geography classes in another.

Table 8.5 Environmental education integration in the curriculum disciplines

Curriculum Subject	Mean	S.D.
Greek Language	3,3	0,85
Mathematics	2,1	0,89
Science	4,19	0,79
Geography	3,8	1,05
Study of the Environment	3,9	1,10
English Language	1,7	0,85
History	2,4	1,06
Music	1,9	0,88
Art	3,8	0,96
Design Technology	3,2	1,08
Physical Education	2,2	1,19
Religion Education	2,5	1,11
Home Economics	3,4	1,26

The highlighted cells indicate the disciplines, which appeared to be the most convenient for environmental education integration and obtained a higher mean compared to the rest.

These are science, ($\bar{X}=4,19$) , study of the environment (which is part of the social studies curriculum) ($\bar{X}=3,9$), geography ($\bar{X}=3,8$), (which is also part of the social studies curriculum) and art ($\bar{X}=3,8$). Home economics and language classes, also appear to

provide sufficient opportunities for environmental education integration. The subjects which approach minimum environmental education integration are: English language classes ($\bar{X}=1,7$), music ($\bar{X}=1,9$) and mathematics ($\bar{X}=2,1$).

The following question (QB2) examined the level of application of both indoor and outdoor extracurricular environmental activities such as assemblies, tree planting, annual beach cleaning campaign, special visits, debating, recycling, etc. The answer to this question provides the frequency of application of these activities, and by checking this information with the school which had the best test results, the first part of research question RQ 2.2 can be answered: Which successful practices have the teachers employed? Which of these practices were more effective in inculcating environmental attitudes?" The effectiveness of the tasks would be derived from the frequency with which they were applied with respect to the environmental score obtained by the school.

QB2, also provides information about the activities that were most popular amongst the teachers and most convenient to apply. The most popular indoor activity is using waste materials for creative activities ($\bar{X}=3,4$), followed by debating and discussing environmental issues ($\bar{X}=3,3$). The most popular outdoor activity is the collection and monitoring of recycling materials. Outdoor activities that take place outside school grounds were not favoured, perhaps due to time limitations or safety reasons. These, nevertheless, were precisely the activities that students in the questionnaire, stated that they enjoyed the most (80,9% of the children stated that they enjoy outdoor visits quite a lot – extremely). In teacher interviews the value of this type of activities as most effective on promoting environmental action and awareness was highlighted.

Table 8.6 Environmental education through extracurricular activities

ACTIVITY	MEAN	SD
Participation of the class in the annual assembly for the environment	3,2	1,04
Tree planting	2,8	1,30
Make use of environmental content mathematics problems	2,4	1,08
Organise special visits (e.g. forestry department, dams, desalination units, waste disposal units, etc.)	2,5	1,04
Field study	2,1	1,01
Participation in the annual beach cleaning activities	2,1	1,33
Make use of “rubbish”, for artistic creations	3,4	1,15
Essays and assignments about environment	3,2	1,2
Discuss over environmental problems (e.g. greenhouse effect, acid rain, pollution, etc.)	3,3	1,18
Recycling	3,4	1,14
Try to minimize waste produced in the class	3,3	1,13
Outdoor activities – teaching (environment is not necessarily part of the activity, simply the place where the activity takes place)	2,4	1,06

Both questions QB1 and QB2 indirectly provide information about the teachers' motivation for incorporating environmental education in teaching, through the curriculum and through extra curricular activities. Thus each question was converted to one variable indicating the environmental education incorporation level in the curriculum and the level of environmental education extracurricular activities application, respectively, following the 1 – 5 scale. Used as motivation indicators, these questions in function with the independent variables were used to determine the profile of the teacher who incorporates environmental education and the profile of the teacher who is willing to add extra-curriculum activities in his/her programme.

For this purpose, multiple regression analysis was used and two models were tested.

Description of model 1: The teacher profile which determines the environmental education integration level in a class.

The environmental education curriculum incorporation was examined in function with a number of independent variables: gender, education (questions A3.1 – A3.4), working experience (A4.1 – A4.4), status (A5.1, A5.2, A5.3), teacher's teaching in more than a class/year (A6), teacher's teaching one or more subjects (B1), teacher training (A8.1, A8.2 and A8.3), environmental issues promotion by the management (B4), additional application assistance (B6.1 – B6.4).

Fig. 8.9. Formula for the EE Curriculum integration model

$$EEInt. = f(G, Ed., Exp., Stat., Sub., Yr., TT., Mgt., Aid, Part).$$

EEInt. = Level of Environmental Education Curriculum Integration

G = gender

Ed.= Education (BEd, postgrad.)

Exp. = Working experience

Stat. = Working status (position: simple teacher or managerial position)

Sub.= Subjects taught by the teacher.

Yr.= Classes s/he teaches (e.g. year 1)

TT= Teacher training (initial, PI INSET training, NGO – organisations' seminars)

Mgt.= Level of EE promotion by the school management

Aid = Possible application assistance by the ministry of education

Part. = Eco-School or non participating school

There was strong statistical evidence that the explanatory variables in the model were related to the expected environmental education incorporation value. The following table includes only the variables of the formula that were statistically significant.

Table 8.7: Model 1 coefficients of the independent variables, determining the profile of the teacher who is more likely to integrate environmental education in his/her teaching.

	Coeff.	t-Test
Intercept	1,58	3,43*
Stat. (1:manager, 0: simple teacher)	0,14	1,27
Postgraduate Education (1: yes, 0:no)	0,42	2,28*
PI INSET Training (1: yes, 0:no)	0,66	3,73*
Part. (1: yes, 0:no)	- 0,32	-2,12*
Sub. (number of subjects taught 1 – 13)	-0,06	-3,11*
Aid. (School based INSET)	0,12	1,67**
Mgt.	0,42	5,10*
* = significant > 95%		
** = significant 80 – 95%		

The explanatory variables of the model explain 48% of the reasons responsible for environmental education integration (R Square = 0,48).

These variables (explanatory variables) represent 48% of the factors that influence the level of environmental education integration in curriculum teaching ($R^2 = 0,48$). The remaining 52% represents the rest of the factors that could interpret / affect the dependent variable (environmental education integration level). These were factors not accounted for by the questionnaire, since they may not be obvious, or easy to measure.

48% is considered to be satisfactory (Tatsuoka 98). The intercept provides the background environmental education integration level, regardless of any other variables that might have an impact on the teacher. Starting with an intercept⁴ of 1.58, the integration level is likely to increase by 0,14 if the respondent has a managerial position in the school. It increases by 0,42 if the teacher has postgraduate studies, 0,42 if the school management promotes the issue and a further 0,66 points if the teacher has attended the Pedagogical Institute's Environmental Education INSET programmes. The integration level would increase further by 0,12, if school based INSET was available. The most determining factors are the Pedagogical Institute INSET training (0,66) and the importance that the school management gives to environmental issues and teachers' education.

The number of subjects a teacher teaches appears to have a negative effect. This is reasonable observation because the more subjects a teacher has to prepare for, the less time there will be for preparing something extra. Therefore, the subject number variable has a negative coefficient. A negative coefficient also appeared with the participation variable. These results indicate that if a teacher works in an Eco-School, it is likely that they will diminish the integration level by 0,32. Even if this does not seem to be reasonable, it can be explained if we consider that the Eco-School teachers are better aware of the variety and spectrum of things that they could apply with their classes and therefore they are strict judges of themselves and the amount of things they do. In order to calculate the expected level of environmental education curriculum integration, each coefficient has to be multiplied by the respondent's statement on each independent variable. After that the sum of the products will provide an estimation of the level at

⁴ Any teacher is at least 1,58 (max. 5), willing to integrate E.E. in his/her teaching.

which the particular teacher is likely to incorporate environmental education in curriculum teaching, within a 1 – 5 scale. (Scale is 1 – 5 since the model provides an estimation of what a teacher might answer to environmental education integration level question, (QB1) according to his/her personal profile, i.e. independent variables).

The model function can be made clearer through an example.

In a hypothetical case, teacher X, for instance, is a classroom teacher, with postgraduate studies. She has no managerial duties (status:1). She works in an Eco-School and has attended the INSET seminars of the Pedagogical Institute on environmental education. The school management promotes environmental education in the school and try with every opportunity to organise school based seminars on the issue, either with the help of the institute or environmental organisations' invited speakers.

Table 8.7.1 Model 1 Application Example

	Multipl. With coeff.		EEInt:
Intercept			+1,58
Stat: (classroom teacher): 0	0 x 0,14	=	0
Postgraduate studies:1 (yes)	1 x 0,42	=	+0,42
Part: 1 (Ecoschool)/	1 x (-0,32)	=	-0,32
PI INSET :1 (yes)	1 x 0,66	=	+0,66
Mgt: 5 (The mgt. promotes EE)	5 x 0,42	=	+2,10
Aid: 1 (school based INSET provided)	1 x 0,12	=	+0,12
Sum	EEInt	=	+4,56

This teacher therefore, is likely to integrate the environmental dimension quite a lot (4,56 when 5 is maximum). Nevertheless, if the same teacher teaches a great variety of curriculum subjects (e.g. 5) this number will decrease by 0,60.

$$5 \times (-0,12) = -0,60 \quad \text{EEInt.} = 4,56 - 0,60 = 3,96$$

The overall model is significant because $F = 9,14 (>2)$.

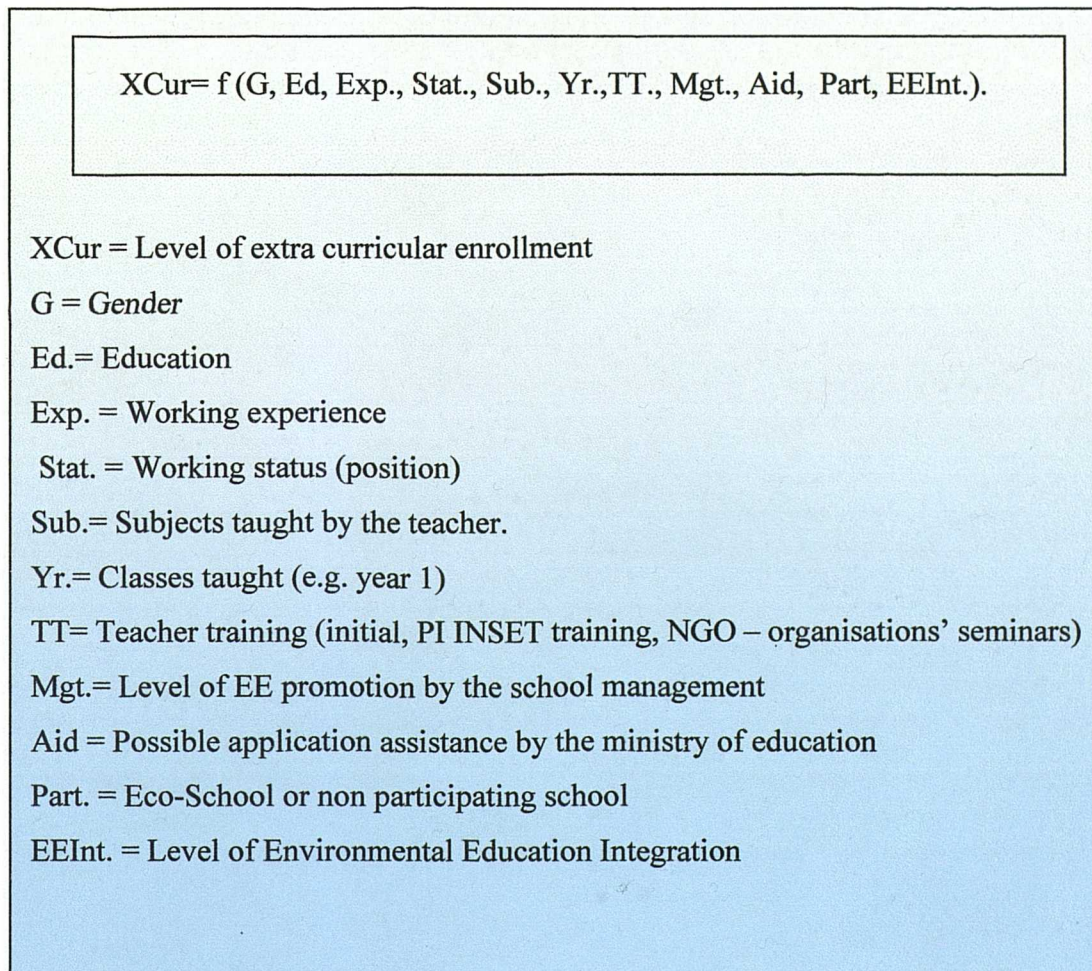
Using the results of this model we can answer the research question “RQ 2.1: What motivates the teachers?” Teachers appear to be motivated and willing to increase the environmental education integration level in their classes, if they are provided enough training and support from the Ministry of Education (Institute and school based training). An extremely motivating factor is the management’s attitude towards the issue. A school teacher who has the management’s support for the promotion of environmental education will achieve a significant integration level. A high workload such as teaching a large number of curriculum subjects is discouraging rather than motivating for environmental education integration. Finally the results indicate that the teacher’s education and position - experience in the school, is also a factor that can positively influence the integration level.

Description of model 2: The factors which influence the level in which a teacher will involve his/her class in EE extracurricular activities.

The second model introduces the new dependent variable: level of extracurricular enrolment (Xcur) in function with all the independent variables mentioned in the previous model plus the environmental education curriculum integration level. The new

independent variable (EEInt) is created by calculating for each teacher (case) the average of B1 question in the teachers' questionnaire, which is a 1 – 5 scale question.

Fig. 8.10. Formula for the EE extracurricular implementation



There was strong statistical evidence that the explanatory variables in the model, were related to the expected extra curricular enrolment in environmental education activities. The table below presents only the independent variables of the formula that were statistically significant.

Table 8.8: Model 2 coefficients of the independent variables, determining the profile of the teacher who is more likely to enrich teaching with extracurricular E.E. implementation.

	Coeff.	t-Test
Intercept	0,16	-
EEInt. (1 – 5)	0,39	3,47*
Stat. (1:manager, 0: simple teacher)	0,13	1,07*
PI INSET Training (1: yes, 0:no)	0,49	2,47*
Part. (1: yes, 0:no)	0,48	2,95**
Mgt. (1 – 5)	0,13	1,3**
* = significant > 95%		
** = significant 80 – 95%		

These variables (explanatory variables) represent 51,2% of the factors that influence the level of enrolment in environmental education extracurricular activities. ($R^2 = 0,512$).

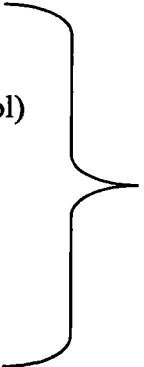
In the same way as the model 1 was explained, we can observe that what mostly encourages a teacher to organise extracurricular activities (indoors and outdoors), for his/her class, is the INSET s/he received (+ 0,49). Another important factor is the school's participation in the Eco-School Programme (+0,48). Moreover the higher the environmental education integration level in the curriculum, the more likely the class is to be involved with environmental education extracurricular activities.

For example:

Teacher N, is a school sub-director, whose school does not participate in the programme. He has attended Pedagogical Institute INSET because he wants to be informed about the issue. The school manager is not very enthusiastic about environmental education and therefore teacher N stated a 2 on management promotion of environmental issues. About himself, he states that he manages to integrate environmental education in the curriculum in an average level and therefore obtains a 3 on EEInt.

The classroom of this teacher is likely to be enrolled in extracurricular environmental education activities .

Table 8.8.1 Model 2 Application Example

Intercept		0,16
Stat: 1 (Subdirector)	 Multiplied by the corresponding coefficient	$1 \times 0,13 = 0,13$
Part: 0 (Non Part. school)		$0 \times 0,48 = 0$
INSET: 1		$1 \times 0,49 = 0,49$
Mgt: 2		$2 \times 0,13 = 0,26$
EEInt: 3		$3 \times 0,39 = 1,17$
SUM.....		$X_{cur} = 2,21$

So, on a scale from 1 – 5 (5: maximum enrolment degree), this teacher will be expected to organise and involve his classroom in extra-curriculum activities to a low degree ($X_{cur} = 2,21$).

(Both models can be very useful especially for policy making or simply promoting environmental education issues because they can provide information about factors which are very likely to contribute to success. Practical contribution and application of the models is discussed in the final chapter.)

Teachers' questionnaire also searched for answers to research questions 2.1 and 2.3:

- RQ 2.1: What does each of the interested parties comment on the National environmental education policy presence in Cyprus primary education?
- RQ 2.3. Which teaching approach would they recommend for environmental education implementation?

Both were answered by question B5 of the questionnaire.

This was also supported quantitatively by the following table:

Table 8.9: Curriculum implementation method preferred (n=78)

	Integrated approach	Separate Topic
Most likely to succeed	63%	37%
Ideal method	77,8%	22,2%

The majority of the teachers support that a form of the integrated approach (cross-curricular) is the ideal method for introducing and implementing environmental education in school and it is also the most likely to succeed (63%). There is a significant percentage which, although aware of the benefits of integration, are still sceptical about the implications of its practical implementation ($77,8-63=14,8\%$).

For example, a sceptical teacher stated that he considers the cross-curricular approach to be the ideal implementation method and the most likely to be successful, but in the open-ended comment to the question he poses the condition that appropriate material and literature support must be provided to the teacher. He also comments that *“...the teacher must have, prepared subject inserts of environmental interest, available within the curriculum and training as far as interdisciplinary approach is concerned.”*

Another teacher, considers the cross-curricular approach to be the most appropriate, but she believes that as a separate subject in the curriculum it will have a better chance of being applied: *“It is better to have it at a designated time in the school programme along with special student and teacher handbooks”*.

RQ 2.4 *“Which would be the role of each of the interested parties for an effective implementation of a national programme?”* was partially answered in the open-ended part of this question and completed through the in depth interviews which will be presented in the following subchapters. In the questionnaire teachers stated that they consider environmental issues to be important and therefore they consider necessary the integration of environmental education in the curriculum and school aims necessary. Most of the teachers also pointed out the necessity for a teacher’s handbook or guide for teaching environmental issues, regardless if this is going to be implemented as a separate curriculum subject or a cross-curricular one. All this requires action on behalf of the Ministry of Education which is challenged by the teachers with: *“...an overall revision of the Curriculum and its modification so as to satisfy the contemporary needs of Education, children’s interests and time restrictions”*.

In order to investigate research question 4.7: “RQ 4.7. Which factors can support the teachers’ task?” the researcher presented a number of statements and asked the respondents to state how helpful the suggestions might be (scale 1 – 5, 1: minimum assistance and 5: maximum assistance).

Table 8. 10 Results of Question 6. Teachers questionnaire. n=78.

Q6. According to the Ministry of Environment and Agriculture, environmental education has to be introduced in all levels of education, with special emphasis in primary and secondary education. The method suggested by them is the integrated method. If this will finally be the method to be used, to which extent do you think the following suggestions would be helpful?

	MEAN	SD
Adjustment of the Curriculum with changes and/or additions to the teaching matter which would bear in mind the environmental dimension	4,08	0,80
Adjustment of the books with changes and/or additions in the teaching matter which would bear in mind the environmental dimension	4,22	0,81
School based EE Seminars	4,17	0,95
EE Seminars in P.I.	3,86	1,02

All four statements are considered to be very helpful. The same issue was triangulated and further examined through the in depth interviews with the school teachers and managers (case studies).

The last part of the questionnaire was addressed only to the Eco-School teachers. It investigated their level of involvement and asked for their opinion on the programme and benefits they received through Likert scale questions were; 1: nothing, 2: a little, 3: enough 4: much, 5: very much.

According to the results, the programme provided teachers with opportunities to:

Table 8. 11 Teachers' benefits from the Eco-School Programme (n=36)

	\bar{X}	SD
Get informed about environmental issues	4,10	1,03
Enrich your teaching practice	4,03	0,92
Improve communication with your students	3,57	1,37
Improve school environment	3,96	0,96
Actively contribute to the protection of Natural Environment	4,03	1,17

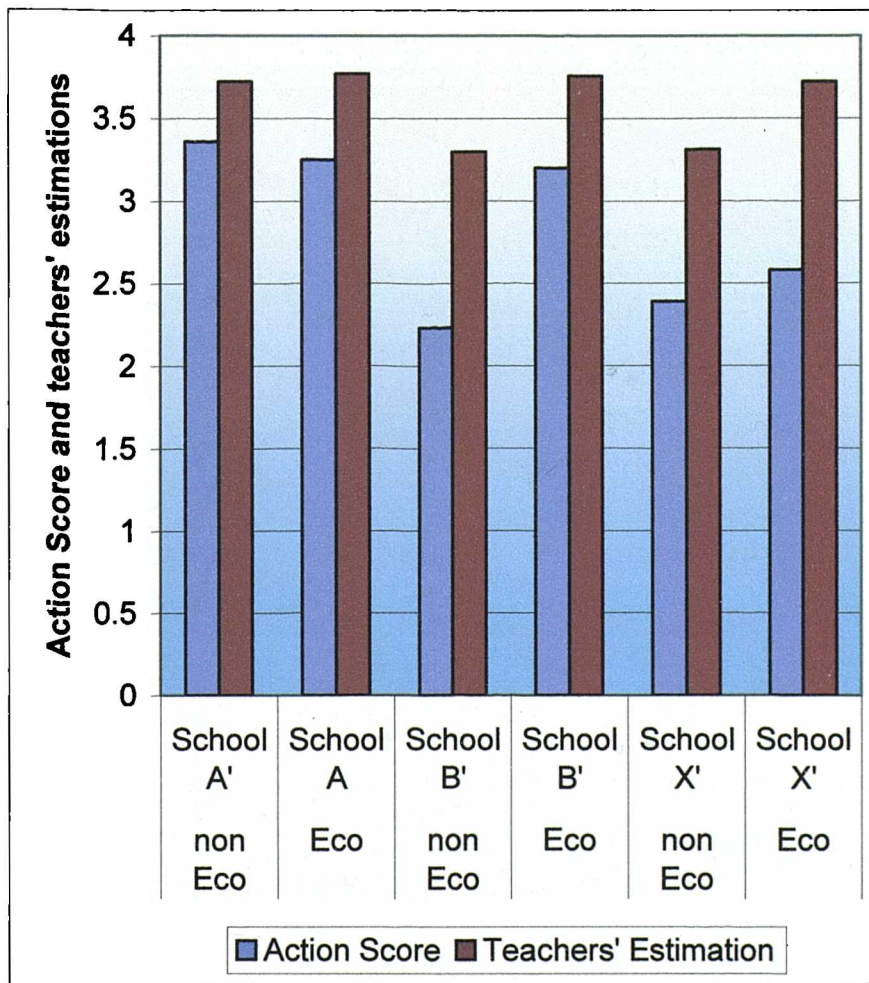
The teachers were also questioned about the programme's impact on their students. They were asked to state the impact level they observed particularly on the following issues: Students' Group work and cooperation, students' achievement, behaviour in class, environmental awareness, behaviour towards peers, initiatives, action for the environment. Out of these, only the environmental awareness and action for the environment, according to the teachers' opinion, are significantly reinforced by the programme (average = 3,9 and 3,7 respectively). The rest of the possible educational objectives are simply slightly influenced by the programme.

As far as the teachers' personal information on environmental education and environmental issues is concerned, the most common information sources appear to be their fellow teachers (3,74), personal study, the media and INSET.

8.1.3 Questionnaire Triangulation.

The comparison of the student's environmental action with their teacher's objectivity when estimating their student's environmental action level, was made possible through the triangulation of the students' environmental action score and the teachers' answer in questions B3.1 – B3.10.

Fig. 8.11 Triangulation of Teacher's estimation of their students' environmental action and action score obtained by the students.

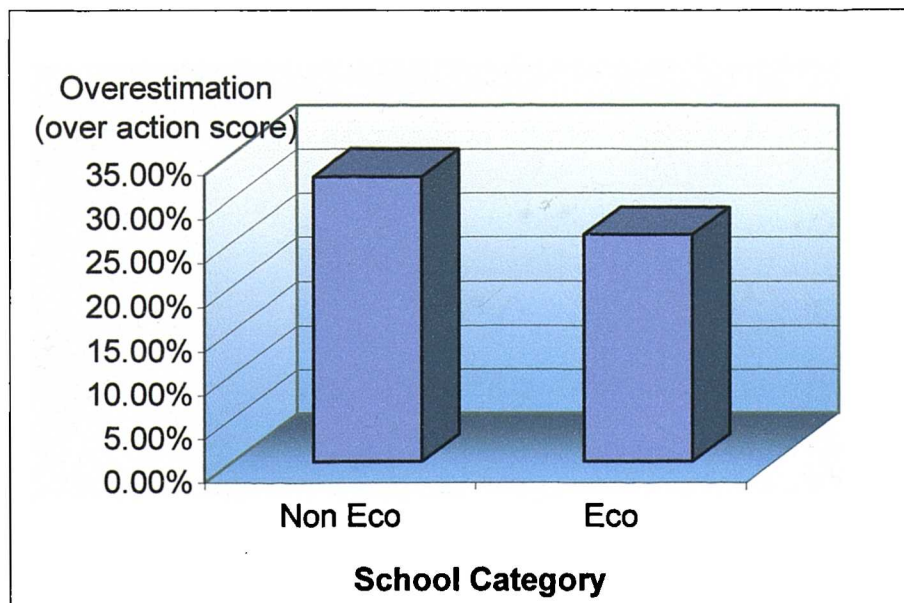


For this purpose, due to the limited teacher questionnaires returned, only three pairs of schools were used. All six schools are big schools, the first pair from Famagusta district, the second pair from Larnaka and the last (Schools X & X') from Nicosia.

A student's maximum possible environmental action score was 6 whereas question B3 in the teacher questionnaire, estimated students' environmental action using a scale of 1 – 5. Therefore in order to create a score of the teachers' estimations about their students' environmental action, equivalent to the students' action score (max.6) the average of question B3 was calculated and transformed its weight⁵ from 5 to 6.

It appears that all teachers overestimated their students' environmental actions, nevertheless, the teachers of the Eco-Schools, were more realistic about their students potential.

Fig. 8.12. Teachers' overestimation of their students' environmental action level.



⁵ i.e. Teacher Estimation Score/6 = Average teachers' estimation/5, therefore, Teachers' estimation score = (Average teachers' estimation X 6) / 5 .

8.2 Case Study of the three Eco-Schools

8.2.1 Document Analysis

The document analysis was a comparative analysis of the evaluation reports submitted by the three case study schools¹. The comparative study was performed for each of the 12 common questions – issues that the schools were expected to answer or provide relevant information.

The analysis investigated three of the research questions:

RQ 4.2: What motivates the students?

RQ 4.3: Which useful practices had the teachers employed during the programme implementation?

RQ 4.4: Which practices can be more effective for the inculcation of environmental attitudes?

Revealing the differences in the variety, quantity and quality of the activities and practices each school employed, could highlight the factors that motivate the students and reveal a pattern for more effective environmental attitude inculcation. It could also help interpret the school ranking in the test results. This was achieved through the comparison of the reports of the three case studies. Along with the answers for the research questions, the evaluation reports provided information about additional factors

¹ School A: school that achieved highest score in test, School B: school that achieved an average score, School C: school that achieved lowest score in test.

such as the structure and organization of the programme within each case study as well as curriculum implementation issues.

The results of the comparative analysis are presented according to the order of the questions. Special reference to the research questions is provided within the analysis.

QUESTION 1. Which people constitute the Eco-Committee of the school?

Table 8.12. School staff participation in the committee

	School management	Teacher coordinator	Teachers	School cleaners	Child care
School A	2	1	6	1	1
School B	3	1	3	1	-
School C	1	1	9	-	-

Table 8.13. Local Community members in the environmental committee.

	School maintenance committee	Local authorities	Parents association	Secondary school links	Energy specialists
School A	2	1	3	1	2
School B	1	3	1	-	2
School C	-	-	-	-	-

Table 8.14 Students participation in the environmental committee.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Student committee reps	total
Sch.A	2	2	2	4	4	4	2 (other than previous)	20 (out of 274, entire school)
Sch.B	-	-	-	Not stated	Not stated	Not stated	11	11 (out of 320, entire school)
Sch.C	-	-	-	Not stated	Not stated	Not stated	Not stated	Not stated

School A managed to involve more effectively the entire school community in the environmental committee and especially ensured a balanced participation of children from all age groups. They also invited specialists to assist them with the topic of the year, which was energy. The same, but in a lower degree was achieved by school B.

School C presented a large number of teachers involved, but further on in the document, clarified that only 6 of the 9 teachers were initially involved in the programme and eventually 3 of these opted out before completing their responsibilities. The fact that they also failed to provide the number of students participating in the committee could reveal lack of organisation and commitment.

Information about school and community communication and cooperation was also available in document questions 8 and 9. In all cases, communication with local

authorities and community was held through schools' newsletters and members' participation in the committee meetings (which were not many in full body). The help received by the schools from the community and authorities was either financial (for school improvement and maintenance) or in the form of a visit. The visit could be from the school to a place within the community (school A) (e.g. oil refinery or power plants) or a visit from a community member, as specialist on energy issues, which was the topic of the year (schools A and B).

QUESTION 2. How was environmental audit organized?

The three evaluation reports revealed that there weren't any major differences in the way environmental audit was performed. All schools used the environmental audit checklist from Eco-Schools teacher handbooks and distributed work, either through class or via the student members of the committee.

QUESTION 3. How were the targets of the action plan decided? (RQ 1.2)

For all schools the committee decided the final targets, taking into consideration the results from the audit and coordinators' suggestions. Only School A used specialized guests to assist the committee meetings and gave the students the opportunity to put down their suggestions. The whole procedure in school A appears to be more democratic and involves a greater number of children (suggestion box available to everyone).

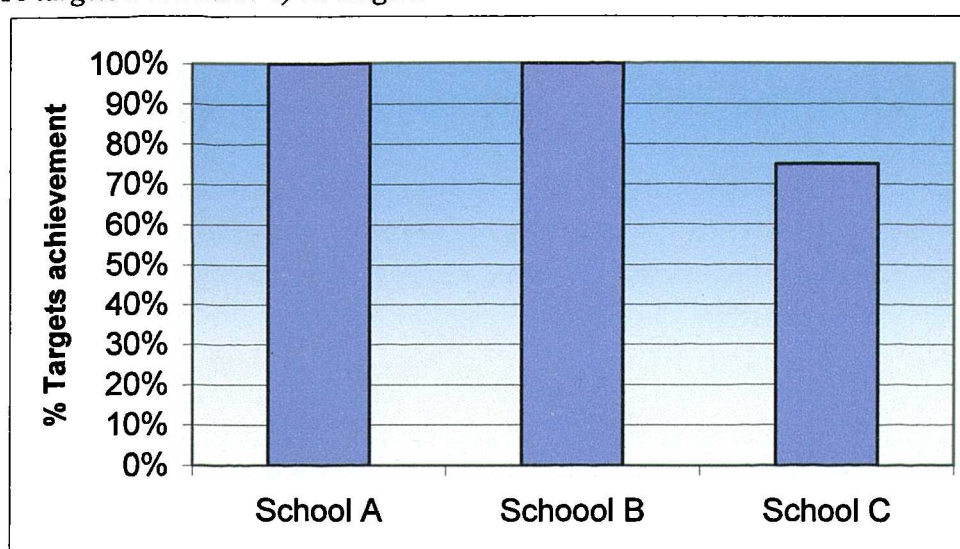
Action plan was:

Table 8.15. Development of the Action Plan.

	Decided by	Based on	Applied by
School A	Entire committee	Students' suggestions Specialist presentations Adults suggestions (members of the committee) Coordinator's ideas Environmental audit Previous years' experience	All school
School B	Entire committee	Environmental audit Previous years' experience	Classroom distribution
School C	Entire committee	Environmental audit PI seminars (coordinator's experience) Previous years' experience	Classroom distribution

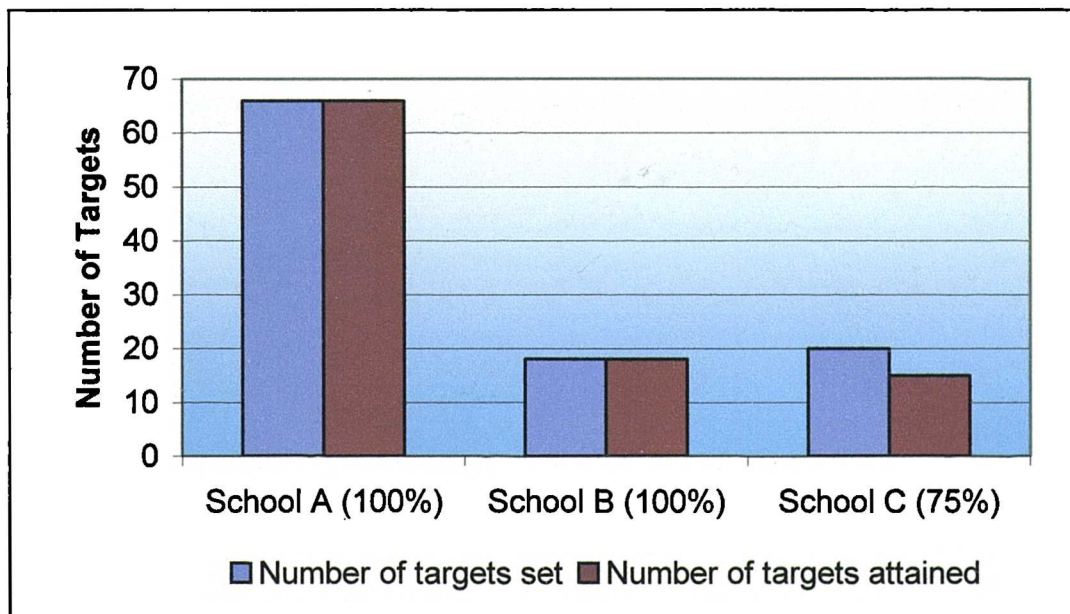
QUESTION 4. In which degree did the school achieve the targets?

Fig. 8.13 Target achievement in three schools: School A set 66 targets, School B set 18 targets and School C) 20 targets.



Schools A and B stated that they have completed almost 100% of their targets and school C 75%. Nevertheless, differences did not only exist on the school's target achievement percentage, but also the number of targets set. Although Schools A and B both achieved 100% of their set targets, the number of targets set by each school was different. Schools B and C set approximately the same number of targets: 18 and 20 respectively. School A set 66 targets. The difference in the number of targets set could be irrelevant, if schools B and C had set multiple targets, which numbered less, but covered equally as much as school A. Therefore, the schools' Action Plans were studied in order to compare each target's complexity and weight. It resulted that each target in all three action plans was of the same weight and complexity. Therefore, the difference in the number of targets between school A and the other two schools indicated the difference in the extent the three schools worked.

Fig. 8.14. Number of Targets set and Achieved by each school



Considering the characteristics of the schools (number of students and teachers), the target number would be expected to be vice versa. Action Plans and the targets are submitted for approval, at the beginning of the year, to the National Operator. The Eco-School Award does not imply a competition between schools, but “competition” of each school with itself. Nevertheless, where the differences between the schools are not radical, the differences between the school targets should not be expected to be so.

QUESTION 5. How is the process monitored and evaluated?

Fig. 8.15 Monitoring Process:

	Person in charge	Tool used	Feedback and motivation
Sch.A	Coordinator and teachers responsible	Action Plan Diary	Memos to responsible teachers
Sch.B	Committee	Not stated	Prizes or reminders
Sch.C	Coordinator and class teacher (since tasks were distributed)	Not stated	Not stated

The programme monitoring in all schools is operated by the programme coordinator and other teachers. School A provides two clear monitoring methods whereas the two other schools fail to do so. School C, does not seem to have a way of providing feedback and motivation to the programme participants in the school either.

QUESTION 6. Write the number and ages of the children involved in activities through the curriculum and information on the topics covered.

Tables with details about the numbers and specific activities employed are presented further ahead as well as in appendix IX. All schools state that all children participated in the programme. The level of participation, though, varies. In School A all children participated in a number of common activities, but in other schools the activities were distributed in classes (age groups). In this case, children did not acquire a holistic view of the topic: they only experienced the activity applied by them. This is made explicit by a comment of the teacher coordinator of B Primary school: “... *all children actively participated at a point of the programme*”.

In general, the activities performed in all schools were similar. Nonetheless, the distribution of the activities in the various classes was different. Consequently, although the school as a whole could demonstrate a variety of activities, each class had a limited experience of environmental issues (School C). Some of the activities in Schools B and C were even applied by groups of children. The school with highest performance (School A) directed all of its activities to all classes and in this way achieved two things: firstly everyone was involved in all of the activities, and secondly these activities clearly gave children an obvious common purpose and team spirit. School A was more effective in inculcating environmental attitudes to the students, perhaps because they participated in a great number and variety of activities in the classroom as well as in whole school activities that offered them a lot of experiences.

The activities can be grouped into four categories: indoor activities and outdoor activities, specific age group directed activities and entire school activities. The following table illustrates the variety of activities performed by all schools and their distribution in the 4 categories.

Fig. 8.16 Categories formed by the grouping of the activities

Vs	Indoors	Outdoors
Specific Age Group	<ul style="list-style-type: none"> Curriculum oriented indoors classroom activities 	<ul style="list-style-type: none"> Curriculum oriented outdoors classroom activities Visits Monitoring and investigations for materials collections
Whole school	<ul style="list-style-type: none"> Poetry competition Song Composing Competition Assemblies Guest speakers <p>Material collection (e.g. aluminium tins for recycling, or clothes for Red Cross donations...)</p>	<ul style="list-style-type: none"> Tree planting Patrols (energy saving patrol, water saving patrol) Garden, school grounds maintenance

Table 8.16. Categories and number of activities per school.

	School A		School B		School C	
	Indoors	Outdoors	Indoors	Outdoors	Indoors	Outdoors
Specific age group	33 (average 6 activities per class)	4	8 (the same 8 in all classes)	3	4	1
Whole school	12	5	4	4	2	1

Table 8.17 Number of age focused and whole school activities in each school.

Activities	Classroom activities	Whole school activities	Guest speakers	Visits
School A	21 (some activities were the same in various classes)	14	3	3
School B	8	6	2	1
School C	4	4	-	-

School A provided some photos to support the report which were included in appendix X'.

QUESTION 7. Describe your school's action day.

Fig. 8. 17. School's Action Day

School A	Environmental week devoted to Energy (Link with Design and technology: photovoltaic cells used on model cars and model houses)
School B	Every last Friday of the month, env. day.
School C	School cleaning campaign Use the least possible energy School grounds improvement Environmental Curriculum

Only School C strictly held one action day. School B had organised it on a regular basis which means that at least 6 environmental action days were organised (some occasions would have been lost due to holidays) and School A had an entire week devoted to environmental action.

QUESTION 8. How was the community informed about the Eco-Sschool Programme and how did they respond?

Fig 8.18 School – Community Communication I

Sch.A	Leaflet publication and distribution to all houses Use green flag on school parades Poster with Eco-Code Participation in Committee Community specialists visit school
Sch.B	Community representatives visit school Leaflet distributed in community Positive reaction from community
Sch.C	Children inform family Parents association newsletter includes a special column on Eco-Schools Publication of leaflets and a story book (Y4.1)

Apparently school A found more means of informing and involving the community in the programme activities. They were more effective in disseminating their Eco-Code through the publication of a poster and involved more community members in the committee.

All schools published either a leaflet or a newsletter on environmental news and although not stated, all schools informed families through the students.

QUESTION 9. Describe any contact your school had with the broader community (help, publicity, financial support ...)

School A, again, had achieved the high contact and communication levels with the broader community fact which provided them with significant practical and financial assistance for the completion of their targets.

Fig. 8.19. School Community Communication II

Sch.A	<p>Communication with other primary schools in area (art competition)</p> <p>Cooperation with school maintenance government authorities (sponsored art competition, a gardener and poster printing expenses)</p> <p>Cooperation with municipal authorities (sponsoring poetry competition)</p> <p>Cooperation with secondary school and high-school of the area</p> <p>Invited speakers from community (presentations on fuel and energy saving)</p>
Sch.B	<p>Municipal Authorities (sponsored dustbins in the yard and cleaned grounds around school)</p> <p>Parents' association support</p>
Sch.C	Cooperation with community for aluminum tin recycling

QUESTION 10. Include Eco-Code and describe how it was formed

The Eco-Code developed by each of the schools is presented in Appendix IX, question 10. There were no significant differences between the three cases. The way in which the Code was written was also similar. School A wrote the Eco-Code during the environmental committee meetings and children submitted their class's suggestions to

the coordinator. This was roughly the case for School B and C as well: each class composed their code and the 12 points emerged from them during a committee meeting

QUESTION 11. How did the Eco-School experience benefit your school?

School A appreciates the effects of the programme much more than the other two schools. They state that the Eco-School project has created a tradition for their school and distinguished their school in the area. It has helped enrich the school grounds and local area. It also has had educational impact since, as the report mentions, the programme offered new experiences to children and helped to enrich their vocabulary. Finally they observed a clear attitude change in the children who were now motivated to keep the school grounds tidy and clean. This is supported by the fact that the school received an award from the municipality.

School B discerned communicative benefits emerging from the programme. They mentioned that the programme facilitated contact and cooperation between children, teachers, school management and the community. The acquisition of a more environmentally friendly attitude and motivation for environmental action was also observed.

School C mentions practical benefits from the programme such as improvement of school grounds. The educational part of the programme enriched the teaching practice through communication with organisations (which was actually one single occasion) and cultivated environmental awareness in the children.

All the questions presented above can provide evidence to support the school ranking and test results: the kinds of activities used, the school climate (democratic procedures being employed for decision making and initiative opportunities), the quantity of activities employed within the curriculum and the quantity and quality of extra-curricular opportunities given in order to enrich teaching practice. Hands on activities and experiential learning, were also offered through indoor and outdoor activities. All these factors could enhance the implementation of a programme and ensure its success.

One other factor that could probably influence the results is the extent of exposure to the programme. School A is a school that includes all ages (yr 1 – 6). Schools B and C are only “upper primary”, (years 4 – 6). Years one, two and three form a completely independent school. Upper Primary and Lower Primary might share the same school grounds (School C) but have a different school management, or even be situated in different areas (School B). At the time the research was conducted, Lower Primary B and C chose not participate in the programme. In 2000 the Eco-School programme had completed 3 years of running in Cyprus schools and all three case studies had been enrolled since the beginning. The student sample was taken from 5th grade. So the sample taken in school A had 3 years of experience in the programme (3rd grade, 4th grade and 5th grade) whereas the others only 2 years (4th grade and 5th).

8.2.2 Interviews

The interviews are analysed together since they share a common agenda. Each interviewee provided a different point of view according to his or her particular role. All the important key issues were included in the categories formed during the analysis.

Interview analysis, as perceived by Powney and Watts (1987:160) and adopted by this research, is not simply the direct description of data but it is a creative and constructive affair. Through reductionism, the categories of description of data are few. An acceptable number is considered 7 ± 2 (Powney and Watts, 1987). In this case the general categories formed were 7.

The analysis of the interviews did not make use of any data processing program and data were assigned to the relevant categories identified through an initial survey of the transcripts.

Interview Categories and their codes

1. SCHOOL CLIMATE: CLIMA

- Attitudes towards the programme **Att**
- Motives of participation **Mot**
- Cooperation between coordinator and teachers, and coordinator and management **Coop**
- The coordinator's role. **Coop**

2. THE ROLE OF THE NGOs : **NGOs**

- The role of the NGOs : **NGOs**
- The role of the National operator **NatOp**

3. MINISTRY OF EDUCATION: **MoE**

- The role of the Ministry of Education **MoE**
- National policy on Environmental Education **NatPol**
- Environmental Education Initiatives in Schools **EEinit**

4. PROGRAMME IMPLEMENTATION ISSUES: **Imp**

Implementation issues

- Implementation Problems **EIP**
- Solutions to the problems **Imp**
- Awareness **Imp. Aw.**
- Activities: -Classroom activities (indoors and out) **Imp. Ac.**
 -Whole school activities (indoors and out) **Imp. Ac.**
- Curriculum – extra-curricular activities **Imp.Ac.**

Empirical Assessment

- Assessment of the programme by individuals' observations **Obs**
- Eco-School Experience **EcoExp**

5. TEACHER TRAINING **TT**

- PI involvement in the programme **PI**
- Initial Teacher Training and INSET **TT**

6. PROGRAMME PARTICIPANTS **PParts**

- Children involvement **ChInv**
- Parents involvement (Parents association and individuals) **Parents**
- Local Authorities **LA**
- PI involvement **PI**

7. PROGRAMME ORGANISATION – STRUCTURE **PrOr**

- Environmental Committee **PrOr**
- Environmental Audit **PrOr**
- Structure **PrOr**
- Coordination **PrOr**
- Assessment **PrOr**

It was inevitable that issues appeared in more than one categories. These repeated sub-categories are only presented once.

CATEGORY 1: THE SCHOOL CLIMATE

The successful implementation of a programme depends on the school climate: for example, if it favors or inhibits the programme's implementation. The first category distinguished in the interviews was a description of the school climate and all the factors that constitute it:

- the motives that the teachers and school managers have in order to participate;
- the attitudes towards the programme of all involved parties (Ministry, school management, teachers, National Operator etc.);

- the level of cooperation among the involved parties;
- each party's role.

Teachers' and school management's motivation:

Information about the teacher's motivation emerged from two sources: internal motivation and external motivation.

Teachers who were keen on participating in the programme were the ones who loved the environment, and were interested in being informed about new issues in education. They perceived the programme as a challenge that employed new teaching approaches and offered new teaching experiences. Those teachers were enthusiastic implementers and enjoyed the programme. Another internal motive was the competitive attitude with other teachers or school managers especially between neighbouring schools. The school management's encouragement and active involvement was mentioned by the majority of the teachers as a very important motivating factor. This evidence is also supported by the quantitative research findings presented in the 1st regression model that tests the factors that motivate the teachers.

The age and experience also emerged as important factors. The interviewees observed that among their colleagues, the younger the teachers are, the more motivated they are to participate. The teachers who had more experience of the Eco-School programme, were more likely to take over further responsibilities, e.g. coordinators. One of the interviewees tried to justify this observation by stating that: *"Those who get involved are normally inexperienced or very young teachers who are still at their level of*

maximum enthusiasm and still have the idealistic image of education, so they do it for the sake of the children”(Survey teacher 1).

External motives in most of the cases had to do with personal benefits. Taking the INSET course and becoming a school coordinator, would give the teacher up to 4 periods a week off teaching for the coordination tasks. Furthermore INSET also provided credits towards an extra qualification. Several teachers perceived participation in such a programme as an opportunity to demonstrate their skills and capacities to the inspectors during an imminent promotion evaluation, e.g.: *“The other interested group might be that of the older teachers who have reached a critical point in their career, they expect an evaluation which will determine a possible promotion so they want to “show off” their abilities and innovative spirit”*(Survey teacher 1). Beyond the clearly utilitarian benefits, the programme also offered the teachers opportunities for professional development by attending further short training abroad. The numbers attending the short training every year is extremely limited but could be considered to be a reward rather than a motive.

Other external motives were benefits that the programme would provide to the school. Normally, the programme is supported by the national operator, local authorities and the parents association, through project funding, awards, or simply providing expert information. An Eco-School receives public recognition and in many cases, teachers have stated that the programme created a tradition for their school and “distinguished” it from the other schools in the area. School A coordinator mentions: *“We publicize (demonstrate) the programme on any occasion, even during national days, when the schools participate in parades, we walk with the national flags and our green flag, too.*

Although it might be a bit out of context, the green flag emphasizes the fact that we are an Eco-School. It is another way of sending messages”(School A coordinator).

Schools within the programme also have opportunities for links and communication with other schools in the country, in other European countries for example Greece.

There are a number of factors which could however have precisely the opposite effect, discouraging a teacher from participating in a programme or in an innovation. Such factors are the external pressure exerted upon some schools during the first year of the Eco-School Programme implementation, by the school inspectors, the Ministry and the community, followed by a pressure from the school manager to the staff. A teacher from a school that decided not to implement the programme, describes the kind of pressure exerted on the staff from the management: *“During the staff meetings, he tried to impose on us the necessity to apply the project. He even ended up threatening us. He started pressuring members of the staff mainly women and teachers with more experience to attend the seminars...he even pressured them by calling them at home.”*(Survey teacher1)

Such de-motivating factors were also the workload; teaching matter, that had to be covered, time pressure or lack of resources. In some cases, the teachers stated that during the year other priorities would appear that would take time from the programme, such as national anniversaries, celebrations, assemblies, or simply the subject matter they had to cover, etc. Other programmes would also compete for the limited and valuable time, or teacher’s energy: *“...you see, there wasn’t actually lack of interest about the programme, ... teachers were applying another innovation ... participated in*

another project... they were already very tired of all the responsibilities and pressures an innovation implies ... they suffered a professional burnout”(Survey teacher 1).

Management attitudes, can also be discouraging, for example if school manager is indifferent and not supportive to the teacher’s efforts. This is also valid for peer indifference or community indifference.

The motivation of management too is influenced by a complex range of factors similar to the ones of the teacher, but at a different level. Competitiveness is a factor which could be with other schools and other school managers: “*...if he didn’t (join the programme) he would appear less active and able than the nearby school head”(Survey teacher 1).* There was even an example of underlying competitiveness with the school’s previous manager: “*It is a programme that started and became a tradition for the school thus it shouldn’t stop”(School B, manager).*

Career progression and promotion is an external motive, for example a sub director becoming school manager or a school manager becoming a school inspector. Furthermore the Cyprus Ministry of Education exerted pressure on schools to join Eco-Schools at the very beginning of the programme. However, after the first “pilot application” year, the programme became completely optional and most of the managers involved were often only motivated by vision: “*... my dream was to make my school an Eco-School” (School B manager)* or another testimony from school A coordinator: “*they (previous school management) wanted to work and demonstrate school’s potential and make the school (which was a new school) distinguished in the area”.* For

some managers, the fact that this programme was assessed gave an extra motive and challenge: *"I expect the award for all this effort"* (school B manager).

Attitudes towards the programme.

Information gathered about the teachers and the managers' attitudes to the programme helps to answer research question RQ 4.8: Which are the teachers' attitudes towards the programme?

The Ministry of Education is encouraging and supportive towards the programme, as well as rewarding for the teachers' efforts. This positive attitude is made explicit by the science inspector who commented on the 4 teaching periods offered to each Eco-School for coordination purposes: *"..I, the brilliant results of the programme and the obvious efforts of the teachers have convinced the Ministry that the teachers are worth this benefit"*.

The National Operator's attitudes, which were clearly distinguished, were purely positive and supportive towards the programme implementation.

Teachers' attitudes to the programme were also very positive. As the National Operator interviewee observed: *"they were motivated even before they were given external motives"*. Even the teacher from the school that failed to enroll, commented that he considered the project to be very positive for Cyprus Education. The positive attitude, nonetheless, does not cancel the teachers' need for compensation and reward and it varies from teacher to teacher. As the director of School A observes, *"... definitely there are some colleagues that are more enthusiastic about the programme and probably they*

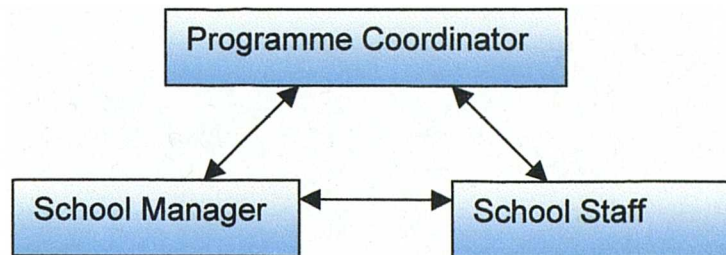
have taken a bigger share of responsibilities than others. On every occasion I try to thank them for their contribution”.

This statement also describes the attitudes of a supportive manager who encourages and rewards his/her staff. Management attitudes were distinguished in two categories by the National Operator interviewee: *“The school managers can be distinguished in two categories, ones are very positive about the programme and manage to do a lot of things in their schools. Others are skeptics, not because they oppose the idea, but because of the workload they have and the lack of time. Most of them are afraid that a programme like Eco-Schools will use a lot of the school’s time and eventually they will not manage to cover the teaching matter...”*. One of the teacher – interviewees also distinguished an opportunistic aspect in the school management’s attitudes. In this case managerial staff indifferent to the programme took coordination time without responding to the duties and thus failed to motivate the school staff effectively (School C). In another example (School B), the school manager herself admitted using the fact that the school is an Eco-School, to pressure the authorities to achieve something for the school (i.e. refurbishment). The interview with School A coordinator also brought up the case of the “conservative manager” who initially was skeptic about the school’s enrollment since the programme was directed by the private sector. Generally, the majority of the school managers appear to be encouraging and motivating, active supporters and participants in the programme.

The final element that was investigated as part of the school climate was the cooperation within the school staff and within the school and other external actors e.g, parents’ association, local authorities, local industry, etc. The cooperation within the school staff

was distinguished in 3 linked levels: the manager – coordinator cooperation, manager – staff cooperation and coordinator – staff cooperation.

Fig. 8.20 Management – Coordination – Teacher cooperation triangle.



The programme is generally directed by the Programme Coordinator. In order to describe the cooperation of the coordinator with the staff and school management, it is useful to clarify their role. The coordinator is the one with the greatest share of responsibility and work. The School C current coordinator comments about the previous coordinator, *"...the greatest part of work lay on his shoulders and his assistant's and they really had a traumatic experience... he eventually accepted the coordinator's role (the next year), after everyone assured him that everyone would have their part."* It appeared, on other occasions too, that the coordinator's role is not a *"popular"* role. School B coordinator was willing to share the 4 periods granted with another staff member and share the coordination responsibilities: *"I didn't want to take 4 periods myself. I'd prefer someone else taking the other two"*, but nobody else was willing to take over coordination responsibilities. Coordinator is the trained and informed member of the staff who therefore has a mentoring role and is responsible for organising meetings with all of the committee, with the children and with the staff. The coordinator

can give suggestions, is open to suggestions and along with the rest of the staff organise the activities.

Cooperation between the coordinator and school staff seems to be, mainly, on work distribution. As School B coordinator says: *"Each class was responsible for a task"*. In some cases the coordinator had cooperated with other staff members to share the coordination of the classes. For instance teacher A coordinates all year 1 classes, teacher B coordinates all year 2 classes, etc. The programme coordinator would be responsible for the overall coordination.

In some cases, the authority of the coordinator may be questioned by other staff members: for example the case of a young teacher – coordinator who wants to distribute tasks amongst peers. Consequently the coordinator may ask for the director's intervention: *"...whatever the coordinator cannot introduce, it can be 'imposed' by the manager"* (school B coordinator).

Managers, thus, support the coordinators' task, participate in decision-making and share the programme responsibility. Therefore they feel that they also have a share of the coordinating role. In one of the cases, though, this share was restricted to being informed on the programme's progress by the coordinator.

The kind of cooperation and coordination that exists among the manager and the coordinator is also expanded to the staff. One of the school managers (School B) explains clearly how the "triangular" staff, coordinator and management coordination – cooperation operates in her school: *"It is expected that the coordinator will be aware of and worried about the work completion. The same goes for the manager. Obviously*

work will be distributed by these two factors to the rest of the staff. The staff expect this guidance. They will not take the initiative.” Interestingly, the coordinator of the same school complained about authority being questioned. This fact indicates that the staff of the school do have an opinion and do take the initiative.

CATEGORY 2: THE ROLE OF THE NATIONAL OPERATOR

This category examines the role of the national operator throughout the programme organisation and implementation, the attitudes that other involved parties have towards the national operator and their relations.

The National Operator has had an initiating role in the introduction of the Eco-School Programme in Cyprus. They initially proposed the programme to the Cyprus Ministry of Education and it was subsequently approved. The National Operator then requested a Ministry of Education representative in the programme. Since the programme initially involved Primary Education only, the primary science inspector was appointed. The science inspector, sponsored by the National Operator, was sent for training in a short Eco-School seminar abroad and returned fully trained and equipped to start the programme. This was the point when more support was required for the programme, and the general director of the Ministry of Education gave instructions for the Cyprus Pedagogical Institute to assist. The Pedagogical Institute organised a special INSET programme for the Eco-School teachers and prepared teaching material and teacher handbooks for each of the programme's topics. The National Operator found sponsors to cover all publication expenses and also participated in the seminars. Schools are obliged to have at least one trained member in order to join the programme.

After the programme initiation, the operator's role became directive, administrative, decision making, encouraging and evaluative. The National Operator was supportive and motivating in many ways: *"Offered some computers to the schools that were awarded, in order to facilitate the communication between them..."*(School A coordinator). They sponsored teachers' participation *"...in conferences for the Eco-Schools either locally or abroad"*. Most important appears to be the dedication by all to the effective implementation of the programme. The operator has been open to suggestions and has observed the successful practices emerging from school initiatives. School B coordinator comments on the programme's improvement gives credit to the national operator: *"it gets improved... because suggestions and opinions are welcomed, no matter if it is a teacher's suggestion or... whoever can give suggestions for the programme. This gives the programme a lot of potential"*.

The National Operator's dedication and commitment appears to be appreciated by most of the other programme actors: the science inspector called them *"the heart and soul of the programme"*. His personal view is that the benefits that private sector involvement can provide in education cannot be overlooked *"...private sector must exist in education ... they are more flexible and skip bureaucratic delays... provide solutions to financial obstacles"*.

School teachers and managers are also pleased with the National Operator and value its contribution. Their positive attitudes emerge from three facts: The Operator's

- openness to suggestions

- responsiveness to requests: *"...well, whatever we asked for..., we are pleased... the mid year meeting with them was very useful. It was the first time that a meeting during the school year was organised. It was very useful because it showed how well the programme runs."* (School B coordinator)
- frequent contact and feedback by mail, phone calls, visits: *"We always had good cooperation,... we have regular communication, whenever we needed something they were always very helpful. During the evaluation they were very friendly and had a good word to say. They encouraged us to continue and I congratulate them for the effort they devoted to the programme".* (School A coordinator)

Nevertheless there were also some comments demanding more contact with the National Operator, not by phone or letters, but in person. School B headmistress supports that: *"when more people visit schools (within the programme), more ideas can be disseminated and they could also come in contact (communicate) with the children..."*. She also expresses disappointment about the evaluation process: *"...a final visit at the end of the year is not satisfactory for schools"*. The same opinion about the evaluation process is shared by several of the other teachers and administrators and is investigated through the programme organisation issues (category 7).

The University of Cyprus representative in the Eco-School National Committee recognises the active role of the National Operator. It appears though that they would have appreciated a more active role for themselves too: *"...yes, more involvement, discussion, participation, see the decisions are taken by the National Operator who by*

the way is very active... nevertheless I feel that my role is that of a 'decorative ornament' (University Programme participant).

The organisation problems highlighted by the teachers apparently originate from a number of obstacles the National Operator has to overcome. As the National Operator representative observed when asked about dealing with the programmes' expansion: *"we have the responsibility to support the programme on a national level"*. Nevertheless, the National Operator (Cyprus Marine Environment Protection Association: CYMEPA) is a small environmental organisation, run by limited staff (3 persons) and not having Eco- Schools as their main activity. The National Operator representative considers it possible to use more of the specialised Pedagogical Institute staff for the programme's needs.

As the resources of the National Operator are limited they have to look for sponsors to support the programme. Consequently they also have to report to the sponsors the programme's aims and results.

The National Operator representative recognises that not everything should be run by the government and clarifies the role that they, as an NGO, have. Nevertheless, he also comments that *"the current situation is very convenient for the Ministry of Education because they found someone else to do the job for them"*. He clarifies that out of the four official environmental education programmes that run in Cyprus, three were coordinated and administrated by them, and only one clearly "belongs" to the Ministry of Education. The Ministry of Education should have a clearer policy on environmental education. The Ministry of Agriculture, Natural Resources and Environment, has a share of the

responsibility as well and according to the National Operator representative they should have a more active educative role, although at the same time he recognises that they as well have limited resources and staff members.

The majority of the interviewed teachers emphasized too the responsibility the Ministry of Education has for the establishment of a clear policy on the environmental education issue. The Ministry should establish a minimum of environmental education in schools, possibly in collaboration with the Ministry of Agriculture and allow NGOs to reinforce this minimum along with all the benefits their involvement implies (skipping bureaucracy, finding resources and providing educational links). A Ministry representative from the INSET trainers group refers to the Ministry's position on the issue: *"...the Ministry encourages the application of programmes introduced by NGOs, precisely because the NGOs have this role to play, to reinforce the Ministry's efforts for environmental education"*. This statement clearly answers research question 2.5, about the role the NGOs can have in an environmental education programme.

CATEGORY 3: THE ROLE OF THE MINISTRY OF EDUCATION

This category gathers information on the Ministry of Education's role in the programme implementation and mainly on its role concerning the policy on environmental education in Cyprus schools. This information gives answers to the corresponding research questions (1.3, 2.1 and 2.6).

The personal statement by the science inspector makes it clear that the Ministry of Education does not have the leading role: *"The Ministry of Education should back up this programme. ... the NGO has the responsibility and control"*. Official programmes

that currently run, are the Eco-School programme, which is applied in both primary and secondary education, the Young Reporters for the Environment, which is applied in secondary education and “Chrisoprasino Fillo”, a cooperation programme between Cyprus and Greece. Out of the three, only the latter is a purely Ministry administrated programme and is on a limited scale.

The teachers feel that the *“Ministry of Education does have capable, qualified and specialised staff and could introduce such an innovation, (of the Eco-School magnitude) directed officially by them”*.

Moreover the Ministry’s responsibility on the environmental education policy is stated. However the vast majority of the interviewees indicated that the environmental education policy for schools is vague and that it is not clearly and explicitly stated. Some of them are unaware that an environmental policy does exist (including the representative of the university in the programme), or they have interpreted the Ministry’s support of NGO directed programs as the Ministry’s policy on environmental education (School A manager). One of the INSET trainers, acting as a Ministry representative, opposes those statements and supports that *“...environmental education already exists in our educational system, simply it doesn’t appear as a separate subject or something you can really see...”*. He also mentioned that during the science curriculum revision in 1996, the responsible committee had received orders to include the environmental issues’ dimension in *“almost every science chapter”*. Continuing on the national policy he explains that *“...the policy of the ministry is based on the decisions taken in Rio. It makes it clear that environmental education will be provided cross-curricularly, and that they intend to establish environmental centres in the country*

in order to meet with the agenda's needs". He therefore believes that the global environmental education policy is clear: *"The policy is not clear analytically for each lesson, but the global policy is clear, and I believe that this is the way it should be"*. He accepts the "vagueness" to environmental education in the curriculum and justifies it by explaining that explicitness would put barriers to environmental education.

The analysis of the Ministry's role on environmental education integration in schools produced two lists of "what the Ministry DOES" and "What the Ministry SHOULD DO" on the issue.

On the Ministry of Education "DOES" list appears that the Ministry:

- provides opportunities for the "acquisition of environmental experiences within the school programme" through the creation of an environmental education centre with plans for more;
- provides teacher training, both through compulsory INSET courses of secondary education and administrators' seminars and optional environmental education courses such as the Eco-School training programme and general environmental education programmes directed to primary education;
- recognised teachers' efforts and rewarded them by providing 4 periods per week, for each school, for the Eco-School programme coordinator(s);
- has given the NGOs access to schools;
- encourages and promotes environmental education initiatives.

The Ministry of Education clearly encourages environmental education initiatives, nevertheless, the teachers feel that this is not enough. One of the teachers comments on these kinds of initiatives. *"...in our school, I have a colleague that always offers the students something new. One semester it could be something from programme X, the next semester she could be doing environmental education. ... she simply is very active and alert but I have to say that there are so many things one could do that environmental education will take place only once in a blue moon unless the teacher is a keen environmentalist"* (survey teacher B).

The teachers feel that *"it is important to specify the implementation approach and make environmental education explicit in our curriculum... yes we lack a real environmental education policy that could guide and be useful to the teacher"*. They find the inclusion of environmental education in the Curriculum very useful where an environmental education syllabus can be introduced, and clear aims can be stated. After all, *"other cross curricular topics are stated in our curriculum, such as health education and ... environmental education is also important and it should find its way into our schools through the curriculum and through a clear policy stated by the Ministry of Education. It should be organised. Now it is up to the teacher"*. (Survey teacher B)

Other teachers expanded on the same issue: (the "Ministry of Education SHOULD" list)

- create an environmental education Curriculum;
- clarify the aims on the issue;
- clarify the teaching approach;
- specify training for interdisciplinary teaching;

- provide books and resources for teaching;
- revise current students' books, in many disciplines and insertion of environmental issues where possible;
- evaluate environmental education practices;
- facilitate acquisition of environmental experiences within the school programme.

Within the general policy issues and environmental education implementation in schools, teachers also brought up the teaching approach issue. One of the statements requested clarification on which teaching method(s) they are supposed to follow. The teachers' (including the school managers) opinion varies on the issue. Several opinions were expressed although the sample was small. Although the majority of the teachers are aware of the benefits from cross-curricular approach, some of them consider its employment to be difficult and prefer a specific time on the timetable dedicated to environmental issues. Another option proposed was a combination of cross-curricular approach along with specific time on the timetable. There were also teachers who were not skeptical about the approach and without any hesitation supported the integrative approach as well as an indecisive one who explained that *"it depends ... if you work with only one class, how well you cooperate with the rest of the staff..."*

Beyond the approach, teachers are also concerned about whether Environmental Education should be compulsory or optional, part of the curriculum. For the majority of the interviewees, it should be compulsory: *"You don't ask the student if s/he wants to take maths classes or language classes..."* Nevertheless, on the implementation of an environmental education programme: *"A programme should be equipped with systems,*

or find ways that will ensure a voluntary participation and commitment. This is an important condition for successful implementation” (INSET trainer).

CATEGORY 4: PROGRAMME IMPLEMENTATION ISSUES

Category 4 examined issues concerning the implementation of the Eco-School Programme. The sub categories formed included the factors supporting the implementation, problems encountered and the ways they were resolved, the way the programme was delivered through the curriculum, the benefits that resulted from the implementation as well as comments from the involved parties describing their “Eco-School experience”.

The factors supporting the implementation were mentioned already during the discussion about the programme’s creation. Briefly these factors were:

- INSET training programme for the Eco-School teachers;
- teacher handbooks for each topic of the programme;
- teacher coordinator’s support;
- local authorities, parents association, local industry and school official suppliers support.

Programme implementation problems and solutions

The problems encountered during the implementation are mainly caused by the “SHOULD” list of the Ministry of Education, presented in page 304. The following table attempts to visualise the problems and provide information on the solutions already given or the solutions suggested by the interviewees.

Fig. 8.21 Programme implementation problems and solutions

IMPLEMENTATION PROBLEMS	SOLUTIONS
Teachers do not feel confident enough to implement environmental education	(Suggestion.) Syllabus within the curriculum
Teachers need to be informed	INSET is available, teaching material was prepared and being enriched. (Suggestion). Prepare material for use in the class, such as handouts. Exchange material with other schools
Teachers need more theoretical support	INSET is available, teaching material was prepared and being enriched. (Suggestion). Prepare material for use in the class, such as handouts. Exchange material with other schools
More frequent visits by the National Operator are required	(Suggestion.) Involve more people, e.g. inspectors
Introduction of the program in secondary education through “primary education” designed seminars (October 2000)	It was changed the following year (October 2001)
Family indifference	(Suggestion.) Organise seminars for parents and enroll community in a greater extend
INSET program is tiring because it takes place right after school hours	(Suggestion.) Morning sessions should be organised School based – district INSET
Older children lose interest in the	(No suggestions given)

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INSET program is tiring because it takes place right after school hours	(Suggestion.) Morning sessions should be organised School based – district INSET
Older children lose interest in the	(No suggestions given)

² Suggestions emerged from teachers' interviews or questionnaire open ended questions.

programme	
Bureaucracy in Ministry of Education	(No suggestions given)
Time restrictions	<p>Students missing classes, or their breaks</p> <p>Teachers adjusting timetables “stealing” time from other disciplines.</p> <p>(Suggestion.) Could use weekends for extracurricular out door activities</p> <p>(Suggestion.) Expand school hours by 1h</p> <p>(Suggestion.) Modify curriculum (cut off matter)</p>
Disseminate programmes results	(No suggestions given)
Funding – resources Problems	Funding provided by parents association, official school providers, local authorities, and other sponsors (banks, local industry)
Work load	Work distribution
Coordinators not receiving all the time granted	(No suggestions)
Evaluation methods need improvement	(Assessment is discussed in programme organisation, category 7)

Time limitations was the problem most stressed by each of the teachers and school managers. One of the many comments on the same issue clearly states: “...we always face time problems: distribution of time (teaching time) and coordination time. The most important problem is the completion of a task within the predetermined time limits set by the action plan, and the coordination amongst the teachers”. This particular teacher,

(school B coordinator) makes fun of herself, after some thought, trying to decide eventually on the hierarchy according to which she wants to present the problems:

“Q. So you consider the time issue to be the most important implementation issue?”

Ans. Errrrr!!!! (hesitating) Yes! Time problems! The second problem is money problem! (Laughs!) Well, money problems could be first and then the time. The financial reinforcement is definitely an important issue, especially when you have cooperation, will, squeeze in some time, but you don't have the resources to work!” (School B Coordinator)

Programme implementation through teaching.

This subcategory investigated the incorporation level of environmental education within the curriculum disciplines and additional activities employed for achieving the Programme's aims. The integration method followed was the integrative approach (“through all curriculum subjects”). Discussing, though, how easy it was to incorporate environmental education in the various lessons teachers suggested that some disciplines may be easier to use than others: *“...in science books, errr yes!, in language text books we also have some text of environmental context, Geography also includes an environmental dimension”*. Other teachers, had trouble with mathematics *“...I consider integration in mathematics to be difficult... the teacher is worried about teaching mathematics”* (implying that the teacher won't bother to incorporate environmental education in this subject). There was a solution too: *“Mathematics is quite difficult to use, hmmm, unless we use recording and data processing and graphs ...”*. In general, the disciplines considered to be the easiest to incorporate environmental issues, were

science and geography, language, art and design technology, as they have contexts or practical opportunities to facilitate the teaching. These results match closely to the ones resulting from the teachers' questionnaire.

Extracurricular activities used, could be distinguished in the same categories presented in the analysis of the evaluation reports:

Fig. 8.22 Categories of extracurricular activities

<u>One class, indoors</u> <ul style="list-style-type: none"> • Model construction (e.g. water cycle) • Research projects • Collection albums • Special projects • Monitoring activities • Document study • Debates • Adopt a WWF animal • Videos 	<u>One class, out doors</u> <ul style="list-style-type: none"> • Visits in the city hall, parliament environmental committee meeting • Home research • Gardening • Monitoring Activities
<u>All school, indoors</u> <ul style="list-style-type: none"> • Action plan target setting • Invited speakers • Letters to environmental organisations or local authorities • Newsletter publication • Competitions 	<u>All school, outdoors</u> <ul style="list-style-type: none"> • Recycling • School grounds maintenance • Water and energy guards • Annual beach cleaning • Nature trail • Visits • "Green festival"

When asked about the possible connection each kind of activity might have with the inculcation of environmental attitudes and action, it was extremely interesting to listen

to the school C coordinator confirming the research findings about environmental action and attitudes in his school and the students' families:

"Teacher: (rather puzzled) I don't know whether I should mention this...all the teachers realised that although we were given the award and did a lot of activities we did not manage to... we offered cognition. ...We achieved a lot on the cognitive level, but on the attitudes... we did not achieve so much.

Question: Why do you think that happened?

Teacher: Well, perhaps because changing attitudes is not so easy to achieve, or perhaps because they won't pay much attention at home..."

Nevertheless, he had noticed that certain activities had better "reached" his class: *"The visits, the visits and the invited speakers. The fact that responsible people, specialists, with experience came to speak to the children. It is one thing that teachers tell them about recycling or energy saving, and it is a thing with a different status to have an operator from the electricity authorities explaining to them the same things. Children face that person in a different way. And, ...(excited) during the visit, I noticed, that when we left the water treatment plant for instance, where they (the students) had heard about the importance of the water, they went "Ahhhh!!!" amazed and excited commenting 'we must be more careful, take care of the water'...Watching videos is another activity that can touch them..."*

School B coordinator also noticed the same effect, by the same activities and she commented that this was due to experiential learning and active learning activities

being, in her opinion, more effective when cultivating attitudes. Similar comments were also expressed by School A coordinator. The observations of the teachers can be statistically confirmed by the students' questionnaire. It appears that beyond the award, the activities that stimulate students' participation the most are first the visits (from and to the school), which provide experience and then the activities in which they create things, which requires active participation.

This variety of activities offered the children several opportunities for new educational experiences, to which they possibly wouldn't be exposed if it were not for the programme:

- Practical activities, beyond theory, escaping curriculum routine
- Cooperative learning
- Experiential learning
- Programme Continuity
- IT and editing skills
- Cognition on Environmental issues
- Family involving activities
- Projects

All this resulted in a number of further benefits and practical outcomes for the school, the students and to some extent their families: According to the National Operator each school managed to recycle 3 cubic metres of aluminum tins in a year and diminish its paper consumption either by double face copies or using scrap paper. The programme also enhanced the school environment. As teachers explain, children became sensitive and aware of environmental problems, and the programme had an impact on the

students' families (not the case for School C). They learned to use the resources in a sustainable way. Teachers and students were involved in democratic procedures of debating or decision making and developed self evaluation skills (according to the national operator, schools that felt that they were not ready for evaluation, did not apply for it).

The “Eco-School experience”.

It is indispensable to include some quotations from the interviews, which in a condensed way describe the experience the participating actors had during their involvement in the programme.

One of the teacher trainers that participated in the evaluation process stated: “... *there was a plethora of exhibits on this year's topic and it was amazing to go around all those marvelous creations. I indeed felt very proud of participating in this project...*”

The National Operator's comment when asked to do an overall assessment of the programme stated that “...*An overall assessment of the programme is that the programme has met its aims and even reached some aims it didn't plan to...*”

School B coordinator admits that: “*I admit that the influence is enormous, mainly on their attitudes and their knowledge on environmental issues*”.

CATEGORY 5: TEACHER TRAINING

This category provides a description of teachers' training on environmental education either as part of their initial teacher training or as INSET, or any other form.

The majority of the interviewed teachers and managers are graduates of the Pedagogical Academy of Cyprus (P.A.C.) (6 out of 8), which was a 3 year teacher training school. It was succeeded by the University of Cyprus in 1993. The Ministry of Education, in order to eliminate any differences in teacher's basic qualification (P.A.C. 3 year degree and UCy 4 year degree), organised with the cooperation of the 'University of Cyprus and Universities in Greece, during 1997 – 98 a one year additional training for P.A.C. graduates to obtain a university BEd.

The teachers remarked that the P.A.C. course did not include environmental education as a distinct discipline. The curriculum included scientific aspects of environmental problems in science, geography and biology². Geography included a field trip and field study techniques.

The additional training year sometimes included environmental education, depending on the university that organised the training programme. Teachers that attended the programme organised by the Aristoteles University of Thessaloniki³, for example, (Schools A and B) stated that they received an environmental education course and had a written assignment for evaluation, on the issue. University of Cyprus did not offer environmental education courses to the 4th year trainees, neither is environmental education a permanent option in their syllabus.

The University representative explained that initial teacher training normally does not include environmental education. An environmental education module had been

² Biology was separated by science discipline and allocated a distinct time in the timetable.

³ Each district's training was assigned to a different University. Nicosia was assigned to the University of Cyprus, Larnaka to the Salonica University, etc. University staff would come during Christmas, Easter and all Summer vacations and give intensive courses.

provided three times, as a semester option, when the faculty's budget permitted it. It only recently became part of the MSc in Science Education. In the times it was offered to the undergraduates, it still was an optional subject, so a student was most likely to graduate and never attend an environmental education course. When it did occur, it did not have a specific content, but the content and its form depended on the trainer and his concept of environmental education. The course was evaluated by a final assessment and a project. According to the university representative, the course was a very popular course but "*for the wrong reasons*". It was popular because it was considered easier than science or mathematics, and it was preferred by average achievement students. Beyond the environmental education occasional course, students would study environmental issues through science, and another course on "*plants and animals*".

The University's external collaborator who had taught the environmental education course once was also interviewed, so he was able to give more details on the course's structure. The course would last for only one semester and it was optional (also mentioned by the other university interviewee). It had been offered three times by three different people. The 1st trainer presented the biological aspect of the natural environment, as environmental education and the second simply added field studies to the course. The third trainer – interviewee - was the first one to apply a holistic approach to environmental education, including the biological, as well as social, cultural and economic factors into the study. The course included 18 class sessions and more or less an equal number of workshops, to sum up to 30 – 35 meetings in total.

INSET training is provided by the Cyprus Pedagogical Institute and provides optional seminars on environmental education, as well as seminars especially designed for the

Eco-School programme. The National Operator set as a condition, for a school's participation in the programme, that it should at least have one trained teacher. The training purposes were analysed by the INSET trainers:

- Teachers would be provided theoretical background and would be introduced to the philosophy and guidelines of environmental education.
- Teachers would be trained to apply the interdisciplinary approach and incorporate environmental education in all curriculum subjects.
- Teachers should overcome the narrow concept of environmental education being a pure natural sciences topic.
- Suggest practical activities and background theory on each of the programme's topic.
- Clarify concepts.
- Understand the programme's structure and demands.

Teachers found the course to be an important aid and resource of ideas and suggestions. They would nevertheless like the programme to offer them some of the "old Eco-Schools' experience" through presentations from their colleagues, exhibitions or videotape. They would also like the seminars to give them more opportunities to discuss practical implementation problems and their solutions. Apart from the seminar content, they also offered several suggestions about the seminar's organisation, they complained about the distance of the training centres and required an expansion to other districts, besides Nicosia and Limassol. They would also prefer the training to take place during school hours and if possible to take the school based INSET form.

CATEGORY 6: PROGRAMME PARTICIPANTS

Category 6 examined the participation of actors that were not investigated through the previous categories: children's participation and attitudes about the programme, the parents as parent association and individuals' involvement and local authorities.

Children's participation: many of the interviewees had sensed a correlation between the age of the children and their level of programme involvement. School C director and School A coordinator believe that children's age and programme involvement, especially in practical activities are inversely proportional: *"...we put more emphasis on the older children who could do more, ... and on the action week for the environment..."* (School A coordinator). From what the teacher said, the fact that the older children participated more was because they were given more tasks to do (since the teachers had already decided that older children would be able to perform the programme tasks better). The school B coordinator was more specific and gave the issue a closer look: *"Age, affects the type of activity rather than the level of involvement"* and explains further: *"A 100% participation in the class you have with the activities that involve the curriculum...everyone will attend it. ... Beyond that there are practical activities such as recycling in general, maintaining school grounds neat, the water guards, ... the further we go to more specific activities, the fewer students can get involved in it and in this case we try to establish a greater number of activities to get more children involved somehow. Nevertheless, global participation in an activity with common objective for all children (in a class) occurs through classroom teaching, lecture, things that rather involve theoretical background"*.

Children appear to enjoy the Eco-School programme. School B headmistress talks about the children in her school *"children were involved in the programme with pride and enthusiasm."* Children feel that they are doing something important. Their presence in a committee with adults and the fact that they have a say and the leading role, makes them responsible and encourages them to take initiatives and be involved in decision making. *"Most of the times they decide themselves what visits they need to do outside the school and generally they have realised that the programme is theirs and they have to assist its implementation"* (School A manager).

In all cases, the parents' association turns out to be an invaluable ally. The parents provide time and effort to assist and they support the programme in practical ways too (expert counselling from professionals, invited speakers, funding school projects). The association participates in the school environmental committee during the first critical meetings that involve decision making, to attend to the programme's needs and provide accordingly. *"...we met at the beginning of the year (with the parents' association), and told them...that we would require a couple of things from them. Their cooperation was perfect, they did everything we asked them to. Specifically we asked them to do signs with messages about water consumption and water saving."* (School C coordinator)

As individuals, the parents accept the programme's influence through their children. They contribute to the recycling material collection activities for example. Nevertheless, not all of them have interpreted fully the purpose of the programme. School C programme coordinator mentions that *"Parents are very pleased and proud, at least the ones I talked to, but I believe that they see it rather as a programme which will*

reinforce their children's knowledge. I don't know if they also see that within the programme also lies attitude change."

School C, have not yet considered the importance of the parents involvement:

"Question: So, have you considered any ways of involving the parents more actively so that you could influence the families too?

Ans. No, we haven't thought about this really, ... We haven't actually sat down to reflect on our results... and see what can be done for improvement".

School A appears to be more effective in involving parents: *"...we involved the parents' association. They had their representatives in the environmental committee (Eco-Committee), we invited their help during the "voluntary aid fair", and messages reached parents through their children, this is precisely the aim, through the new generation to influence the rest of the social group. Some of my colleagues had parents coming over to the school and complaining: '..our children won't let us water the plants using a hose...."*

The programme implementation is also supported by local authorities and school official suppliers. Their support is mainly sponsoring school's tasks, e.g. a newsletter publication or a students' visit, and where applicable they can provide expert information. School A Coordinator also describes the experience the school had during their cooperation with the municipality. *"We had a very good cooperation with the municipality. At first they gave us the water saving bags for the toilets, in order to save water every time we flush the toilet, they sponsored our publications and did whatever*

we asked them. The first year we got the green flag, you know, spontaneously after the award ceremony we (talking about the school representative that participated in the award ceremony: teachers and children) went to the city hall with the flag and told them 'you got a blue flag, (FEEE Blue flag award) we brought you a green one. At the moment the city council was having a meeting and the mayor accepted us and we had our picture taken with the mayor, they also helped to publish ... and the rest of the community heard about the programme.'

CATEGORY 7: PROGRAMME STRUCTURE AND ORGANISATION

This category focused on structural and organisational issues of the programme. The following aspects were examined: structure of the environmental committee; the mechanisms of the environmental audit; the Eco-Code structure; and the assessment of the programme.

The environmental committee, (except for School C), managed to involve all the actors required by the programme. Local authorities, municipality, parents association, and schools' official suppliers were all represented in the committee. School A included members of the non teaching school staff, such as cleaners and school refectory staff.

Representation of children was in all cases an average of two children per class, thus a minimum of 10 – 12 children would participate in the committee. In large schools where 2 children per class would mean more than 20 children in the committee (School B), only one child per class would attend the committee's meetings: *"Officially, we have 2 children from each class, that is 22 children, plus the council. Nevertheless only one student represents a class in the meetings and not always the same. School council*

comes only if the issue is very urgent". Schools B and C chose to involve children, other than the ones already participating in the class committee, so as not to increase those children's responsibilities. "...no we tried to avoid this so as not to overload the students' committee with more responsibilities that would take more of their time. The children from the school committee participate in the environmental committee but they are not the core members"(School B coordinator).

School A chose to use the children from the students' council, and this changed every semester, along with one or two other representatives from each class. *"They participated in the meetings and then transmitted the messages to their classmates in the class. We tried to make them feel important, and once we even took them out to dinner, in a hotel, so more of them were interested and wanted to enroll. "Oh! Please, let me in, let me in", because they realized it was something good. Some of the younger ones too, were mature enough, and participated in the committee either because they were members of their class council or because they distinguished for good performance in environmental issues. So they were selected in this way. Each class determined their own Eco-Committee representatives.*

Q. So apart from the class committee in the Eco-Committee participated class representatives.

A. Yes".

Schools A and B involved Local Authorities, municipality and parents association representatives in the Environmental Committee. School C involved only 4 members of the Parents' Association. For all school cases, the participants outside school, were

involved only at the beginning of the year. School B coordinator's comment on the Eco-Committee meetings was the case for all three schools: "*A. Full body meetings are not very common. We don't meet in full body so often because of the responsibilities and time limitations the members have. The meetings are rather held with school members of the committee (school staff and students)*". School A appeared to have slightly more full body meetings: "*So the basic full body meetings were two or three at the beginning and then another one when we were organizing the environmental activities week and a final one before the evaluation, in order to assess our achievements, to see if we were ready for the flag... We did not do that many full body meetings*" (School A coordinator).

The school members of the committee (teachers and children) would conduct the Environmental Audit and the full body committee would create the Action Plan. Normally the coordinator would be the main source of suggestions for activities. During the implementation process the programme co-ordinator would call regular meetings with teachers and students: "*... mainly I as coordinator I would call the children's group of the eco committee, either for information or ...or because they had suggestions to put forward and approve them...*" (School A coordinator). These kinds of meetings, were for all the cases held every 2 – 3 weeks.

The procedures for creating the Eco-Code in schools B and C were clearly stated through the interviews. The committee has to improve the code statements, but it is not explicit who suggested them. School A coordinator gave a thorough description of the process.

“Q. How about the Eco-Code...”

A. How we did it? Well, during the action week I would gather ideas from all classes, and give them a handout sort of like a form to fill out with their suggestions, about things they did, about energy saving, water saving, solid waste,... out of this volume of suggestions we did an initial selection and then the Eco-Committee (children members) would decide which statements would be included, normally the most simple ones and easiest to apply and pass on as a message. The final form of the code would again be approved, all statements one by one, by the entire school community during an assembly (by raising hands or orally). After that the statements can become a poster or as you can see we can write them down on signs in various places in the school... which we rotate actually, most of the signs were created in the first year of the programme when we were more enthusiastic, anyway the messages are also received by the school visitors, which are many, because theatric plays are hosted by our school and other local activities, so that is another form of message dissemination apart from the board which permanently includes the Eco News” (School A coordinator).

Generally the comments on the programme structure were about the benefits of the flexible structure and the good planning and implementation of the programme. “*You choose activities, targets, number of activities...*” The programme structure allowed independence and freedom but was not entirely unstructured. As School A manager pointed out: “*Structure is what constitutes a programme*”.

The only part of the programme's structure that obviously does not satisfy any of the school actors is the assessment process. The National Operator very clearly describes how the process is held and the criteria for the evaluation.

"Question. How is the Eco-School evaluation performed?"

Answer. Well, it is basically constituted of 2 parts. The first part takes place during the year before the evaluation visit. We check if the school has indeed completed the standard procedures, they submitted their application on time, they handed in their action plan, the structure of their environmental committee, and eventually submitted their Eco-Code with all the documents that would support the demand for evaluation. The second part of the evaluation takes place with our visit to the school. A group of people, or just one of us, either a CYMEPA employee or from the Pedagogical Institute, will visit the school and evaluate it according to three guidelines. The first thing to check is whether the school environment makes it obvious that the school is an Eco-School. This is shown through signs on the walls, etc. The second important factor is the participation of the students in all the stages of the programme. We insist that the Eco-School programme is a programme run by the students and not the teachers. So we invite a small group of children (the representatives of the school), and with a friendly approach, this is not the holy inquisition, and they will tell us what they did themselves and how well informed they are about the activities that took place in their school. The third factor is the existence of the Eco-Code on a central spot of the school. So according to these three criteria, usually a school is positively evaluated. The occasions when the students could not respond to our questions were negligible. The only case I can clearly say was in a secondary school in which the student-committee members

were only 15 students and they did everything, it wasn't the involvement of the whole school unit as we would wish. This year's target is of course the involvement of a higher percentage of students especially the younger ones, rather than increasing the number of the schools". Another evaluation criterion, mentioned on another occasion, which is quantitative, is that a school is considered to have achieved successful implementation, if it can prove that it met at least 2/3 of the targets set in the action plan.

The evaluation process described above was not the same in all cases. This was possibly because of an increase in school number, which made time limits stricter, or perhaps because various people conducted the assessment and shared the school visits. The Coordinator in School C, expresses his complaints on the issue: *"Evaluation was really superficial and brief. It only lasted for 10 minutes ... this was felt by 10 children for 10 minutes."* He goes on explaining the schools' *"tricking mechanisms"* which can be employed when this evaluation style is employed: *"...It was somehow frustrating, in the sense that even if a school does absolutely nothing it can find ways to convince the National Operator that they worked"*, referring to a number of exhibits presented during the assessment. Indeed, one of the INSET trainers who was involved in the assessment, obviously excited about what he saw, states *"...there was a plethora of exhibits on this year's topic and it was amazing to go around and see all these marvelous creations"*. Apparently what the teacher implied was that the number of exhibits does not necessarily indicate a high degree of involvement.

Every one of the teachers and school managers came up with a considerable number of suggestions for improving the evaluation process. School A administrator explains that *"evaluation could be performed progressively, step by step, all year long instead of a*

final evaluation. Of course it is a fact that we constantly inform CYMEPA (the National Operator) about the progress but we would like their presence to be stronger during all the phases of the programme". So what apparently is perceived as an all year long evaluation by the National Operator, is for the teachers merely the bureaucratic part of the programme and simple communication contact.

Suggestions for evaluation improvement are:

- examine school grounds;
- visit classes;
- talk with the children;
- be an evaluation committee rather than one single person (as this is more prestigious and gives more importance to the process);
- organise an assembly for the evaluators to announce the results;
- frequent evaluation visits during the year.

Some of these suggestions would include extra time and costs by the organizers, but are likely to enhance the quality of the process.

CHAPTER 9: DISCUSSION AND REFLECTIONS ON THE RESEARCH OUTCOMES

The research findings were used to form a model for the planning and application of environmental education in Cyprus Primary Education. The model is composed of a multilevel system, which includes all interested parties, in a top to bottom planning and bottom to top implementation feedback form. The three involved parties from top to bottom would be:

1. Policy and Decision-Makers: Ministry of Education; University, NGOs;
 2. school managers; teachers;
 3. students.
- } School level

Each group's roles and responsibilities are defined according to the conclusions extracted from the research findings and the description of the current situation of environmental education, as presented in chapter 5.

Within the model a whole school environmental education programme is proposed as the vehicle for effective environmental education delivery.

9.1 The current environmental education situation:

A general environmental education policy does exist. It consists of one paragraph stated in the Ministry of Agriculture, Environment and Natural Resources Plan of Action (1996), proposing the use of the integrated / cross-curricular approach and emphasis on primary and secondary education. There is nevertheless a need for a more explicit and

analytical statement considering environmental education by the Ministry of Education itself.

While much work is being done in environmental education, either by school initiatives or even the Ministry of Education itself (e.g. the creation of the environmental education centre), environmental education in Cyprus, as in other parts of the world *“is still far from being institutionalised as a fundamental, mandated and sustained part of the educational system”* (Benedict, 1999).

There is unanimous agreement amongst the research participants, for the need of specific guidelines and explicitness of a National Policy on environmental issues. In the case of education the need is focused, not on a general policy document (such as the Plan of Action, Ministry of Agriculture, Environment and Natural Resources, 1996), but on the practical implementation of the policy through integration in the National Curriculum and educational practices. The teaching approach proposed by the Ministry of Agriculture document (1996) was an integrative approach, although some reservations were expressed on the practicality and effectiveness of the method. The possibility of environmental education as an independent subject in the curriculum is also mentioned but time limitations in particular would not permit such an implementation. *In any case*, such a separate subject implementation is not commensurate with the holistic philosophy of environmental education (UNESCO-Norwegian University Press, 1991:28, UNESCO-UNEP, 1993: 48, UNESCO, 1977: 13, Palmer, J. & Neal, P., 1994:30, Lahiri, *et al*, 1992).

It also appears that formal traditional environmental education has doubtful effect beyond schools on the ways that people act in their lives and *“falls short of viable strategies for social action”* (Scott & Oulton, 1999). As a response to this challenge, Scott and Oulton (1999) propose the case for multiple approaches. This would likely be cross-disciplinary and multifaceted in that it will be informed by a combination of traditions and ideological persuasions and involve environmental education practitioners, which together will offer more than any of them could alone.

The implementation of environmental education in Cyprus would be best applied through a holistic approach to the Curriculum, which would permit a number of approaches to teaching. Cyprus Primary Education structure is very flexible and could enact a holistic/ multiple approach effectively.

9.2 Whole school environmental education programme

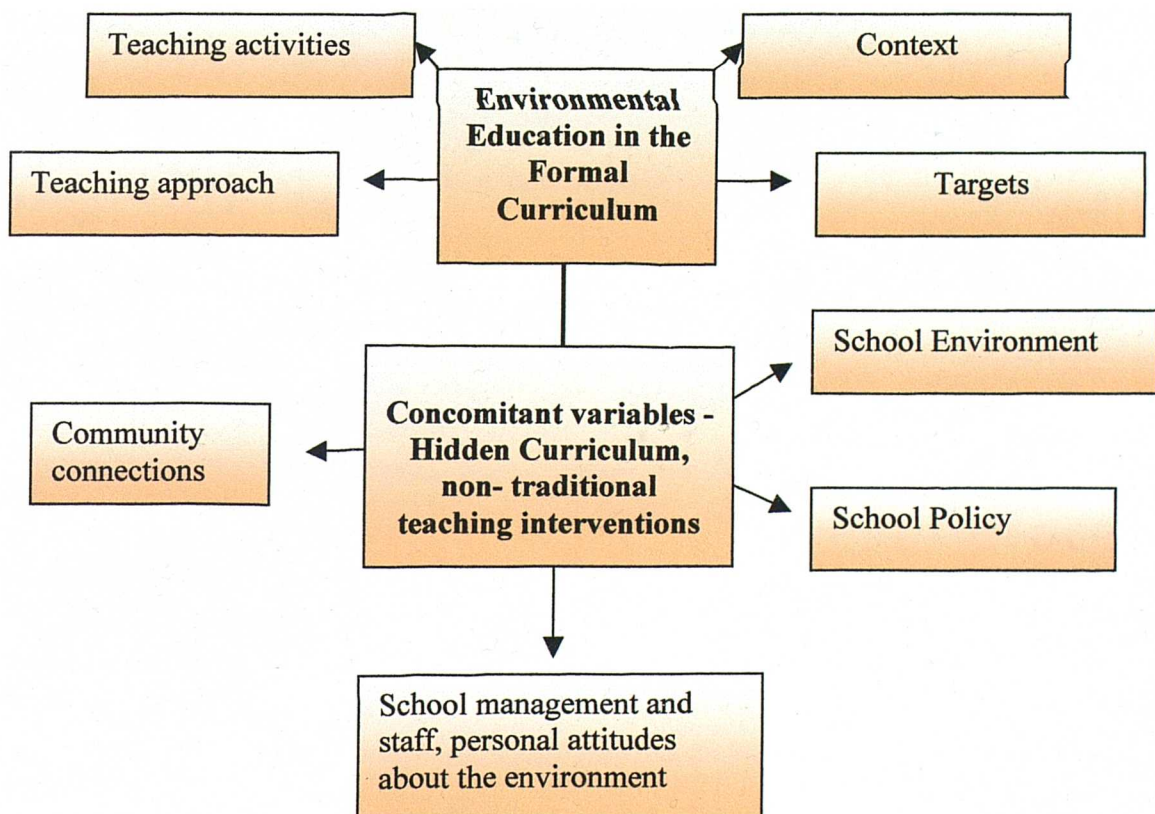
9.2.1 Why opt for a whole school environmental education programme?

The case of multiple approaches, proposed by Scott and Oulton (1999) also mentions the involvement of various environmental education practitioners. These: teachers, students, managers, researchers and people across the community, do not approach environmental education in the same way, but what is done, is done well, and the approaches selected by each meet clearly identified goals suited to the social, cultural, political and philosophical context in which education takes place. (Scott and Oulton, 1999). Therefore curriculum, has to be supported and enhanced by the involvement of all

practitioners and encourage the use of a number of techniques that best suit the context rather than seeing one particular view whatever the circumstances.

Recognising all the benefits emerging from the implementation of an environmental education programme highlighted by the research (in this case the Eco-School programme), the vehicle proposed for Cyprus as a response to the need for establishing a framework where multiple approaches (within the curriculum, school life and school – community opening) could be engaged, is an environmental education programme.

Fig. 9.1. Environmental education implementation through a whole school environmental education programme.



Whole school environmental education programme can better achieve the “ecologisation of the school” (Posh, 1999), meaning that a programme would establish

a framework for interaction with the environment in an intellectual, material, spatial, social and emotional sense. A school that strives for “*ecologisation*” would launch initiatives at three levels: the pedagogical level, the social/organisational and the technical/economic level (Posh, 1999).

The first level is represented, in the proposed environmental education programme framework for Cyprus (fig. 9.1) by the “environmental education in the formal curriculum” boxes. Suggestions about the curriculum based on this research’s results are presented in the following section.

Both the social/organisational and technical/economic levels are included in the second part of fig. 9.1: the concomitant variables -hidden curriculum and non- traditional teaching interventions, mainly within the community connections and school’s environmental policy. School – community connections can vary in intensity level as Uzzel (1999) argues, yet school and community connections have the potential to overcome traditional settings and facilitate action competence approach. The optimal relationship would be Uzzel’s (1999) 4th model (‘dialogue model’), where school becomes a social agent. *“Barriers between the school and the local community should be permeable: community members are present in the school and the pupils are active in the local community”*. This relation is one of the Eco-School programme requirements.

The employment of a whole school environmental education programme is a highly recommended way of environmental education implementation. This is supported by the results emerging from a research conducted for the Regional Report for N. America. The research indicated that the traditional education model “Awareness Attitudes

Behaviour” does not work for a large number of human beings (UNESCO-UNEP-MIO/ECSDE, 1996:19). Educational practices should shift from behaviour modification approaches to action competence. Behaviour modification approach aims at prescribing certain of the pupil’s behavioural patterns which would contribute to solving current environmental problems. Action competence approach is related to developing a critical reflective and participatory approach by which the adult can cope with future environmental problems. (Breiting and Mogensen, 1999).

For critically competent behavioural change in the environmental arena the educational climate created must provide two things:

1. put the learner in a situation where he psychologically owns the issues – ownership;
2. provide the learner with the skills needed to empower him to take positive action – empowerment.

Whole school environmental education programmes provide the required conditions.

“However, very few countries have introduced environmental education programmes in schools, which involve students and which use a research based scope and sequence...”
(Knapp, 1996).

The research revealed a number of benefits/implications emerging from the application of the programme studied, concerning the students. The programme:

1. has a greater impact on improving lower achievers’ environmental action and cognition;
2. motivates low achievers to communicate school events to their family;
3. increases low achievers’ family involvement to school activities;

4. generally facilitates the transmission of school messages to the family;
5. diminishes the impact that socio-economic factors have on school contact with the family by improving the school – family communication of low socio-economic background through school activities. Socio-economic group 0-1 (unemployed and non-specialist workers) may have more time to spend with their children, perhaps because of limited professional responsibility, therefore they appear to have better communication with school than group 2 (specialist workers) and group 3 (technical professions). High socio-economic groups 5-6 (prestige and management professions) also appear to have received a greater school impact through their children's communication of school events. A similar result about the same social group, emerged in Rovira (2000:152), *"those students who spoke most about the programme to their parents were those students more receptive due to their social position, age and educational level"*. It is very important to stress that the Eco-School Programme appears to have managed to approach the "lower" social groups too and has actively involved them in school activities, diminishing, this way, the differences that might exist due to socio-economic origins.
6. can improve teacher – student communication;
7. enhances teaching practices;
8. engages children in extracurricular activities, augments their interest and motivates participation;
9. facilitates (as indicated by the second regression model in the research results) whole school and extracurricular activities based on experiential and action learning activities

and therefore enhances the inculcation of environmental attitudes in students (May, 2000, Zelenzy, 1999, Kadji-Beltran *et al.*, 2001);

10. children consider it to be interesting and educational.

Environmental education initiatives in Cyprus Primary schools consist of a limited number of programmes, and the occasional teachers' initiatives. There is room for many more programmes to run and support environmental education in the majority of schools who have never been enrolled in such programmes.

9.2.2 The role of the Ministry of Education: whole school environmental education programme considerations

Considering the benefits that can emerge from a whole school environmental education programme, as highlighted by the research, makes such a programme an extremely important means for achieving key environmental education targets. The Ministry of Education should consider making such programmes available to all schools by:

1. promoting the existing programmes and providing them with more support, so as to be able to reach nationwide levels of implementation;
2. encouraging the NGOs to establish more programmes, a solution that might require less support from the Ministry. The second possible solution would require the assessment of the proposed programme, by the Ministry of Education. Therefore, the Ministry could consider the aims that an environmental education programme should promote, and the criteria with which the programmes would be evaluated in order to ensure that quality programmes enter the educational system. The Ministry of

Education could be responsible for the assessment of the programme implementation as well.

3. creating a Ministry of Education programme.
4. allowing schools to develop their own programmes based on a carefully structured framework, and simultaneously creating a support system for the schools.

According to the suggestions of the research participants, an environmental education programme should be optional. The forced application of an environmental education programme as stated in some of the interviews (Teacher 1 Survey interview, National Operator, PI INSET trainers & Science Inspector) is equivalent to its failure.

Nevertheless, environmental education through a programme has far too many benefits to be ignored. In Austria for example, *“school programmes will become mandatory by the year 2003”* (Posh, 1999) in order to achieve school ecologisation (Environment and School Initiatives Project: ENSI). The specific project (ENSI) *“invited schools to initiate environmental education programmes within a framework of aims and principles, and to use action research as a means of examining and resolving the problems of realising them in practice”*. (Elliot, 1995:23)

Regardless of the solution for Cyprus; optional or mandatory, the Ministry of Education should provide enough incentives to motivate schools and teachers to enrol in environmental education programmes. Several countries have realised the importance the incentives have for the schools to enrol in an environmental education programme. Some examples are the Green School Award programme in Sweden and Environment and School Initiatives Project in Austria (e.g. financial benefit for schools as a reward

for the savings obtained by the programme implemented). There are some important incentives provided for the Eco-School programme in Cyprus, by the Ministry of Education, e.g. time off for the programme coordinators, and recently a small grant for the participating schools. These incentives should be available to all the existing programmes and maintained even if all schools in the country decided to enrol in a programme.

Apart from an incentives system there are several other needs that should be met before the school “ecologisation” is attained. The following suggestions could support the environmental education implementation in Cyprus in an environmental education programme and are also applicable for curriculum practice.

- Establishing an environmental education coordinator for each school. These persons should be motivated teachers, with experience of programme implementation so as to be confident enough to apply the programme effectively, and mentor their colleagues without authority questioning. Various motives can be considered to persuade teachers to take this role (more time off, perhaps salary bonus, professional development).
- The effectiveness of the coordinators can be supervised and supported by district environmental education coordinators or district inspectors. These can also act as links, facilitating communication and cooperation among schools.

A programme design and implementation can also consider the following factors for more effective implementation as illustrated by the research findings:

1. Greater school and community involvement can achieve better and wider results. Especially when aiming to promote environmental attitudes and action, the involvement of school staff, students, parents, local community and local authority is essential.
2. Democratisation of the process. As highlighted by School A director, students can be involved to a greater extent during decision-making and thus develop more initiatives. The democratic process, along with the curriculum and school structure, can support many of the goals of environmental education (Pennock, 1993:93).
3. Citizen participation is crucial for environmental programmes (Rovira, 2000:153). Therefore, an increase in school visits towards the community, and community's participation in school activities can achieve the school's "opening to the society" and enhance the programme's impact. Experiencing the difference students can make in their community involves both knowledge and action and therefore empowers their education (Kreisberg, 1992, Pennock, 1993). At this point, schools might consider organising activities for students' action in the community as well as seminars (through invited speakers) and communication opportunities with parents.
4. Student motivation. New experiences, visits and practical activities appear to motivate the students, according to the research findings. The most motivating element, though, appeared to be the award. The award offers satisfaction for the fruitful results of the students' efforts and provides opportunities for celebrating the success. *"Celebration of learning is rewarding and relieving for all"* (Pennock,

1993:97). So, an environmental education programme design might consider involving a competitive character.

5. Create commitment for the effective implementation of the programme by creating “ownership” feelings to the children and school staff (Knapp, 1996:19, Pennock, 1993:98).

9.3. Curriculum issues

9.3.1 The Environmental Education through the Cyprus Formal Primary Curriculum.

The term “environmental education” is not mentioned within the curriculum, despite being mentioned in policy documents; nevertheless encouraging environmental issue study is one of the curriculum’s aims. There is a considerable number of opportunities for environmental education integration within each discipline; these are currently not highlighted and generally remain unnoticed and/or not exploited. The interviews with the teachers and the open-ended questions in the teacher’s questionnaire, stress the need for a distinct environmental education section in the Curriculum, which can orient the teachers towards enhanced environmental teaching. Several aims of each discipline could be met through environmental education context. However most teachers expect these opportunities to be made explicit to them. Language aims, for example can easily be attained through environmental context and be connected at the same time with real life situations:

“Some of Yr. 5 and 6 Language Curriculum targets which could be attained through environmental issues context:

Listening and oral expression:

Children should participate and coordinate debates. At the end they should be capable of reaching certain conclusions...

Study and literature review skills:

Children should be able to search in dictionaries, encyclopaedias, guides, newspapers, magazines, catalogues, etc. for the information they seek... ”.

(Kadji-Beltran, 2001:19)

In the language example the targets presented can make use of several environmental controversial issues causing debate and discussion (e.g. Eco-tourism in Akamas Nature Reserve: Pro or against?).

9.3.2 The role of the Ministry of Education: Curriculum considerations

For tackling the policy vagueness of the Ministry of Agriculture and the lack of explicit policy from the Ministry of Education the latter can consider the following suggestions as these emerge from the research findings, in order to establish a minimum of environmental education integration in the curriculum that will ensure the coverage of the environmental education aims:

1. The Ministry of Education should insert in the Cyprus National Curriculum an additional chapter on environmental education (as is done with other cross-curricular issues). This chapter could provide the teacher with:
 - a. information on the environmental education aims;
 - b. information on environmental education philosophy;
 - c. the necessary guidelines on the teaching approaches and what each of them could better succeed;

- d. information about the opportunities that already exist for environmental education implementation through the curriculum (For example in the UK this exists through the SCAA:1996);
- e. examples of good practice;
- f. suggestions for activities and links with the curriculum.
- g. practical suggestions for extracurricular expansion
- h. suggestions on community linking activities.

2. The Ministry of Education should revise the students' books. The research findings indicated that there are some disciplines where environmental education can easily be integrated. Special attention should be given to the "difficult" disciplines, e.g. mathematics, so as to facilitate the teacher's task and achieve the "greening" of the curriculum. The context and handbooks of each discipline should be reviewed by subject specialists with the help of environmental education advisors. This collaboration strategy latter could help provide ideas on how environmental education could be implemented. Environmental education advisors can also link the environmental education inserts within the curriculum topics, having a global view of the curriculum. In this way they can ensure progression and continuation, sufficient coverage of important issues, and avoid repetitions. This can also facilitate the employment of any form of the integrative approach decided for the environmental education implementation.

Specific suggestions emerging from some of the interviews and teacher questionnaire open-ended questions for some of the disciplines could be:

- **Greek Language** textbooks should include more texts on environmental issues, aiming both at environmental cognition as well as attitudes. This would not prohibit the fulfilment of any of the language targets. Language writing skills and literature review skills can be practised through documents of environmental interest, along with debating skills. Such teaching aids already exist in the market and provide reading comprehension texts (e.g. Molyviatis, 1997).
- Monitoring activities could become part of **mathematical** problems, as well as the use of electricity or water consumption bills within the mathematics books. Apart from studying mathematics through real life examples, the child will have the opportunity to link the consumption impact on the environment. Excellent mathematical problems can emerge from several environmental problems and phenomena, such as bioaccumulation for instance, which can give practical examples of arithmetic progressions and patterns within the environmental context. This can achieve both the understanding of the mathematical concept as well as a visualisation of the environmental problem.
- There are lots of activities taking place in **art and design technology**, especially through reusing old material (Llimos & Sadurni: 1996). This way of working can involve many hands on activities, and facilitate active learning, which appears to be a teaching approach that effectively inculcates environmental attitudes (Knapp, 1995; May, 2000; Zelezny, 1999; Kadji *et al.* 2001). The simple explanation of the environmental benefits from re-using materials can awaken the students' awareness on the issue. Nevertheless this is something that the teacher has to point out, and since it is not explicit in the curriculum it is not ensured that it will be done.

Bringing this to the teacher's attention can be easily achieved through a paragraph within the curriculum or the discipline's activity guides.

- **History** could have several environmental education implants for example through comparing old and contemporary lifestyles, or justifying locations where several cultures appeared, the environmental impact of historic events, or the environmental origins of historic events.
- **Music** could draw attention to the sounds of nature, and try to imitate them, practising musical skills, or investigate the sounds from different natural objects (cane for example) and how musical instruments can be created by these. Practical creative ideas could be using discarded objects, for the creation of musical instruments (e.g. bottles or cans), possibly linking music with art.
- **English language** teaching can also make use of texts and approaches mentioned for Greek language.

The point here is not to analyse all environmental education integration possibilities in each of the curriculum disciplines, but to point out that there are many opportunities that can be used, if a well-organised plan is established providing support, resources and confidence to the teacher.

The importance of providing these teaching conditions is emphasised by May (2000):

“The overall teaching context that fosters student growth in environmental –related outcomes is multidimensional and incorporates elements both within and well beyond the classroom walls. Desirable

conditions include varied forms of support, resources, flexibility and climate” (p.6).

Reinforcing the teaching conditions would also facilitate an enhancement of environmental cognition. According to the comparison results of this research (Kadji-Beltran, 2000) and a similar research conducted in Ireland¹ (MJOM 2001), Eco-Schools’ score on environmental cognition was not significantly different from the score obtained by schools outside the programme. This could be interpreted if we consider that the environmental education targets for the primary years emphasise attitudes and environmental awareness rather than cognition, which is stressed at the end of primary, beginning of secondary education (Engleson *et al*, 1991, p.9). Nevertheless, during the fifth year, children were expected to be more competent on the cognitive level. Leeming *et al* (1995), emphasise the importance of reinforcing environmental cognition since they consider it to be a substantial condition for obtaining maximum effectiveness in environmental education programmes (p.10). Resources and aids can contribute towards this direction.

3. The Ministry of Education should promote through the Curriculum, experiential and action learning, for effective inculcation of environmental attitudes and environmental action. According to the current and other research findings, experiential and action learning can be effective teaching practices for environmental education (May, 2000, Zelezny, 1999, Kadji-Beltran, *et al.*, 2001).

¹ Cyprus Eco-School National Operator provided Irish Green Schools with details on research methodology and results presented in the paper (Kadji – Beltran 2000). The Green School research conducted in Ireland, followed a quite similar research methodology and tools, used a much larger sample and produced strikingly similar results.

“The teaching methods and style, environmental educators frequently use are constructivist, student directed and experiential in orientation” (May, 2000:6). Zelezny (1999:12) stresses that active participant involvement is positively related to effectiveness in improving environmental behaviour and attitudes.

4. The Ministry of Education should give more emphasis on the lower primary curriculum. Environmental education is even more marginalized in those ages. As School B coordinator observed, the younger children in her school (year 4) appeared to be more enthusiastic about the programme implementation in their school. Nevertheless, the lower primary school (years 1 – 3) corresponding to School B (higher primary, years 4 – 6), did not enrol. According to Palmer (1999), *“early childhood is an absolutely critical time. During those formative years, impacts upon thinking and feeling about the environment occur”*. Zelezny (1999:12) supports early age educational interventions for the improvement of environmental behaviour, as well, because:

“...younger participants are (a) more influenced by interventions because they learn new pro-environmental behaviours more easily, (b) more interested in environmental issues and improving the environment, or (c) more eager to present themselves as pro-environmental if that is interpreted to be more socially desirable”.

5. Following the previous rationale it would be reasonable to expand environmental education implementation in pre – primary education. Pre-school children are capable of forming concepts concerning environmental issues and citizenship responsibilities (Leeming *et al.*, 1993:9). Environmental education expansion in the early years would

extend children's time exposure to environmental education practice and experience and facilitate long lasting attitude change (Eagles and Demare, 1999:37).

9.4 Encouraging Teachers to employ environmental interventions into their teaching.

9.4.1 Teachers' training on environmental education

?
1.
The Ministry of Education (policy and decision makers), and the University of Cyprus, should provide ways of facilitating environmental education implementation by preparing and motivating educators. Teacher competencies and experiences that support environmental education are necessary for successful implementation. Along with generic pedagogical skills, teachers should be equipped with environment – related content knowledge and skills (May, 2000:5), especially since the environmental education policy indicates an integrated approach. Such an approach requires a great number of trained teachers (although not in much depth), (Lahiri *et al.*, 1992).

The University of Cyprus at the moment fails to provide solid and regular environmental education training. Providing initial teacher training on the issue will help make teachers familiar with the issue's philosophy, aims, and approaches that can be used and thus can increase their confidence in implementing environmental education. Such programmes should be mandatory.

9.4.2 Teacher's Profile

The Ministry of Education can facilitate the introduction of environmental education in schools by finding ways of motivating the teachers to integrate environmental education in their teaching. According to the findings of the 1st regression model, the teachers who are willing to integrate environmental education are the ones with a managerial position and/or a postgraduate degree and/or teachers with expertise in environmental education. Teacher position and postgraduate studies are factors beyond the control of the Ministry. The profile of teacher's experience, though, can be modified, thus the factors the Ministry should tackle and invest in, are:

1. INSET provision. Teachers might be more motivated to attend environmental education INSET if it were organised on a school basis, or if it provided solid professional development qualifications. Acquisition of competence is a means of increasing teachers' confidence for teaching environmental matters.
2. Curriculum support: This can be provided by:
 - creating an environmental education syllabus with information on what should be taught, at which age and background information on environmental issues for the teacher;
 - teaching matter relief so as to diminish matter pressure and provide some time for environmental issues;
 - books revision.
3. Ensure that a teacher's workload is not increased by having to teach a vast variety of different disciplines, in a variety of different classes.

4. The regression model showed that the encouragement the management offers to the teacher increases the environmental education integration in the curriculum. Therefore the Ministry could probably consider ways of highlighting to the school managers the importance of their role as environmental education implementation supporters. This could be achieved by inserting this aim through the management seminars already organised by the Pedagogical Institute.

9.5 Visualisation of a National Environmental Education Programme

To achieve effective implementation and long term effect of environmental education, energy and resources should be directed toward making the educational system itself work for change in a committed manner. This, according to Benedict (1999) requires developing effective policy for changing structures of competencies, curriculum and cooperation throughout the educational hierarchy.

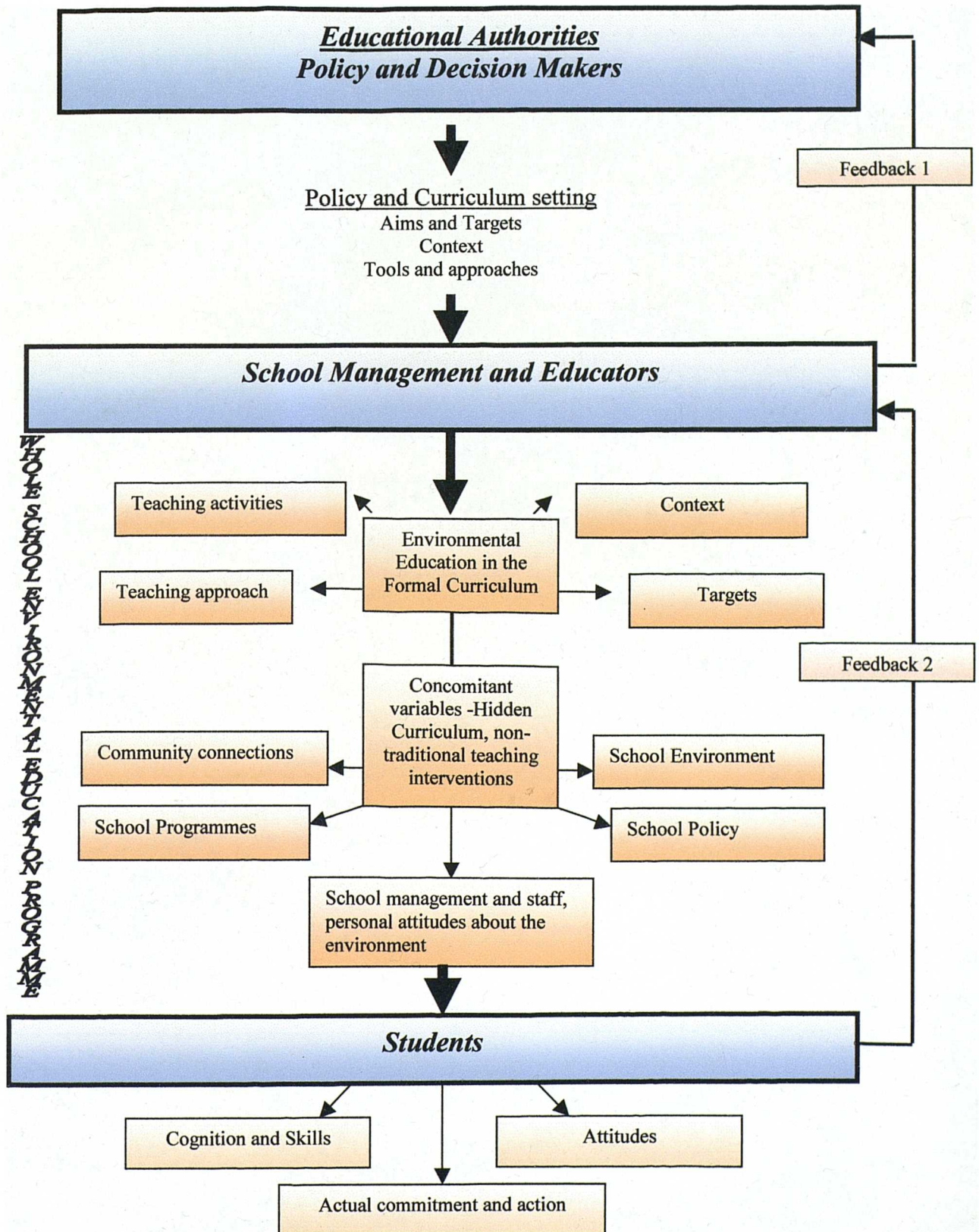
The development of a model for a National environmental education programme for Cyprus takes under consideration all “levels of educational hierarchy”: it tries to involve all top to bottom factors with careful planning of each stage and continuous feedback from bottom to top to improve and assess the implementation. This model agrees with Benedict’s (1999) suggestion for a systemic approach in environmental education. She argues that for an environmental education innovation to be sustainable (durable), a systemic approach to changing the institutional framework of environmental education is required. Such an approach would focus on placing responsibility for environmental education with the educational authorities; curriculum revision; competence; building and development of networks of intersectoral cooperation with institutions outside

school. According to Benedict (1999) this could be organised within a multilevel system: the teacher – pupil learning relationship level; the classroom level; the school level.

As illustrated by diagram 9.2, educational authorities are responsible for creating the implementation model (whole school environmental education programme), in collaboration with the teachers. Teachers that have integrated environmental education in their teaching and that have environmental education programme experience can provide useful recommendation and support during the creation of such a plan (diagram 9.2, feedback 1).

The plan, after its first revision, according to expert teachers recommendations can be implemented by schools. It could initially involve only a number of pilot schools that would continuously provide feedback about the plan. The results can be evaluated both by the teachers' observations on the overall programme function, as well as by assessing the programme's impact on students, by means of a test, interviews, observation or other suitable assessment techniques. These results can finally be communicated to the policy and decision makers and used for any necessary modification and improvement of the proposed programme.

Fig. 9.2. Planning and applying an EE Programme in Cyprus



9.6 Research limitations and future investigation

Practicality, effectiveness, potential and limitations of the theoretical model and practical conclusions resulting from this research project can only be assessed during application. The designing of the framework itself involves a great number of expert contributors, teachers and children, let alone the application, and still remains to be seen how persuasive this proposal could be for the Ministry of Education.

The number of aims covered by research, and the issues under investigation can be innumerable. Therefore, one has to choose priority issues and focus on them, in order to set clear borders around the area of the research.

A limitation of this work is the concentration of the survey on a specific age of children, a fact that inhibited any quantitative data collection about younger children's response to the programme. It would be interesting to investigate the effects of an environmental education programme during early ages, and the duration any existing impact might have.

Another limitation is the lack of in-depth investigation on the programme's effects on the families, through a supplementary research design that would gather data directly from home. Although the results of the programme's impact on the family were statistically significant, the administered impact measurement tool (student questionnaire, questions C1, C4.1 – 6) could have included a greater variety of questions.

A distinct research could be specifically designed in order to investigate a school programme's impact on the families, by directly involving parents in the process through a parent questionnaire or/and interviews.

The response on the teachers' questionnaire was quite limited, probably because of the period in which it was administered (approximating Christmas holidays). A follow up questionnaire would be useful.

Further research that can emerge from the effort to create a holistic – whole school model for the implementation of environmental education in primary education can be directed towards specific issues such as:

- Which of the programme's facets are responsible for each of the emerging benefits?
(For example which part of the Eco-School Programme is responsible for the improvement of the teacher – student communication?)
- Investigate how INSET could better prepare programme coordinators.
- The estimation of the cost the implementation of the plan might have.

Some other questions have also emerged from the research findings, and include:

- Which are the factors responsible for the differences in the overall test score among the districts?
- Can an environmental education programme encourage low achievers to improve their general achievement in the school?
- Could an environmental education programme have an impact on the students' general behaviour?
- How long does the Programme impact on the student last?

Literature and research have pointed out that classroom interventions can have greater and more lasting impact on environmental attitude inculcation, whereas non-traditional interventions have a greater and more lasting impact on environmental cognition (Eagles & Demare, 1999; Leeming *et al.*, 1993; Zelezny, 1999). Nevertheless, research using adults' sample reached contradictory conclusions: according to Palmer (1999:387) personal experiences gained individually outdoors have more impact on developing environmental concern compared with experiences provided by formal education. The verification of these statements could stand as an individual research study on its own and could highlight the effectiveness of certain environmental education practices.

It would also be quite useful to investigate the cost effectiveness of all the implementation suggestions presented, so as to see their financial feasibility. For instance, how many teaching periods could be spent for environmental education coordination and planning in a school? How much would that cost?

This study has been an attempt to investigate potential methods for the effective integration of environmental education in Cyprus primary schools. It was the researcher's intention to reveal evidence of practical importance and use: the gaps, existing with respect to environmental education in Cyprus and possible methods for filling them, approaches to be used, teachers' opinions on the issues, and research results to support examples of good practice.

Being aware of the research limitations, it is the researcher's hope that the information emerging from this thesis can be useful and supportive in developing and establishing a clear policy for environmental education in primary schools in Cyprus.

REFERENCES:

ENGLISH REFERENCES:

- Aldrich, M.B., & Kwong, J. (1997). *Environmental Education*. IEA Education and Training Unit and IEA Environment Unit, UK.
- Alkin, M.C., & Ellet, F.S. (1990). Development of Evaluation Models. Walberg, H.,J., & Haertel, G.D. (Eds.). *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Alkin M.C. *et al*, (1991), Does Evaluation make a difference? In Anderson D.S. & Biddle B.J., (Eds.). , *Knowledge for policy*, The Falmer Press, London
- Alkin M.C., (1990), Curriculum Evaluation Models. In Walberg, H.,J., & Haertel, G.D. (Eds.). *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Anderson D.S. and Biddle B., J., (Eds.). (1991). *Knowledge for Policy, Improving Education Through Research.*, The Falmer Press, London.
- Anderson, L.W. (1990) Attitudes and Their Measurement. In Walberg, H.,J., & Haertel, G.D. (Eds.), *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Anderson, L.W. (1988). Likert Scales. In Keeves, J.P.(Ed.) *Educational Research, Methodology, and Measurement: An International Handbook*. Pergamon Press, Oxford.
- Arbizou – Echavarri, F., & Alfredo, L., (1997). Environmental Education and Training in Spain. . In Scoulllos M. (Ed.), *Environment and Society. Proceedings of the Thessaloniki International Conference*. pp. 237 – 240., UNESCO and the Government of Greece.
- Babbie, E. (1991). *The Practice of Social Research*, Wadsworth Publishing, California.
- Baczala, K. (1992) *Towards a school policy for environmental education : an environmental audit*. Walsall : National Association for Environmental Education. Wolverhampton University.
- Baines, J. (1996). Agenda 21 and Environmental Education. In *Education and the Environment in Europe. Council of Europe in-service training programme for teachers*. 25 – 31 March 1996.
- Ballantyne, R., Connel, S., Fien, J. (1998). Students as Catalysts of Environmental Change: A framework for Researching International Influence Through Environmental Education. *Environmental Education Research*. 4, 3, (285-297) Carfax, UK.

- Bell, S. (1999). *Local Radio Station: A storyline topic*. Netherlands: Conijn.
- Benedict, F. (1999). A Systemic Approach to Sustainable Environmental Education. *Cambridge Journal of Education*. Vol. 29, No.3, The University of Cambridge School of Education, UK.
- Benedict, F. (Ed.). (1991). *Environmental Education for Our Common Future. A Handbook for Teachers in Europe*, Norwegian National Commission for UNESCO, UNESCO-UNEP, IEEP and ASP.
- Bennett, B. (1987). Four steps to evaluating Environmental Education learning experiences. *Conference of the North American Association for Environmental Education*. 19 October, Canada.
- Berger, A.A. (1998). *Media Research Techniques*. Sage, London.
- Best, 1970, *Research in Education*, Prentice Hall, Englewood Cliffs, New Jersey
- Bogner, F.X., & Wiseman, M. (1997). Environmental Perspectives of Danish and Bavarian Pupils: Towards a Methodological framework. *Scandinavian Journal of Educational Research*, Vol 41, No.1, pp.53 – 71.
- Borg, W.R. & Gall, M.D. (1989). *Educational Research: an Introduction*. 5th ed., Longman, New York..
- Brannen, J. (1992). *Mixing Methods: qualitative and quantitative research*. Aldershot: Avebury.
- Breiting, S. & Mogensen, F., (1999). Action Competence and Environmental Education, *Cambridge Journal of Education*. University of Cambridge School of Education, UK.
- Breiting, S., (1997). *The new Generation of Environmental Education Focus, on Democracy as Part of an alternative Paradigm*.
<http://www.edu.uleth.ca/ciccte/nac...rnate/pubfiles/15.Breiting.rev.htm>
- Burgess, R.G. (1989). *The Ethics of Educational Research*. The Falmer Press, London.
- Burges, R.G. (Ed.). (1993). *Educational Research and Evaluation for Policy and Practice?* The Falmer Press, London.
- Burges, R.G. (Ed.) (1985), *Strategies of Educational Research. Qualitative Methods*, The Falmer Press, London.
- Caduto, M., (1983). A Review of Environmental Values Education. *Journal of Environmental Education*. Vol 14 (3), pp 13 – 21.
- Campbell, R.J. (1985). *Developing the Primary School Curriculum*. London: Holt, Rinehart and Winston

- Carson, R., (1991). *Silent Spring*. Penguin, London.
- Chambers, B. (1995). *Awareness into Action. Environmental Education in the Primary Curriculum*. The Geographical Association.
- Chen, P.J. (1997). Environmental Educators, It is time to Design a Whole Curriculum Now. *Environmental Education Research*, Vol.3, No.2, Carfax, London.
- Cohen, L. & Manion, L. (1996). *Research Methods in Education*, Routledge, London.
- Connell, S. (1997). Empirical – Analytical Methodological Research in Environmental Education: Response to a Negative Trend in Methodological and Ideological Discussions. *Environmental Education Research*. Vol.3, No.2, pp.117-132.
- Council for Environmental Education (1987), *Introducing Environmental Education for Schools: Educating for Life*. CEE, Reading.
- Council of Europe (1988). *Resolution of the Council and Ministers of Education Meeting with the Council. Environmental Education*. No88/C177/03, Council of Europe.
- Davis, R.G. (1990). Educational System Assessment and Planning Models. In Walberg, H.J., & Haertel, G.D. (Eds.). *The International Encyclopedia of Educational Evaluation*. Pp. 710 – 714, Pergamon Press, UK.
- Decorte, E.& al. (1990). *Les Fondements de l' actionDidactique*. Bruxells: Deboeck.
- Denzin N.K. (1988) *Interpretive Biography*, Beverly Hills, CA: Sage
- Denzin, N. & Lincoln, Y.S. (Eds). (1994). *Handbook of Qualitative Research*. Thousand Oaks, Sage Publications.
- DES, 1986, *The Curriculum from 5 – 16, Curriculum matters 2*, London, HMSO
- Drever E., (1995) *Using semistructured interviews in small scale research. A teachers' guide.*, The Scottish council for research in education (SCRE)
- DFEE, QCA (2000). *The National Curriculum Handbook for Primary Teachers in England*, London: www.nc.uk.net
- Diane, C. (1997). *Alternative Paradigms inn Environmental Education Research: The Interpretive Perspective*. pp.1 -18:
<http://www.edu.uleth.ca/ciccte/nac...rnate/pubfiles/08.Cantrell.fin.htm>
- Dillon, P., & Gayford, G. (1997). A Psychometric Approach to Investigating the Environmental Beliefs, Intentions and Behaviors pf Pre-Service Teachers. *Environmental Education Research*, Vol. 3, No. 3, pp. 283- 297, Carfax, UK.
- Eagless, P. & Demare, R. (1999). Factors influencing Children's Environmental Attitudes. *The Journal of Environmental Education*. Vol.30, No.4, pp.33-37.

- Elliot, J. (1994). Developing Community –focused Environmental Education through Action Research, In OECD. (Ed.). *Evaluating Innovation in Environmental Education*. pp. 31 – 59. OECD Documents.
- Elliot, J. (1995). Teaching and Learning in the Environment. Reconstructing the Environmental Education Curriculum: teachers' perspectives, in *Environmental Learning for the 21st Century*, OECD, Paris
- Faye, B. (Ed.). (1991). *Environmental Education for our Common Future. A Handbook for Teachers in Europe*. UNESCO – UNEP, IEEP, Norwegian University Press, Norway.
- FEEE (1999). *Foundation For Environmental Education in Europe. The European Blue Flag Campaign, Eco-Schools, Young Reporters For the Environment*. FEEE, UK.
- Filho, W.L. Eurosurvey: An analysis of Current Trends in Environmental Education in Europe. In Herris, G. & Blackwell, C. (Eds.). *Environmental Issues in Education-Monitoring Change in Education*. Cambridge University Press, UK.
- Fien, J. (Ed.) (1993). *Environmental Education. A Pathway to Sustainability*. Deakin University, Australia.
- Fien, J., & Trainer, T., (1993) A Vision of Sustainability. In Fien, J. (Ed.). *Environmental Education. A Pathway to Sustainability*. Pp. 24 – 39. Deakin University, Australia.
- Fien, J. (1993). *Environmental Education and Social Change*. Deakin University, Australia.
- Fien, J. (1995). *Education for the Environment. Critical Curriculum Theorising and Environmental Education*. Deakin University Press, Australia.
- Fien, J. & Spork, H. (1993). *Trends and Issues in Environmental Education*. Deakin University.
- Fielding, N. (1993). Qualitative Interviewing. In Gilbert, N. (Ed). *Researching Social Life*. Sage, London.
- Firestone, W.A. (1987). Meaning in Method: the rhetoric of quantitative and qualitative research. *Educational Researcher*, Vol.16, No.7, p.p.16-21.
- Fishbein, M., & Ajzen, I., (1975) *Belief, Attitude, Intention and Behaviour: An introduction to theory and research*. Addison – Wesley, Reading, Massachuttes.
- Fontana, A. & Frey, J. (1994). Interviewing: the art of science. In Denzin, N. & Lincoln, Y.S. (Eds). *Handbook of Qualitative Research*. Thousand Oaks, Ca: Sage Publications
- Fortino, C. (1997) Leaders in Environmental Education. *Environmental Education Research*. Vol.3, No.2. pp. 203-224. Carfax, London.

- Gayford, C. (1998) The Perspectives of Science Teachers in Relation to Current Thinking about Environmental Education. *Research in Science and Technological Education*. Vol. 16, No. 2, pp.101-113
- Georgiou S.N., (1999), Parental attributions as predictors of involvement and influences on child achievement, *British Journal of Educational Psychology*, vol. 69, pp. 409 – 429, The British Psychological Society.
- Gilbert, N. (Ed). (1993) *Researching Social Life*. Sage, London.
- Giolitto, P.; Mathot, L.; Pardo, A. & Vergnes, G. (1997). *Environmental Education in Europe*, ECSC-EC-EAEC, Brussels.
- Gough, A. (1997). Education and the Environment: Policy, Trends and the Problems of Marginalisation. *Australian Education Review*, No. 39, Australian Council for Educational Research. (ACER).
- Goodall, S.(Ed.). (1994) *Developing Environmental Education in the Curriculum*. David Foulton Publishers, London.
- Goodson, I. (1983). *School Subjects and Curriculum change: Case Studies in Curriculum History*. Groom Helm, London.
- Goodson, I. (1985). History, Context and Qualitative Methods in the Study of Curriculum, In Burges, R.G. (Ed.). *Strategies of Educational Research. Qualitative Methods*. Social Research and Education Studies Series 1, pp.207 – 231. The Falmer Press, London.
- Gough, N. (1998). Learning with Environments: Towards an Ecological Paradigm for Education. In Robottom, I. (Ed.). *Environmental Education. Practice and Possibility*. Deakin University.
- Engleson, C.D., Hottmann, M., Gomoll, R., & Grady S. (1991). *A Guide to Curriculum Planning in Environmental Education*. Wisconsin Department of Public Instruction, DPI, USA.
- Gilbert, N. (Ed.). (1993). *Researching Social Life*. Sage, London.
- Hammersley, M. (1992). *What's Wrong with Ethnography?* Routledge, London.
- Hardy, J. (1999). Chaos in Environmental Education. *Environmental Education Research*, Vol. 5, No.2, pp.125 –143, Carfax, UK.
- Haury, D., & Milbourne L.A., (1998 December) *Choosing Instructional Materials for Environmental Education*. CSMEE Digest 96 - 8, ERIC Digest:
<http://www.ericse.org/digests/dse98-13.html>
- Hitchcock G., and Hughes D. (1995). *Research and the Teacher. A qualitative introduction to School Based Research*, Routledge, London.

- Horning, E., Lundberg, P., Skoglund, G. & Astrom, O. (Eds.). (1994). *Eco-Logic. Environmental Education. Methods and Examples*. Keep Sweden Tidy Foundation.
- Hopkins, C. (1998) The content of Education for Sustainable Development, in Scoulos, M. (Ed.), *Environment and Society: Education and Public Awareness for Sustainability*, Proceedings of the Thessaloniki International Conference 8 – 12 December, 1997. UNESCO and The Government of Greece
- Huckle, J., & Sterling, S. (Eds.). (1997). *Education for Sustainability*. Earthscan, London.
- Huckle, J. (1993). Environmental Education and Sustainability: A View from Critical Theory. In Fien, J. (Ed.). *Environmental Education. A Pathway to Sustainability*. Pp. 43 – 65. Deakin University, Australia.
- Huckle, J. (1983). Environmental Education. In Huckle J., (Ed.), *Geographical Education, Reflection and Action*. Oxford University Press, UK.
- Hungerford, H., Peyton, R., (1986), *Procedures for developing an Environmental Education Curriculum*, UNESCO, Paris.
- Hungerford, H. & Volk T., (1990). Changing learning behaviours through Environmental Education. *Journal of Environmental Education*, V21, No.3, 14.
- Jensen, B., & Schnack, K. (1987). The Action Competence Approach in Environmental Education. *Environmental Education Research*, Vol.3, No.2, pp. 163-178, Carfax, London.
- Jewett, A.E. & Ennis, C.D. (1993). Ecological Integration as a Value Orientation for Curricular Decision Making. In Fien, J. *Environmental Education and Social Change*. Deakin University, Australia.
- Moser, C., & Kalton, G. (1993). *Survey Methods in Social Investigation*. Dartmouth, UK.
- Jones, N. (Ed.). (1998). Inspecting the Environmental Dimension of Schools. *A Checklist for School Inspectors*. Council for Environmental Education, U.K.
- Johnson, A. (1997). Confluent Education. *In Context*. Vol.6 Summer 1994, p.38. The Context Institute., On line: <http://www.context.org/ICLIB/IC06/Johnson.htm>
- Jickling, B., & Spork, H. (1998). Education for the Environment, *Environmental Education Research*, Vol. 4, No. 3, pp. 309-327, Carfax, UK.
- Kadji-Beltran, Ch., Barker, S. & Raper, G. (2001). Primary school pupils' awareness of environmental issues: The influences of teaching styles and activities. In Valanides, N. (Ed.). *Science and Technology Education. Preparing Future Citizens.*, 1st IOSTE Symposium in Southern Europe. Vol.I-II, IOSTE, University of Cyprus, Ministry of Education and Culture, The Cyprus Pedagogical Institute.

- Kant, L., & Orr, L. (1990). Educational Profiles. In Walberg, H.J., & Haertel, G.D. (Eds.). *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Keating, M., (1993). *The Earth Summit's Agenda for Change. A plain language version of Agenda 21 and the other Rio agreements*. Centre for Our Common Future.
- Keeves J.P. (Ed.) (1988). *Educational Research, Methodology and Measurement. An International Handbook*. Pergamon Press, Oxford.
- Keeves, J.P.(1990). Evaluation Research, Decision Making, Social Policy and Planning. Social Theory and Educational Research. In Walberg, H.J., & Haertel, G.D. (Eds.). *The International Encyclopedia of Educational Evaluation*. p.p. 671 – 685, Pergamon Press, UK.
- Knapp, D. (1995) Regional Report for North America and Europe In Scoullos, M.J., (Ed.). *Re-orienting Environmental Education for Sustainable Development. Summary Report. MIO-ECSDE Inter-regional Workshop*. (p.19) UNESCO, UNEP, MIO-ECSDE, University of Athens.
- Knapp C. E., (1983). A Curriculum model for Environmental Values Education, *Journal of Environmental Education*, Vol 14 (3), pp 22 – 26
- Kreisber, S. (1992). *Transforming Power: Domination, Empowerment and Education*. State University of New York Press.
- Kyburz-Graber, R., (1999). Environmental Education as Critical Education: How Teachers and Students Handle the Challenge. *Cambridge Journal of Education*. Vol. 29, No.3, The University of Cambridge School of Education, UK.
- Lahiry, D., Sinha, S., Gill, J.S., Mallik,U., & Mishra, A.K. (1992). *Environmental Education. A Process for Pre-Service Teacher Training Curriculum Development*. NCERT, UNESCO – UNEP, IEEP, India.
- Leeming, F., Dwyer, W., Porter, B., & Cobern, M. (1993). Outcome Research in Environmental Education: A Critical Review. *Journal of Environmental Education*, Vol. 24, No. 4, Pp. 8 – 21.
- Leeming, F., Dwyer, W., & Bracken, A.B. (1995). Children's Environmental Attitude and Knowledge Scale: Construction and Validation. *Journal of Environmental Education*, Vol. 26, No. 3, pp. 22 -31.
- Lewy, A. (1990). Formative and Summative Evaluation. In Walberg, H.J., & Haertel, G.D. (Eds.), *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Likert, R., (1932). A Technique for the Measurement of Attitudes. In Woodworth, R.S., (Ed.). *Archives of Psychology* Vol. XXII, No.140. New York.

- Lopez-Ospina, G. (1998). *European Eco-Schools Seminar*, Slovenia 24 – 26 September.
- Lozzi, A. (1984). A Summary of Research in Environmental Education 1971-1982. *The Second Report of the National Commission on Environmental Education Research National Association for Environmental Education. Monograph no 2*. Columbus, OH:ERIC/SMEAC.ED.259879.
- Lyon, N. (1998). *With Portfolio in hand: Validating the new teacher professionalism*. New York: Teacher College Press.
- Lynch, P. (1991). Experiential Environmental Education. In *Our Common Future: The Way Forward*, Proceedings of the New Zealand Natural Heritage Foundation, International Conference on Environmental Education, Pakmerson North, NZ, 26 – 30 August, 1991, pp.202 – 206.
- Marcinkowski, T. (1993). Assessment in Environmental Education. in Wilke R.J. (Ed.). *Environmental Education Teacher Resource. Handbook. A Practical Guide for K – 12 Environmental Education*. Corwin Press & Sage, in cooperation with National Science Teachers Association, Virginia.
- May, Th.S. (2000). Elements of Success in Environmental Education Through Practitioner Eyes. *The Journal of Environmental Education*, Vol.31, No.3, 4 – 11.
- Mayer, M. (1994). Evaluating the Outcomes of Environment and School Initiatives., In OECD. (Ed.). *Evaluating Innovation in Environmental Education*. pp. 89 – 103, OECD Documents.
- Mayor, F. (1997). Educating for a Sustainable Future. In Scoullos M. (Ed.), *Environment and Society. Proceedings of the Thessaloniki International Conference*. pp. 60 – 67., UNESCO and the Government of Greece.
- McDonald, B. (1994) Interviewing in Case Study Evaluation. In OECD. (Ed.). *Evaluating Innovation in Environmental Education*. OECD Documents.
- McDonald, B. (1994). Values, Power and Strategy in Evaluation Design. Some Preliminary Coniderations. In OECD. (Ed.). *Evaluating Innovation in Environmental Education*. pp. 109 – 114, OECD Documents.
- McKernan, J. (1998). *Curriculum Action Research. A handbook of Methods and Resources for the Reflective Practitioner*. Kogan Page, London.
- McLeish, E., (1996). *Eco-Schools. Environmental Review*. The Eco-Schools Programme. Tidy Britain Group.
- McLeish, E., (1996). *Water, Towards a Sustainable Lifestyle*. The Eco-Schools Programme. Tidy Britain Group.

- Measor, L., (1985) Interviewing: A Strategy in Qualitative Research In Burges, R.G. (Ed.). *Strategies of Educational Research. Qualitative Methods*. Social Research and Education Studies Series 1, pp.207 – 231. The Falmer Press, London.
- Merriam S.B. (1988). *Case Study Research in Education. A Qualitative Approach*. Jossey Bass Publishers, San Francisco.
- Miles, B.M. & Huberman, A.M. (1994). *Qualitative Analysis*. Sage Publications, London.
- MJOM (2001). *Green Schools Research Report*. FEEE
- Morris, M. & Schagen, I. (1995). *Green Attitudes or Learnt Responses?* Global Environmental Education, National Foundation for Environmental Research (NFER)
- Murillo Martilla E., (1999) European Union Policies on Education for Sustainability, *European Conference on Environmental Education Policies and implications for Sustainable Development*. June 8 – 10, Benediktbeuren, Germany.
- National Forum on Partnerships, supporting Education about the Environment. (1994). *Education for Sustainability. An Agenda for Action.*: <http://www.gcric.org/edu/pcsd/intro.html>
- NAEE (1988) *The political and Educational Context of Skill Progression.*, NAEE, UK.
- NAAEE, (1999). *Excellence in Environmental Education – Guidelines for learning (K – 12) Executive Summary and Self Assessment Tool*. North American Association for
- Neal, P. & Palmer, J. (1990). *Environmental Education in Primary School*. Primary Matters, Blackwell, London
- Newhouse 1990
- OECD. (Ed.). (1994). *Evaluating Innovation in Environmental Education*. OECD Documents.
- Oppenheim, A.N. (1992). *Questionnaire Design and Attitude Measurement*. Heinemann, London.
- Palmer, J. (1999). Research Matters. A Call for the Application of Empirical Evidence to the Task of Improving the Quality and Impact of Environmental Education. *Cambridge Journal of Education*. Vol. 29, No.3, The University of Cambridge School of Education, UK.
- Palmer, J. (1995, Autumn). How Research is Informing Practice in Environmental Education. *Environmental Education*, Vol. 50, p.33 – 35
- Palmer, J. & Neal, P. (1994). *The Handbook of Environmental Education*. Routledge, London

- Palmer, J.A. (1993). From Santa Claus to Sustainability. In Gilber, J.K. (Ed.). *International Journal of Science Education*, Vol. 15, No.5, pp.487 – 495, Taylor and Francis, London.
- Panel for Education for Sustainable Development (1998). *Education for Sustainable Development in the Schools Sector: A report to DFEE/QCA*, Council for Environmental Education, Development Education Association, RSPB and WWF-UK.
- Pike G. & Selby, D., (1990) Greening the Staffroom, A staff development file in EE, WWF UK
- Pennock, M. (1993). Environmental Education and Participative Democracy inn the total school experience. In Fien, J. & Spork, H., (Eds.). *Trends and Issues in Environmental Education*. Deakin University.
- Plimmer, D., Parkinson, E., Carlton, K. (1996). *The Environment. A Primary Teacher's Guide*. Cassel, London.
- Popham, W.J. (Ed.). (1974). *Evaluation in Education, Current Applications*. MrCurthan Publishing Corporation, California.
- Posh, P. (1999). The Ecologisation of Schools and its Implications for Environmental Policy. *Cambridge Journal of Education*. Vol. 29, No.3, The University of Cambridge School of Education, UK.
- Posh, P. (1996). Curriculum Change and School Development. *Environmental Education Research*, Vol, 2 (3), pp.347 – 362.
- Posh , P. (1994). *The Study "Environment and School initiatives". Phase one*. In: Evaluation, Innovation in Environmental Education. Paris: O.E.C.D. 21-27.
- Posh, P. (1993). Research Issues in Environmental Education. *Studies in Science Education*. No.21, pp. 21 – 48.
- Powney J. & Watts, M. (1987). *Interviewing in Educational Research*, Routledge and Kogan, London.
- Radnor, H.A. (Ed.). (1994). *Qualitative Interpretive Research. Collecting and Analysing Interview Data*. University of Exeter, Monograph, UK.
- Robottom, I., & Hart, P. (1993). *Research in Environmental Education. Engaging the Debate*. Deakin University, Australia.
- Robottom, I. (Ed.) (1998). *Environmental Education. Practice and Possibility*. Deakin University.
- Robson, C. (1993). *Real World Research: A resource for social scientists and practitioners - researchers*. Blackwell, Oxford.

- Ross, K.N. (1988), Sampling. In Keeves J.P. (Ed.). *Educational Research, Methodology and Measurement. An International Handbook*. Pergamon Press, Oxford.
- Rossi, P.H., Freeman, H.E. (1993). *Evaluation a systematic approach*. Sage Publications, London.
- Rossmann, G.B. & Wilson, B.L. (1984). Numbers and Words: combining quantitative and qualitative methods in a single large-scale evaluation study. *Evaluation Review*, 9, 5.
- Rovira, M. (2000). Evaluation Environmental Education Programmes: some issues and problems. *Environmental Education Research*, Vol.6, No.2, pp. 14 – 155, Carfax, London.
- Royal Norwegian Ministry of Education, Research and Church Affairs, (1995). *Strategy for Environment and Development in the Education Sector*, KUF, Oslo.
- Rubin, H.J. & Rubin, I.S. (1995). *Qualitative Interviewing: the art of hearing data*. Sage, London.
- Sanders, R.,J. (1990) Curriculum Evaluation. In Walberg, H.,J., & Haertel, G.D. (Eds.), *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Saran, R. (1985). The use of Archives and Interviews in Research on Educational Policy, In Burges, R.G. (Ed.). *Strategies of Educational Research. Qualitative Methods*. Social Research and Education Studies Series 1, pp.207 – 231. The Falmer Press, London.
- SCAA, (1996). *Teaching Environmental Matters through the National Curriculum*, SCAA, UK.
- Schubert, W.H. & Shubert, A.L., (1990). Curriculum Validation. In Walberg, H.,J., & Haertel, G.D. (Eds.), *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Shubert, W.H., (1986), *Curriculum, Perspective, Paradigm and Possibility*. MacMillan, New York.
- Scoullios, M.J., (Ed.). (1995). *Re-orienting Environmental Education for Sustainable Development. Summary Report. MIO-ECSDE Inter-regional Workshop*. UNESCO, UNEP, MIO-ECSDE, University of Athens.
- Scott, W., & Oulton, C., (1999). Environmental Education: Arguing the Case for Multiple Approaches, *Educational Studies*, V.25, No.1, Taylor and Francis, UK.
- Scriven, (1967) The Methodology of Evaluation in AERA, *Perspectives on Curriculum Evaluation*, Monograph Series on Curriculum Evaluation, No.1 Rand McNally and Co, Chicago.

- Singh, M. (1998). Critical Literacy Strategies for Environmental Educators, *Environmental Education Research*, Vol. 4, No. 3, pp. 341-355, Carfax, UK.
- Stake R., (1994) "Case Studies" In Denzin, N.K., and Lincoln Y.S., (Eds). *Handbook of Qualitative Research*, Thousand Oaks, CA: Sage
- Stenhouse, L. (1988). Case Study Methods, In Keeves J.P. (Ed.) *Educational Research, Methodology and Measurement. An International Handbook*. Pergamon Press, Oxford.
- Sterling, S., in Abraham J., Lacey C. and Williams R. (Eds.), *Deception, Demonstration and Debate*, Kogan Page, London.
- Sterling, J.(1993) Environmental Education and Sustainability. A view from holistic Ethics. In Fien, J. (Ed.). *Environmental Education. A Pathway to Sustainability*. Pp. 169 - 99. Deakin University, Australia.
- Sterling, S., (1996). Education in Change. In Huckle, J., & Sterling, S., (Eds) *Education for Sustainability*. Earthscan, London.
- Sterling, S. & Cooper, G. (1992). *In Touch. Environmental Education in Europe*. WWF. UK.
- Stevenson, R. (1998). Schooling and Environmental Education: Contradictions in Purpose and Practice. In Robottom, I. (Ed.). *Environmental Education. Practice and Possibility*. Deakin University.
- Stokking, H., van Aert, L., Meijberg, W., & Kaskens, A. (1999). *Evaluating Environmental Education*. IUCN, Commission on Education and Communication, France.
- Strong, C. (1998). The impact of Environmental Education on Children's Knowledge and Awareness of Environmental Concerns. *Marketing Intelligence and Planning*. Vol. 16. No.6. pp.349 – 355. MCB University Press.
- Stufflebeam, D.L., XXX. (1971). *Educational Evaluation and Decision Making*. Itasca 111, Peacock
- Stufflebeam, D. (1974) Alternative Approaches to Educational Evaluation. A Self-study Guide for Educators. In Popham, W.J. (Ed.). *Evaluation in Education, Current Applications*. MrCurthan Publishing Corporation, California.
- Suarez, T. (1990). Purposes and Goals of Evaluation Studies. Needs Assessment Studies. In Walberg, H.,J., & Haertel, G.D. (Eds.), *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Sverige, H., Brunner, W., Horning, E., et al (1994), *Eco-Logic: Environmental Education*, Keep Sweden Tidy Foundation.

- Taba, H., (1962). *Curriculum Development. Theory and Practice*. Harcourt, Brace and World, New York.
- Tatsuoka, M.M. (1988). Regression Analysis. In Keeves J.P. (Ed.). *Educational Research, Methodology and Measurement. An International Handbook*. Pergamon Press, Oxford.
- Tidy Britain Group, (1996). *Eco-Schools Handbook*. Tidy Britain Group, UK.
- Tidy Britain Group, (1996). *Litter and Waste. Towards a Sustainable Lifestyle. Eco-Schools Handbook*. Tidy Britain Group, UK.
- Tikka, P.M., Kuitunen, M.T. & Tymys, S.M. (2000). Effects of Educational Background on Students' Attitudes, Activity Levels and Knowledge Concerning the Environment. *The Journal of Environmental Education*, Vol.31, No.3, pp.12-19.
- Tilbury, D. (1995). Environmental Education for Sustainability. Defining the New Focus of Environmental Education in the 1990s. *Environmental Education Research*, Vol.1, No.2, pp.195 – 212, Carfax, UK.
- Tilbury, D. & Turner, K. (1997). Environmental Education for Sustainability in Europe. *Environmental Education and Information*, Vol. 16, No.2, pp.123-140.
- Tyler, R.W. (1949). *Basic Principles of Curriculum and Instruction* University of Chicago Press, Illinois.
- UNESCO (1998), *Educating for a Sustainable future. A transdisciplinary vision for concerted action*, Environment and Society: Education and Public Awareness for Sustainability: International Conference, Thessaloniki, 8 - 12 Dec 1997, UNESCO
- UNESCO, UNEP, IEEP, Environmental Education Series 22. (1993). *Procedures for Developing an Environmental Education Curriculum. A Discussion Guide for UNESCO training seminars on Environmental Education*. UNESCO, E.E. Unit, Science and Environmental Education Section, Division for the Renovation of Educational Curricula and Structures.
- UNESCO-UNEP. (1986). *Procedures for developing an environmental Education Curriculum*. No 22. Paris.
- UNESCO-UNEP. (1992). *Environmental Education: A process for pre-service teacher training curriculum development*. No 26. Paris.
- UNESCO (1977), *Trends in Environmental Education*, UNESCO, Belgium.
- Uzzell, D., (1999). Education for Environmental Action in the Community: New Roles and Relationships. *Cambridge Journal of Education*. Vol. 29, No.3, The University of Cambridge School of Education, UK.

- Valanides, N. (Ed.). (2001). *Science and Technology Education. Preparing Future Citizens.*, 1st IOSTE Symposium in Southern Europe. Vol.I-II, IOSTE, University of Cyprus, Ministry of Education and Culture, The Cyprus Pedagogical Institute.
- Van Dalen, D.B. (1979). (4th Ed.). *Understanding Educational Research: an introduction*. McGraw- Hill, New York.
- Van Volsem, S., & Vens, V. (Eds.) (1997). *Schools, Universitites and the Environment. International Seminar on Environmental Care and Environmental Management Systems in Schools and Universities*. The British Council, USIS, Vrije Universiteit Brussel.
- Van Matre, S. (1979). *Sunship Earth. An Acclimatization Programme for Outdoor Learning*. American Camping Association Martinsville, Indiana.
- Van Rooijen, A. (Ed.) (1995). European Education Magazine, Context. No.11.
- Vincent, G. (1992). State of Progress on Environmental Education within European Community. In *Proceedings of the Conference on Environmental Education in Europe, Cooperation in Development*. 11-14,8-14 Nov. The Netherlands, Hogeschool Rotterdam & Omstreken.
- Volk, T.L., (1993). Integration and Curriculum Design. In Wilke, R.J. (Ed.), *A Practical Guide for K-12 Environmental Education*, Corwin Press, Sage, in cooperation with Natural Science Teachers Association, Virginia.
- Walberg, H.J., & Haertel, G.D. (Eds.). (1990). *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Wals, A. (1997) *Critical Phenomenology and Environmental Education Research*: <http://www.edu.uleth.ca/ciccte/nac...e/pubfiles/13.Wals.part1&2.rev.htm>
- Wals, A., & Alblas, A. (1997). School Based Research and Development of Environmental Education: A Case Study, *Environmental Education Research*, Vol.3, No.3, pp. 253-267.
- Wheeler, K. (1985). International Environmental Education. A Historical Perspective *Environmental Education and Information*. Vol.4 No.2, pp.144 – 160.
- Worthen, B.,R. (1990). Program Evaluation. In Walberg, H.,J., & Haertel, G.D. (Eds.), *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Wolf, R., M. (1990) Evaluation Models and Approaches; A framework for Evaluation. In Walberg, H.,J., & Haertel, G.D. (Eds.), *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Wolf, R.M. (1988) Questionnaires, In Keeves J.P. (Ed.) *Educational Research, Methodology and Measurement. An International Handbook*. Pergamon Press, Oxford.

- Willis, G. (1990) Qualitative Curriculum Evaluation. In Walberg, H.,J., & Haertel, G.D. (Eds.), *The International Encyclopedia of Educational Evaluation*. Pergamon Press, UK.
- Wilke R.J. (Ed.). (1993). *Environmental Education Teacher Resource. Handbook. A Practical Guide for K – 12 Environmental Education*. Corwin Press & Sage, in cooperation with National Science Teachers Association, Virginia.
- Wilson, R.A., (1996) *Starting Early: Environmental Education During the Early Childhood Years*. CSMEE Digest 96 - 2, ERIC Digest: <http://www.ericse.org/digests/dse96-2.html>
- Zachariou, A. & Kadji – Beltran, Ch. (2001). Alternative Methods of Evaluation in Environmental Education: The use of Portfolio and Story-line. In Valanides, N. (Ed.). *Science and Technology Education. Preparing Future Citizens.*, 1st IOSTE Symposium in Southern Europe. Vol.I-II, IOSTE, University of Cyprus, Ministry of Education and Culture, The Cyprus Pedagogical Institute.
- Zlezny, L.C. (1999). Educational Interventions That Improve Environmental Behaviours: A Meta-Analysis. *The Journal of Environmental Education*, Vol. 31, No. 1, pp. 5 –14.

GREEK REFERENCES:

- Flogaiti, E. (1998). *Environmental Education*. Ellinika Grammata, Athens.
- Frangoudaki, A., (1985). *Sociology in Education. Theories about the social inequities in school*. Papazisis, Athens.
- Georgopoulos, A. & Tsaliki, E. (1993). *Environmental Education, Principles, Philosophy, Methodology, Games and Activities*, Gutenberg, Athens.
- Heliopoulou, I. (1999). Storyline Method. A Methodological Suggestion for Teaching Environmental Matters in Nursery School. In Kalaidjides, D. (Ed.) *Proceedings of the 1st Hellenic Conference on Environmental Education*, Athens.
- Ioannou, V., & Hadjikostis, C. (2000). Registration of Environmental Assignments, Research and Environmental Education School Programmes in Cyprus. In Pitsouli, Th. (Ed.). *Proceedings of the Thrace – Aegeon – Cyprus Conference on Information and Cooperation on Environmental and Educational Issues and their Role on Forming a Common Policy Towards Sustainable Development.*, Ministry of Macedonia, Thrace and Aegeon, Government of Greece and Ministry of Education, Government of Cyprus.

- Kadji-Beltran, Ch.; Zachariou, A. (2002). Environmental Education in Nursery School. In Cyprus Pedagogical Institute (Ed.) *Educational Issues in Pre-Primary Education*, Pedagogical Institute of Cyprus and the University of Cyprus (to be published)
- Kadji-Beltran, Ch., (2001). *Biodiversity Handbook for Eco-School teachers*, Theopress, Cyprus.
- Kadji-Beltran, C., (2000). The impact of an Environmental Education Programme, on children's environmental cognition and attitudes. In Valanides, N., (Ed.). *Proceedings of the 2st Pan-Hellenic Conference on Teaching Natural Sciences and applying New Technologies in Education*. Department of Education, University of Cyprus
- Kadji-Beltran, C. (1998). *Report of Teachers' Empirical Assessment on the Eco-School Programme*, Pedagogical Institute of Cyprus, Unpublished.
- Kassotakkis, M.I. (1998). *Assessing Students' achievement*. Grecores, Athens.
- Katsikis, A., & Zachariou, A., (2000). Environmental Education in Cyprus: Ministry of Education Policy on the Issue. In Valanides, N., (Ed.). *Proceedings of the 2st Pan-Hellenic Conference on Teaching Natural Sciences and applying New Technologies in Education*. Department of Education, University of Cyprus
- Katsikis, A. (1992). *Ecology and Environmental Education: Environmental Education Course Notes*. University of Ioannina, Greece.
- Llimos, A. & Sadurni, L. (1996). *Create and Recycle*. Patakis, Athens
- Ministry of Agriculture, Environment and Natural Resources. (1996). *National Action Plan for the Environment*, Ministry of Agriculture, Cyprus.
- Ministry of Education and Culture (1996). *Report on the Educational System of Cyprus*, Ministry of Education and Culture, Cyprus.
- Palmer, J., Suggate, J., & Tsaliki, E. (1998). Important Influences on developing environmental awareness. *Educational Inspection*. N. 28, pp. 149 – 170, Athens.
- Papademetriou, V. (1998). *Environmental Education and School*, Typotheto, Athens.
- P.E.E.K.P.E. (1999). *Elementary essays on Environmental Education. The Tbilisi Declaration*. P.E.K.P.E Athens.
- Programme Development Department. (1996). *Primary Education Curriculum*. Ministry of Education and Culture, Cyprus.
- Programme Development Department. (1994). *Primary Education Curriculum*, Ministry of Education and Culture, Cyprus.
- Raptis, N. (2000). *Environmental Education and Instruction. The Existing Options' Theoretical Framework*. Tipotheto, Athens.

- Theophilides, C. (1997). *Interdisciplinary approach to teaching*. Gregores Publications, Athens.
- Tsindis, (1987) *Environmental Education*, Unpublished study, for the Ministry of Education and Culture, Ministry Records, File "Environment".
- University of Cyprus (1999) *Study Guide*, University of Cyprus
- University of Cyprus (2000) *Study Guide*, University of Cyprus
- University of Cyprus (2001) *Study Guide*, University of Cyprus
- Valanides, N., (Ed.). (2000). *Proceedings of the 2st Pan-Hellenic Conference on Teaching Natural Sciences and applying New Technologies in Education*. Department of Education, University of Cyprus
- Wilden (1997) *Epistemology and ecology.*, Translated in Greek by Terzakis, F., Parousia, Athens
- Wood, F., Killina, J., McQuarrie, F., & Thompson, S. (1999), *Organising a School-Based Staff Development Programme*, ASCD. Translated in Greek by Kadji, C., Cyprus Pedagogical Institute, Nicosia.

EURYDICE RESOURCES:

- Centro de Investigacion y Documentacion Educativa (CIDE) (1999), (Minimum Core Curriculum) *Educacion Primaria. Conocimiento del medio natural, social y cultural*, Ministerio de Educacion y Cultura, Espana.
- Ministry of Education of Denmark (1998). *A green approach to education and Training - Situation report after 5 years of a green approach to Education and Training*, Ministry of Education, Denmark
- Ministry of Education and Science, (1999), *Memorandum, Education and learning for Sustainable Development in Sweden*, Ministry of Education and Science, Stockholm, Sweden.
- National Board of Education, (1994). *Framework Curriculum for the Comprehensive School*. National Board of Education, Finland.
- National Board of Education, (1998). *Programme for Furthering Sustainable development in the years 1998 – 2000*. National Board of Education, Finland.

- Netherlands Eurydice Unit, (1999), Information on the Netherlands National Curriculum.
- Royal Norwegian Ministry of Education, Research and Church affairs (1995), *Strategy for Environment and Development in the Education Sector, 1995 - 1998*, Norway
- Royal Norwegian Ministry of Education, Research and Church Affairs , Ministry of Environment, Ministry of Petroleum and Energy, Ministry of Fisheries, Ministry of Health and Social Affairs, Ministry of Local Governments and Labour, Ministry of Cultural Affairs. (1997), *National Environmental Education Programmes for Action-oriented and interdisciplinary Environmental Training in the School's own Local Area*. <http://www.vann.zoo.no/english/program.htm>
- Royal Norwegian Ministry of Education, Research and Church Affairs (1994), *Environmental Education Network*: <http://www.vann.imf.uib.no/English/ee.htm>
- The Scottish Office Education Department (1993), *Curriculum and Assessment in Scotland, National Guidelines: Environmental Studies*, 5 - 14.

SPANISH REFERENCES:

- Comision Tematica de Educacion Ambiental, Conferencia Sectorial de Medio Ambiente, (1997) *Documento Base para la elaboracion del Libro Blanco de la Educacion Ambiental en España*. Comision Tematica de Educacion Ambiental. España.
- Ministerio de Educacion y Cultura, (1997.) *Documento Base para la elaboracion del libro Blanco de la educacion ambiental en Espana*.
- Ministerio de Educacion y Cultura, (1999) *Libro Blanco de la educacion ambiental en Espana*. <http://www.mma.es/educ/ceneam/blanco/blanco.htm>
- Muriel, J.L. (1997). *El Libro Blanco de la Educacion Ambiental*. Firmas: <http://www.mma.es.8088/ODMMA/Ceneam/02Firmas/firma29.htm>

APPENDIX I: Triangulation of Research Questions through the Research Tools used.

RESEARCH QUESTIONS																								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8		
SQ																								
TQ																								
SI																								
DA																								
CSI																								

NOTE:
 SQ= Students' Questionnaire
 TQ= Teachers' Questionnaire
 SI= Survey Interviews
 DA= Document Analysis
 CSI= Case Study Interviews

APPENDIX II (english)

Republic of Cyprus
(logo)

M.E.C. 346/68/2B

MINISTRY OF EDUCATION
AND CULTURE
GENERAL DIRECTOR OF
PRIMARY EDUCATION
OFFICE
1434 NICOSIA.

Mrs. Chrysanthi Kadji
Teacher
Pedagogical Institute
P.O.B. 12720
Nicosia 2252
Fax. 480505

Subject: Research application in schools of primary education sector.

With respect to the above subject, received on 16/11/99, I inform you that your request for using some schools from the primary education sector is granted, aiming to gather ideas and information about environmental education in schools in Cyprus.

Please contact the school administrators beforehand, in order to avoid any disturbance of the school functions. I would also like to ask, that any teacher participation in the survey, questionnaire administration or interviews, should not take place during working hours.

We would appreciate it if you could share with us the findings of this interesting research project.

General Director
of Primary Education
(Signature)

Co. GEDE
District Education Office



Υ.Π.Π. 343/68/2B

ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ
ΚΑΙ ΠΟΛΙΤΙΣΜΟΥ
ΓΡΑΦΕΙΟ ΔΙΕΥΘΥΝΤΗ
ΔΗΜΟΤΙΚΗΣ ΕΚΠΑΙΔΕΥΣΗΣ
1434 ΛΕΥΚΩΣΙΑ

25 Νοεμβρίου, 1999


✓ Κυρία
Χρυσάνθη Κάτζη
Δασκάλα
Παιδαγωγικό Ινστιτούτο
Τ.Θ. 12720
Λευκωσία 2252
Φαξ:480505

Θέμα: Διεξαγωγή έρευνας σε δημοτικά σχολεία

Αναφέρομαι στη σχετική με το πιο πάνω θέμα επιστολή σας, με ημερομηνία 16.11.99, και σας πληροφορώ ότι εγκρίνεται το αίτημά σας, για διεξαγωγή έρευνας σε δημοτικά σχολεία, με στόχο τη συγκέντρωση ιδεών και πληροφοριών για την Περιβαλλοντική Εκπαίδευση στα δημοτικά σχολεία της Κύπρου.

Παρακαλώ, να συνεννοηθείτε εκ των προτέρων με τους διευθυντές των σχολείων που θα επισκεφθείτε, ώστε να μην επηρεαστεί η ομαλή λειτουργία των σχολείων. Επίσης, σε ό,τι αφορά τη συμμετοχή των δασκάλων στη διεξαγωγή της έρευνας, συμπλήρωση ερωτηματολογίου ή/και προσωπική συνέντευξη, παρακαλώ να γίνει σε μη εργάσιμο χρόνο.

Θα το εκτιμούσαμε ιδιαίτερα αν μας κοινοποιούσατε τα πορίσματα αυτής της ενδιαφέρουσας ερευνητικής εργασίας.


Διευθυντής
Δημοτικής Εκπαίδευσης
Λ.Λ.

Κοιν. : ΓΕΔΕ
: ΠΛΕ Επαρχιακά Γραφεία Παιδείας

ΑΠ/ΑΠ ΑΡΕΡΕΥΝΕΣ

APPENDIX III: Student Questionnaire



For the teacher:

Dear friend,

Thank you for the time you spend to answer this questionnaire. I assure you that it has nothing to do with your assessment in school and it will not affect your grades. Have in mind that it is extremely important to answer with sincerity.

Part A

Follow the instructions and answer the following questions.

a) Name: _____

b) School: _____

c) Circle what is valid for you: Boy Girl

d) Father's profession: _____

e) Mother's profession: _____

Part B

1. Match the following

Greenhouse effect	●
Ozone hole	●
Sound pollution	●
Biodegradable	●

● Annoying and irritating sounds
● Materials that easily decompose and are absorbed by earth
● Substances that when diluted in water, they assist the rapid multiplication of the organisms that live in it. At the end though everything dies.
● Temperature rise
● Increase of the ultra violet radiation (it is harmful and causes cancer)

(4 points)

2. The following are some energy sources: **sun, petrol, gas, wind, coal, waves**. Put each of them in the appropriate box.

Renewable Energy Sources	Non renewable energy sources

(2 points)

3. Which of the following do you think are endangered species: Eagle, whale, chicken, pigeons, cats, green turtles, elephants, cockroaches.

Endangered species	Non endangered species

(2 points)

4. Write down the names of two rare plants and two rare animals of Cyprus.

Plants	Animals
1	1
2	2

(2+2 points)

5. Write down one reason explaining why the plants you mentioned are threatened.

α. _____ (1 point)

6. Write down one reason explaining why the animals you mentioned are threatened.

α. _____ (1 point)

7. Write down two ways by which you and your family could save energy at home.

α. _____
β. _____ (2 points)

8. Write down two ways by which you and your family could reduce the quantity of waste produced in your house.

α. _____
β. _____ (2 points)

9. Which of the following could be recycled? ✓ the right column.

	YES	NO	I DO NOT KOW	
polystyrene glass				1-0
glass bottle				1-0
fruit				1-0
paper				1-0
cans(e.g. tuna can)				1-0
aluminium tins (e.g. softdrink tin)				1-0

PART C



Answer the following questions:

1. How do you get at school in the morning? Put ✓ next to the **ONE** most common method you travel. (**ONLY ONE WAY**)

Every day I go to school:

On foot		2
By car (my parents)		0
By car (in cooperation with the neighbours)		1
By bus		1
By bicycle		2

2. Put a ✓ in the box that applies to you.

Your brother is brushing his teeth and has the tap water running.

You would:

Turn it off.		1
Tell him to turn it off.		1
It is not my business.		0

3. It is very hot. You would really fancy a cold beverage to drink, which would be your choice if your favourite drink was available in the following forms: (same price and quantity)

aluminium tin
(1 point)

glass bottle
(1 point)

carton
(0 points)

plastic bottle
(0 points)

Justify your choice giving only one reason, the one you consider to be the most important:

It does not break easily	
the material can be recycled	
I like it best	
it can be reused	
It decomposes and is absorbed by earth	
If compressed it does not occupy much space in the bin	
Because:	

2 points.

4. At home:

	Yes	No
We have a garden		
We keep pets		
We have a solar system for warming the water		
We recycle paper		
We recycle aluminium tins		
We have 2 or more cars		

PART D (To be answered only by the Eco-School Students)

1. Do you participate with the environmental committee? YES / NO

2. For which of the following are you currently responsible :

1. Classroom cleaning	
2. School yard cleaning	
3. School garden care	
4. Classroom plants care	
5. Responsible for switching off the lights	
6. Responsible for turning off any running tabs.	
7. Gathering material for recycling	
8. Monitoring of recycling materials quantities	
9. Monitoring of electricity consumption	
10. Monitoring water consumption	

3. In which extend activities like the ones above, that you do at school, are also done at home?
(✓ what applies to you.)

None	Some	All

4. In order to improve my school's environment I... :

	Never	Occasionally	Always
Throw my rubbish in the bin	1	2	3
Step on the flowers and grass in the garden	1	2	3
Use both sides of the sheets in my exercise books	1	2	3
Keep my books clean	1	2	3
Bring materials from home to recycle	1	2	3
Consume a lot of water	1	2	3
Leave the lights in my classroom on, even when there is nobody in	1	2	3
Help the annual beach cleaning campaign	1	2	3
Clean the area around school with my friends	1	2	3

5. What do you think of the Ecoschool programme?.

	Not at all	A little	Quite	Enough	Extremely
It is tiring	1	2	3	4	5
It is entertaining	1	2	3	4	5
It is interesting	1	2	3	4	5
It is educational	1	2	3	4	5
It is expensive	1	2	3	4	5
It is useful	1	2	3	4	5
It is time consuming	1	2	3	4	5
It is boring	1	2	3	4	5

6. Would you like to continue participating in the Ecoschool programme?

YES / NO / I do not know

7. The following are activities done by some of the ecoschools. In which extend would you like your school to be involved in such activities? (If you have already done some of them, in which degree did you enjoy them?)

	nothing,	a little	quite	enough	extremely
Appear on the TV	1	2	3	4	5
Publications in the press	1	2	3	4	5
Visiting the house of commons	1	2	3	4	5
Special visits	1	2	3	4	5
Award ceremony at the end of the year	1	2	3	4	5
Using waste materials to make things	1	2	3	4	5

Thank you very much for your help.

Chrysanthi Kadji-Beltran



APPENDIX IV: Questionnaire for the teacher

Dear Colleague,

This questionnaire is an attempt for gathering information and ideas about how environmental education might be integrated in Cyprus Primary Education as well as evaluating the current practices.

Your support will contribute to the achievement of the aims of this investigation. I really appreciate your collaboration.

Thank you in advance,

Chrysanthi Kadji

Pedagogical Institute of Cyprus

Tel: 305933, Nicosia

Part A: Personal Features:

Put ✓ for what is valid for you.

1. Gender:

Man

☐

Woman

☐**2. Education:**

Teacher's College	
Pedagogical Academy	
1 additional year for Bed	
University BEd	
Postgraduate Studies	

3. Working experience:

1 - 5 years	6 – 10 years	11 - 20 years	more than 20

4. Working Status:

Teacher	Sub Director	School Director

5. The class I teach is:

A	B	C	D	E	St	None

6. Lessons I teach (outside my class, or if I don't have a class)

.....

7. Answer by inserting a ✓ for yes or no

	YES	NO
I had Environmental Education Courses during my initial studies		
I attended Pedagogical Institute INSET seminars on Environmental Education (Eco-Schools and E.E.)		
I attended INSET seminars on Environmental Education organised by other organisations. If yes, please mention which:		
I am a member of an Environmental Organisation		

Part B: Classroom - teaching features

1. Put in a circle what you believe:

In which degree would you say, you have incorporated an environmental dimension when teaching: (1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

	I Do not teach the lesson					
Greek Language		1	2	3	4	5
Mathematics		1	2	3	4	5
Science		1	2	3	4	5
Geography		1	2	3	4	5
Study of the Environment		1	2	3	4	5
English Language		1	2	3	4	5
History		1	2	3	4	5
Music		1	2	3	4	5
Art		1	2	3	4	5
Design Technology		1	2	3	4	5
Physical Education		1	2	3	4	5
Religion Education		1	2	3	4	5
Home Economics		1	2	3	4	5

2. Put in a circle what you believe:

In which degree do you apply the following activities?

(1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

Participation of the class in the annual assembly for the environment	1	2	3	4	5
Tree planting	1	2	3	4	5
Make use of environmental content mathematics problems	1	2	3	4	5
Organise special visits (e.g. forestry department, dams, desalination units, waste disposal units etc.)	1	2	3	4	5
Field study	1	2	3	4	5
Participation in the annual beach cleaning activities	1	2	3	4	5
Make use of "rubbish"; for artistic creations	1	2	3	4	5
Essays and assignments about Environment	1	2	3	4	5
Discuss over Environmental Problems (e.g. greenhouse effect, acid rain, pollution etc.)	1	2	3	4	5
Recycling	1	2	3	4	5
Try to minimise waste produced in the class	1	2	3	4	5
Out door study	1	2	3	4	5

3. Put in a circle what you believe:

In which degree do you think your students apply the following?

(1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

They do not pollute the school environment	1 2 3 4 5
They take care of the things they buy (ecologically friendly choices)	1 2 3 4 5
They respect the animals	1 2 3 4 5
They respect school plants	1 2 3 4 5
They respect their books	1 2 3 4 5
They respect their school mates	1 2 3 4 5
They do not waste paper	1 2 3 4 5
They try to save water	1 2 3 4 5
They try to save energy (e.g. switch off the lights)	1 2 3 4 5
They are informed about environmental problems	1 2 3 4 5

4. Put in a circle what you believe:

In which degree does school administration promote environmental policy the following:

(1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

In the school activities (e.g. assemblies, environmental programmes, participation in environmental activities and organisations...)	1 2 3 4 5
In the school management (concerning materials school buys)	1 2 3 4 5
In the curriculum organisation	1 2 3 4 5
Generally in matters of students' attitudes (e.g. in the school grounds, during an excursion etc).	1 2 3 4 5

5. Answer by inserting a ✓ for what you believe.

Between having EE introduced as a single new subject or a cross curricular subject, which do you see to be:

	Integrated approach	Separate topic approach
The way most likely to succeed		
The ideal way		

Please justify your answer:.....

.....

.....

6. According to the ministry of Environment and Agriculture, EE has to be introduced in all levels of education, with special emphasis in primary and secondary education. The method suggested by them is the integrated method. If this will finally be the method to be used, in which extend do you think the following suggestions would be helpful? (1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

Adjustment of the Curriculum with changes and/or additions in the teaching matter which would bare in mind the environmental dimension	1 2 3 4 5
Adjustment of the books with changes and/or additions in the teaching matter which would bare in mind the environmental dimension	1 2 3 4 5
School based EE Seminars	1 2 3 4 5
EE Seminars in P.I.	1 2 3 4 5

We would really appreciate your comments and suggestions on the issue:

.....

.....

.....

.....

.....

Part C: To be answered by Eco - Schools teachers ONLY.

1. In what extend did the project give you the opportunity to:

Get informed about environmental issues	1	2	3	4	5
Enrich your teaching practice	1	2	3	4	5
Improve communication with your students	1	2	3	4	5
Improve school environment	1	2	3	4	5
Actively contribute to the protection of Natural Environment	1	2	3	4	5

2. In what extend did the project affect your students concerning the following points:

Group work and cooperation	1	2	3	4	5
Achievement	1	2	3	4	5
Behaviour in class	1	2	3	4	5
Environmental awareness	1	2	3	4	5
Behaviour towards peers	1	2	3	4	5
Initiative	1	2	3	4	5
Action for the environment	1	2	3	4	5
Other (specify)	1	2	3	4	5

3. Put the following in order according to their importance as far as your personal information is concerned:

Peers	1	2	3	4	5
Personal study	1	2	3	4	5
Internet	1	2	3	4	5
Pedagogical Institute Seminars	1	2	3	4	5
Other seminars	1	2	3	4	5
Conferences	1	2	3	4	5
Media	1	2	3	4	5
Specialists	1	2	3	4	5
Other (please specify)	1	2	3	4	5

**4. Answer by inserting a ✓ for what is valid for you.
My responsibilities are:**

I participate with Eco - School committee	
I inform my colleagues about the seminars	
I find material	
I coordinate colleagues	
I coordinate children	
I have responsibilities for the environmental audit	
I have responsibilities for the planning of the Action Plan	
I have responsibilities for applying the Action Plan	
I monitor the application	
I am responsible for Curriculum links	
I communicate with parents association	
I communicate with local authorities	
I communicate with NGOs and private organisations	
I inform the community about school activities	
I inform school	
I coordinate the creation of Environmental Code	
I ensure funding	
Other responsibilities (Please specify)	

5. In which extend were the following a problem for the successful application of the project?

Funding	1	2	3	4	5
Time	1	2	3	4	5
Children's response	1	2	3	4	5
Parents' response	1	2	3	4	5
Cooperation with local authorities	1	2	3	4	5
Finding material	1	2	3	4	5
Getting help	1	2	3	4	5
Distributing responsibilities	1	2	3	4	5
Incorporating the environmental dimension in the curriculum	1	2	3	4	5
Cooperation with school management	1	2	3	4	5
Other.	1	2	3	4	5

6. Answer by inserting a ✓ for what is valid for you.

Project offers me:

Satisfaction	
Pride for doing something for the environment	
Extra tasks	
Fatigue	
New experiences	
Opportunities for professional recognition	

7. I would wish for the programme to continue: Yes

☐

No

☐

Thank you very much for your help.

Chrysanthi Kadji - Beltran

APPENDIX VI: Pilot Students' questionnaire

Questionnaire 1: Cognitive and attitudinal evaluation of students in experimental and control schools.

Dear student. We thank you for the time you spent to answer this questionnaire. Have in mind that it has nothing to do with your evaluation and it will not affect your grades at school.

Please follow the instructions and answer the following questions.

Part A: Personal Characteristics

a) Put in a circle what is valid for you:

Gender: Girl Boy

b) School Name: _____

c) Student Number:

d) To be completed by your TEACHER:

Grade: _____

Part B: Test on Environmental Cognition

1. Match the following by drawing a line between the points of the two columns

Greenhouse effect •	• Irritating and annoying sounds
Ozone layer depletion •	• Substances that do not disappear and they are accumulating in the organisms that eat them, having as a result their death
Sound Pollution •	• Substances that break down into organic substances and get absorbed by earth relatively fast
Bioaccumulation •	• Certain substances in the water that create excess of food, and many plants and animals appear in it.
Biodegradable •	• Global warming
	• Increased ultraviolet radiation, which causes cancer.

2. Put the following energy sources in the appropriate box: sun, petrol, natural gas, wind, geysers, coal, nuclear energy, waves

Renewable Energy Resource	Non Renewable Energy Resource

3. Which of the following animals do you think face the danger of extinction? Put them in the right column: Eagles, whales, dolphins, chicken, parrots, camels, tigers, seals, pigeons, donkeys, cats, elephants, cockroaches.

Endangered Species	Non endangered species

4. Write down 2 plants of Cyprus and two animals, which are very rare

a.
b.

a.
b.

5. Write down 2 reasons explaining the threats some of these animals face.

a. _____
b. _____

6. Write down three ways, by which you can keep seawater in our country clean.

a. _____
b. _____
c. _____

7. Write down three ways by which you can save energy in your house

a. _____
b. _____
c. _____

8. Write down three ways in which you can reduce waste volume in your house

a. _____
b. _____
c. _____

9. Which of the following products can be recycled? Underline the correct ones:

A plastic bottle

glass bottle

babies cloths

fruit

wood

paper

tins

aluminium cans

YES	NO	I don't know

10. Put the appropriate answer in a circle:

Have you ever had a class outside your classroom?

If yes, did you like it?

If not would you like to?

Yes / No

Yes / No

Yes / No

Part C: Test on Environmental Awareness

Answer the following questions:

1. How do you get at school in the morning? Put ✓ next to the ONE, most common way you use.

On foot	
by my parents car	
with neighbours	
by bus	
on my bike	

2. You see your best friend drinking water and leaving the tap running. What would you do? (Put ✓ next to ONE of the options)

Turn it off yourself,	
tell her/him to turn it off,	
leave the tap running	

3. You would really fancy a cold juice to drink, which would be your choice if your favourite drink was available in the following forms:

can	glass bottle	carton	plastic bottle

Justify your choice: _____

4. Your parents go shopping and they need a clothes softener. The family's favourite brand is available in the following packaging and with the following prices (as noted in a supermarket)

	Product	Price
1	Small carton of concentrated liquid, (when diluted makes 2 litres) (refill)	95c
2	Plastic container of 2 litres	£1.25
3	Plastic container of 4 litres	£2.25
4	Small plastic container of concentrated liquid (2 litres when diluted)	99c

Which product would you advise them to buy? No.

Explain why? _____

5. Put ✓ where appropriate:
In your house do you:

Have a Garden	
Keep Pet animals	
Have a solar heating system for warming water?	
Recycle	
Have only one car?	
Have more than two cars?	

**Part D: Questions on students' involvement in Eco - Schools programme
(to be answered only by experimental group)**

1. Do you participate in the environmental committee? Yes / No

2. Which of the following are your current duties? Put ✓ in the appropriate boxes:

1. Cleaning the classroom	
2. Cleaning school grounds	
3. Taking care of school garden	
4. Taking care of classroom plants	
5. Taking care of any school pets	
6. Switching off the lights	
7. Making sure that tabs are off	
8. Gathering material for recycling	
9. Measuring - monitoring material gathered	
10. Monitor the electricity consumption	
11. Monitor the water consumption	

3. In which extend things that you do at school you also do them in your house? (Put ✓ to the answer that is valid for you.)

Everything	Many things	Some things	Very few	Nothing

4. What have you done so far to improve your schools environment? Mark the appropriate numbers:

	Always	Sometimes	Never
I do not throw rubbish on the floor	1	2	3
I help with the garden	1	2	3
I use both pages in my exercise books	1	2	3
I keep my books clean	1	2	3
I bring staff from home for recycling	1	2	3
I do not walk on the flowers and plants	1	2	3
I try not to waste water	1	2	3
I always switch off the lights	1	2	3
I participate in the annual beach cleaning campaign	1	2	3
I participate in school campaigns about cleaning the local area.	1	2	3
Have you done something else, not mentioned here? Please write it down:	1	2	3

5. Do you find the programme:

	Extremely	Very much	Not very much	A little	Nothing
tiring	1	2	3	4	5
amusing	1	2	3	4	5
interesting	1	2	3	4	5
educational	1	2	3	4	5
expensive	1	2	3	4	5
useful	1	2	3	4	5
Time-consuming	1	2	3	4	5
boring	1	2	3	4	5

6. Do you wish for the programme to continue in your school? Yes / No

7. What is it that you like the most about the programme?

.....

.....

.....

8. How much do you like the following “activities” of the programme?

	Extremely	Very much	Not very much	A little	Nothing
Being on t.v.	1	2	3	4	5
Writing in the papers	1	2	3	4	5
Visiting the parliament	1	2	3	4	5
Visiting places (e.g. ships)	1	2	3	4	5
Winning the Eco-School title	1	2	3	4	5
making creative things from waste	1	2	3	4	5

Thank you very much for your cooperation,
Chrysanthi Kadji-Beltran

APPENDIX VI: Students' questionnaire descriptive analysis

Part A:

GENDER: Boy 52,2% Girl 47,8%

ACHIEVEMENT:

Grade A	Grade B	Grade C	Grade D
34,9%	36,2%	22,1%	6,8%

PARENTS PROFESSION

Profession	0	1	2	3	4	5	6
Father	0,6 %	15,8%	20,7%	31,9%	22,1%	5,5%	3,4%
Mother	31,2%	8,1%	6,1%	32,2%	18,8%	2,7%	0,9%

PROGRAMME PARTICIPATION

N=673

Non Participating schools : 44,7% (N= 301)

Participating schools :55,3% (N=372)

DISTRICTS

District 1 (Nicosia)	44,3%
District 2 (Limassol)	18,2%
District 3 (Larnaka)	25,1%
District 4 (Famagusta)	12,5%

Part B

Students had to match each term with its explanation.

	Student percentage that gave a correct answer.	Non participative schools' percentage in the correct answers	Programme participative schools' percentage in the correct answers
Greenhouse effect	70,5%	47,2%	52,8%
Ozone hole	63,4%	37,6%	62,4%
Sound pollution	87,9%	46,0%	54,0%
Biodegradable	50,7%	45,1%	54,9%

2. Students had to sort the following energy sources according to whether or not they were renewable: sun, petrol, gas, wind, coal, waves.

Fully correct: 10,9% Of all students that gave a fully correct answer, 34,7% were students of non participative schools and 46,3% from ecoschools.

Partially Correct 27,8% Of all students that gave a partially correct ans., 46,3% were non participative schools students and 53,7%, from Eco Schools

Wrong answer 61,3%

3. Out of the following animals the students had to sort the endangered species: Eagle, whale, chicken, pigeons, cats, green turtles, elephants, cockroaches.

Fully correct answer: 43,3%, Of all the students that gave a fully correct answer, 45,1% were students from non participative schools, and 54,9% from EcoSchools.

Partially correct: 36,1, Of all students that gave a partially correct answer, 45,1% were students of non participating schools and 54,9% EcoSchool students.

Wrong Answer 20,6%

4. Students were asked to write down the names of two rare plants and two rare animals of Cyprus.

	4.1 Plants	4.2 Animals
Fully Correct	37,2	51,9
Partially correct	43,8	35,4
Wrong answer	19,0	12,7

4.1 Fully correct answer: Of all the students that gave a fully correct answer, 47,0% were students from non participative schools, and 53,0% from EcoSchools.

Partially correct: Of all students that gave a partially correct answer, 37,8% were students of non participating schools and 62,2% EcoSchool students.

4.2 Fully correct answer: Of all the students that gave a fully correct answer, 45,0% were students from non participative schools, and 55,0% from EcoSchools.

Partially correct: Of all students that gave a partially correct answer, 45,6% were students of non participating schools and 54,4 % EcoSchool students.

5. Students were asked to write down one reason explaining why the plants they mentioned are threatened.

	Non Participating schools	Eco-Schools
Percentage of correct aswers (for all)	76,2%	
Out of 76,2% correct answers:	45,8%	54,2%

6. Students were asked to write down one reason explaining why the animals they mentioned are threatened.

	Non Participating schools	Eco-Schools
Percentage of correct aswers (for all)	76,2%	
Out of 76,2% correct answers:	45,3%	54,7%

7. Students were asked to write down two ways by which they and their family could save energy at home.

Fully Correct	29,9%
Partially correct	44,0%
Wrong answer	26,1%

Fully correct answer: Of all the students (29,9%) that gave a fully correct answer, 45,2% were students from non participative schools, and 54,8% from EcoSchools.

Partially correct: Of all students (44,0%) that gave a partially correct answer, 42,0% were students of non participating schools and 58,0% EcoSchool students.

8. Students were asked to write down two ways by which they and their family could reduce the quantity of waste produced in your house.

Fully Correct	26,3%
Partially correct	47,9%
Wrong answer	25,8%

Fully correct answer: Of all the students (26,3%) that gave a fully correct answer, 38,1% were students from non participative schools, and 61,9% from EcoSchools.

Partially correct: Of all students (47,9%) that gave a partially correct answer, 38,3% were students of non participating schools and 61,7% EcoSchool students.

9. Students were asked to indicate which of the following materials could be recycled.

	YES	NO	I DO NOT KOW
9.1 polystyrene glass	19,1%	45,6%	45,6%
9.2 glass bottle	63,7%	27,2%	9,1%
9.3 fruit	10,4%	8,0%	81,6%
9.4 Paper	83,8%	6,1%	10,1%
9.5 cans(e.g. tuna can)	67,3%	17,8%	14,9%
9.6 aluminium tins (e.g. softdrink tin)	92,9%	4,2%	3,1%

(highlighted indicates correct answer)

Out of the students that gave a correct answer to this question:

	Non participative	Eco-Schools
9.1 polystyrene glass	43,9%	56,1%
9.2 glass bottle	43,4%	56,6%
9.3 fruit	49,3%	50,7%
9.4 Paper	41,7%	58,3%
9.5 cans(e.g. tuna can)	50,1%	49,9%
9.6 aluminium tins (e.g. softdrink tin)	44,7%	55,3%

PART C

1. Students usually go to school.

On foot	24,6%
By car (my parents)	64,2%
By car (in cooperation with the neighbours)	9,2%
By bus	1,1%
By bicycle	0,9%

Out of the children that go to school:	Non Participating	Eco-Schools
On foot	46,6%	53,4%
By car (my parents)	46,8%	53,2%
By car (in cooperation with the neighbours)	29,5%	70,5%
By bus	57,1%	42,9%
By bicycle (only 2 cases)	0%	100%

2. What would the students do if:

"Your brother is brushing his teeth and has the tap water running. You would":

Turn it off.	61,1%
Tell him to turn it off.	38,3%
It is not my business.	0,6%

Out of the children that stated that:	Non Participating	Eco-Schools
Turn it off.	43,7%	52,7%
Tell him to turn it off.	41,3%	58,7%
It is not my business.	25,0% (one case)	75,0% (3 cases)

3. The students were presented with the following question.

It is very hot. You would really fancy a cold beverage to drink, which would be your choice if your favourite drink was available in the following forms: (same price and quantity)

Aluminium tin	Glass bottle	Carton	plastic bottle
40,0%	18,3%	10,5%	31,1%

Justify your choice giving only one reason, the one you consider to be the most important:

It does not break easily	16,6%
the material can be recycled	46,8%
I like it best	12,2%
it can be reused	14,6%
It decomposes and is absorbed by earth	1,6%
If compressed it does not occupy much space in the bin	2,7%
Because:	5,5%

4. Students were asked about their home:

At home:

	Yes
We have a garden	77,8%
We keep pets	56,9%
We have a solar system for warming the water	71,6%
We recycle paper	23,9%
We recycle aluminium tins	43,4%
We have 2 or more cars	82,3%

PART D: (To be answered only by the Ecoschool Students)



1. Student percentage that participates in the environmental committee: 21,7%

2. Students were asked about their programme responsibilities.

For which of the following are you currently responsible :

1. Classroom cleaning	65,4%
2. School yard cleaning	44,3%
3. School garden care	24,2%
4. Classroom plants care	29,9%
5. Responsible for switching off the lights	9,6%
6. Responsible for turning off any running tabs.	13,5%
7. Gathering material for recycling	17,6%
8. Monitoring of recycling materials quantities	6,6%
9. Monitoring of electricity consumption	7,2%
10. Monitoring water consumption	11,5%

3. Students were asked about applying school activities at home.

*In which extend activities like the ones above, that you do at school, are also done at home?
(✓ what applies to you.)*

None	Some	All
11,7%	72,1%	15,4%

4. Students were asked about their personal action:

In order to improve my school's environment I... :

1:Never 2: sometimes 3: always	Max	min	X	SD
Throw my rubbish in the bin	3	1	2,70	0,63
Step on the flowers and grass in the garden	3	1	1,12	0,41
Use both sides of the sheets in my exercise books	3	1	2,47	0,71
Keep my books clean	3	1	2,85	0,39
Bring materials from home to recycle	3	1	1,41	0,66
Consume a lot of water	3	1	1,40	0,63
Leave the lights in my classroom on, even when there is nobody in	3	1	1,17	0,44
Help the annual beach cleaning campaign	3	1	1,71	0,71
Clean the area around school with my friends	3	1	2,09	0,67

5. Students' opinion about the was asked.

What do you think of the EcoSchool programme?.

1: Not at all, 2:A little, 3:Quite, 4:Enough 5: Extremely

	max	min	X	SD
It is tiring	5	1	1,75	0,90
It is entertaining	5	1	3,06	1,34
It is interesting	5	1	4,04	1,14
It is educational	5	1	4,06	1,27
It is expensive	5	1	1,63	1,07
It is useful	5	1	4,03	1,19
It is time consuming	5	1	2,38	1,13
It is boring	5	1	1,65	1,08

6. Students were asked about the continuation of the programme.

Would you like to continue participating in the Eco-School programme?

YES	NO	I Don't know
72,1	12,5	15,4

7. Students were asked about activities that they might like better or that could motivate them to participate in the Eco-School programme.

The following are activities done by some of the ecoschools. In which extent would you like your school to be involved in such activities? (If you have already done some of them, in which degree did you enjoy them?)

1: Not at all, 2:A little, 3:Quite, 4:Enough 5: Extremely

	max	min	X	SD
Appear on the TV	5	1	3,52	1,46
Publications in the press	5	1	2,98	1,52
Visiting the house of commons	5	1	3.38	1,59
Special visits	5	1	3,86	1,39
Award ceremony at the end of the year	5	1	4,29	1,22
Using waste materials to make things	5	1	3,57	1,46

APPENDIX VII: Teachers' questionnaire descriptive analysis

Part A: Personal Features:

N=78

Non Participating schools' teachers: N₁=46 (59,7%)

Eco-School teachers N₂=31 (40,3)

1. **Gender:** Men: 26,3% Women: 73,7%

2. Education:

Teacher's College	1,3%
Pedagogical Academy	73,7%
University BEd	76,3%
Postgraduate Studies	14,5%

3. Working experience:

1 - 5 years	6 – 10 years	11 - 20 years	more than 20
25,0%	25,0%	21,1%	28,9%

4. Working Status:

Teacher	Sub Director	School Director
80,2%	13,2%	6,6%

5. The class I teach is:

A	B	C	D	E	St	Various Classes
14,5%	11,8%	19,7%	14,5%	18,4%	18,4%	22,4%

6. Lessons I teach

7. Answer by inserting a ✓ for yes or no

	YES	NO
I had Environmental Education Courses during my initial studies	41,6%	58,4%
I attended Pedagogical Institute INSET seminars on Environmental Education (Eco-Schools and E.E.)	20,8%	79,2%
I attended INSET seminars on Environmental Education organised by other organisations. If yes, please mention which:	24,7%	75,3%
I am a member of an Environmental Organisation	2,6%	97,4%

Part B: Classroom - teaching features

1. Put in a circle what you believe:

In which degree would you say, you have incorporated an environmental dimension when teaching: (1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

	Maximum	Minimum	Mean	SD
Greek Language	5	2	3,3	0,8
Mathematics	5	1	2,1	0,9
Science	5	3	4,2	0,8
Geography	5	1	3,8	1,0
Study of the Environment	5	1	3,9	1,1
English Language	4	1	1,6	0,8
History	4	1	2,45	1,06
Music	3	1	1,9	0,9
Art	5	2	3,7	0,9
Design Technology	5	1	3,2	1,1
Physical Education	4	1	2,2	1,1
Religion Education	5	1	2,5	1,1
Home Economics	5	1	3,4	1,2

2. Put in a circle what you believe:

In which degree do you apply the following activities?

(1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

	MAX	MIN	Mean	SD
Participation of the class in the annual assembly for the environment	5	1	3,2	1,0
Tree planting	5	1	2,8	1,3
Make use of environmental content mathematics problems	5	1	2,41	1,08
Organise special visits (e.g. forestry department, dams, desalination units, waste disposal units etc.)	5	1	2,5	1,0
Field study	5	1	2,1	1,1
Participation in the annual beach cleaning activities	5	1	2,1	1,3
Make use of "rubbish", for artistic creations	5	1	3,4	1,1
Essays and assignments about Environment	5	1	3,2	1,2
Discuss over Environmental Problems (e.g. greenhouse effect, acid rain, pollution etc.)	5	1	3,3	1,2
Recycling	5	1	3,4	1,1
Try to minimise waste produced in the class	5	1	3,2	1,1
Out door study	5	1	2,4	1,0

3. Put in a circle what you believe:

In which degree do you think your students apply the following?

(1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

	MAX	MIN	Mean	SD
They do not pollute the school environment	5	1	3,0	0,7
They take care of the things they buy (ecologically friendly choices)	5	1	2,2	0,7
They respect the animals	5	2	3,5	0,8
They respect school plants	5	2	3,6	0,8
They respect their books	5	2	3,3	0,7
They respect their school mates	5	1	3,1	0,8
They do not waste paper	4	1	2,7	0,9
They try to save water	5	1	3,1	0,9
They try to save energy (e.g. switch off the lights)	5	1	2,9	0,9
They are informed about environmental problems	5	1	3,0	0,9

4. Put in a circle what you believe:

In which degree does school administration promote environmental policy the following:

(1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

	MAX	MIN	Mean	SD
In the school activities (e.g. assemblies, environmental programmes, participation in environmental activities and organisations...)	5	1	3,6	1,0
In the school management (concerning materials school buys)	5	1	3,5	1,0
In the curriculum organisation	5	1	3,4	1,0
Generally in matters of students' attitudes (e.g. in the school grounds, during an excursion etc).	5	1	4,2	0,7

5. Answer by inserting a ✓ for what you believe.

Between having EE introduced as a single new subject or a cross curricular subject, which do you see to be:

	Integrated approach	Separate topic approach
The way most likely to succeed	63,0%	37,0%
The ideal way	77,8%	22,2%

6. According to the ministry of Environment and Agriculture, EE has to be introduced in all levels of education, with special emphasis in primary and secondary education. The method suggested by them is the integrated method. If this will finally be the method to be used, in which extend do you think the following suggestions would be helpful? (1: none, 2: very little, 3: enough 4: quite a lot, 5: a lot)

	Max	Min	Mean	SD
Adjustment of the Curriculum with changes and/or additions in the teaching matter which would bare in mind the environmental dimension	5	2	4,1	0,8
Adjustment of the books with changes and/or additions in the teaching matter which would bare in mind the environmental dimension	5	2	4,2	0,8
School based EE Seminars	5	2	4,2	0,9
EE Seminars in P.I.	5	2	3,8	1,0

Part C: To be answered by Eco - Schools teachers ONLY.

1. In what extend did the project give you the opportunity to:

	MAX	MIN	Mean	SD
Get informed about environmental issues	5	2	4,1	1,0
Enrich your teaching practice	5	2	4,0	0,9
Improve communication with your students	5	1	3,6	1,3
Improve school environment	5	2	3,9	0,9
Actively contribute to the protection of Natural Environment	5	1	4,0	1,1

2. In what extend did the project affect your students concerning the following points:

	MAX	MIN	Mean	S.D.
Group work and co-operation	5	1	3,4	1,0
Achievement	5	1	2,9	1,0
Behaviour in class	5	1	3,3	1,0
Environmental awareness	5	2	3,9	0,8
Behaviour towards peers	5	1	3,1	1,0
Initiative	5	2	3,6	1,0
Action for the environment	5	2	3,7	0,8

3. Put the following in order according to their importance as far as your personal information is concerned:

	MAX	MIN	Mean	SD
Peers	5	2	3,7	0,9
Personal study	5	1	3,6	1,1
Internet	5	1	2,5	1,4
Pedagogical Institute Seminars	5	1	3,0	1,6
Other seminars	5	1	2,5	1,7
Conferences	5	1	2,4	1,3
Media	5	1	3,6	0,9
Specialists	5	1	3,4	1,1
Other (please specify)	5	1	2,5	2,1

**4. Answer by inserting a ✓ for what is valid for you.
My responsibilities are:**

I participate with Eco - School committee	48,1%
I inform my colleagues about the seminars	25,9%
I find material	63,0%
I coordinate colleagues	18,5%
I coordinate children	55,6%
I have responsibilities for the environmental audit	29,6%
I have responsibilities for the planning of the Action Plan	37,0%
I have responsibilities for applying the Action Plan	63,0%
I monitor the application	66,7%
I am responsible for Curriculum links	29,6%
I communicate with parents association	18,5%
I communicate with local authorities	14,8%
I communicate with NGOs and private organisations	22,2%
I inform the community about school activities	22,2%
I inform school	37,0%
I coordinate the creation of Environmental Code	33,3%
I ensure funding	22,2%

5. In which extend were the following a problem for the successful application of the project?

Funding	1	2	3	4	5
Time	1	2	3	4	5
Children's response	1	2	3	4	5
Parents' response	1	2	3	4	5
Cooperation with local authorities	1	2	3	4	5
Finding material	1	2	3	4	5
Getting help	1	2	3	4	5
Distributing responsibilities	1	2	3	4	5
Incorporating the environmental dimension in the curriculum	1	2	3	4	5
Cooperation with school management	1	2	3	4	5
Other.	1	2	3	4	5

6. Answer by inserting a ✓ for what is valid for you.

Project offers me:

	MAX	MIN	Mean	SD
Satisfaction	5	2	3,9	0,9
Pride for doing something for the environment	5	1	3,6	1,2
Extra tasks	5	1	3,5	1,2
Fatigue	5	1	2,8	1,2
New experiences	5	3	4,1	0,7
Opportunities for professional recognition	5	1	1,8	1,2

7. I would wish for the programme to continue: Yes: 92,6% No: 7,4%
(64,9% missing cases)

APPENDIX VIII a: Interview Coding: Codes and Colours:

1. SCHOOL CLIMATE: CLIMA

- Attitudes towards the programme **Att**
- Motives of participation **Mot**
- Cooperation between coordinator and teachers, and coordinator and management **Coop**
- The coordinator's role. **Coop**

2. THE ROLE OF THE NGOs : NGOs

- The role of the NGOs : **NGOs**
- The role of the National operator **NatOp**

3. MINISTRY OF EDUCATION: MoE

- The role of the ministry of education **MoE**
- National policy on Environmental Education **NatPol**
- Environmental Education Initiatives in Schools **EEinit**

4. PROGRAMME IMPLEMENTATION ISSUES: Imp

Implementation issues

- Implementation Problems **EIP**
- Solutions to the problems **Imp**
- Awareness **Imp. Aw.**
- Activities:-Classroom activities (indoors and out) **Imp. Ac.**
- Whole school activities (indoors and out) **Imp.Ac.**
- Curriculum – extracurricular activities **Imp.Ac.**

Empirical Assessment

-Assessment of the programme by individuals' observations **Obs**

-Ecoschool Experience **EcoExp**

5. TEACHER TRAINING TT

-PI involvement in the programme **PI**

-Initial Teacher Training and INSET **TT**

6. PROGRAM PARTICIPANTS PParts

-Children involvement **ChInv**

-Parents involvement (Parents association and individuals) **Parents**

-Local Authorities **LA**

-PI involvement **PI**

7. PROGRAMME ORGANISATION – STRUCTURE PrOr

-Environmental Committee **PrOr**

-Environmental Audit **PrOr**

-Structure **PrOr**

-Coordination **PrOr**

-Assessment **PrOr**

APPENDIX VIIIb: Example of an Interview Coding.

27 March 2000

Interview with school B Coordinator.

Personal Information about interviewee:

Female

3 Years of working experience

Postgraduate Studies in Environmental Education

Q. I am not sure if you are informed about the issue since you are a new teacher in the school, ... Whose initiative was the participation of your school in the programme?

A. As far as I know the person who initiated the programme in the school was the director who was here on that year. I can't remember his name but I know it was his initiative. Some of the colleagues told me that he had attended some seminars abroad, during the 1st year of the programmes application.

I believe that my colleagues worked as hard as they could. Then the director retired before the end of the school year and there was a pause and I don't know what happened after that.

Q. How about the current situation. You are the coordinator. How do you cooperate with the colleagues?

A. Cooperation exists, I couldn't say that there is no cooperation but in many cases a lot of distinct activities and tasks require distribution and application and they use a lot of our time, attention and effort. Nevertheless, in general I have to say that our cooperation is satisfactory.

Q. You talked about work distribution How is this achieved?

A. We initially had our committee, with some external participants. After that distribution takes place by class. Each class is responsible for a different task: 4th year is responsible for one thing, 5th year for something else and 6th year for something different. Moreover distribution takes place within the children themselves, among the committee members, and the school board. This is the main distribution.

Q. Do you observe a variation in the teacher's enthusiasm? Are some teachers more or less enthusiastic than others?

A. The truth is that this phenomenon is observed, not only with the Ecoschool programme of course, but with which ever program runs beyond the formal curriculum. Some teachers are more willing to work , probably because they like

the topic better than the others. Others are less participative and only do what is absolutely necessary, minimum.

Q. And who determines what this minimum is?

A. Well, it is the action plan, and some things that can be done through the curriculum, as they are set and distributed by the coordinator. Those are things that must be done.

Q. Who establishes the curriculum links?

A. We did it through the action plan, and all the team worked on this. Well, the main activities are suggested by the coordinator since the coordinator is the one who has more material and information handy. Of course any other ideas and suggestions that come from the colleagues are welcome. Some of them have been in the school long enough to have participated for all 4 years in the programme, whereas for me it is the first time. The school is more experienced than me. Well, ok. I think that every one does his/her part.

Q. Which is the role of the director? Speaking about the Ecoschool Programme...

A. It is mainly coordinating and informative. That is, whatever the coordinator cannot "impose" (in) can be applied through the director since the role of the director and the role of the teacher / coordinator is different, for instance in my case that I only have 3 years of working experience. That is important. In general I think that his role is coordinating and informative about various things.

Q. How are the students involved in the programme?

A. Beyond the environmental committee do you mean?

Q. I refer to the students of the entire school.

A. The entire school. After the distribution of the activities that each class should apply, say, the 4th year,... I can talk about the 4th year since my class is a 4th year, all the colleagues of the 4th year cooperate to complete the activities that correspond to their classes, which could be a visit or a lecture. Some classes chose to do the monitoring of the aluminum tin quantities gathered for recycling. Some other classes take over the garden maintenance. This distribution emerges from the action plan but it involves all the children in the class. Of course the level of involvement also depends on the teacher.

Q. Is there a correlation between the age of the children and their involvement degree?

A. Well, yes, rather yes, rather.... I believe that age affects the type of activity rather than the level of involvement. I.e., initially we see which activities are suitable for the specific age and if it is indeed suitable for the age a lot of children can be involved.

Q. This question probably repeats some of the things we already discussed... Anyway, What opportunities do the students have, to get involved in the programme and what kind of activities can be used?

A. You refer to everyone's participation?

Q. Generally speaking. What you mention, i.e., if it is global participation or if it is a class oriented / directed activity...

A. 100% participation in the class you have with the activities that involve the curriculum, that is if a topic that has something to do with eco... is to be thought in the 4th year, everyone in the class will attend it. So in this case we have 100% participation of the children in activities connected to the curriculum.

Beyond that there are practical activities such as recycling in general, maintaining school grounds neat, the water guards ... I am now telling you the ones that come to my mind more easily, ... the water guards, especially this year that we focus on water. The further we move to more specific activities the fewer students can get involved in it and in this case we try to establish a greater number of activities in order to give the opportunity to more children to get involved somehow. Nevertheless, global participation in an activity with common objective for all children occurs through classroom teaching, lectures, things that involve a rather theoretical background.

Q. Have you distinguished any class for excellence in achievement in the programme?

A. I couldn't say that, at least for the 4th year where I work, we cooperate very well. The question is very subjective since the amount and quality of work done by the children depends on the teacher: how enthusiastic, creative and how well informed s/he is. I must say that we all work at the same level.

Q. What difficulties do you encounter during the application of the programme?

A. I think that the most difficult task is the coordination and the distribution of the time. Although the colleagues and the headmistress are most willing to work for the programme, we always face time problems: distribution of time and coordination time. The most important problem is the completion of a specific task within predetermined time limits (time schedule) set by the action plan and the coordination among the teachers. During the school year, so many other tasks appear, that without good coordination it would be impossible to run the programme. As the coordinator of the programme, I can verify this fact, and I see the existing problems. There is will, but there are so many time obstacles that cause a lot of problems.

Q. So you see the time issue as the most important implementation problem.

A. Errrrr! Yes! Time problems.

The second problem is money problem. (Laughs!) Well, money problems could be first and then the time. The financial reinforcement is definitely an important issue especially, when you have cooperation and will, time and you don't have the resources to work.

Q. How do you tackle the time and money problems you face? Who can reinforce you?

A. Financially we have the parents' association financial support, school official suppliers (eforia) and as an ultimate resort, the municipality. We don't have any other official sponsors. We try to make a good and fair budget since we don't want to be too much trouble for our benefactors mainly the official school suppliers, the municipality too, several times. The time problem....

Q. Did you take all 4 free periods you were supposed to?

A. No, only two.

Q. How about the other two? Did someone else take them?

A. Errr., no. The programme was not arranged like this. Besides, I didn't want to take all 4 periods my self, I'd rather prefer someone else getting the other two periods, 4 periods would be a lot of time for me. As a solution for the time problems, I try to do as many things as I can, since I have 2 periods off for this purpose. Since the coordination of all the committee is very difficult, we organise special meetings, e.g. I arrange to meet with art teachers only or the 5th grade teachers only or only the children that belong to the eco – committee and on another occasion the students' school council. So we have these group meetings.

Q. Aren't the students from the student council the same children that belong to the eco committee?

A. No we tried to avoid this so as not to overload the council with more responsibilities that would take more of their time. (they would miss more classes) The children from the council participate in the committee but they do not constitute the core members.

Officially we have 2 children from each class, that is 22 children plus the council. Nevertheless, only one student represents a class in the meetings and not always the same. School council comes only if the issue is more urgent. The council children are already loaded with more responsibilities and we wouldn't want to put them another burden. Nonetheless, they do belong to the committee.

Q. Are you aware of how the committee functioned last year?

A. I don't have many details although the colleagues have informed me extensively. I know that last year participated in the committee the school's students council, some class representatives, external participants, parents association, topic specialists, etc., and the school staff.

Q. Let's go back to the difficulties encountered and the ways you tackled them. More or less you have already told me about the cooperation between the staff and the school management. Is there something else you might like to add?

A. Either we want it or not, there are problems of cooperation with whichever task / programme a school decides to operate. It is a narrow community with many people involved, so it is expected to have to deal with some reactions, and with the pressure of time they increase, but I do not feel that the colleagues are not willing to work for the programme. That is no problem. I think that the reactions are caused by the pressure the teachers receive. Even I, sometimes, I might feel that other priorities come up and the programme is of secondary importance on that occasion. Always, the problems emerge from the time limitations.

Q. How about cooperation with the parents?

A. With the parents, we cooperate ... what we demand from the parents is of course very limited.

Q. Perhaps I wasn't clear, I refer to the parents association.

A. The parents association is full of people interested in the programme, willing to participate and assist mainly where financial issues are concerned. Let us put it this way, we never had a problem with them.

Q. The local authorities?

A. The local authorities... starting from the Larnaca municipality, ... we are very pleased with them. As far as other authorities with which we collaborated this year, e.g. water authorities, and water council, or last year, the oil refinery and power plants, were most helpful and assisted the programme completion.

Q. Which is your contact with the National Operator?

A. Well, whatever we asked for, ... we are pleased. The mid year meeting with them was a very helpful. It was the first time that a meeting during the school year was organised. It was very helpful because it showed how well the programme runs. O.k. since most of the times I personally contact the operator, I can say that I never ha any problems.

Q. The Pedagogical Institute,

A. The only contact I had with the Institute was during the training course we attended. We didn't have to contact them since then. Well, the seminars were quite informative, at least for me, since it is my first year working with the programme.

Q. Who participates in the environmental committee?

A. As I already mentioned we have 2 representatives from each class, we have 11 classes so there are 22 representatives, officially speaking, the students council, 5 members, 5 people from school staff, a representative from school suppliers committee, a representative from the city council, the water authorities, other school staff, parents association, a total of 30 – 35 people.

Q. All these attend every meeting?

A. Full body meetings are not very common. We don't meet in full body so often because of the responsibilities and limited time available the members have, The meetings are rather held with school members of the committee (school staff and students).

Q. How often are these... school staff and students' meetings held?

A. Usually every fortnight, although sometimes it could be every 3 weeks.

Q. Did you observe any impact of the programme on the students of your class? And the school in general if you can answer about the school in general.

A. I admit that the influence is enormous mainly on their attitudes and their knowledge on environmental issues. I see a greater impact on the 4th year students, who come from another school, which did not run any programmes of the sort. I also observe a difference in the students' behavior, compared to other schools I have worked. There is a big difference. I am telling you this, and I can document it because I personally conducted a research on the issue for my postgraduate degree. I had seen Ecoschools and schools and schools which had no conduct whatsoever with the programme and I can say that there is a great difference. The difference was very obvious in the classes and in their attitudes and knowledge.

Q. Were you able to observe any impact the programme might have on the students' families?

A. Although this is a bit difficult to observe, we can see it through the behavior of the students, that is, how many children are willing to do some things depend on the family. Let me give you an example of what I mean. When we announce, we ask them to collect aluminum tins for recycling, their will to collect tins, might emerge from them, but it also may be a result of attitudes cultivated at home and the interest the family will show for the collection of the tins. This is a practical example. Other ways of judging the parents' interest is the parents' committee involvement in the programme's assemblies: in that case of course they are obliged to participate, nevertheless well... I can say that it works on both directions, we have an impact on the family and the family influences us by encouraging children to participate in the programme in the school.

Q. Do you feel that your class has gained something from the programme?

A. Yes, I do feel that the kids have acquired a general understanding, since it is very difficult to implant some ideas in their heads, and mainly change some of the ideas the children have. I do feel that we do a good work, yes, I feel that children enter a rhythm, a sensitivation about the environment, which is the ultimate aim. Sometimes their enthusiasm goes beyond from the framework, i.e. they get interested more than the expected, because of their enthusiasm for the new topic. As they grow older, their interest for practical involvement lessens but their awareness and their way of thinking, they process things in their minds. Probably when they go to the 6th grade they may not be so keen about the programme, but they definitely have acquired a quite global opinion about environmental issues.

Q. How do you evaluate the programme's structure?

A. You mean the duration?

Q. I mean the general framework and guidelines that determine the way the school will work.

A. I think that it is quite organised. Each year, as I saw through the teachers handbooks and the seminars I attended, it gets improved, and this is apparent because of the increase in the participating and awarded schools. About the guidelines, I think that the existence of one or two trained teachers, that have attended the pedagogical institutes training programme and the cooperation that exists with Cymepa, the contact, is enough for a smooth implementation of the programme. I am sure that the organisers might see other problems too, which the teachers are not able to see, since they have access to many schools. We can only observe our school. I think that it is ok. It is very well structured and the programme operates perfectly.

Q. How flexible do you think the programme is, how free do you feel to ...

A. Quite sufficiently, sufficiently, because suggestions and opinions are welcomed either a teachers suggestions or... whoever can give suggestions for the programme. This fact gives the programme a lot of potential. It wouldn't be preferable, errr, it would be easier if we had a pre-designed action plan for instance with 20 targets, for the school to achieve. Nevertheless, I consider that such an approach would minimise schools' initiative, creativity and flexibility and prevent whichever new element might be incorporated in the programme with the capacity to assist its evolution. In spite of that, I don't think that any educators would oppose to a ready-made action plan targets.

Q. So you believe that they would prefer ready-made targets?

A. Yes they would, because it is most practical, and we would know, “we covered this, we covered the other, and all the rest of the schools did the same... so we are ok” if we consider this point of view. But if you asked them how much flexibility and freedom they would want in the programme I am sure that they wouldn't opt for the ready made programme.

Q. Which would be your personal preference?

A. I would go for a combination of the two. It would be nice, since the programme has now 4 years of running experience, some of the things considered to be more effective and it is proved that they assist the children, why not disseminate those information to the schools so that they can include them in their basic aims, and give them space for... I mean, if the basic targets are 5, they could come up with 15 more of their own. I think that a combination would be the right thing to do since the programme has acquired certain experience and can see some things that can have results. Why not?

Q. How do you see the way the programme is assessed?

A. I didn't have the experience of the evaluation. I know that we have to apply for it and be able during the evaluation to present our work with evidence.

Q. What do you think of this as a method of evaluation?

A. The assessment application is very reasonable, there might be schools which decide not to do it. As far as the rest of the evaluation procedure, I don't really know what happens, in order to express an opinion.

Q. The operator goes to the school, and checks the things that you mentioned, especially quantitative and obvious things,

A. Definitely the evaluation is an important part of the programme which will make both the staff and the children feel that they have indeed worked but under no circumstances should it reach the other extreme of being something that causes stress and anxiety to the teachers. As I said, I cannot really give my opinion on the issue because I do not have the experience of an evaluative visit.

Q. How helpful were the seminars you attended?

A. They were very helpful. I cannot say that I would expect something more or different. They did give us training about the programme and its functions, the topics that are included, ... total... communication, all participating factors, and Cymepa, that whenever we can turn to them for any help we might require. The seminars were very helpful.

Q. Was there anything more that you might have wanted?

A. Starting with activities connected to the curriculum we mainly work through language classes: various texts or language activities with environmental context, discussions of ecological issues... The next discipline is art. I don't teach art but I know that they do a lot of things within the environmental context: posters, handicrafts, etc. There are of course more disciplines, like technology, science, that might be applied, especially in higher classes. Beyond the curriculum, we have activities such as recycling, the efforts of the children through activities for saving water, participation in the annual beach cleaning, we did a mini investigation about

water saving and we plan to repeat it at the end of the year to see the change, it is not a scientific research of course but we try to be as objective as possible.

Q. All these activities you mentioned are activities that involve the entire school community. How are individual students involved in this kind of activities, which is their part? Do all students in each class participate?

A. The annual beach cleaning for example, not all students participated in that activity. It was optional and only a part of the students enrolled, and the ones who were more willing to participate were the younger ones. As far as material collection for recycling is concerned, again, some classes are responsible for that. As far as the curriculum is concerned, as I mentioned before, all children in the class participate, since it is a lesson for the class... I don't know if that answers your question.

Q. Yes, that is what I meant. Were there any lessons where the incorporation of E.E. was more difficult and other that it was easier to do?

A. I believe that it is easier to do through language lessons. We begin ... er... I told you, since this is the schools 4th year of participation in the programme, and this is only my first year, thus the school is actually ahead of me, I cooperated with the rest of the colleagues, we start with a programme, as far as what we teach is concerned, to introduce little by little, to the children the year's issue. We wouldn't start immediately with topics of which the content would be water, we would start with broader topics, earth, protection and conservation and then becoming more specific, moving inwards, we would start with specific issues such as water, atmosphere. It is easier to do through language classes. After that, for instance 4th year Geography has an entire unit devoted to water, and Cyprus water reservoirs. It would be much easier now for the children to get the point and work more creatively during the class compared to how they would have worked if they hadn't had the initial conduct with environmental issues. It would have been so out of place as if it had dropped on that moment from the sky. The language classes assist children's understanding and getting the point when other discipline classes follow, science, geography ... we usually dispose some time of our schedule, which each teacher decides on his/her own, each week, for ecological matters. It is the only way to... get things done.

Q. Are you referring to the language classes?

A. Yes, personally, I "stole" for instance two periods from the language schedule per week, and I teach language through environmental issues. Another teacher might do it in a different way. Nevertheless, it is the only way to get organized and give the class, otherwise, ... you know...

Q. How about the lesson which is more difficult for the introduction of EE?

A. I think that theoretical classes, which stay out of the environmental context, such as religion and history. Mathematics is quite difficult to use, unless, we use recordings and data processing, graphs etc which well, it is a good opportunity for incorporation. Well, it is the rest of the lessons, music, religion, history, the non core - secondary disciplines. Although, music for instance, there could be some effort, through songs...

Q. Were there any activities that you observed, that could be more effective in inculcating environmental attitudes to the children?

A. Attitudes... you mean classroom activities?

Q. No, in general, either classroom or entire school activities...

A. I could say that messages can reach children through theoretical lessons, that is, language or science, through the experiments they perform. For instance, a very simple experiment we do, is the one which you paint the water and put flowers in it and see that the flowers become colored. These are activities that affect them, and affect them and they can recall them on any moment. Generally, the more practical is the student's participation, is widely accepted that it has a greater impact on his behavior. At this point, concerning the child's attitude, is extremely important the interest shown by the family. For instance, with the aluminum collection, children might be interested in participating, but if family assists their efforts, recycling will become a way of life for them. If they don't have their family's support they will stop as soon as the programme stops. That is their interest is seized there. As far as their attitudes are concerned, we do see a modification, which nevertheless is slow. For instance we observe the 6th years, these children have been participating in the programme for three years and we can see which children still care for the programme, which have developed environmental opinion and position, and ok, the children that will go on applying the environmental principles applied in school are even less. So when they go to secondary schools, it is obvious that many things and actions they have followed will be forgotten.

Q. So, do you observe a decline of their interest in the programme?

A. Yes, because there are other factors introduced in their lives...

Q. I refer to primary school, in particular, you mentioned that the 6th years...

A. Yes, The fact is that the younger ones, in the 4th year, are more enthusiastic and this probably increases their interest. The older ones, become aware of other things, with age, classes become more demanding, but, I insist that they develop some lasting conceptions. There is an apparent (not real) depletion of their interest intensity, but they are still susceptible to new attitudes and ideas. Well, it also depends on how well the teacher will manage to attract their attention, as well as the school and the family.

Q. Yes, that is indeed very important. Well, we still have a little bit about the role of the Ministry of Education. Which do you think is the policy of the Ministry of Education towards E.E.?

A. You mean with respect to the Curriculum?

Q. Yes.

A. They promote E.E. mainly through Science classes and geography in a slightly lower degree. There is no official policy, or E.E. discipline. In the entire curriculum, within the general disciplines' aims, there are some occasional links with development of environmental attitudes. For instance, the general aim of science is bla bla bla and development of environmental awareness. The activities suggested by the Curriculum are extremely limited. Nevertheless, I cannot say that it entirely ignores it. The suggestion concerning E.E. exists, it is nevertheless not promoted, as it should. This is my personal opinion. This year we observed through the official Ministry instructions, **a better cooperation amongst the Ministry and CYMEPA**. We received some official documents from the Ministry about the Eco-School programme, I can't recall something similar occurring in the previous years. This is a good way on behalf of the Ministry to support the programme. Official Ministry documentation is of course more ... valid.

Q. Well, there was an attempt at the beginning to avoid bureaucratic procedures, nevertheless, the National Operator had always been informing the Ministry of Education and collaborating with them.

A. O definitely, the programme wouldn't have been implemented if the Ministry hadn't supported it. All I mean is the reactions I observe that my colleagues have when receiving an official Ministry instruction and the way they face any information by other carriers, without of course underestimating anyone. They simply realize that it is something more "official".

Q. How about the Ministry's role in introducing E.E. in our educational system in general and not only the Eco-Schools...

A. Personally, I believe, from my experience, that they mention it, but they do not reinforce or promote it. E.E. depends totally on the teachers' interest and creativity, in which extending environmental issues will be expanded.

Q. So, which do you think the Ministry's role should be?

A. To my opinion there should be some time dedicated on E.E. not necessarily as a separate subject, because I know that an option is its integration in other curriculum disciplines, well, it should be more... obligatory. I mean, that if a school does not participate in an E.E. programme such as Eco-Schools, E.E. in some of those schools does not exist. I think that this is not acceptable. I mean, errr, I congratulate the National Operator and all the voluntary work taking place, but there is a great number of schools that do not participate in the programme and those schools have no access to E.E. whatsoever. This is non-acceptable. Perhaps it should be something more official, even imposed...our educational system is so centralized... so it probably should be established on an obligatory basis. Since it can not be applied, not even cross-curricularly by teachers, in schools outside the programme, perhaps, the solution is to establish a class of E.E. (separate subject), with its own explicit Curriculum. Since our schools work according to the Curriculum instructions, then E.E. should be part of the curriculum. It should not be "one more general aim" amongst the vast mass of existing general aims.

Q. Aha!

A. This is my personal position.

Q. How easy do you think is it for a teacher to implement E.E.? I am talking about a teacher in general, any teacher, not a specialized one...

A. I believe that it is not so easy. Starting simply from the teachers initial training, for instance, me, during my studies in the University of Cyprus, I had no training on E.E. It only now appeared in the University's programme. Just that fact, makes it difficult to teach E.E. because it is not a subject we can provide according to what we believe it is... there are some phenomena, for instance, ... On the other hand, we have time restrictions. For a teacher who is not trained to teach E.E. and who is not obliged by the programme to provide E.E. to the students, that is how the school works, s/he will simply ignore it. S/he may do nothing or very few things. The truth is that besides the Eco-School programme, there is no other official policy or

implementation guidance, and the teacher finds it extremely difficult to apply... Lack of materials and resources, lack of training and knowledge, lack of time...

Q. So how do you think that the teacher could be practically reinforced?

A. Through seminars, which actually do take place. They are organized by the Pedagogical Institute and they are optional, so again, it all depends on the teacher's interest and willingness to attend them. During the investigation I did last year, schools met the extremes, some schools had developed an in depth insight of environmental issues, and some other schools, did not even know (laughing) what recycling means. It was indeed, disappointing.

Q. Is there anything else you would like to ask about facilitating the teachers' work?

A. I think that,... all I can say, is that if the school expresses environmental interest, or if there is one person who wants to ...say that that person is placed in a school outside the Eco-School programme, and there is no other EE programme taking place there, if there is an interested teacher, I imagine my self situated in a such a school, the minimum that can be done is informing the rest of the staff and trying to promote E.E.

Q. What else could the ministry do?

A. Apart from the seminars offered, err.. say, they could provide material and other resources. Nevertheless, starting from the fact that it officially does not exist in the curriculum, I doubt that the Ministry of Education will waste any time and resources on the issue.

Q. Eventually how do you assess the entire programme?

A. I believe it is a very serious programme, that is serious because it serves a very serious purpose, and serious because it is taken seriously on the way it is implemented. It is extremely important, it is something lacking from our curriculum and the programme fills up for the Curriculum Gap. The ideal thing would be more influence and authority by the ministry towards the schools, although, the way I see the programme developing, I believe that it is rapidly expanding and winning more and more schools. I am in favor of the programme and I believe that it will expand successfully and become broadly embraced. It has positive results, I can say. That is all.

Q. O.k. Thank you very much, that was extremely helpful and enlightening.

APPENDIX IX: Results of the document analysis of the three case studies' evaluation reports.

QUESTION 1. Which people constitute the Eco-Committee of the school?

Table 1.1 School staff

	School management	Teacher coordinator	teachers	School cleaners	Child care
Sch.A	2	1	6	1	1
Sch. B	3	1	3	1	-
Sch. C	1	1	9	-	-

Table 1.2 Local Community members

	School maintenance committee	Local authorities	Parents association	Highschool links	Energy specialists
Sch.A	2	1	3	1	2
Sch.B	1	3	1	-	2
Sch.C	-	-	-	-	-

Table 1.3 Students

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Student committee reps	total
Sch.A	2	2	2	4	4	4	2 (other than previous)	20 (out of 274, entire school)
Sch.B	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	11	11 (out of 320, entire school)
Sch.C	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated

QUESTION 2. How was environmental audit organized?

There weren't any major differences in the way environmental audit was performed. Most school used environmental audit checklist from teachers handbooks and distributed work, wither by class or within the student members of the committee.

QUESTION 3. How were the targets of the action plan decided?

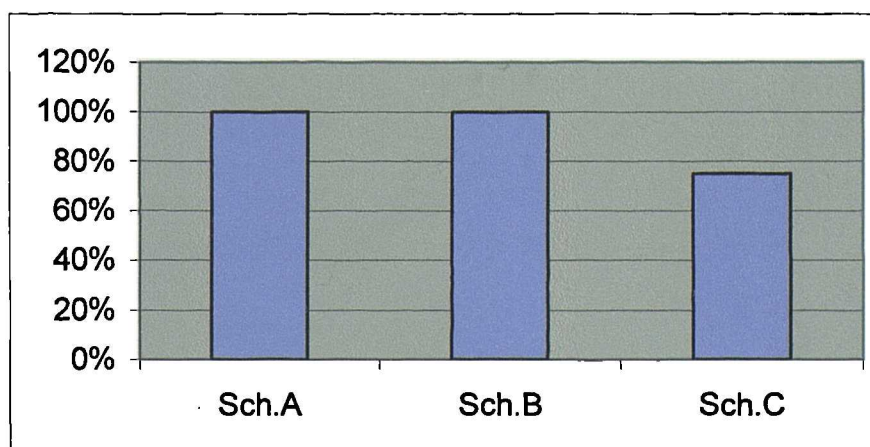
Table 2: Action Plan Organisation.

Action plan was:

	Decided by	Based on	Applied by
Sch.A	Entire committee	Students suggestions Specialists presentations Adults suggestions (members of the committee) Coordinator's ideas Environmental audit Previous years experience	All school
Sch.B	Entire committee	Environmental audit Previous years experience	Classroom distribution
Sch.C	Entire committee	Environmental audit PI seminars (coordinator's experience) Previous years experience	Classroom distribution

QUESTION 4. In which degree did the school achieve the targets?

Fig. 1. Target acnievement level.



Target achievement in three schools:

Sch.A set 66 targets, Sch.B set 18 targets and Sch.C, 20 targets.

QUESTION 5. How is process monitored and evaluated?

Table 3. Monitoring Process:

	Person in charge	Tool used	Feedback and motivation
Sch.A	Coordinator and teachers responsible	Action Plan Diary	Memos to responsible teachers
Sch.B	Commitee	Not stated	Prises or reminders
Sch.C	Coordinator and class teacher (since tasks were distributed)	Not stated	Not stated

QUESTION 6. Write the number and ages of the children involved in activities through the curriculum and information on the topics covered.

Table 4. Topics infused in the Curriculum

School A

Yr1	Seasons and wheather change. Energy use								
Yr2		Planet Earth	Energy sources	Saving Energy	Protection from electricity	Food chains	Water cycle	Visit to a greenhouse	
Yr3			Energy sources	Saving Energy		Food chains, webs and pyramids			Protection of the environment
Yr4				Saving Energy	Hazards and protection from electrical appliances				
Yr5			Energy sources	Saving Energy					
Yr6					Hazards and protection from electrical appliances				

Yr1							
Yr2							
Yr3	Endangered species	Nature balance					
Yr4			Electrical appliances	Forms of energy			
Yr5				Forms of energy and transformation	Electric circuits (science)	Oil producing countries (geography)	Electricity consumption in school (mathematics: monitoring and calculations)
Yr6					Electric circuits (Science)		

Yr1					
Yr2					
Yr3					
Yr4					
Yr5				Essay on Environment in English	Discussion on environmental issues, such as global warming, ozone layer, nuclear plants, renewable energy resources.
Yr6	Mathematics problems on energy	Energy use	Good and bad conductors	Essay on Environment in English	Discussion on environmental issues, such as global warming, ozone layer, nuclear plants, renewable energy resources.

Activities involving entire school community:

- Tree day assembly and tree planting
- Lecture on energy (the invited speaker gave two lectures, one for the 1 – 3 grades and another for the 4 – 6)
- Lecture on saving energy (the invited speaker gave two lectures, one for the 1 – 3 grades and another for the 4 – 6)
- Leaflets from Electricity Authorities
- Lecture on fuel
- Visit to Power Plant (years 5 and 6)
- Visit to oil refinery (year 5)
- Poetry competition (years 3 – 6)
- Song composition Competition (all classes in music lessons)
- Art competition (Competition also invited participations from all the other schools in the area)
- Investigation on transport (done by teachers but all students participated / research population)
- Light Patrol
- Garden maintenance
- School grounds maintenance (keep school grounds clean)

School B

Yr4	Texts with environm . content	Monitor Energy consumption (group of students)	Science experiments	Signs with env. Messages (design tech. And art)	The electricity bill	Compost (group of students)	Leaflet on Energy saving (language) , (group of students)	Design and creation of apparatuses , using solar energy (group of children)
Yr5	Texts with environm . content and Essays	Monitor Energy consumption (group of students)	Science experiments	Signs with env. Messages (design tech. And art)	The electricity bill	Compost (group of students)	Leaflet on Energy saving (language) , (group of students)	Design and creation of apparatuses , using solar energy (group of children)
Yr6	Texts with environm . content	Monitor Energy consumption (group of students)	Science experiments	Signs with env. Messages (design tech. And art)	The electricity bill	Compost (group of students)	Leaflet on Energy saving (language) , (group of students)	Design and creation of apparatuses , using solar energy (group of children)

Activities involving entire school community

- Water saving patrol
- Energy saving patrol
- School grounds patrol
- Tin recycling
- Energy saving family competition
- Tree planting (1 per class)
- Presentation by Electricity authorities invited speaker
- Greenpeace Speaker
- Visit to oil refinery (only 5th yr)

School C

Yr4		Investigation on paper consumption in school Responsible class Y4.1	Investigation on water consumption in school Responsible class Y4.2 (Activity not applied. Teacher opted out)			Visit Athalassa Government nurseries (ministry of Agriculture and Environment) Yr4.1
Yr5				Investigation on water consumption at home Responsible class Y5.3 (Activity not applied. Teacher opted out)	Investigation on energy consumption at home Responsible class Y5.2	
Yr6	Investigation on garbage quantities produced in school Resp. class Y6.1 (activity not applied. Teacher opted out)				Investigation on energy consumption in school Responsible class Y6.2	

From table, Y4.2,. Y5.3, Y6.1 opted out and Y4.3, Y5.1 and Y6.3 did not participate on the first place.

So out of 9 classes, only 3 classes completed an activity.

Activities involving entire school community

- “Keep school grounds clean” campain
- Recycling old batteries
- Recycling tins
- Eco-Code
- Art Competition (planned, but failed to apply)
- Literature competition (planned, but failed to apply)
- Cartoon Competition (planned, but failed to apply)

QUESTION 7. Describe your school’s action day.

Sch.A	Environmental week devoted to Energy (Link with Design and technology: photovoltaic cells used on model cars and model houses)
Sch.B	Every last Friday of the month, env. day.
Sch.C	School cleaning campain Use the least possible energy School grounds improvement Environmental Curriculum

QUESTION 8. How was the community informed about the Eco-School Programme and how did they respond?

Sch.A	Leaflet publication and distribution to all houses Use green flag on school parades Poster with Ecocode Participation in Committee
Sch.B	Community Reps visit school Leaflet distributed in community Positive reaction from community
Sch.C	Children inform family Parents association newsletter includes a special column on Ecoschools Publication of leaflets and a story book (Y4.1)

QUESTION 9. Describe any conducts your school had with the broader community (help, publicity, financial support ...)

Sch.A	Communication with other primary schools in area (art competition) Cooperation with school maintenance government authorities (sponsored art competition, a gardener and poster printing expences) Cooperation with municipal authorities (sponsoring poetry competition) Cooperation with secondary school and highschool of the area Invited speakers from community (presentations on fuel and energy saving)
Sch.B	Municipal Authorities (sponsored dustbins in the yard and cleaned grounds around school) Parents association support
Sch.C	Cooperation with community for aluminum tin recycling

QUESTION 10. Include Eco-Code and describe how it was formed
School A

I turn off dripping tabs
 I have a shower instead of a bath
 I don't play with water
 I respect the areas I visit
 I save materials and reduce waste
 I keep my school clean
 I collect al tins for recycling
 I use paper wisely
 I walk or use my bicycle to go to places
 By saving energy I save money
 I turn off lights where not needed
 I don't use an airconditioner when windows are open
 I turn tv off when nobody is watching
 We save water and energy by using a full washing machine
 I avoid opening the refrigerator often

Code was written in school meetings and children submitted their suggestions to the coordinator.

School B

I turn off electric appliances when not in use
I open refrigerator only when I need something
I don't open oven's door unpurposefully
I operate airconditioners when windows are closed
I collect recyclable materials
I use the electronic lamps that use less energy
Wherever possible, I use public transport, or my bike or I walk.
I try to use appliances that can work on solar energy or rechargeable batteries
I buy only what I need, as much as I need to diminish waste volume
I save water

Each class composed their code and the 12 points emerged from them during a committee meeting

School C

I feed the bin	I respect trees and plants
I keep school clean	I plant and take care of trees
I don't play with water	I turn lights on when necessary
I use a bottle for drinking water	I turn lights off when I leave school
I am alert for running tabs	I turn heating off when sun is shining

Each class composed their code and the 12 points emerged from them during a committee meeting

QUESTION 11. How did the Ecoschool experience benefit your school?

School A:

Ecoschool project created a tradition
Made our school distinguish
Enriched school grounds and local area
Offered new experiences to children
Facilitated vocabulary enrichment
Motivated children to keep school grounds tidy and clean (award from municipality)

School B:

Trigger children's initiative for action
Facilitated conduct and cooperation between children, teachers, school management and the community
Acquisition of a more environmentally friendly attitude

School C:

Improvement of school grounds
Environmental Awareness in children
Communication with organizations
Enriched teaching practice

QUESTION 12. Other comments

School A

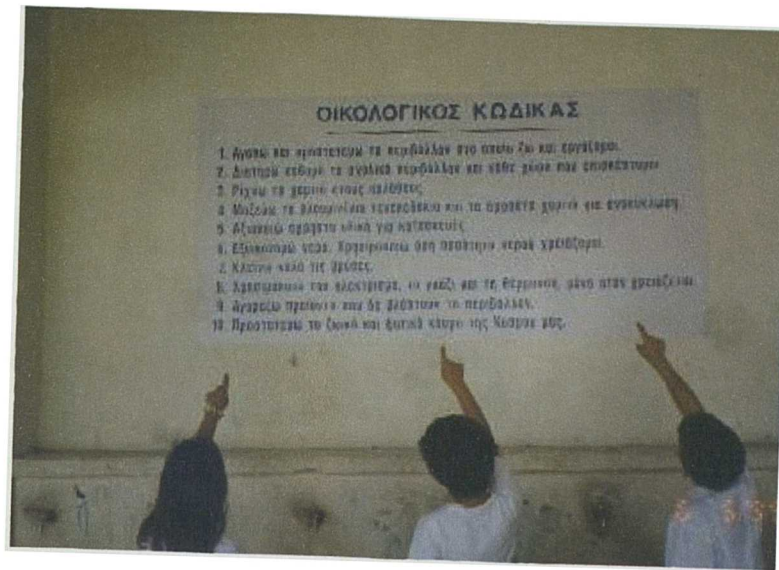
Thank National Operator for computer donation and internet connection

Difficulty in monitoring energy consumption because school is also used at night for adult classes.

School B: -

School C: -

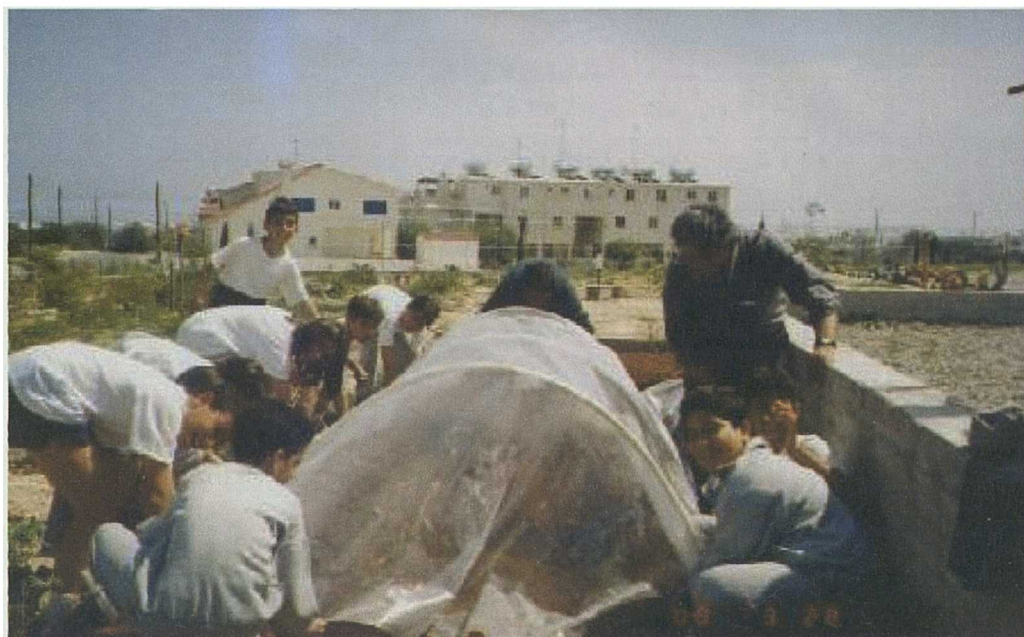
APPENDIX X: Activities Snapshots



Picture 1. The school's Eco-Code.



Picture 2. Collection of aluminium tins for recycling.



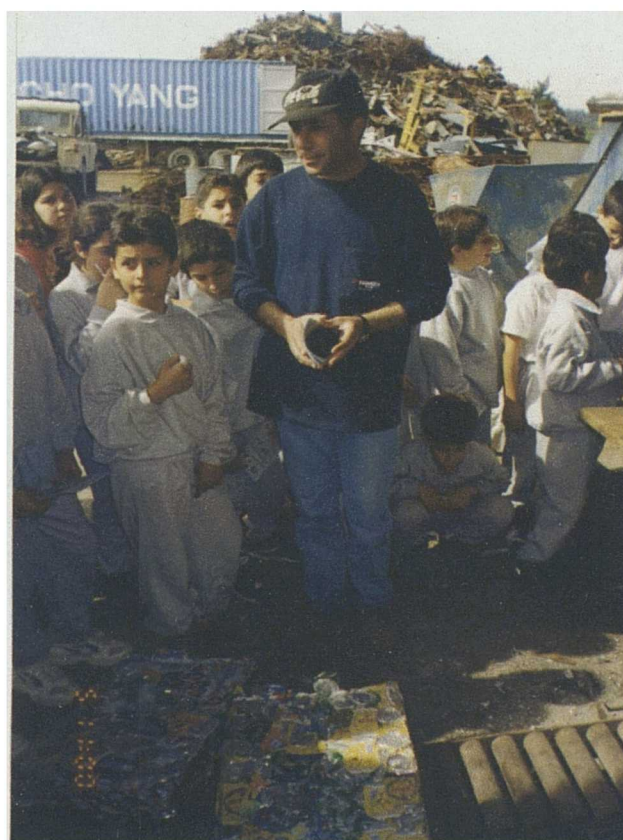
Picture 3. Construction of a Greenhouse in School A.



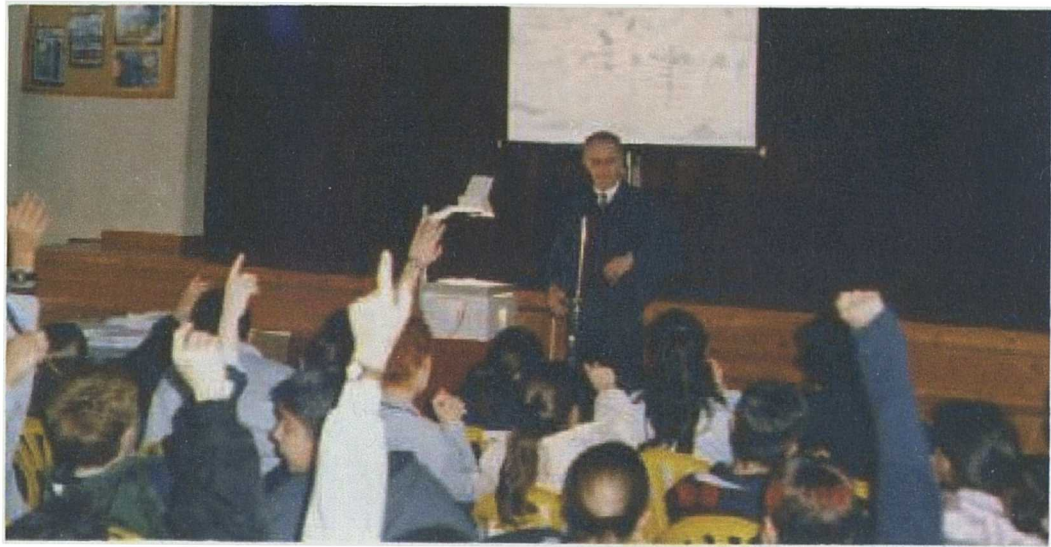
Picture 4. Weather observation station in School A.



Picture 5. Poetry Competition awarded group in School A



Picture 6. Students' visit in a scrap metal, recycling industry.



Picture 7. Invited speaker in School A.



Picture 8. Students' visit in a landfill



Picture 9. School A Students' visit in Dhekelia Power Plant.



Picture 10 School A Students' visit in Dhekelia Power Plant.