

CHAPTER 1: INTRODUCTION

1.1 Background to the study

During the past two decades, increasing concern has been expressed about the negative impact of human activity upon the environment (Ballantyne 1989a:7). To this extent, the Living Planet Report 2000 (Yeld 1997:23) suggests a 33% decline of ecosystems over the last 30 years, while human pressure on these systems (water, clean air, arable land, etc.) increased by about 50% over the same period (DEA&T 1999:12 ; DEA&T 2001:1).

Without doubt, negative environmental impacts and increasing depletion of valuable life-supporting resources pose an enormous challenge to everyone. The importance of education as a response to this challenge, to reverse detrimental environmental practices, through developing environmentally literate citizens, is commonly accepted today (Ballantyne 1989:7; DEA&T 2000b:11). According to Sheehy (2000:109), this is even more so in the new millennium, since some of today's school children will be called upon to make important decisions which could have dramatic effects on the environment of tomorrow. All children as they go about their daily activities, will be making choices and engaging in types of behaviour which will have an impact on the environment. A strong legacy is, therefore, left in society that is clearly seen in

the rapid development of environmental education programmes designed to encourage individuals to adopt environmentally sensitive attitudes, values and behaviour (Sheehy 2000:109).

In South Africa, there can be little doubt that we are living in a time of environmental crises: South Africa's environmental problems include widespread poverty, unemployment, water shortages, air pollution and soil erosion, to name but a few (DEA&T 1999:18; Le Roux 2000:47). The varied nature of the crisis means that everyone is affected in some way, although some suffer impacts more directly, and others are better equipped to deal with adversities than others. In South Africa, as in the rest of the world, one of the responses to the environmental crisis is environmental education (DEA&T 1999:40; Le Roux 2000:47; Yeld 1997:29).

Environmental education in South Africa, as a response to the environmental crisis, dates back more than 20 years. In 1982, the Environmental Education Association of Southern Africa (EEASA) was established among a group of environmentalists and environmental educators, many of whom were from South Africa (DEA&T 2001:15).

National government, provincial government, para-statal organisations and many NGO's supported school based environmental education activities during those early years. This often happened, and still does, through the development of teacher and learner support materials (such as the Share-Net resource network) and school group visits to the country's (provinces') various environmental education centres (DEA&T 2001:15). While these various agencies were often the only environmental education support teachers could call on, their activities were also often ad hoc, not co-ordinated and at times poorly integrated with school programmes and curricula (DEA&T 2001:15).

Evidence of a growing national commitment to environmental education processes, is reflected as early as 1995 in South Africa's white paper on Education and training (South Africa 1995:22). This document states that:

“ environmental education, involving an interdisciplinary, integrated and active approach to learning, must be a vital role of all levels and programmes for the education and training system in order to create environmentally literate and active citizens and ensure that South African citizens, present and future, enjoy a decent quality of life through the sustainable use of resources.”

The White paper on Education and Training is one of a number of national policies that reflects the importance of environmental education, or carry clear implications for environmental education processes and strategies.

These policies draw on the following:

- The South African Constitution / Bill of rights of 1996 (South Africa 1996:10) which enshrines the right of every citizen to a healthy and safe environment. This has created the platform for the consideration of environmental management in government policies, in which environmental awareness and education are seen as fundamental. For citizens to exercise their environmental rights, they need to participate meaningfully with insight on environmental matters and environmental education becomes critical.
- The RDP Document (ANC 1994:19) states that there is a need to develop programmes to rekindle our people's love of the land, to increase environmental consciousness amongst the youth, to co-ordinate environmental education policy at all levels, to empower communities to act on environmental issues and to promote and environmental ethic.
- Agenda 21: The South African Government is a signatory to Agenda 21, adopted at the United Nations Conference on Environment and Development. Agenda 21 (UNCED 1992: 63) states:

“ there is a need to increase people’s sensitivity to, and involvement in, finding solutions for environmental and ethical awareness, values and attitudes, skills and behaviour needed for sustainable development. Education needs to explain not only the physical and biological environment, but also the socio-economic environment and human development. “

In national government, the DEA&T played a key role, in partnership with various bodies, including EEASA to motivate for the inclusion of environmental considerations in the new curriculum being developed by the Department of Education (DoE) through the EEPI and EECl (more details on this in Chapter 2). This curriculum, Curriculum 2005, is based on an outcomes based, learner centred framework for teaching and learning, introduced in 1996, with the explicit aim to transform education in South Africa’s schools (DEA&T:2001 :15).

The policy – and curriculum lobbying work of the Environmental Education Policy Initiative (1993-1995) and the Environmental Education Curriculum Initiative (1996-), bore considerable fruit in 2000 when the Council of Education Ministers advised curriculum developers to pay special attention to environmental education in refining Curriculum 2005 (DEA&T 2000b:11; EECl

1999:1). Each of the eight learning areas in the new curriculum for GET band (piloted in June 2001), addressed aspects of environmental education outcomes that are integral to that learning area (South Africa 2000:1-2; DEA&T 2001:15; DEA&T 2000b:9). This development for the first time gave formal recognition to environmental education in the South African school curriculum. Up until this time only individual teachers and schools with an interest in environmental education, had been were involved in environmental education activities. Environmental education processes were not generally a compulsory feature of teacher education (DEA&T 2001:15).

In 2001 the launch of a National Environmental Education Programme (NEEP) for the GET band, was a major national environmental education initiative. The programme, sponsored through a bi-lateral agreement with the Danish government, aims to enhance inter-governmental cooperation (Between DoE, DEA&T, the Department of Water affairs and Forestry and others) to provide a coherent and coordinating framework through which various environmental bodies can work with schools. It also builds the capacity of provincial education department staff to support teachers with facilitating environmental education processes in the new curriculum (DEA&T 2001:15; Ministry of Education 2001 - Press Conference NEEP:1-2) .

The ongoing commitment of national government to environmental education as a response to the environmental crisis was recently reflected in the words of the National Minister of Education:

“ Schools can contribute to making the environment everybody’s business by being active learning environments... schools and learners can move to action to address and report on the many problems ...” (Asmal 2000b:1).

The environmental challenge is, however, diverse and therefore, environmental education as a response to the environmental challenge globally and nationally, should also reflect this diversity.

1.2. Problem statement and purpose of the research

The diversity of the environment and the implied challenge it poses to environmental education as a response to the environmental challenge posed globally and nationally, is described by Oppenheimer (1995:10) as follows:

“Environment is the physical, biological and social setting for living things. But environment, viewed as a set of unsolved problems for humans, itself unfolds in a social context, an evolving framework of economic, political and intellectual relations. This framework has changed radically in the past 25 years;

consequently, the solutions to environmental problems and even notions of what constitutes an environmental problem have been profoundly altered.”

The diversity of environmental education is stated by Robottom (1996: 48) as follows:

“ Perhaps like no other subject, environmental education is diverse. Much of the environmental education curriculum is constructed from an investigation of environmental issues”,

therefore, environmental education is a process with the purpose of:

“ the creation of a citizenry who can help resolve environmental issues”

(Monroe 1988: 38).

In response to the global and national challenge, due to the diversity of environmental education, local environmental issues need to be addressed

(Yeld 1997:28-29) as reflected in the following statements:

“ Environmental education should encourage students to think and reflect on a local environmental issue. Students investigate to find out what is causing

problems. They then take suitable action to do something about the situation”
(Jacana 1996:9).

” In order to establish a legacy which we will be proud to pass along to future generations, it is necessary for educators to help students develop an awareness and sensitivity to their environment – to help them understand how the environment functions, how people interact with it, and how (their) environmental issues and problems arise and can be solved ” (Chacko 1996:8).

The problems to be investigated in this research will be to answer the following:

Can the implementation of a school environmental policy and management plan assist in the curriculum integration of environmental education, the organisation of environmental education processes, the management of resources and the addressing of environmental issues in schools in Mpumalanga?

In view of the above mentioned, the objective of this research is to indicate that the exposure to the implementation of school environmental policies and management plans in schools in Mpumalanga, as a strategy in response to the diversity of local environmental issues, can assist and contribute towards

curriculum integration of the environment, the management of resources, the addressing of local environmental issues and organisation of school environmental education processes.

1.3. Research methodology

1.3.1 Literature search

A literature search will be conducted to establish international and national perspectives on the subject field, as well as the theoretical background and models of environmental education, which can be related to the subject field.

The literature will include as wide a variety of readings as possible, since topic specific material is relatively difficult to locate.

1.3.2 Document development

The research methodology included the development of the document, the Mpumalanga edition of the school environmental policy and management plan, which is a resource pack, based on the Share–Net example, but adapted by the researcher for the specific purposes of the Mpumalanga province. This pack was generously sponsored by the private sector, in order to ensure that interested schools received copies free of charge. The Mpumalanga edition also contains loose pages (like the Share-Net pack), each representing an aspect of a school, for example the school calendar, resources used in the

school as well as fieldwork activities. A format of loose pages in a folder was selected rather than a booklet so that the teachers could choose and use whatever is relevant to their particular situation. One side of the page provides information on this aspect in South Africa, and relevant Mpumalanga specifics, which could support further investigation, as well as making a few links to specific outcomes in the new curriculum.

The other side of the page is largely blank with space for filling in policy plans. There is also a selection of appendices to support the various pages. These appendices include, for example, a year planner with environmental days and a booklet with suggestions for celebrating these days, that could be valuable in terms of the organisation of environmental education processes in schools. This was developed to ensure that the subjects had exposure and access to the relevant documentation, to guide them through the process of developing and implementing a school environmental policy and management plan.

1.3.3 Competition

The “Adopt-a Schoolyard” competition was implemented and linked to the development and implementation of school environmental policies and management plans.

1.3.4 Workshops

Workshops were held for teachers in all three regions of Mpumalanga on the development and implementation of school environmental policies and management plans. This ensured that the subjects were exposed to examples of the development and implementation of school environmental policies and management plans, since all participants in the workshops developed environmental policies and implementation plans during the practical session.

1.3.5 Analysis of reports

Reports and photographic evidence received from 43 schools which entered the “Adopt-a Schoolyard” competition in 2001 and 2002, will be analysed to determine the relationship between exposure to the implementation of a school environmental policy and management plan, curriculum integration of environmental education, the organisation of environmental education processes, the management of resources, and the addressing of environmental issues in schools in Mpumalanga.

1.3.6 Research method

The qualitative research method will be followed, because data to be interpreted and analysed will reflect the experiences of the subjects in terms of exposure to the implementation of a school environmental policy and

management plan, curriculum integration of environmental education, the organisation of environmental education processes, the management of resources and the addressing of environmental issues in schools in Mpumalanga.

Burgess (1984:4) describes this common aspect in the qualitative method as follows:

“Having briefly considered the different terms that refer to qualitative research, it should be clear that they entail one common aspect, namely the interpretation or construction of the lived experiences of subjects. “

Therefore, a multi-perspective approach (utilising different qualitative techniques and data collection methods) will be conducted (De Vos 1998 : 241) to interpret the actual life experiences of the 43 subjects that developed and implemented school environmental policies and management plans from 2001 to 2002.

The data collection methods include the following:

- School environmental policies developed by the participating schools

- Reports from participating schools on the implementation of the school environmental policies
- Photographs reflecting “before” and “after” situations at the school in terms of the addressing of environmental issues.

A descriptive study will be done, by means of a systematic study and content analysis of the collected data for the research (Mouton 1989:45 ; De Wet 1981:12 ; Mahlangu 1987:15), to determine whether exposure to school environmental policies and management plans in Mpumalanga has assisted and contributed to the following :

- Curriculum integration
- Organisation of environmental education processes
- Management of resources
- Addressing of environmental issues

The results of the above mentioned will be recorded and analysed in chapters 5 and 6.

1.3.7. Selection of schools

Research will be conducted on data gathered from the 43 schools in Mpumalanga that participated voluntarily in the “Adopt-a-Schoolyard”

competition in both 2001 and 2002. This competition was based on the implementation of the school environmental policy and management plan.

1.4 Value/Importance of the research

The importance of environmental education strategies that respond to the diversity of local environmental issues, contribute towards the addressing of local environmental issues (DEA&T 2001:10) and the organisation of school environmental education processes is clearly reflected internationally (Leeming 1993:8 ; Robottom 1996:48 ; Robottom 1987:80 ; Schaeffer 1992:8 ; Sheehy 2000:109).

Through the interpretation of recommendations for environmental education objectives contained in both the 1977 Belgrade Charter and the 1977 Tblisi Intergovernmental Conference Report, an environmentally responsible citizen can be defined as one who has :

- an awareness and sensitivity to the total environment and its allied problems (and/or issues),
- a basic understanding of the environment and its allied problems and / or issues,
- feelings of concern for the environment and motivation for actively participating in environmental improvement and protection,

- skills for identifying and solving environmental problems and/or, issues and
- active involvement at all levels in working towards the resolution of environmental problems and/or issues (Bornmann 1997: 63; Chacko 1996 : 8-9; Fien 1996:6; Hungerford 1990:9; UNESCO 1993:2.20).

These objectives articulate clearly how environmental education is different from any other existing discipline – with an emphasis on attitudes, life skills and action – not just knowledge and process skills (Braus 1995:46; Tilbury 1995:199; Pettus 1982:184).

According to Hungerford (1990:13; Firth 1996:11; Gough 1993:274 and Robottom 1987:80-82) there has been a great deal of criticism about the lack of direction in environmental education over the past 15 years. The lack of emphasis upon the objectives reflected above, which focused on assistance to actually solve environmental problems and develop problem-solving skills, is contrary to the recommendations contained in both the 1977 Belgrade Charter and the 1977 Tblisi Intergovernmental Conference Report.

Research by Ramsey (1993:36) also reflects this criticism as follows:

“Unfortunately most science and environmental methodologies do not include issue instruction components. The data from this study indicate that the incorporation of issue instruction and action training in school curricula would seem likely to achieve the goal of citizen participation and environmental issue remediation.”

A further dimension in terms of the importance of the proposed research is that environmental education programmes, which focus on issues and the analysis thereof are more successful than those that have not included those experiences. Howe (1991:7) states it as follows:

“Programmes and materials that focus on experience with issue analysis, issue investigation and attention to real environmental issues and problems have been more successful than those that have not included those experiences.”

Although the importance of the proposed research is reflected internationally, it is even more important in the South African context. The National Environmental Management Act, promulgated in 1999 by the South African Government, is a clear reflection of Government’s commitment to solve environmental issues.

Lotz (1999:1) states it as follows:

“ It articulates the human right to a healthy environment (A constitutional right) through legislation and enables citizens to take action to protect their environmental rights.”

To achieve this, the lack of understanding among the general public about the mechanisms that lead to environmental degradation and the empowerment of citizens with the skills they require to commit themselves to responsible action (Blignaut 1992:255; Monroe 1988:38), need to be addressed through environmental education. Field studies by Joubert (1993:13) and Jacana (1996:9), as well as research by Blignaut (1992:255) reflected that the successful introduction of environmental education into formal education, needs to provide an educational structure which is conducive to a holistic integrated approach (Greig 1987:xlii). It would also need to cater for the investigative, problem-solving and environmental action skills (Fien 1993b:205; Schleicher 1989:265; UNCED 1992b:2.15).

According to Le Roux (2000:289), research proved that environmental education processes, as well as addressing of local environmental issues within the school context, is fragmented and, therefore, do not meet the

requirements as indicated above by Joubert, Jacana and Blignaut (DEA&T 2001:4).

The development of a school environmental policy and management plan, however, provides a valuable framework for environmental education strategies that respond to local environmental issues and the organisation of school environmental processes (EECI 1999:17; Le Roux 1999 : 11,12 293; Lotz 1999:7; Winter 1997 :9).

It is anticipated that, as a result of this research, the importance of the implementation of school environmental policies and management plans in schools in Mpumalanga, as a strategy for environmental education, which results in curriculum integration of the environment, the management of resources, addressing of local environmental issues and the organisation of school environmental education processes, in line with the objectives of environmental education as reflected internationally and nationally, will be proved.

1.5. Definition of concepts:

Curriculum

Can be described as the sum of all formal and informal learning and teaching opportunities (Le Roux 1999:286) and is, therefore, an interrelated set of plans and experiences which a student completes under the guidance of the school (Lemmer 1999:99). The school's educational programme, consisting of both the curricular and extra-curricular activities, may be regarded as the school's broad curriculum. The function of the broad curriculum is to structure different subjects, learning areas and activities in a school in such a way as to accomplish educative teaching (Van Deventer 2003:173).

Environment

Refers to the places where people and other organisms like plants, animals and insects, live (DEA & T 2000:3).

Environmental education

The process that enables students and teachers to participate more fully in the planning, implementation and evaluation of educational activities aimed at resolving an environmental issue that the learners have identified (Wals 1990 : 252). It is therefore a response to environmental issues and risks that threaten

people's chances of sustainable living in healthy environments (DEA&T 2000:6).

Mpumalanga

By "Mpumalanga" is meant the geographical areas contained within the borders of the province of Mpumalanga.

Outcomes Based Education

It is an approach to learning, based on the attainment of critical and learning outcomes, or developing competences through and at the end of a learning programme. The educator develops learning programmes to foster skills, values and competences as intended outcomes (Le Roux 1999:286).

School environmental policy

Open framework for stating the intentions and principles and managing action plans for improving school environmental performances (Le Roux 1999:21).

South Africa

By "South Africa" is meant the geographical areas contained within the borders of the Republic of South Africa, excluding Lesotho and Swaziland.

Sustainability

Refers to (World Commission on Environment and Development, 1987 in Tilbury 1995:197) the need for reconciliation between economic development and environmental conservation, the need to place any understanding of environmental concerns within a socioeconomic and political context and to combine environmental and development concerns.

1.5.1 Acronyms and abbreviations:

CBO's

Community Based Organisations

DEA&T

Department of Environmental Affairs and Tourism

DoE

Department of Education

DWAF

Department of Water affairs and Forestry

EEASA

Environmental Education Association of Southern Africa

FET

Further Education and Training

GET

General Education and Training

HET

Higher education and Training

IPC&WM

Integrated Pollution Control and Waste Management

IUCN

International Union for the Conservation of Nature

NEEP

National Environmental Education Programme

NEMA

National Environmental Management Act

NGO's

Non-Government Organisations

NQF

National Qualifications Framework

RDP

Redistribution and Development Programme

SAQA

South African Qualifications Authority

SGB's

Standards Generating Bodies

UN

United Nations

UNEP

United Nations Environment Programme

UNESCO

United Nations Education, Science and Cultural Organisation

WWF

World Wide Fund for Nature

1.6. Research programme

Chapter 1 –

Introduction and background for the research, including the purpose of the research, the importance of the research, research methods and concepts definitions.

Chapter 2–

Literature review of national and international perspectives on environmental education related to the research.

Chapter 3 –

Literature review of perspectives on education which influence environmental education related to this research.

Chapter 4 –

Description of research methodology and collected data.

Chapter 5 –

Analysis and discussion of the data with specific reference to support of curriculum integration and the organisation of environmental education processes.

Chapter 6 -

Analysis and discussion of the data with specific reference to the management of resources, as well as addressing environmental issues.

Chapter 7 –

Conclusions and recommendations.

CHAPTER 2: LITERATURE REVIEW

2.1 International perspectives

2.1.1 Introduction

The early origin of environmental education can be traced - according to Irwin (1984:7) - to the faint origins of education for care of the environment in classical Greek times as evident in the writings of Plato and Theophrastus.

The modern concept of environmental education has its roots in Europe in the nineteenth century when the industrial revolution had caused widespread alienation of man from nature and the increasingly wasteful demand for and destruction of natural resources over the past 150 years (Irwin 1990b:3).

In addition, Darwin's "Origin of Species", published in 1859, also brought into question man's entire relationship with the rest of the living world (Irwin 1984: 7). Reactions to this changing world and man's relationship to it, ranged over a broad spectrum. Romantics mourned the passing of the rustic scene.

Wordsworth for example wrote:

"Is then no nook of English ground secure

From rash assault?...

plead for thy peace, thou beautiful romance

Of nature; and if human hearts be dead,

Speak, passing winds; ye torrents, with your strong
And constant voice protest against the wrong.”

(From : On the projected Kendal & Windermere Railway by Wordsworth)

Man's increasing demands resulted in increased production, often detrimental to natural resources, therefore, the birth of the modern environmental education is often cited as the publication of “Silent Spring” in 1962 in the USA by the scientist and environmental activist Rachel Carsons. “Silent Spring” documents the influence of agricultural chemicals in North America on the rural environment; the Silent spring, is the result of the songbirds dying because of pesticides. The author's potent mix of scientific evidence and restrained emotion also gave strength to the emerging green political lobby (Le Roux 1999:186).

Environmental education has, however, evolved worldwide from an ill-defined surrogate for nature conservation 50 years ago, into a socio-ecological movement of many dimensions. It has become a sophisticated concept embracing ecological knowledge and understanding, total people/environment relationships, ethics, politics, sociology and public participation in decision-making (Irwin 1990:3). Alongside this evolution of ideas, in particular the past

20 years, considerable effort has been expended internationally to address global environmental concerns. These concerns include global climate change, its influence on bio-diversity and ecological destruction, poverty and disease, political instability, industrial impacts due to unsustainable economic activities, etc. Rapid population increase especially in the developing countries always poses a major challenge for environmental management/improvement (Mosidi 2000:3).

Governments, with considerable input from civil society, developed responses to these environmental concerns. These responses also attempt to clarify and delineate the concept of environmental education. This has involved a great deal of debate and discussion both in environmental and educational literature and at international forums (Mosidi 2000:3 ; Irwin 1990:3). As a response, governments have staged many notable events such as:

- The Belgrade Charter of 1975
- Tblisi Declaration in 1977
- World Conservation Strategy of 1980
- The Moscow Environmental Conference in 1987
- Publication of Our Common Future in 1987
- The launch of the Brudlandt Report in 1987
- The publication of Caring for the Earth in 1991

- Earth Summit and Agenda 21 in 1992 where nations deliberated on environmental challenges and some countries reaffirmed their commitment to addressing environmental problems
- Conservationists meeting in Canada in 1996
- State of the World Report in 1997
- UNEP Report in Nairobi, Kenya in 1997
- Earth Summit +5 in Rome in 1997
- Establishment of the United Nations Inter-ministerial forum on the environment in 2000 and the Malmo Declaration (DEA&T 2001:2; Le Roux 1999:186; Mosidi 2000:3).
- World Summit on Sustainable Development in Johannesburg in 2002

2.1.2 Historical background

Environmental education has emerged as a global phenomenon since an appeal was made for a United Nations Environmental Education Programme (UNEP) at the International Conference on the Human Environment in Stockholm in 1972. This first intergovernmental co-operation on environmental education (in Stockholm 1972) already recommended a programme for interdisciplinary environmental education and initiated an environmental education programme (UNEP) (Blignaut 1992:252 ; Schleicher 1989:266). One of the aims of this study is to prove that interdisciplinary environmental

education, as reflected through curriculum integration and the organisation of environmental education processes in schools (Chapter 5 of this study) can be achieved through the development and implementation of school environmental policies and management plans as proposed by this research.

Three years later it was stated at the Belgrade Conference (1975) that environmental education demands global thinking and local action and should focus on the relationship between man and the biosphere. An International Environmental Education Programme (IEEP), was launched in 1975 and a document - the Belgrade Charter - a global framework for environmental education, was prepared. The framework entails the following aims:

- To foster clear awareness and concern about economic, social, political and ecological interdependence in rural and urban areas.
- To provide every person with the opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.
- To create new patterns of behaviour of individuals, groups and society towards the environment (Bornmann 1997:58; DEA&T 2001:27; Hungerford 1990:8; Schleicher 1989:266).

The development and implementation of school environmental policies and management plans in Mpumalanga in this research, is aligned with the international perspective and aims of the Belgrade Charter. It aims to be a catalyst for local environmental action by creating new patterns of behaviour of individuals, groups and society as a whole towards the environment. This is achieved inter alia through empowerment by means of raising environmental awareness and the provision of opportunities to acquire environmental knowledge and environmental skills through curriculum integration and organising of environmental education processes in schools (Chapter 5 of this study), as well as the management of resources, and addressing of environmental issues (Chapter 6 of this study).

According to Schleicher (1989:266), soon after the Belgrade Charter, it was emphasised (at the Munich conference) that the social sciences should coordinate the different environmental perspectives to avoid a one-sided factual-functional interpretation by natural sciences. The plea for the involvement of the humanities was substantiated (1977 at Tbilisi) with the arguments that ethical, cultural and economic dimensions somehow determine the concepts for environmental interpretation and the attitudes towards environmental use. Accordingly environmental knowledge, attitudes skills and participation were held to be of equal importance and the approved guidelines emphasised that:

- Environmental education should consider the environment in its totality – natural and built, technological and social.
- It should be interdisciplinary in its approach and cover local, as well as international issues.
- It should enable the learner to have a role in planning the learning experience and provide an opportunity for making decisions and accepting its consequences.

The development and implementation of school environmental policies and management plans in this research follows an interdisciplinary approach, as has already been indicated. It aims to consider the school environment in its totality. Due to the learner's active participation in terms of development and implementation of the policy, the learner plays a role in the planning, decision-making and accepting of consequences and therefore is aligned with the guidelines indicated above.

This Tbilisi conference held in 1977 in Georgia (the former USSR) by UNESCO, was the first inter-governmental conference on environmental education. It was attended by 66 member states and recommendations for the wider application of environmental education in formal and informal education were prepared. A brief set of objectives for environmental education in formal

education based on eleven principles was published in a report afterwards (Bornmann 1997:58). It was the first time that there was international discussion and agreement about the urgency of environmental education worldwide and clear goals and objectives that could be implemented in every country of the world (Braus 1995:46).

These objectives, found in the Tblisi conference declaration (1978) are the following:

- Awareness: to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied programmes.
- Knowledge: to help social groups and individuals gain a variety of experiences in and acquire a basic understanding of, the environment and its associated problems.
- Attitudes: To help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.
- Skills: to help social groups and individuals acquire the skills for identifying and solving environmental problems.
- Participation: to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward the resolution of environmental problems (Hungerford 1990:8).

Publications based on this event provide the framework for environmental education in many countries (Bornmann 1997:58). It also provided a framework for the school environmental policy and management plan, as developed and implemented for the purpose of this research in terms of curriculum integration, organisation of environmental education processes, management of resources and addressing of environmental issues.

2.1.3 A new focus on Environmental Education

In 1980 the World Conservation Strategy (WCS) launched a significant document concerning conservation and environmental education. According to Bornmann (1997:59) and Tilbury (1995:205), this document stressed the importance of utilisation of resources through “sustainable development”.

Tilbury (1995:195) emphasises that mounting concern over environment and development problems has meant greater support for this educational approach, which not only considers immediate environmental improvement as an actual goal, but which also addresses educating for sustainability in the long term. This form of environmental education differs significantly from the apolitical, naturalist and scientific work that was carried out under the environmental education banner in the seventies and early eighties. The World Conservation Strategy’s consideration of immediate environment improvement, links with the development and implementation of school environmental policies

and management plans as a contributor towards addressing local environmental issues, as discussed by this research. A chapter on environmental education contained the following message:

“The long term task of environmental education is to foster or reinforce attitudes and behaviour compatible with the new ethic. Attitudes, behaviour, culture and environmental ethic was emphasised. These four concepts still are core issues in the theory and practice of environmental education today, especially when a curriculum for environmental education is developed (Bornmann 1997:59).”

The WCS also explored the links between economic growth and environmental conservation and in doing so linked social issues such as poverty with development and the environment. Consequently, environmental education had to redirect its goals towards “ education for sustainability”, which meant the consideration of social, political and economic causes of the environment situation. In the 1990’s, environmental education has taken a more defined stance and addressed educating for sustainability in the long term (Bornmann 1997:59 ; Fien 1996:2.27). This is clearly reflected in the history of environmental education that reveals a close connection between the changing concerns about the environment and its associated problems and the way in which environmental education was defined and promoted. This is also the

case in the 1990's, when mounting concern over the environment and development problems shifted its focus to environmental education for sustainability. The new decade prompted environmental education to take a more clearly defined stance about the problems of contemporary society. The result was greater support for an educational approach that not only considers immediate environmental improvement as an actual goal, but which addresses education for sustainability in the long term. This form of environmental education is concerned with integration of the complementary disciplines of environment and development education and requires reconciliation between environmental conservation and economic development (Tilbury 1995:197).

The 1992 Rio Earth Summit (United Conference on Environment and Development), the largest ever inter-governmental environmental forum, resulted in the adoption of a number of international agreements, including Agenda 21. Agenda 21, together with the publication "Caring for the Earth" (IUCN et al 1992) provided further interpretation of the concepts 'sustainable development' and 'sustainable living' as policy issues (DEA&T 2001:2; Firth 1996 :11). At the Earth Summit in 1992, a key recommendation for educators was that environmental education and development education should be incorporated as an essential part of learning in formal and non-formal education (Agenda 21, Earth Summit 1992; Bornmann 1997:59; Fien 1993; Tilbury 1995).

The implementation of school environmental policies and management plans can be a means of implementing this key recommendation, since it provides opportunities for curriculum integration, management of resources, organisation of environmental education processes and the addressing of local environmental issues.

The social, economic political and ecological imperatives of the concept and processes of sustainable development have established a renewed agenda for environmental education which links it very closely with development education. The IUCN has described this new direction for environmental education as education for sustainable living, while others prefer to use the term 'education for sustainability' (Fien 1995:23; Firth 1996:12). The need for environmental education for sustainability (EEFS), was identified and agreement emerged among scholars and researchers that EEFS must re-orient itself towards improving the quality of life of all citizens (Agenda 21, Earth Summit 1992; Bornmann 1997:59; Fien 1993; Orr 1992; Tilbury 1995) .

The 1992 Earth Summit concluded that:

“Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues”

(UNCED: Agenda 21:221). This immensely appealing rhetoric expresses a common and conventional view of environmental education and what it needs to accomplish. Agenda 21 further states:

“Education is critical for promoting sustainable development and improving the capacity of people to address environment and development issues... It is critical for achieving environmental and ethic awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making” (UNCED 1992b:Chapter 36:2).

Fien in Tilbury (1995:205) adds to this dimension with the statement that pupils must embark on the task of critical appraisal through EEFS. This will include consideration of the different ideological value positions and their interpretation of environment and development issues. Through EEFS, pupils also engage in a critical review of their own developing environmental and political values. EEFS promotes critical understanding and the skills required to challenge bias, support rational decision-making and examine solutions and prospects for change.

A five year follow-up to the Rio Summit was staged in Rome in 1997, where nations deliberated on progress in addressing environmental challenges and

some countries reaffirmed their commitment to address these problems. The general view of this conference was however, disappointment at the lack of global progress in halting environmental degradation, poverty and overconsumption (DEA&T 2001:2). The Rio + 10 Earth Summit was hosted by South Africa in 2002. Increased international concern for the “lack of progress and accountability” on environmental matters led to the establishment of the United Nations Inter - Ministerial Forum on the environment in 2000, which produced the Malmo Declaration . This declaration, like most of the major events and publications noted here, emphasizes the role of environmental education as a significant response to environmental issues especially in relation to sustainable development and sustainable living (DEA&T 2001:2).

The strategy for the development and implementation of school environmental policies and management plans, is aligned with the development in focus towards environmental education for sustainability, since it aims at addressing local environmental issues in a sustainable way through policy implementation and regular review and evaluation of action plans and their implementation, as well as the integration of the environment in the curriculum, the management of resources, and the organisation of environmental education processes in schools.

2.1.4 “Active involvement”

According to Firth (1996:10), the growing awareness, often articulated as an environment development crisis, has led to calls for changes to improve the situation. In the World Conservation Strategy, scientists asked for changes in the behaviour of entire societies, therefore Tilbury (1995:204) argues that one of the challenges for environmental education in the coming decade was to prepare students effectively to be socially critical and engage them as agents of environmental protection and change, to improve the capacity of people to address environment and development issues. Active involvement in environmental issues should, therefore, be a critical component for the new focus of environmental education in terms of sustainable development.

Bornmann (1997:58) states it as follows:

“Environmental education also entails practice in decision making and self formulation of a code of behaviour about issues concerning environmental quality.”

According to Robottom (1996:50) an approach of active involvement is consistent with national and international discourses in environmental education demonstrating a strong rhetorical commitment to the notion of “community”. For instance, policy statements emanating from UNCED and the Commonwealth Government’s commitment to ESD both mobilise and imply

definitions of environmental education that step beyond the notion of education as something only to be found in the classrooms.

The Rio Declaration on the Environment and Development endorsed at UNCED, sets out 27 principles to guide the international community towards global sustainable development. Principle 10 states that:

“Environmental issues are best handled with the participation of all concerned citizens, at the relevant level.”

Gough (1997:42) argues that the UNESCO-UNEP International Environmental Education Programme which commenced in 1974 and is still current, has sponsored many such projects which have sought to promote educational action in response to concerns about the environment. The international focus reflects this. According to UNESCO (IEEP A Global Enterprise: p. 1.190), the main focus of the International Environmental Education Programme thus rests on:

- “Developing general environmental and development awareness,
- improving information and knowledge

- defining concepts, methods and approaches, incorporating environment, development and population dimensions into the educational process of all countries
- promoting values, attitudes and behaviours fostering ethical responsibilities
- promoting commitments for action for the protection and improvement of the environment
- stimulating participation in sustainable development decision-making and activities improving quality of life.”

Thus, the goals of environmental education have been described as:

- “to foster clear awareness of, and concern about, economic, social, political and economic interdependence at local, regional, national and international/global levels;
- to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment (and)
- to develop and reinforce new patterns of environmental sensitive behaviour among individuals, groups and society as a whole for a sustainable environment ... “(Fien 1996:2.28).

The guiding principles and goals that were adopted for educational institutions to consider in EE curriculum planning emphasise a similar problem-solving action orientation (Stevenson 1993:304). These goals and principles indicate that the contemporary aspirations of EE go beyond developing students knowledge and awareness of environmental concerns, but also leads to active involvement in helping to resolve actual environmental issues, management of resources, organisation of environmental education processes, and as proposed by this research, can be achieved through the implementation of school environmental policies and management plans.

2.2 National perspectives

2.2.1 Introduction

National perspectives towards environmental education evolved from a strong focus on knowledge and awareness of nature conservation and ecology, to the active involvement of learners in addressing environmental issues (Ballantyne 1987:7; DEA&T 2001:6; Le Roux 1997:47).

2.2.2 Historical background

The historical background, which reflects the development of national perspectives in terms of environmental education, is reflected in four time periods for the purposes of this research, e.g.:

2.2.2.1 Before 1972

2.2.2.2 1972 – 1988

2.2.2.3 1989 – 1994

2.2.2.4 1994 onwards

2.2.2.1 Before 1972:

According to Ballantyne (1987:7), the historical development of environmental education in South Africa has been recorded in detail by Irwin (1984). He notes that, prior to 1972, concern for environmental education had its roots in government actions designed to establish natural parks, address soil erosion and reclaim veld for agricultural purposes. This approach regarding environmental education during the aforementioned, period is described by Le Roux (1997:47) as follows:

“The environment was initially seen as natural ecosystems and early responses to the environment crisis thus focused on protecting endangered wildlife in nature reserves. It was assumed that people needed to be taught ecology and be made aware that nature was at risk. “

The approach followed in terms of fieldwork methods included show-and-tell, experiential learning, quiet reflection (solitaire) and guided questioning.

Research in terms of environmental issues focused on problematic environments such as cities with industries and pollution due to the assumption that if people became better informed and more aware, they would do something about the problems (Le Roux 1997:47). The aim of this research is, however, to indicate that in addition to this assumption, students also need to be actively involved in resolving actual environmental issues. Curriculum integration of the environment, management of resources and the organisation of environmental education processes, can contribute to achievements in this regard.

During these years environmental education was the practice for the interested few. The ecological orientation of the practitioners towards environmental issues in this early stage of environmental education practice, was confined to conservation and ecological education. Due to this, the practice was that only the scientists had the right messages that were to be transmitted to the rest of the people. The emphasis was on awareness raising which was only confined to scientific subjects such as geography and physical science (DEA&T 2000:6). The development and implementation of school environmental policies and management plans, as proposed by this research, aims to empower not only

through awareness raising as the early emphasis reflects, but also through the provision of opportunities to acquire environmental knowledge and environmental skills through curriculum integration of the environment, organisation of environmental education processes and management of resources, thus creating new patterns of behaviour of individuals, groups and society resulting in the addressing of local environmental issues.

During this period EE centres were built and supported mainly by the private sector. These EE centres became popular offering excursions to national parks and in certain instances, 'veld schools'. The thinking was that the "immersion and acclimatisation" of people in natural experiences would modify their behaviour. The popular teaching strategies of the time included a more hands – on approach. Environmental education activities also did not form part of the formal curriculum in school. Environmental education programmes were driven by non – government organisations (NGO's). These programmes were dubbed informal and non-formal environmental education, with the focus on school children and youth eco-clubs. In cases where the community and traditional leaders were involved, it was through the extension workers from the Parks Board. During these early years, the concern for environmental education was, however, implied rather than explicit in nature (Ballantyne 1987:7). Other non-governmental initiatives included organisations such as the Wilderness

Leadership school, the Wildlife Society of Southern Africa and others which had by 1960's already recognized the importance of educating people about their environmental responsibilities and had begun to set up programmes to put these in effect (Jacana 1996:9).

The concern for the environment during this period was implied rather than explicit. Environmental education focused on education and awareness raising. Active involvement in environmental issues, curriculum integration, management of resources and other organisation of environmental education processes, as proposed by this research, was not the general practice.

2.2.2.2 1972-1988:

In 1972 a Cabinet Committee on Environmental Conservation was established under the control of the Minister of Planning. This was the first government body to actively promote the need for conservation and environmental education in South Africa. The committee drew attention to the importance of environmental education in their recommendations regarding a National Policy on Environmental Conservation. These recommendations were published in a White Paper in 1980. This paper was the first to indicate the need for environmental education in South Africa if "all individuals and institutions are to have the right attitude to the environment" (White Paper 1980 :6). The

reference to “all individuals and institutions” reflects a broadening in the focus of involvement in environmental education, from the practice of only a few interested parties and privileged school children to the entire society, in line with the focus of the development of school environmental policies and management plans - involving society as a whole - as proposed by this research.

According to Ballantyne (1987: 8-9), the White Paper (1980) was tabled as the Environmental Conservation Act of 1982 after debate. This act led to the establishment of the Council for the Environment in 1984, charged with advising Government on all aspects of environmental management. In 1985 the Council, acknowledging the importance of environmental education, appointed a committee directly responsible for developing this approach in South Africa. The committee for environmental education actively pursued its task and played a leading role in promoting environmental education in formal, non-formal and informal situations. Of major importance to the implementation of environmental education in schools, is the National Policy for Environmental Education drawn up by the committee and submitted to the minister for the environment in 1986 (Council for the Environment, 1986). An examination of the national policy indicates that its aims and objectives are congruent with current international thinking and practice in environmental education. This is

reflected in the general principles laid down in the policy. These included the following:

- environmental education should consider the environment in its totality;
- be a continuous, lifelong process;
- be interdisciplinary in its approach;
- involve active participation by learners;
- examine current and political environmental issues;
- emphasise individual responsibility towards the environment.

It was recommended that these principles are to be promoted in both formal and informal environmental education programmes and provide a conceptual framework within which strategies for the implementation of environmental education in South Africa should be conceived. The principles laid down by this national policy, especially active participation by learners and the examination of current and political environmental issues, reflect a clear change in perspective on environmental education from knowledge and awareness, in line with the purpose of this study.

During this period non-government initiatives included the first International Conference on Environmental Education in South Africa which took place in 1982 at the initiative of Treverton College at Mooi River in Natal. Not only was it

the first time that a wide spectrum of South Africans concerned with environmental education issues had come together to discuss common concerns, but it also saw the formation of the Environmental Education Association of Southern Africa (EEASA). This association has, subsequently, played a significant catalytic, developing and co-ordinating role in terms of environmental education (Irwin 1990:4).

The Wildlife Society's Umgeni Valley Project, which was started in Natal in 1973, has played a major and innovative role in the development of environmental education in South Africa and today is a model for the 2000's. Of special interest is the work being done on integrating the concept of evaluation with environmental education. The Umgeni Valley Project has been fortunate in enjoying the support and co-operation of the Natal Education Department and the Natal Parks Board and has worked very closely with other education departments represented in the province. This situation has unfortunately not been repeated in other provinces of South Africa. Some provinces have set up their own internally controlled and racially exclusive 'outdoor' education programmes such as the 'Veld schools' in the former Transvaal (Irwin 1990:4).

The NEAC (National Environmental Awareness Council) started in Soweto in 1974 and notwithstanding the political and social turmoil in South Africa over the following years, has grown in popularity and effectiveness. Through the efficient offices of the South African Nature Foundation, the local arm of the Worldwide fund for nature, the construction firm of Murray and Roberts have sponsored Southern Africa's first Chair of environmental education at Rhodes University. This enabled research priorities in environmental education to be identified and much needed research to be initiated (Irwin 1990:5). During this period, the reflected principles for the practice of environmental education are in line with the development and implementation of school environmental policies and management plans and, therefore, the purpose of this research.

2.2.2.3 1989–1994:

In 1989, after years of resistance from conservatives in some departments of education, a White Paper on Environmental Education was tabled in parliament. For this purpose, the Department of Environmental Affairs and the Council for the Environment deserve much of the credit, since it embraces the Tblisi principles (Irwin 1990:4) and, therefore, also reflects the purpose of this research.

2.2.2.4 1994 onwards:

The slow, but far-reaching transformation processes following South Africa's first democratic elections, involved many political changes. In South Africa it has been recognised that the socio-political injustices of the past resulted in unequal access to resources and persistent discrimination in the impact of environmental education on people. Following the political transformation towards a democracy, the government is under pressure to redress past inequalities, deliver basic services such as health care and clean water, re-distribute land and facilitate the economic growth, seen as a prerequisite for true transformation (DEA&T 2001:9). While equity, economic development and delivery are paramount concerns, South Africa's Constitution also recognises the importance of the environment and guarantees citizens the right to an environment not detrimental to their health and well-being (EECI 1999:4). This means addressing concerns associated with the rapidly deteriorating physical environment. The commitment of government towards the environment is reflected in several documents. The most relevant are the RDP document and the South African Constitution (DEA&T 2001:9).

The RDP Document of 1994 states that there is a need to develop programmes to rekindle our love of the land and increase environmental consciousness amongst the youth, to co-ordinate environmental education policy at all levels,

to empower communities to act on environmental issues and to promote an environmental ethic. Aligned with this, the South African Constitution/Bill of Rights of 1996 enshrines the right of every citizen to a healthy and safe environment. This has created the platform for the consideration in government policies of environmental management, in which environmental awareness and education are seen as fundamental (DEA&T 2001:15). For citizens to exercise their environmental rights, they need to participate meaningfully with insight on environmental matters and environmental education becomes critical not only on the level of knowledge and awareness of the environment, but the active involvement of citizens in addressing environmental issues as proposed by this research. Other initiatives to ensure environmental processes that could work towards the resolution of environmental problems include several new environment policies, the signing of international agreements and the development of a participatory approach to policy making. These initiatives which indicate co-operation amongst all sectors of society in reducing environmental risks and which have laid the foundation for sustainable development in South Africa, include the following:

- Agenda 21: The South African Government is a signatory to Agenda 21 adopted at the United Nations Conference on Environment and Development (DEA&T 2001:15).

- The White Paper on Education and Training: which states that environmental education involves an interdisciplinary, integrated and active approach to learning. It has to play a vital role in all levels and programmes of education and training systems, in order to create environmentally literate and active citizens and ensure that all South Africans, presently and in the future enjoy a decent quality of life through the sustainable use of resources (EECI 1999:3; Lotz 1999:1).
- The National Environmental Management Act (NEMA): focuses on the introduction of sustainable development and is an example or a re-orientation in how the government intends to organise and manage natural resources in equitable and just ways. NEMA is developed to address South Africa's environmental issues (EECI 1999:3; Lotz 1999:1).
- The White Paper on the National Water Policy for SA (April 1997)
- The National Water Act (Act 36 of 1998): which guides water management according to the principles of equity and sustainability (Irwin 1999:4).
- The White Paper on the Development and Promotion of Tourism: which articulates the important role of environmental management in tourism development and promotion (DEA&T 2001:9).

- The Draft White paper on Integrated Pollution and Waste Management and the National Waste Management Strategy: which aims to reduce the generation and the environmental impacts of all forms of waste (DEA&T 2001:9).
- The White Paper - Environmental Management Policy for South Africa: Most important is strategic goal number 5 (Empowerment and environmental education) of the Environmental Management policy White Paper which is to promote the environmental education empowerment of South Africa's people. To increase their awareness of and to assist them to develop knowledge, skills, values and commitment that we need to achieve sustainable development (DEA&T 2001:9).

At regional level, South Africa is also playing a significant role in environmental education in terms of the SADEC regional environmental education programme. The purpose of this programme is to enable networking partners, at all levels, to strengthen EE processes for equitable and sustainable development in the SADEC region (DEA&T 2000b:7). This can only be achieved by empowering all citizens to become actively involved in the addressing of environmental issues as proposed by this research.

2.2.3 A new focus

A new focus in the national perspective on environmental education is evident from:

2.2.3.1 the broadening of the perception on environment

2.2.3.2 the introduction of environmental education into formal education

2.2.3.3 the NEEP programme

2.2.3.4 the emphasis on active participation in learning

2.2.3.1 Broadening of the perception on environment

The environment came to be gradually more broadly perceived than mere biophysical processes, when environmental problems were perceived as having political, social and economic implications too and people - rather than nature - came to be central to environmental education methods. This broadening of the perception regarding the environment was also reflected by WESSA in 1996, when its name was changed from Wildlife Society to the Wildlife & Environment Society of SA. This more accurately portrayed the society's activities (Le Roux 1999:47). According to van Rooyen (1998:118 - 120) the concept "environment" was often seen to imply the natural or biophysical environment exclusively but, in its fullest sense it also entails the biophysical, political, economic and social dimensions of reality in which man lives.

Environmental education therefore focuses on the complicated set of links between these different dimensions of the environment, emphasizing cause and effect relationships. The concept “environment” is a comprehensive term, and therefore there is scarcely a subject included in the school curriculum that does not have a bearing on the environment. This new focus is also reflected politically by Nelson Mandela’s outline of the struggles for South Africa (Firth 1996:13), which included the massive political and ethical agenda faced if attempting to make democracy a substantive rather than a lifeless activity. In Mandela’s outline a significant connection between democracy and the environment, with specific reference to political, social and economic implications, was made as follows:

“ At the top of the agenda of the Government’s Reconstruction and Development Programme are the people. The RDP sets out the task of meeting the basic needs of everyone in South African society, especially the poorest of our people, to develop human resources, to build the economy and to democratise state and society. The challenges we face are enormous... With the establishment of a democratic government, the conditions for successfully implementing policies of integrated environmental management are propitious.”

It can, therefore, be deducted that in South Africa public awareness and concern about environmental issues has increased notably and political, economic and social changes which enabled greater public participation in development planning is evident. Meaningful public participation, however, requires citizens who understand the dynamics that operate within their environments and have the attitudes and skills necessary to contribute positively and actively to the maintenance, planning and improvement of their environment. This requires education about, in and for the environment, complemented by specific skills development programmes (Blignaut 1992:252), that is best achieved through the infusion of environmental education with formal education. The development and implementation of school environmental policies and management plans, as proposed by this research, can result in the improvement of the environment, through the development of skills and attitudes necessary to identify and address environmental issues as a result of curriculum integration of the environment and the organisation of environmental education processes and the management of resources. Pupils, rather than nature, are central to the methods of developing and implementing the policy and management plan and, therefore, reflect the broadening of the perception on the environment as evident from the new focus in the national perception on environmental education.

2.2.3.2 Introduction of environmental education into formal education

The infusion of environmental education into a new South African curriculum marks a historic shift from the past, where it was not part of the mainstream, formal education (Le Grange 1997:12), since it is clear from the historical background, as described, that in the past, government attempted to address environmental issues without identifying the vital role of education in planning the protection, conservation and improvement of South Africa's environment. It is noticeable, however, that in the past an appreciation of the importance of education in the process of environmental planning emerged from conservation departments. Ironically, this has resulted in environmental education being promoted by conservation organisations rather than education departments (Ballantyne 1987:2).

According to Le Grange (1997:3), the first attempts to include environmental education in the formal curriculum was the 1989 White paper on Environmental Education. The White paper's inclusion of the guidelines adopted at the international conferences held in Belgrade (1975) and Tblisi (1977) was an encouraging shift from narrow interpretations of environmental education held up to this point. However, this policy process was not broadly inclusive and resulted in little implementation in formal education.

In 1992 the Environmental Education Policy Initiative (EEPI) was started as a more inclusive process of gathering and developing environmental education policy options for formal education in South Africa. A significant outcome of this process was the inclusion of environmental education in the Government White Paper (1995) on Education and Training, as one of the key principles for education and training policy in South Africa. The principle states:

“Environmental education, involving an interdisciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of the education and training system in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources” (principle No 17:22) .

The shift in 1996 from national education policy development to curriculum development necessitated the need for a curriculum initiative in environmental education. This prompted the establishment of the Environmental Education Curriculum Initiative (EECI), to take the work of the EEPI from policy to curriculum development. Since its establishment in 1996, the EECI was given opportunities to formally contribute to the new curriculum for South Africa. These included participation in the department of education’s national

workshops, official representation on the national Learning Area Committee (LAC) for human and social sciences, representation at all coordinating committee meetings, representation in reference groups for the technical committee on phase committees and working on the development of learning programmes. Through these various means of participation, the EECl has been involved in attempts to ensure the inclusion of environmental concerns in the specific outcomes of the outcomes-based curriculum for South Africa (Le Grange 1997:13).

2.2.3.3 NEEP

NEEP is the result of a ground-breaking participatory initiative started in 1993. An alliance between the DEA&T and civil society lobbied for the consideration of environmental issues in the development of education policy. In 2001 the Minister of Education announced the launch of a R34 million National Environmental Education Programme (NEEP) for General Education and Training (GET). Developed in partnership with the Danish government, the NEEP (GET) aims at inter-sector co-operation in ensuring that environmental considerations are addressed in every learning area in the new national curriculum (DEA&T 2001:3).

The NEEP – GET project support teachers to implement environmental education within South African school, and particularly within the new South African Curriculum. NEEP- GET is a response to and offers support for new educational policies within the framing context of South African environmental policy. The immediate objectives of the NEEP-GET project are:

Environmental learning is integrated throughout the curriculum for the general Education and Training (GET) band. Group 1 provincial departments of education have the capacity to implement environmental learning in participating districts and schools, thus providing a foundation for expanding environmental learning to other districts and schools. Groups 2 provincial department of education have increased capacity to implement environmental learning in schools (DEA&T 2001:3-6).

These objectives will be reached through 7 major project outputs:

Output 1: Initiatives have been taken to integrate environmental learning in the curriculum for the GET band.

Output 2: Professional development programme for Provincial EE Coordinators to facilitate, extend and sustain the process of enabling provincial and district staff to integrate environmental learning in their work is implemented.

Output 3: Professional development programme for provincial and district staff to facilitate, extend and sustain the integration of environmental learning in schools is implemented.

Output 4: Professional development programme for teachers to support them with the integration of EE into learning areas is implemented.

Output 5: Guideline documents and resource materials to support the integration of environmental learning are developed and produced.

Output 6: Initiatives have been taken to influence pre-service teacher education regarding environmental learning.

Output 7: Coordination of school focused environmental learning initiatives is improved at national and provincial levels.

The following principles underlie the NEEP project:

- Participation, ownership and sustainability
- Responsiveness to context
- Reflexive and applied competence (integration of theory and practice)
- Utilisation of existing resources
- An integrated, collaborative and coordinated approach (DEA&T 2001:3-6).

The development of school environmental policies and management plans as reflected in this research is aligned with the aims of NEEP, since it aims at integrating environmental concerns and considerations in every learning area through curriculum integration and the organisation of environmental education processes and therefore, is a very important instrument for the implementation of NEEP.

Although the curriculum review accepted by the Minister of Education in June 2000 reflected a key change for environmental education i.e. the elimination of phase organisers, one of which was the environment, it did not mean that the environment was no longer useful for organising learning programmes.

Encouraging for environmental educators was Minister Asmal's strong advice to the task team to pay special attention to the environment. This was reflected in his speech of acceptance of the review when he emphasised " respect for the environment" as a core value to underlie educational programmes. This is also clearly reflected in the NEEP programme (DET 2001:3; Potenza 2000:1).

Minister Asmal's support for the environment and NEEP is evident from the appointment of an environmental education advisor (Dr. Razeena Wagiet) and a team, consisting of representatives of the Ministry of Education, the Department of Environmental Affairs and Tourism and the Department of Water

Affairs & Forestry, to work on plans for NEEP. The aim is to support environmental education processes in schools across South Africa (DET 2000:1; Lotz 2000 :3).

Dr. Wagiet's appointment included:

- The development and publication of the Enviro Days 2000 booklet to provide schools with orientation and contact details to celebrate different environmental days, outlined by the Minister.
- The initiation and development of a concept plan on the development of policy and strategy for environmental education implementation on different levels of the education and training system, including General Education and Training (GET) and Adult Basic Education and Training (ABET)
- A formal partnership between the Department of Education and the Department of Environmental Affairs and Tourism, at Chief Directorate level, to implement environmental education in the context of the education system. This is reflected in the establishment of a pilot project in environmental learning within the context of the 2000 Curriculum for Grades 4 and 8. Initial plans indicated that this would involve the development of resource materials and the establishment of EE support teams in the provinces to work with teachers. It also

involved a research process to develop a research report for the implementation of environmental learning within the context of Curriculum 2005. This research report will form part of Curriculum 2005 for Grades 4 and 8.

- Plans to establish and expand greening projects which encouraged schools to improve their environmental management, were also implicated. This initiative would encourage schools to document their active learning processes (Lotz 2000:3).

The development and implementation of school environmental policies and management plans incorporate the integration of environmental commemorative days as part of environmental learning in schools. It also provides teachers with relevant information and curriculum links for the celebration of these days. The addressing of environmental issues can result in improved environmental management, through the establishment and expanding of greening projects in school. This also involves active learning and is also implemented through the development and implementation of school environmental policies and management plans as reflected in this research.

The National Environmental Education Programme also aims to contribute to the implementation of Minister Asmal's Tirisano "Working Together" Call for

Action (Asmal 2000:1; Potenza 2000:1). Some of the key issues identified by Minister Asmal's nine-point plan include:

- Improved management in schools and institutions
- School community linkages
- A focus on active learning through OBE

2.2.3.4 Active participation in learning

Minister Asmal (2000:1) describes active learning as an important component of the new focus of the national perspective, as follows:

“An important step in this process is “learning by doing” where children learn through interactive experiences... This active learning approach, where not only knowledge, but also skills development and values education is the driving force behind our Curriculum 2005.”

The new emphasis and focus on a participatory, local problem solving approach to environmental education, thus involves learning through active involvement in local environmental issues. This learning can also be described as learning through action and not learning for action (Jacana 1996:3). This perspective reflects a move from the strong emphasis on the transmission of information and suggests more active participation in learning. The EEPI

(1995:15) and DEA&T (2001:28) attributes the following characteristics to teaching and learning which reflects the following moves in perspective :

- a move towards thinking skills and problem solving
- a move towards responsibility and awareness of the consequences of actions.

Methods should include case studies, issues-based work and practical involvement in real local issues. Such work should ideally reflect the following characteristics :

- Local focus
- Participatory (within and across learning institutions)
- Across boundaries (social, economic, school, college and local authority)
- Problem-solving focus
- Involve local community (industry, local authority, civic structures etc.)
- Teachers and students should solve problems together; the teacher's role is to create opportunities for such learning experiences
- Active learning as opposed to transmission, should allow students to feel part of the education process; learning to take responsibility for themselves and their actions

- The overall style should be based on dialogue and interaction, hands-on work, learning in the context of environmental problems, issues and processes
- A combination of education in, about and for the environment.

Active participation in learning is also encouraged through the Eco-Schools programme. The Eco – Schools programme was developed in 1994 on the basis of the need for involving youth in finding solutions to environmental and sustainable development challenges at local level as encouraged by the UN Conference on Environment and Development of 1992. It is a programme for environmental management and certification, and sustainable development education for schools that encourages a holistic, participatory approach and combination of learning and action. The Eco-Schools programme is designed to encourage curriculum –based action for a healthy environment. When schools register with the programme, both teachers and learners commit to an ongoing process of developing lesson plans and learner-centred activities that are in line with the Revised National Curriculum Statement. Participating schools choose at least three focus areas, develop lesson plans and school improvement plans, and record their progress in a portfolio. Portfolios are assessed at the end of the year and successful schools gain Eco-School status and are awarded a green flag. Schools may keep their flag and status for a

year, after which another portfolio is submitted and assessed. The Eco-Schools programme was launched in South Africa in 2003. This pilot programme is supported by WWF-SA and the Wildlife and Environment Society of South Africa (WESSA), developed in partnership with the Department of Education and funded by Nampak (Ward 2004:6).

Active participation of learners can be achieved through the development and implementation of school environmental policies and management plans, (EEPI 1995:28) as reflected by this research, since it involves and, therefore, also reflects the following characteristics:

- The process: The process of achieving it is more important than the product itself. It is essentially an educational process. The implementation, review and monitoring aspects of the process are of great value and, therefore, clearly reflect the characteristics of participation and local focus as indicated.
- The role players: The process should involve all role players in the community; academic staff, grounds staff / workers, administrative staff, school management, parent bodies, pupils, student leadership, special interest groups, local authorities and, therefore, clearly reflect participatory dialogue and interaction characteristics.

- Consultative and interactive approach: The process should be consultative and interactive; done by people, not for them and, therefore, clearly reflect participation, involving local communities, across boundary characteristics.
- The school curriculum: The policy development process could form a focus for many themes or lessons within classrooms and subjects.
- Implementation and monitoring: Various groups, across the school community, can also be given responsibility for various portfolio's. Finally, a representative group should be established that could serve in a monitoring capacity. This clearly reflects participatory characteristics - across boundaries – involving the local community.
- Environmental auditing; a useful tool: It would probably be a useful way to start the process by conducting a thorough audit of the school in terms of environmental practice/management. The findings of the audit can be used as a basis for further policy development work. Again, the audit, findings and recommendations should all be done by the range of interest groups, as class projects, as extra-curricular activities and so forth. This clearly reflects characteristics of interaction and teachers and students identifying problems together, based on dialogue and hands-on work.

- Adopting the policy: Symbolically important would be the adoption of a policy document at a high profile school gathering. It is necessary to remain aware of the fact that the policy document itself is of secondary importance to the process and that the document is merely one point along a line of on-going work, review and re-development of policy and improved environmental circumstances. This reflects the characteristics of participation.
- Linkages outside the school: Apart from the linkages with local authorities or other interest or specialist groups, this process lends itself to forming linkages with other school communities. It, therefore, reflects characteristics of participation, across boundaries, involving local communities.

The development and implementation of school environmental policies and management plans, as proposed by this research, which contributes to curriculum integration, the organisation of environmental education processes, the management of resources and the addressing of environmental issues, involves the active participation of learners in education and, therefore, is aligned with the new focus in national perspective in terms of active involvement in learning.

CHAPTER 3: LITERATURE REVIEW

Environmental education influenced by perspectives on education

3.1 Introduction:

Trends in environmental education have been largely shaped and influenced by the different trends in perspectives on education. These perspectives on education should not be seen as separate entities, but are interwoven ideas that have been used to justify and steer environmental education processes.

According to Le Roux (2000:55,73), one of the ways in which various perspectives on education can be organised in schools, is through the development of a school environmental policy. In order to explore the influence of the educational perspectives on environmental education and especially their relevance for this study, each of the following perspectives will be briefly discussed with specific reference to teaching methods, models relevant to the perspective and the application of the perspective to this study.

3.2 The influence of educational perspectives on environmental education:

3.2.1. The influence of behaviourist perspectives

The work of B.F. Skinner on reinforcement principles forms the core of the experimental analysis of behaviour philosophy (Proctor 1990:11). This

philosophy provides a “world view” in which all aspects of behaviour are determined entirely by environmental contingencies. It focuses on the operant conditioning, which refers to changes in behaviour that occur as a function of responses being reinforced. Reinforcement contingencies imposed by the environment are assumed to select certain responses over others in various contexts (Proctor 1990:5) and the examination of interactions between environmental variables and behaviour provide the key to solving the problems that confront psychology and society and, therefore, also education (Proctor 1990:6).

Behaviour analysts have extended Skinner’s system to provide a complete interpretation of human learning, with the impact of his writings also in the education field (Proctor 1990:11) and the behaviour management techniques adopted by professionals in education (Proctor 1990:3). Therefore, the behaviourism perspective advocates that, given adequate knowledge, all human actions admit analysis into stimulus and response and that the ability to predict them depends on exhaustive study of behaviour in that light. Any systematic effort to understand behaviour must, therefore, include the consideration of what we learn and how we learn (Domjan 1998: 2).

Learning is, therefore, an enduring change in the mechanisms of behaviour involving specific stimuli and /or responses that result from prior experience

with similar stimuli and responses. Whenever we see evidence of learning, we see the emergence of a change in behaviour – the performance of new responses or the suppression of a response that occurred previously. Changes in behaviour are the only way to tell whether or not learning has occurred (Domjan 1998:13). According to Robertson (1994:22), behaviourist and classical views take the product of the process as evidence of the process. In behaviourist terms:

“to educate is to cause change in behavior along pre-specified objectives...e.g. changing learner behaviour through environmental education.”

The behaviourist perspective was clearly reflected in the traditional thinking in the field of environmental education, that we could change behaviour by making human beings more knowledgeable about the environment and its associated issues. This was linked to the assumption that, if we make human beings more knowledgeable, they will in turn become more aware of the environment and its problems and thus more motivated to act towards the environment in more responsible ways (Hungerford 1990:9). This tradition has been termed education ‘about’ the environment (EECI 1999:4).

Le Roux (2000:55) also emphasises that this approach sought to change behaviour by making people aware, for example in schools and field centres, therefore, early responses to the environmental crisis in the 1960's and 70's assumed that environmental problems would be solved by exposing people to experiences in nature and by giving them information about conservation problems. The intention was to change other people's behaviour through:

- informing them about the environment (through interpretation of natural areas, nature study or ecology as a subject)
- informing them about problems in the biophysical dimension
- making people aware of the environment (through experiences in nature)

The earliest approaches to environmental education, with a behaviourist perspective, were concerned with the deterioration of the natural environment and the prevention of pollution by industrialists. When people spoke of the environment, they meant the biophysical environment; plants and animals and other natural resources. Environmental education processes consisted mainly of transmitting facts about human impacts on the biophysical environment (Bornmann 1997:63; Firth 1996:11; Hungerford 1990:90; Lotz 1999 :10; Robertson 1994: 22).

3.2.1.1 Teaching methods:

Teaching methods advocated for developing responsible environmental behaviour is based upon a linear view of the relationship between knowledge, attitudes and behaviour and the assumption that the correct knowledge and attitudes leads to the correct behaviour (Fien 1993b:201).

The teaching methods within a behaviourist orientation include:

- show and tell : this is where environmental education started, with conservation experts teaching people by telling them all they knew about nature and ecology
- targeted communications ; getting the message across, e.g. posters and pamphlets (Le Roux 2000:57)
- questions and answers (EECI 1994:4)
- talk and chalk (EECI1999:4)

In South Africa, during the 1960's and 70's the early behaviourist responses to the environmental crisis in terms of teaching methods centered round information that was mostly textbook driven, and teachers taught mainly prescribed content about the environment. Veld schools (field centres) were established by the Department of Education, aimed at exposing children to the wonder of creation, information about the environment and the aims of

Christian Nationalism. Encounters with nature and environmental issues were very important learning opportunities (Le Roux 2000:55).

3.2.1.2 Models of behaviourism:

An early and widely accepted behaviourist model for environmental education has been described in the following manner:

” increased knowledge leads to favourable attitudes...which in turn lead to action promoting better environmental quality” (Hungerford 1990:10).

Hines (in Hungerford 1990:10) elaborated further on this model, explaining that an individual who expresses an intention to take action, will be more likely to engage in the action than would an individual who expresses no such intention. However, it appears that the intention to act is merely an artifact of a number of other variables acting in combination (e.g. cognitive knowledge, cognitive skills and personality factors) (Hungerford 1990:9).

An individual can, therefore, only intentionally act on a particular environmental problem when that individual is cognitively aware of the existence of the issue. Knowledge of the issue is a prerequisite to the action. An individual must also possess knowledge of those courses of action which are available and which

will be most effective in a given situation, as well as the skill in appropriately applying this knowledge to a given issue (Hungerford 1990:10).

Figure 3.1 : The Hines model of responsible environmental behaviour

(From: Hungerford 1990:10)

3.2.1.3 Application of the behaviourist perspective to this study:

The development and implementation of a school environmental policy and management plan reflects aspects of the behaviourist perspective within the educational process since it provides for:

- fieldwork and excursions that involve encounters with nature and environmental issues
- access to environmental information
- environmental knowledge

Although environmental knowledge is a prerequisite for the investigation and solving of environmental issues, the behaviourist approach does not create the critical thinking skills necessary to develop action potentialities for the long term (Fien 1993:201) and, therefore, a combination of perspectives (including the behaviourist perspective) is necessary for the development and implementation of school environmental policies and management plans.

3.2.2. The influence of the Experiential Learning Perspective (ELP)

Experience based learning means learning that is closely tied to the direct, contemporary experiences of the learners, treating all knowledge as based on experience, which is clearly tied to the work of John Dewey, Kurt Lewin and Jean Piaget (Malinen 2000:19). Influences and abstractions are discussed after the concrete learning experience itself (Caduto 1983:243). One of the most famous perspectives on experiential learning is that of David Kolb. Kolb himself defines experiential learning as:

“ the experiential learning model pursues a framework for examining and strengthening the critical linkages among education, work and personal development” (Malinen 2000:19).

Experiential learning can, therefore, be seen as a programme profoundly re-creating our personal lives and social systems, a guiding philosophy and conceptual rationale, as well as a practical tool for lifelong learning (Malinen 2000:18).

Experiential learning sought to educate through experiences in the environment, be it a city street, a farm, a rural village, a beach, a park or a forest. Experiences in the environment can be used to give reality, relevance and practical experience to learning. Increased awareness of aspects of the environment can be expected from any opportunities of direct contact with the environment. Opportunities to learn outdoors can also be used to develop important skills for data gathering such as observation, sketching, photography, interviewing, and using scientific instruments, and social skills such as group work, co-operation and aesthetic appreciation. Environmental awareness and concern can additionally be fostered by linking learning to direct experiences in the environment and allowing learners to become captivated by the complexity

and wonder of natural systems, or immersed in the values conflict over particular environmental issues (Fien 1996:28).

This perspective sought to do environmental education through experiences in nature, because children learn by encountering and manipulating objects (Lotz 1997:249). ELP emphasises the importance of actual hands-on experience (encounters) to learning (Le Roux 2000:59), since critics of the education 'about' the environment tradition note that transmission of information about the environment and environmental degradation is too narrow to address the complexity of environmental issues. They argue that people are more likely to become concerned about the environment through actual experiences in nature. This tradition has been termed education 'in' the environment (EECI 1999:4).

According to Caduto (1983:243) the personal decisions made during ELP are good practice in applying one's own values concerning the environment. A problem to be investigated can range from being involved in local political maneuvers for saving a piece of land from unwise development, to identifying rare and endangered plants and studying their role in the ecosystem as a means of enhancing learners' appreciation for the value they possess. As a result of the nature of environmental education, especially that which occurs

outdoors, ELP is an integral, vital part of any environmental education programme. The effectiveness of this strategy could be enhanced if a more conscious, systematic effort were made to bring values study into the lesson and follow-up activities in an explicit ELP manner. This means learning that is closely tied to the direct contemporary experiences of learners, after the concrete learning experience itself.

3.2.2.1 Teaching methods

Methods associated with this perspective include experiential learning methods such as:

- fieldwork
- habitat studies
- solitaire

It included both sensory experiences and spiritual involvement methods. These came to characterise EE as something different and special methodologically. The outdoor encounter came to be seen as the “real” environmental education, back - to - basics experience of holistic learning (Le Roux 2000:60).

3.2.2.2. Models

According to Lotz (1997:349), the engagement with these different kinds of teaching and learning methods in the context of a local environmental issue or environmental risk, can contribute to the discovery, uncovering and understanding of resource management through dialogue, (talking), reflecting (informed thinking about) and encounter (hands-on experience), therefore, a useful model to consider for experiential learning is that of Dialogue – Encounter – Reflection. It highlights the importance of actual experiences with what is being studied and the value of reflecting on what we come to encounter. One can also think of this model in terms of 3 T's : Talking, Touching and Thinking (Le Roux 2000:59; Lotz 1997:349-350).

Figure 3. 2 Dialogue – Encounter - Reflection

(From: O'Donoghue and Janse van Rensburg 1995 in Le Roux 2000:59)

3.2.2.3 Application of the Experiential Learning Perspective to this study:

Key elements of the development and implementation of the school environmental policy and management plan includes fieldwork that provides for hands-on learning. This can include anything beyond the school grounds that provide opportunities for learning. This investigation about and in the environment can be taken further by action projects. Studies involving fieldwork offer the opportunity to encounter situations with real life relevance and could stimulate dialogue and discussion, as well as reflection on the way we live. A wide variety of methods of fieldwork can be used to study different environments; in the Mpumalanga edition of the school environmental policy and management plan, an example of a grassland study is attached as an appendix. A list of environmental education centres in Mpumalanga is also attached as an appendix to the Mpumalanga edition to encourage field trips to environmental centres and, thus, enhance experiential learning.

3.2.3 The influence of the Liberal Humanist Perspective

The Liberal Humanist Perspective advocates that the natural potential in a learner simply be allowed to develop. Bushnell (1996:18) describes the practice of this theory as follows:

“ an insistence on play, pleasure and kindness, a respect for the child’s nature, and an admiration of variety and range in reading struggling against a will to control.”

Both Maslow and Rogers came to the humanistic theory and education through their work as psychologists. They had an important influence on the numerous educators who wrote on pedagogy. Maslow’s criticism of the educational system is centered on the system’s concern with efficiency, thus implementing the greatest number of facts into the greatest possible number of children, with a minimum of time, expense and effort. According to Maslow, education should be “intrinsic”, for the pleasure of knowing more about oneself and one’s true potential as a human being. He saw growth as the objective of education and he named the highest form of growth “self- actualisation”. The ideal college (educational institution) would be a kind of educational retreat, in which you could try to find yourself; find out what you like and what you want; what you are and are not good at... the discovery of identity, part of learning who you are, part of being able to hear your inner voices, and discovering what it is that you want to do with your life. Maslow believed that if teaching was carried out in a way that stressed personal discovery, it would encourage learners to have “real experiences, illuminations, the sense of mystery and of awe” in the

process and, therefore, considered appropriate circumstances to be certainly one of the pressing tasks for professional educators.

Roger's response to the conventional educational setting and methodology was to develop a theory of "person centered education", where the cognitive skills may be combined with better knowledge of self-and of interpersonal behaviour.:

" When students perceive that they are free to follow their own goals, most of them invest more of themselves in their effort, work harder, and retain and use more of what they have learned than in conventional courses"

Rogers developed educational theories and practices that focused on helping people to become self-actualised, mature and functional. True education, according to Rogers, was the facilitation of change and learning. The key element in this process was the quality of the personal relationship between facilitators and learners. He also carefully outlined the qualities necessary to facilitate real learning that comprised of the facilitator being a real person, entering into a relationship with the learner without presenting a front or a façade. Self evaluation and group evaluation of both the facilitator and the learners is an essential step to ensure that learners take responsibility for

pursuing the aims they set for themselves in their contracts and that facilitators are continually learning .

Many of the early methods and approaches in environmental education, influenced by both behaviourism and cognitive psychology, came to be seen as too narrow. They were criticised for socially engineering people according to the wishes or ideas of others. In response, environmental education increasingly came to be seen as a broad approach to education that was less authority driven and more learner-centred. With the emphasis on more open ended and active experiential learning processes, teachers took on new roles as facilitators allowing learners to freely experience the environment. Learners were seen to be free to decide what they wanted to do with regard to environmental problems. These ideas have influenced environmental education at field centres to a large extent. This approach seldom seeks a critical engagement with the local issues and sustained problem solving actions. Within this approach people are seldom challenged to take action for sustainable living (Le Roux 2000:62).

3.2.3.1 Teaching methods

The associated methods included diverse encounter (hands-on) experiences, dialogue (discussion) experiences and reflection (thinking) experiences so as to foster greater social awareness and change (Le Roux 2000:63).

3.2.3.2 Application of the Liberal Humanist Perspective to this study:

By means of the implementation of the school environmental policy and management plan, liberal humanist perspectives are accommodated within aspects like fieldwork. Fieldwork can contribute to almost any learning programme, whether it is an urban study or an ecosystem study in a nature reserve. Environmental education centres in Mpumalanga usually offer courses for school children ranging from a few hours to a week and the methods include encounter experiences, discussion of the experiences and reflection on these experiences.

3.2.4. The influence of the Constructivist perspective

Constructivism embodies that all knowledge is human constructs, and that this knowledge has been determined by things such as politics, ideologies, values, exertion of power, the preservation of status, religious beliefs and economic interest (Phillips 2000:6). The constructivist perspective assumes that knowledge, no matter how it is defined, is in the brains of persons and that the

thinking subject has no alternative but to construct what he or she knows on the basis of his or her own experience. What we make of experience constitutes the only world we consciously live in (Von Glasersfeld 1995:1). According to Brophy (2002:11), constructivists tend to agree on four characteristics as central to all learning:

- learners construct their own learning
- new learning depends on students' existing understanding
- social interaction/dialogue plays a role
- authentic learning tasks are needed to ensure meaningful learning

Therefore, the following pedagogical recommendations flow from the fundamental constructivist principles of learning:

- The overall goal is to stimulate thinking in learners that results in meaningful learning, deep understanding and transfer to real world contexts
- The teacher encourages knowledge construction through primarily social learning processes
- Lessons feature clear content goals and multiple ways of representing key ideas
- Learners are encouraged to raise questions, generate hypotheses and test their validity

- Learners are challenged by ideas and experiences that generate inner cognitive conflict or disequilibrium
- Students are given time to engage in reflection through journal writing, drawing, modelling and discussion, to facilitate learning through reflective abstraction
- The learning environment provides ample opportunities for dialogue within a community of discourse that engages in activity, reflection and conversation
- Within this community of learners, it is the students themselves who must communicate their ideas to others, defend them and justify them
- Students work with big ideas – central organising principles that have the power to generalise across experiences and disciplines (Brophy 2002:13).

Therefore, in the theory of constructivism, knowledge is constructed in the mind of the learner. Piaget, in his work with children actively manipulating objects, emphasised that learners are active constructors of meaning as they encounter and manipulate their environment. For example, a child creates meaning (learns) when he or she pours water into containers of different sizes. Even when they sit and listen, learners actively construct meaning, based on what they already know. A key educational idea which, thus, comes via

constructivist perspectives, is that learners are not empty containers who passively absorb meaning, but active constructors of meaning who bring their existing understanding into the learner situation (DEA&T 2001:27; Le Roux 2000:63).

Constructivist theories, popular in mainstream education, highlighted the importance of recognising learners' existing knowledge and methods that would mobilise this knowledge and assist learners to build on it. It was argued that understanding is actively constructed, not passively absorbed (DEA&T 2001:27). In this approach learners create or construct meaning for themselves and in terms of this epistemology, "environment" is not something that has a reality separate from ourselves and our social milieu, rather a social construct (Robertson 1994:29).

In the 1990's, constructivist philosophies started playing a considerable role in shaping environmental education methodologies. One current trend has been to make classroom learning relevant to learners through fieldwork where they would use what they know in the classroom and their own experiences to make sense of what they see in the field. Various interpretations of constructivism were influencing educational theory worldwide and also became a dominant orientation in the development of Curriculum 2005. Among environmental

educators in South Africa, this development manifested in a wider recognition that the concept 'environment' was social constructed used differently by different groups in different contexts. Similarly, recognition of the constructed and contextual nature of environmental issues, as well as their complexity, developed, as it would be difficult to address an environmental issue with educational messages which have been developed outside of the context of the community affected by the issue, hence, the principle that environmental education processes should be contextual (DEA&T 2001:27).

The ways in which we understand and define our environment, environmental issues and potential solutions, have been constructed historically within our various cultural contexts, in which symbols and the use of language play an influential, but mostly hidden, role. Providing learners with the symbolic, cultural and conceptual capital to explore environmental issues, became an important focus in environmental education methodologies, e.g. through dialogue–encounter-reflection. Exposing the limitations which language (and as a result, historical worldviews) place on our approach to environmental issues, forms part of constructivist environmental education methodologies (DEA&T 2001:27; Shallcross 1998:253 ; Winter 1996:27).

3.2.4.1 Teaching methods:

Within the constructivist perspective, the teacher is neither a top-down authority or social engineer, nor a background facilitator, but an active mediator of knowledge and values with learners (Le Roux 2000:63). The social constructivist view, therefore, sees learners constantly reconstructing a social reality, thus, socially critical environmental education processes, of “contextual reconstruction”, will have the characteristic feature of reconstructive co-defining of the way we see the world (Le Roux 1997:47). Developing stories together would be another way of seeing this process, because the idea of a curriculum is perceived as a process of exploring what is unknown and of learning and understanding developing through dialogue and reflection. Learning and understanding are made and negotiated, not transmitted (Le Roux 1999:7). Ballantyne and Packer (in Winter 1996:27) explored the application of a constructivist approach to environmental education, because of its potential to integrate the teaching and development of environmental knowledge, attitudes and behaviour. Learners construct environmental conceptions in relation to environmental phenomena. These conceptions, in turn influence the way in which they are likely to interact with the world. It also suggests that teaching strategies which induce cognitive conflict, are effective in enhancing or developing conceptions, e.g. cognitive conflict motivates learners to resolve dissonance by seeking new information, or by trying to re-organise the existing

knowledge. They suggest that courses that favour a constructivist approach to environmental education, may help learners to become aware of, and reflect on different conceptions.

Ballantyne and Packer (in Winter 1996:27), therefore, contend that in order to design effective learning experiences, educators need to be aware of the range of conceptions and misconceptions held by learners. This could be one of the most significant conceptual shifts, because it is the one that is most likely to influence personal behaviour and their practice as environmental educators. It appears that the constructivist approach provided an opportunity for students to reconstruct their environmental conceptions through their participation in group learning situations. Group activities provided opportunities for students to reflect on their own thinking, understanding and interpretation of environmental concepts, while practical hands-on skills were developed through fieldwork activities (Winter 1996:27). Guided questioning is another method that a constructivist educator would consider using. This involves the learners interpreting their environment through careful questioning from an educator (Le Roux 2000:64). Ballantyne (Winter 1996:27) claims that the constructivist learning experiences enable students to become aware of inconsistencies, inadequacies and the consequences of their own environmental knowledge

and conceptions. They also become aware of the relevance and relative merits of alternatives.

3.2.4.2. Models:

Education for Sustainability (EFS) / Education for Sustainable Development (ESD) is an emerging, but dynamic concept that encompasses a new vision of education that seeks to empower people of all ages to assume responsibility for creating a sustainable future. It explores the relationships between economic systems, ecological systems and justice in contexts ranging from local communities to global institutions, with the goal of preparing young people and citizens with the knowledge, skills and attitudes that will enable them to meet their own needs without compromising the ability of future generations to meet their own (Sustainability Education Centre 2002:3). Education for Sustainability (EFS) is by implication constructivist, participatory and process based. It is not consistent with authoritarian structures that convey very didactic messages (Shallcross 1998:253) and, therefore, reflects the following four key principles:

- Participation and action: learners participate in the learning activity
- Relevance: learners determine what sustainable development means to them personally in their lives

- Critical reflection: learners consider how new information compares with their values and then determine how their values coincide or conflict with the values of others
- Dialogue and Listening: learners exchange ideas in order to understand how other people's visions and values influence their actions (Tilbury 2002:2).

Figure 3.3

A model for developing and sequencing education for sustainability (modified from Smyth, 1994)

3.2.4.3 Application of the Constructivist Perspective to this study:

The implementation of a school environmental policy and management plan can accommodate the constructivist perspective through the implementation of aspects like the environmental calendar. The celebration of World Environment Week can provide opportunities for students to reflect on their own thinking, understanding and interpretation of environmental concepts like waste management, through the guided questioning method used by the teacher. Participation in activities like clean-up campaigns and recycling as a result of the celebration of World Environment Week (previously mentioned) provide an opportunity for students to reconstruct their environmental conceptions.

The development and implementation of school environmental policies and management plans can also be applied to the four principles of ESD as follows:

- Participation, e.g. the rehabilitation of a wetland can be identified as an action project in terms of the policy and learners will actively learn during the process.
- Relevance, e.g. in a rural area the wetland rehabilitation action project will be very relevant to water quality in the area.
- Critical reflection, e.g. should grazing be controlled in the wetland area mentioned previously.

- Dialogue and listening, e.g. community meetings to understand how the livestock farmers feel in terms of the rehabilitation of the abovementioned wetland.

3.2.5. The influence of the Socially Critical Perspective

The socially critical theory is a theory about rational problem solving which attempts to open up the problem-solving process to new viewpoints and potentially new solutions. This theory tries to show how schooling can be educational in the fullest sense, through the promotion of the problem-solving power of learners in an evolutionary way. Democratic problem solving methods are considered to be the most efficient methods for communities to use in solving problems and the open communication process is considered to be essential to both community problem solving and efficient development of the problem solving powers of learners in classrooms (Young 1992:6). Fendler & Popkewitz (1999:11) reads critical theory through three common assumptions: the ability to predict, the potential for resistance and the role of the intellectual, progressive change. The critical theory movement emphasises the idea that specific reasoning skills underbid the curriculum as a whole; that the purpose of education generally is to foster critical thinking; and that the skills and dispositions of critical thinking can and should infuse teaching and learning at all levels of schooling. Critical thinking is linked to the idea of rationality itself

and developing rationality is seen as a prime, if not the prime aim of education.

To critical thinking, the critical person is something like a critical consumer of information; he or she is driven to seek reasons and evidence (Popkewitz 1999:48) through action research, which refers to the inclination that interpretative stances are directly linked to social change (Popkewitz 1999:10).

Social critical perspective is, therefore, specifically concerned with societal relations of power and inequalities and oriented to collective and avowedly political notions of empowerment to effect social change. It is positioned as that which attends to practices of teaching/learning intended to interrupt particular historically situated systems of oppression (Firth 1996:14). The social critical perspective is, therefore, focused on the reconstruction of society, based on empowerment and emancipation (Firth 1996:12) and concerned with the social processes in creating knowledge and critical intervention for change (Le Roux 2000:66).

Socially critical perspectives recognised that environmental problems are rooted in social problems, related to our socially construct, and thus are open to change ways of thinking about our environment (Le Roux 2000:66). The solutions are linked to social transformation and the need to challenge political, social and economic systems (Le Roux 2000:66; Robertson 1994:29). Socially

critical environmental education processes tend towards empowering people to participate in the resolutions of problems and to act in the interest of democracy and social justice and, therefore, there is evidence that environmental education is being characterised increasingly as socially critical in its intent. Both environmental education and socially critical pedagogy seek to empower students to participate in a democratic transformation of society (Gough 1993:268; Le Roux 2000:66).

South African relevance:

Educational and development theories which emphasise learner participation, have had a strong influence on environmental education theory and practice in South Africa. These theories drew on socially critical traditions developed by educators and development practitioners in Africa, India, Australia and the USA. A critical perspective highlights the fact that environmental issues are not merely the outcome of individual ignorance, to be rectified by individual awareness and behaviour change, but that there are also social and structural issues, with deep roots in social, economic and political systems, to be tackled through social action and change (DEA&T 2001:25). Very relevant to environmental education in South Africa, was the political situation and the emerging critical understanding of the nature of environmental issues, the social injustices which contribute to these issues and the imperative of

addressing such injustices as an integral part of addressing environmental issues (DEA&T 2001:26).

According to Tilbury (1995:204), a socially critical environmental education offers the most effective contribution we can make to the realisation of sustainable development (Huckle 1983:12), because socially critical skills are essential for an understanding of the problematical concept of sustainability. Furthermore, achieving sustainability requires the development of politically literate individuals, who have the critical skills to understand the complexity of environmental problems and solutions and the ability to participate individually and collectively in the resolution of environmental problems.

Teachers working within the framework of a socially critical pedagogy, attempt to provide learning experiences that give students a historical and critical perspective on society and give them opportunities to engage in activities that are consistent with building a responsive, democratic society (Gough 1993:273).

3.2.5.1 Teaching methods

The methods used in these more recent orientations to environmental education, include action research and community problem solving (AR and CPS) as reflected in figure 3.4. The educational idea is that learning involves

interacting processes of thinking–touching–talking (reflection–encounter–dialogue) within the context of action. The action research model can be described as a cyclical problem solving strategy which encourages learners to define and research a problem, find and implement a solution, evaluate their action and then feed the findings of their evaluation back into further research and action (Le Roux 2000:67 ; DEA&T 2001:25).

Joint investigations of local environmental problems are another current trend, for example projects that use low cost kits to test for water pollution. These kits give the tools of science to learners and encourage them to think of solving local problems, thus bridging the gap between schools and communities and between learning and doing. According to Gough (1993:273), such tasks include collaborative community projects which are a response to community concerns and which engage students in collaborative reflection and learning from direct experience.

In a socially critical school, teachers teach less often by didactic approaches such as telling and testing and more often by encouraging enquiry, critical reflection and action. They work with students on topics that the students believe to be important and through tasks they find rewarding and significant (Gough 1993:273) and, therefore, participants in these learning activities are

often encouraged to question the status quo and to think of ways in which social systems can change to allow for more sustainable living patterns (Le Roux 2000:67). A further benefit of the ARCPS model for environmental education, is that it provides successful bridges between natural and social sciences (Wals 1990:252).

3.2.5.2. Models

Figure 3.4

Action Research Spiral after McTaggart et al (1982)

3.2.5.3 Application of the Social Critical Perspective to this study:

The aspect of action projects within the development and implementation of school environmental policies and management plans can accommodate the socially critical perspective, since environmental issues can be highlighted as a result of the review of school environmental audits. Areas for improvement are rectified through environmental awareness and change of behaviour, resulting in the addressing of these issues through social action, often involving the local school community.

The process often involves the important elements of community problem solving (as reflected in figure 3.4):

- recognising a problem (through an environmental audit)
- collecting, organising and analysing information
- defining the problem from a variety of perspectives
- identifying, considering and selecting alternative actions to take;
developing a plan of action
- implementing a plan of action
- evaluating the outcome and the entire process (Wals 1990:254).

3.3. Conclusion

Environmental issues are complex and multi-faceted and, therefore, the challenge is to provide a range of learning opportunities for encounter, dialogue and reflection in diverse settings, as we respond to a wide range of different environmental issues and risks through education. A suitable mix of methods, related to the perspectives that have been briefly discussed, seem useful together with a better understanding of the ideas which inform and influence our use of these methods in different situations. One of the ways in which various environmental processes (and perspectives) can be organised in school, is through the development of a school environmental policy and management plan (Le Roux 2000:73).

The development and implementation of a school environmental policy and management plan in a school can also enable education change and transformation of the classroom practice from the traditional behaviourist model of education to more interactive, social constructivist approaches, which are experiential and socially critical in orientation (Lotz 1999:10). This transformation of the practice of environmental education through the development and implementation of the school environmental policy and management plan is very important, considering that a certain consensus was established that environmental education should pay particular attention to the

students' attitudes and interests. Their concerns seem to increase with their level of comprehension and an inclusive and integrated way of thinking, which involves problem solving methods and personal decision making beyond the school walls, a redefinition of values, which will result in the goal of a considerate co-existence between man and nature (Schleicher 1989:265).

Environmental education can no longer be viewed as a body of knowledge, or a set of prescriptions for providing intense environmental experiences, or even methods for taking action to improve the environment. Instead, environmental education processes compare the past environment to the present, plan for a better future, take action and attempt to remedy problems encountered along the way in context of risk. It is increasingly recognised that there are no simple solutions to environmental issues, no one best method of environmental education and that a range of methods and processes are needed to resolve complex environmental issues and problems as they arise in different contexts (EECI 1999:5). Therefore, the development of school environmental policies and management plans with a broad view of environment, as a wheel of interacting biophysical, social, political and economic concerns can be a way in which various environmental processes and perspectives can be organised in a school (Le Roux 1999:8).

CHAPTER 4 : RESEARCH METHODOLOGY

4.1 Introduction:

As stated in the previous chapter, the development of school environmental policies with a broad view of the environment, as a wheel of interacting biophysical, social, political and economic concerns, can be a way in which various environmental processes and perspectives can be organised in a school (Le Roux 1999:8) and thus achieve the following goals:

- Involve students in the planning of their own education, and as a result, shifting more responsibility for education to the students themselves.
- Place education in a meaningful context for students.
- Provide students with opportunities to apply acquired knowledge in improving a local problem that they themselves have identified and recognised to be important.
- Develop skills needed in environmental problem solving, including: working in groups, gathering, analysing, synthesising and interpreting information; clarifying norms and values, designing, implementing and evaluating a plan of action and joint critical decision making.
- Identify and utilise sources of information within the school's surroundings for educational purposes.
- Link disciplines through focusing on real world issues.

- Substitute feelings of apathy and powerlessness with the feeling that one, be it as individual or in a group, can indeed make a difference (Wals 1994:166).

The research methodology, including the research design and data collecting technique of this research, was developed with the aim to support the notion that during the process of developing and implementing a school environmental policy and management plan, students are given responsibility in the planning of educational activities and are provided for with the opportunity to take responsible action in improving the quality of their immediate environment, by responding to a local environmental issue in co-operation with other affected people.

4.2 Research methodology:

The first phase of the research methodology includes document development (the development of the Mpumalanga edition of the school environmental policy and management plan) the development and implementation of the “Adopt-a-Schoolyard Competition” (linked to the development and implementation of school environmental policies and management plans), workshop sessions, analysis of school environmental policies and management plans received as entries for the abovementioned competition in 2001 and 2002 and the analysis

of reports and photographic evidence received from schools reflecting the implementation of the school environmental policy and management plan.

4.2.1 Research design:

Despite the fact that Harding (1999:317) supports an approach of combining descriptive and experimental analysis in educational research, Peshkin (1993:28) states that: “ many types of good results are the fruits of qualitative research. Its generative potential is immense... there is no prototype qualitative researchers must follow, no mold we must fit in, to ensure that we are bound for the right track.” Since this study aims to find out what schools do, why they do it and with what consequences they do it, a qualitative research design will be followed to evaluate the implementation of school environmental policies and management plans in relation to curriculum integration, organisation of environmental education processes at schools, management of resources and the addressing of environmental issues. This approach will be followed, because, according to Peshkin (1993:24-25), description and interpretation are very important in qualitative research, but we often fail to appreciate the foundational character of good description for all research, even though we need to know what the schools do, why they do it, and with what consequences, before we prescribe what they should do differently. Interpretation is also valued because it explains or creates generalisations and

not only engenders new concepts, but also elaborates existing ones. This research is descriptive, since it involves the description, recording, analysis and interpretation (Mahlangu 1987:14) of the school environmental policies and management plans, reports and photographic evidence of schools in Mpumalanga that implemented school environmental policies and management plans over a period of two years. Content or document analysis as a type of descriptive study will be done since a systematic examination of records or documents, as provided by participating schools, as sources of data will be done (Mahlangu 1987:17) with the objective to make generalisations from the results (nomothetic).

The skills and resources are available to the researcher, due to the development of the Mpumalanga edition of the school environmental policy and management plan and the evaluation of the implementation plan through the entries received for the Adopt-a-Schoolyard Competition. This study follows a multi perspective approach in terms of qualitative research, which aims at describing, making sense of and interpreting this interaction in terms of the meaning the subjects attach to it (De Vos 1998:240; Landman 1980: 105). The common aspect entailed in this study will be the interpretation of the implementation of school environmental policies in Mpumalanga schools, with the main aim to evaluate this in terms of curriculum integration, organisation of

environmental education processes, management of resources and addressing of environmental issues.

4.2.2. Preparation for data collection

4.2.2.1 Document development

Share–Net compiled a resource pack to guide and support the development and implementation of school environmental policies in 1998. In 1999, this resource pack was adapted by the Free State province for utilisation in that province and in 2000 the Free State edition and the Share-Net edition was combined and adapted, by the researcher, for utilisation in Mpumalanga. The Mpumalanga adaptation included a list of Mpumalanga environmental centres and their contact details. It also describes the activities and specialisation fields of each environmental centre. The aspect on environmental competitions also includes Mpumalanga province specific competitions. The aspect on enviro-clubs is supported with information on enviro-clubs, including topics on how to start an enviro-club, how to start and implement an environmental project, fundraising, club management, success stories of established enviro-clubs, etc. The Mpumalanga adaptation furthermore includes additional information on grassland studies, school environmental audits and how to conduct a water study, as well as the Jacana publication on environmental education, and the interactive booklet : “Everyone lives in a catchment” with information on

environmental education classroom activities related to catchment management for teachers. (The researcher was a joint compiler of this booklet).

This resource pack, which became known as the Mpumalanga edition of the school environmental policy and management plan, was generously sponsored by the private sector, to ensure that interested schools receive copies free of charge. As with the Share–Net compiled policy pack, the Mpumalanga edition also contains loose pages, each representing an aspect of a school, for example, the school calendar, resources used in the school and fieldwork activities. These elements can be audited and incorporated into a school environmental policy. A format of loose pages in a folder was selected, rather than a booklet in order to enable the teachers to choose and use whatever is relevant to their particular situation. One side of the page provides information on this aspect and suggests useful resource material and sources of information in Mpumalanga and in South Africa that could support further investigation, as well as making a few links to specific outcomes in the new curriculum.

The other side of the page is largely blank with space for filling in policy plans. There is also a selection of appendices to support the various pages. These

appendices include, for example, a year planner with environmental days and a booklet with suggestions for celebrating these days.

4.2.2.2 Competition

The marketing of the development and implementation of the Mpumalanga edition of the school environmental policy and management plan was linked to a competition for schools in Mpumalanga, the “Adopt-a-Schoolyard” competition. For this competition, schools are expected to develop and implement a school environmental policy and management plan. A requirement for entry for this competition is to provide a copy of the school’s environmental policy and management plan, a report on the implementation of the school environmental policy and management plan, as well as photographic evidence on how environmental issues were addressed in the immediate environment. Entries for the competition are submitted to the office of the researcher, since her office is responsible for the organisation, implementation and judging of the competition.

The implementation of the school environmental policy and management plans will be studied through the evaluation of entries received for the “Adopt-a-Schoolyard” competition 2001 and 2002, with specific reference to:

- Support to curriculum integration (Chapter 5 of this research)

- The organisation of environmental education processes (Chapter 5 of this research)
- Management of resources (Chapter 6 of this research)
- Addressing of environmental issues (Chapter 6 of this research)

4.2.2.3 Workshops

Two workshops were held in all 3 regions of Mpumalanga: Ehlanzeni, Ekangala and Eastvaal during 2000, 2001 and 2002 for teachers interested in developing and implementing school environmental policy and management plans and entering the “Adopt–a-Schoolyard” competition. These workshops, aimed at equipping teachers with the relevant information, needed to develop and implement school environmental policies and management plans. These workshops also emphasised the guidelines of the EECI (1995:28) regarding school environmental policies and management plans as follows:

The process:

It was emphasised during the workshop that that developing a school environmental policy, is not a one–off action, but a continuing process. Since this aims at improving the policy on a regular basis, the process is more important than the product itself, since it is essentially an educational process.

The role players:

It was emphasised in the workshops that the process of developing a school environmental policy and management plan should involve all role players in the school community; academic staff, grounds staff / workers, administrative staff, school management, parent bodies, pupils, student leadership, special interest groups as well as local authorities.

A consultative and interactive approach:

It was clearly stressed in the workshops that the process of developing a school environmental policy and management plan should be consultative and interactive. It should be done by people, not for them, e.g. at a meeting of the parent body, a workshop process should be carried out, whereby parents can voice their concerns, for example, about safety issues (traffic, litter, pollution and noise). Outside resource people, for example those with expertise in certain fields, could also be consulted.

Timespan:

The development and implementation of a school environmental policy and management plan, is a process that takes time (and should). Teachers were informed at the workshops that the process could easily take an entire year and

should, in fact, be part of an on-going review process that gets revisited every second year.

The school curriculum:

The workshops focused on the school curriculum and the focus within classrooms and subjects that the school environmental policy and management plan development process could form for many themes or lessons. Examples like the following were given: in natural sciences, the class could look at biological and ecological features and processes in and around the school and develop proposals for the safe management of these. The same can apply to social sciences, for example traffic management (pedestrians, bicycles and cars). Such a review process can or should involve the local traffic authority. A thorough curriculum audit could also form part of this process, involving staff in curriculum development. The possibility of giving various groups across the school community responsibility for various portfolios, was also highlighted during the workshops.

Environmental auditing:

It was emphasised during the workshops that a useful way to start the process of developing a school environmental policy and management plan, is by conducting a thorough audit of the school in terms of environmental

practice/management. The findings of the audit could be used as a basis for further policy development work. Again, the audit, findings and recommendations should all be done by the range of interest groups, as class projects, as extra-curricular activities, etc.

Adopting the policy:

During the workshops, the adoption of the school environmental policy and management plan document at a high profile school gathering was recommended to ensure a high profile and support for the process. It was, however, also stressed that the policy document itself is of secondary importance to the process and that the document is merely one point along a line of on-going work, review and redevelopment of policy and improved environmental circumstances.

Linkages outside the school:

Obvious linkages like those with local authorities or other interest or specialist groups, were explained. It was also stressed that this process lends itself to forming linkages with other school communities. Of particular value here, is the fact that just as environmental processes and issues cross all sorts of barriers (social, economic, political and geographic), so involvement in environmental activities should draw people together around common concerns.

4.2.3. The sampling plan

Schools that enter the “Adopt–a–Schoolyard” competition, apply and implement school environmental policies and management plans. Extreme or deviant case sampling (De Vos 1998:254; Kane 1985:51; Mouton1989:108) is used in this study, because the participants and situations selected are most likely to provide particularly information rich data, since they entail one common aspect, namely the interpretation or construction of the lived experience of subjects (De Vos1998:241), which is in this study the interpretation of the school environmental policies that have already been implemented. The boundaries or parameters for the data collection are schools that participated in the “Adopt– a – Schoolyard” competition, limited to the Mpumalanga province. Accessibility of the setting (participants) is ensured through their participation in the competition.

4.2.4. Data collection

Data was collected from schools from the entries submitted for their participation in the “Adopt–a–Schoolyard” competition of 2001 and 2002. As stated previously, the following information was reflected from the data collected :

- the school's environmental policy and management plan,

- a report on the implementation of the school environmental policy and management plan and
- photographic evidence of the addressing of environmental issues in the immediate environment.

On the basis of this exploration, a review and analysis of the data collected will be done to evaluate the implementation of school environmental policies and management plans in Mpumalanga with specifically to support to curriculum integration, organisation of environmental education processes, management or resources and the addressing of environmental issues.

Data collection of 2001 and 2002 is reflected (Appendix A) according to where, (region in Mpumalanga in which the school is situated) and the type of school.

4.2.5. Data analysis

Although different data collection techniques can be employed in qualitative research (Kane 1985:51; Peu 2001:51; Vilakazi S 2000:40), data collection and analysis for this research is done through the grounded theory methodology as described by De Vos (1998:265), since the creation of theory is based more on observation than on deduction and, therefore, in this study an evaluation of the implementation of school environmental policies and management plans in Mpumalanga in relation to curriculum integration, the organisation of

environmental processes, resource management and the addressing of environmental issues. Both substantive and formal theory is applicable to this study. A substantive theory is a description and abstraction of what goes on in a particular setting (De Vos 1998:266), e.g. schools that implemented environmental policies. In formal theory, abstractions and hypotheses about the relationships among these abstractions are developed. These hypotheses explain phenomena in many kinds of settings. Formal theory is concerned with a conceptual area of study. According to De Vos (1998:266), ideally one should begin by developing substantive theory in a particular area and then broaden it to formal theory by using several substantive theories, as done in this study, e.g. an evaluation of the implementation of school environmental policies (substantive theory) in relation to curriculum integration, the organisation of environmental processes, resource management and the addressing of environmental issues (formal theory).

4.2.5.1 Coding procedures

According to De Vos (1998:271), coding represents the operation by which data is broken down, conceptualised and put back together in new ways. The coding procedure used in this study is open coding, since the analysis of the data pertains specifically to the naming and categorising of phenomena through the close examination of the data (reports submitted). Data is broken down into

discreet parts, closely examined, compared for similarities and differences and questions are asked about the phenomena as reflected in the data. The following steps are followed in this study for the coding of the data:

- Labeling phenomena- Conceptualising data is the first step in the analysis for this study. The reports in this study are taken apart and sentences and paragraphs are named according to the phenomena it represents. Incidents are compared with each other and similar phenomena are given the same name.
- Discovering categories – Once the phenomena have been identified, concepts are grouped around them (categorising)(De Vos 1998 :272; Mouton 1989:103). A phenomenon represented by a category is given a conceptual name.
- Naming a category – In this study, categories are named logically relating to the data it represents. Properties, the characteristics or attributes of each category are also identified. In this study, the process of open coding stimulated the discovery not only of categories, but also of their properties and dimensions.
- Writing the code notes – In this study, four categories are developed, i.e. curriculum integration, organisation of environmental education processes, management of resources and the addressing of environmental issues. Three of these categories are developed in terms

of sub-categories and all are analysed according to dimensions indicated below.

- Sub-categories - The category curriculum integration is divided into the sub-categories natural science, life orientation, language literacy and communication, technology, human and social sciences, economic and management sciences and arts and culture for this study. The dimensions that are analysed in the category of curriculum integration are achievements in 2001, achievements in 2002, achievements according to regions in Mpumalanga and achievements according to type of school.
- The category of organisation of environmental education processes is analysed in the dimensions of achievements in 2001, achievements in 2002, achievements according to region in Mpumalanga and achievements according to type of school.
- The category management of resources is divided into the following sub- categories i.e. water, electricity, paper and soil and analysed in the dimensions of achievements in 2001, achievements in 2002, achievements according to region in Mpumalanga and achievements according to type of school.
- The category addressing of environmental issues, is divided into the following sub-categories, i.e. greening, waste management, soil erosion,

recycling and alien vegetation and analysed in the dimensions of achievements in 2001, achievements in 2002, achievements according to region in Mpumalanga and achievements according to type of school.

4.2.5.2 Description of data / measuring instruments

Descriptive statistics is concerned with the description and/ or summarisation of the data obtained (de Wet 1981:173;Huysamen 1998:4; Mahlangu 1987:93) with the purpose of reducing large amounts of data physically, and to draw conclusions about them. For the purpose of this study, data is summarised in tabular format in terms of dimensions and sub-categories under each category identified. Summary characteristics are computed in terms of percentage increase/decrease per year analysed for the categories, sub-categories and dimensions indicated.

4.3 Conclusion

The analysis and discussion of results of this research for the categories 'curriculum integration and organisation of environmental education processes' are done in chapter 5 and the categories 'management of resources and addressing of environmental issues' are dealt with in chapter 6.

CHAPTER 5: ANALYSIS AND DISCUSSION OF RESULTS

5.1. Curriculum integration:

According to Tilbury (1995:210), the ultimate purpose and justification for environmental education, is considered to be Environmental Education for Sustainability (EEFS) which builds upon the characteristics of previous environmental education approaches. Education with these objectives builds upon much of the principles of environmental education since the 1980's, by adding relevance to the curriculum. This can be achieved through whole-school curriculum planning, as reflected by Le Roux (1999:286) in the discussion of models of curriculum development, came to the conclusion that new participatory and consultative organisational structures in schools and systems would be necessary to create a climate in which the intellectual framework for curriculum could be developed. Cornbleth (1990:315) supports this as follows:

“Curriculum as praxis is a social process that develops through the dynamic interaction of action and reflection. That is, the curriculum is not simply a set of plans to be implemented, but, rather, is constituted through an active process in which planning, acting and evaluating are all reciprocally related and integrated in the process...curriculum is constructed within actual learning situations with

actual students, learning is a social process and curriculum knowledge is socially constructed and subject to critique and reconstruction.”

At the school level, practical curriculum debate can be provided for through participatory decision-making structures and curriculum planning forums involving stakeholders like parents, representatives from civil society and teachers. The development and implementation of a school environmental policy and management plan can provide a possible forum to enable whole school curriculum planning (Le Roux 1999:286).

Environmental education can also influence the curriculum. According to Bornman (1997:60), an analysis of the influence of environmental education on the curriculum is provided by Palmer and Neal (1994:19–20) from the United Kingdom (UK). They maintain that the threefold structure (learning about, through and for the environment) sits alongside four elements of curriculum development, namely empirical, synoptic, aesthetic and ethical elements:

- Empirical element: Aspects of the environment lend themselves to objective observation, measurement and analysis. Analytical skills as an important part of thinking skills could be taught. Pupils learn to observe, measure, record, interpret and discuss by making direct contact with the environment.

- Synoptic element: Pupils realise the complexity and interrelatedness of environmental issues and the importance of using suitable methods for collecting information for evaluation. A research attitude and some research skills could be developed.
- Aesthetic element: The qualitative rather than the quantitative nature of aspects of the environment are emphasised. Aesthetic elements may help pupils to realise that in some cases there is no right or wrong answer in absolute terms to aesthetic questions and that the answer in such cases requires a compromise.
- Ethical element: All programmes of environmental education aim at introducing pupils to the idea of personal responsibility and the concept of stewardship. Pupils are trained to ask if the criteria of proposed actions are based on morally justifiable values. Critical thinking is stimulated (Caduto 1983:30-35; Newhouse 1990:26 – 31; Palmer & Neal 1995:19-20; EECI 1999).

This threefold structure (learning about, through and for the environment) of environmental education, incorporating the four elements of curriculum development, as well as whole school curriculum development, reflects the relevance of a cross-curricular orientation to environmental education processes, as aimed through the development and implementation of school

environmental policies and management plans. It is of major importance that environmental principles are to be taught across the school curriculum, rather than environmental education being promoted as an independent subject. It is, thus, considered to be a teaching approach leading to the development of environmentally sensitive attitudes, values and behaviour. The promotion and education about, from and for the environment echoes the established emphasis on the teacher as a key player in ensuring that environmental education goals are achieved in the schools (Ballantyne 1987:3).

According to the EECl (1999:7), this should also be reflected in teacher education programmes. Units of learning on human and social sciences methods, technology methods, language and communication and others might, therefore need to include an environmental focus on orientation. Many of the competencies enable learners to become environmentally literate and to take environmental action. If the practical, foundational and reflective competences for the roles are analysed, we find that many of them consider environmental issues explicitly and are particularly enhancing of learners' capacity to take environmental action. Braus (1995:46) supports this as follows:

“Environmental education has been a leader in pushing for interdisciplinary education, critical thinking, problem solving and other integral components.”

According to Blignaut (1992:253), there is a strong support for some form of integrated approach for environmental education which favours the implementation of a curriculum that enables pupils to experience the environment as an integrated whole... the interrelationships between man and his environment can be taught most effectively through an integrated (whole school) approach, since this approach is perhaps the only genuine model for cross-curricular EE or EFS (Shallcross 1998:252).

In South Africa, the outcomes-based framework for the education system means that school learners should be guided to achieve a range of outcomes by the time they complete their education. In the previous education system, curricula were pre-determined and teachers were provided with fixed syllabi and had little opportunity to participate in the curriculum development process. The new framework requires teachers to become more actively involved in developing learning programmes. The development of action plans as part of a school environmental policy and management plan, enables teachers and educators to develop locally relevant and responsive curricula. A school environmental policy development process can play a useful role in supporting teachers to make curriculum changes.

5.1.1 Analysis of results for curriculum integration:

The conceptualising of data for this study reflects the implementation of school environmental policies in relation to curriculum integration as a category. It, therefore, supports the statement that the school environmental policy development process plays an important role in supporting teachers to make curriculum changes. It also contributes to the cross curricular integration of the environment and whole school curriculum development, because this is achieved in schools in Mpumalanga that participated in this research. The development and implementation of a school environmental policy and management plan played a useful role in supporting teachers in this regard.

The coding of the category curriculum integration (refer paragraph 4.2.5.1) also reflected the following sub-categories, which clearly indicates the learning areas in schools:

- natural science
- life orientation
- language, literacy and communication
- technology
- human and social sciences
- arts and culture
- mathematical literacy and mathematical science

Dimensions within the category of curriculum integration are analysed according to 2001 and 2002 reports, regions in Mpumalanga and types of schools. The data for the categories, sub-categories and dimensions is further computed in terms of percentage decrease/increase.

The following tables show a total of 22 of the 43 schools (51%), that developed and implemented school environmental policies and management plans in 2001 reflected achievements in terms of curriculum integration in their reports and responses. A total of 32 of the participating 43 schools (74%) that developed and implemented school environmental policies and management Plans in 2002 reflected achievements in terms of curriculum integration in their reports and responses.

Table 5.1.

The results in terms of curriculum integration per region is as follows:

<u>Region</u>	<u>Total number of schools</u>	<u>Curr. Integration 2001</u>	<u>Percentage 2001</u>	<u>Curr. Integration 2002</u>	<u>Percentage 2002</u>	<u>% Increase / decrease</u>
Ekangala	14	7	50%	11	79%	+ 29%
Ehlanzeni	16	7	44%	9	56%	+ 12%
Eastvaal	13	8	62%	12	92%	+ 30%

Table 5.2.

Per type of school the results are as follows:

<u>Type</u>	<u>Total</u> <u>number of</u> <u>schools</u>	<u>Curr.</u> <u>Integration</u> <u>2001</u>	<u>Percentage</u> <u>2001</u>	<u>Curr.</u> <u>Integration</u> <u>2002</u>	<u>Percentage</u> <u>2002</u>	<u>% Increase /</u> <u>decrease</u>
Primary	32	18	56%	26	81%	+ 25 %
Secondary	4	2	50%	3	75%	+ 25%
Others	7	2	29%	3	43%	+ 14%

Table 5.3.

The sub-categories for curriculum integration is reflected in the analysis of the learning areas that were integrated by the 2001 and 2002 participants in the following table:

<u>Learning area</u>	<u>Number of</u> <u>schools</u> <u>that did</u> <u>curriculum</u> <u>integration in</u> <u>2001</u>	<u>Percentage in</u> <u>relation to number</u> <u>of schools that did</u> <u>curriculum</u> <u>integration in 2001</u>	<u>Number of</u> <u>schools</u> <u>that did</u> <u>curriculum</u> <u>integration in</u> <u>2002</u>	<u>Percentage in</u> <u>relation to</u> <u>number of</u> <u>schools that did</u> <u>curriculum</u> <u>integration in</u> <u>2002</u>	<u>% Incr ease /</u> <u>decrease</u>
Natural Science	20	91%	21	66%	-25%
Life orientation	14	64%	15	47%	-17%
Language, Literacy and Communication	13	59%	14	44%	-15%
Technology	13	59%	15	47%	-12%
Human and Social Sciences	8	36%	16	50%	+14 %

Economic and Management Sciences	6	27%	7	22%	-4 %
Arts and Culture	5	22%	8	25%	+ 3%
Mathematical literacy and mathematical science	0	0%	9	28%	+28%

Some of the examples of curriculum integration as reflected by the participants in this study in 2001 include the following:

School 1:

“ By making a vegetable garden in our school we aimed at bringing learning support materials closer to the classroom situation. In Natural Science Grade 4 learn about parts of plants, Grade 5: germination of seeds, Grade 6: Food types, Grade 7: Insects, etc. The policy helped us with integration of all learning areas through the environment. Curriculum links were :

- Natural science SO2 (Specific Outcome 2) - demonstrate the acquisition of knowledge and an understanding of concepts and principles in natural science.
- Technology SO2 (Specific Outcome 2) - Apply a range of technological knowledge and skills ethically and responsibly.
- Arts and Culture SO6 (Specific Outcome 6) - use art skills and cultural expression to make an economic contribution to self and the society.”

School 42:

“ The school Environmental Policy and Management Plan helped to organise and plan our activities in a way that benefits the school, the pupils and the community, e.g. erosion control – we are using stones and tyres to slow the fast flowing of the water and thus controlling soil erosion (Technology). We involve the pupils and needy parents to plant vegetables for economic sustainability (Natural Sciences and Life Orientation). We are using the permaculture method that is both cheap and easy (Technology). We also do intercropping and prepare our own compost. We are also involved in recycling bottles that are sold to the depot. Through the recycling of paper, we make handmade paper cards (in the Art period) that sold for an income (Economic and Management Sciences) for the school. Other empty containers are also decorated and sold. Dustbins are made from paper-mache. The paper that is not used for the cards and paper- mache is also sold to a recycling depot. All this is integrated in the curriculum.”

Some of the examples of curriculum integration as reflected by the participants in this study in 2002, include the following:

School 31:

“Curriculum integration is done as a result of the development and implementation of the School Environmental Policy and Management plan. The following are examples thereof:

Natural sciences (NS)-

Natural sciences deals mostly with environmental education e.g deforestation, uses of plants and endangered plants are covered in the Grade 7 (NS) syllabus. This information covers:

NS SO4 : Demonstration and understanding of how scientific knowledge and skills contribute to the management , development and utilisation of natural and other resources.

SO5 : Use scientific knowledge and skills to support responsible decision – making.

By being involved in the actual planting of trees, learners are better able to relate and understand what they have learnt in the classroom.

Language, Literacy and Communication-

When learners are involved in environmental discussions and activities they integrate what they learn with :

SO6 : Learners use language for learning and

SO1 : Learners make and negotiate meaning and understanding.

In the classroom they use language, in the gardens they use language and that is how they get to acquire environmental vocabulary e.g. erosion, cabbage, recycle, clay soil, mulching, weeds, inter-cropping, harvest, pollution, deforestation, etc.

Technology-

Learners are now aware of the effect of gases in the greenhouse structure. The knowledge gained from global warming competition is integrated with Technology.

SO6 : Demonstrate an understanding of the impact of technology.

Learners understand and can associate technological progress with the damage caused in the greenhouse structure, e.g. the world progresses from a sledge to a motorcar, but cars are not environment friendly. Production of electricity – coal uses damages the ozone layer.

MLMMS –

SO1 : demonstrate an understanding and ways of working with numbers

SO2 : Manipulate number patterns in different ways

When learners actually sell the produce, they are working with numbers. They convert cents into rands and vice versa.”

School 32:

“The enviro-club is a very useful vehicle to develop key outcomes, since they engage in entrepreneurial activities (EMS), demonstrate a personal role in the economic environment, as well as demonstrate managerial expertise and administrative proficiency. The monthly meetings of the club is also a useful vehicle for developing H&SS outcomes. Due to the environmental policy, the school also participates in environmental competition e.g. the Junior Water Prize -, Adopt-a-Schoolyard competition and the Edu-plant competition. It is integrated in the curriculum as follows:

LLC-SO4 Access, process and use information from a variety of sources and situations

LO-SO2 Use skills and display attitudes and values that improve the relationship in family groups and the community

The resource utilized, at the school, focuses on recycling and water auditing and the school provides a useful curriculum focus for integrating learning programmes, such as Science and Technology with Economic and Management Sciences. It is integrated in the curriculum as follows:

HSS-SO4 Learners will be able to make sound judgement about the development management and utility

The soil rehabilitation projects of the school is integrated in the curriculum with Technology and Natural Sciences. “

5.1.2 Discussion of results - curriculum integration:

5.1.2.1

The research reflects an increase from 51% (2001) to 74% (2002) in terms of achievements regarding curriculum integration, as reflected by the 43 schools that participated in this study in 2001 and 2002 in their reports and responses.

It is clear from this, that the more exposure schools get in terms of development and implementation of school environmental policies and management plans, the higher the percentage integration with the curriculum.

5.1.2.2

The results per region in terms of curriculum integration also supports an increase in terms of percentages reflecting curriculum integration - in all regions - which supports the abovementioned point.

5.1.2.3

Primary schools reflect both in 2001 and 2002, the highest percentage in terms of curriculum integration. Primary schools also had the highest number of participants and it is clear that the development and implementation of school

environmental policies and management plans are very suitable to primary schools.

5.1.2.4

The increase in percentage curriculum integration by secondary schools and other schools from 2001 to 2002, again reflect that the more exposure a school has in terms of the development and implementation of school environmental policies and management plans, the higher the percentage integration with the curriculum.

5.1.2.5.

The analysis of the sub-categories (learning areas) that have been integrated, reflects that Natural Sciences is the sub-category (learning area) that had the highest level of integration as a result of the development and implementation of school environmental policies and management plans.

5.1.2.6

The (sub-categories) learning areas of Human and Social sciences reflect an increase in terms of curriculum integration from 2001 to 2002 of 14%, and indicates that this learning area benefits in terms of curriculum integration as a

result of the implementation of school environmental policies and management plans.

5.1.2.7

The sub-category (learning area) of Arts and Culture reflects an increase of +3%, and indicates that this learning area benefits in terms of curriculum integration as a result of the implementation of school environmental policies and management plans.

5.1.2.8

The sub-category (learning area) of Mathematical Literacy and Mathematical Science was not reflected by the participants of 2001 as an area integrated with the curriculum as a result of the development and implementation of school environmental policy and management plan. The results for 2002 reflect a 28% curriculum integration. It can be deducted that exposure to the development and implementation of school environmental policies and management plans could result in benefits for this learning area.

5.1.2.9

The discussion of the results for this study, with specific reference to the development and implementation of school environmental policies and

management plans in support of curriculum integration, reflects that whole school curriculum development and cross-curricular orientation to environmental education processes, can be achieved through the development and implementation of school environmental policies and management plans.

5.2. Organisation of environmental education processes:

The presence of environmental education in public school curricula, as reflected in the analysis and discussion of the curriculum integration, can often be characterised by loose organisation and a little sense of direction (Hungerford 1980:42). Le Roux (1999:6) describes this as tension between having no structure and some form of structure, which enables rather than restricts or inhibits. Having a focus such as an environmental policy could provide teachers with a broad framework within which they could develop learning programmes relevant to their particular schools. School environmental policies have, therefore, developed as a response to this fragmentation and tension as an attempt to create a more coherent approach. An environmental policy should enable planned progression in order to avoid repetition for some and omission for others as illustrated by the following example:

“A water theme during March around Water Week enables teachers to plan various activities which link to provide learners with a more holistic understanding” (Le Roux 1999:290).

5.2.1 Analysis of results for organisation of environmental education processes:

Data conceptualising for this study, reflects the implementation of school environmental policies in relation to the organisation of environmental education processes as a category and, therefore, supports the statement that the school environmental policy development process plays an important role in the organisation of environmental education processes. The research for this study reflects achievement in terms of the organisation of environmental education processes in schools in Mpumalanga, which are supported by the development and implementation of a school environmental policy and management plan. The category of organisation of environmental education processes is analysed according to 2001 and 2002 reports, regions in Mpumalanga and types of schools. The data for the category and dimensions is further computed in terms of percentage decrease/increase.

The following tables show a total of 16 of the 43 schools (37%) which developed and implemented school environmental policies and management plans in 2001 reflected achievements in terms of the organisation of

environmental education processes in their reports and responses. A total of 25 of the participating 43 schools (58%) that developed and implemented school environmental policies and management plans in 2002, reflected achievements in terms of the organisation of environmental education processes in their reports and responses.

Table 5.4

The results per region in terms of organisation of environmental education processes are as follow:

<u>Region</u>	<u>Total number of schools</u>	<u>Org. of env. educ.processes 2001</u>	<u>Percentage 2001</u>	<u>Org. of env. educ.processes 2002</u>	<u>Percentage 2002</u>	<u>% Increase / decrease</u>
Ekangala	14	4	28%	7	50%	+ 22%
Ehlanzeni	16	6	38%	8	50%	+ 13%
Eastvaal	13	6	46%	10	77%	+ 31%

Table 5.5

The results per type of school in terms of organisation of environmental education processes are as follow:

<u>Type</u>	<u>Total number of schools</u>	<u>Org. of env. educ. processes 2001</u>	<u>Percentage 2001</u>	<u>Org. of env. educ. processes 2002</u>	<u>Percentage 2002</u>	<u>% Increase / decrease</u>
Primary	32	14	44%	17	53%	+ 9%

Secondary	4	0	0%	4	100%	+ 100%
Others	7	2	29%	4	57%	+ 28%

Some of the examples of the organisation of environmental education processes as reflected by the participants in this study in 2001, include the following:

School 15:

“ Our school uses the environmental calendar to organise the environmental themes for the year. We focus on National Water Week, World Environment Week, Arbor Week, the International Day for the Preservation of the Ozone Layer and National Marine Week.

March 19–24 will focus on water awareness, including water auditing. A play, aimed at water awareness, will also be produced. June 4-10 will focus on the environment, especially the relationship between man, animals and plants. Sketches reflecting this relationship, will also be done. September 8-14 will focus on plants and the advantages of greening, also relating to the Ozone layer. Trees planted by each class will reflect taking care of trees. During Marine Week, the school will undertake a trip to the coast and marine life will be focused on in the school in preparation for this trip.”

School 16:

“ It shall be the environmental policy to keep the environmental calendar and to participate in all activities related to it. This shall be carried jointly, by both the school and the community, with the aim of promoting environmental awareness (activities such as cultural dances). The days and weeks to be commemorated are :

- World Environment Week : The focus will be on waste and clean-up campaigns and recycling will be prioritised as themes.
- National Water Week : The focus will be on saving water, the importance of water and on life in rivers.
- Arbor Week : The focus will be on the importance of trees, how to plant a tree, how to look after a tree and poems and dramas will be performed.
- Wetlands Day: Environmental officers will escort the pupils to the nearest wetland in order to explain the functioning and importance of the wetland. “

Some of the examples of the organisation of environmental education processes as reflected by participants in this study in 2002, include the following:

School 33:

“Water Week 1-7 March : Grade 7 do research on water wastage in our school.

On 7 March, the Department of Water Affairs and Forestry, performs a play on water conservation for the school. On 22 March, during World Day for Water,

special attention is given in all lessons on water conservation. On 2-5

September, Arbor Week , tree planting and the judging of flower beds of

different classes will take place. Winners to be announced on 5 September.”

School 39:

“ Different days have been targeted for the whole year for a range of different activities, e.g.:

- 11-15 February: flowers and grass planted specifically for decoration and for soil erosion prevention.
- 13-17 May: cleaning up of the school environment
- 22-26 July: recycling of tyres and plastics for decoration and the creation of a car parking in the school yard.
- 2-7 September: Trees will be planted in celebration of Arbor Week.
- 16-19 September: Grade 9 learners will be conducting lessons to the community on the subject pollution. This will help the community to be aware of environmental issues and to care for the environment.”

5.2.2. Discussion of results; The organisation of environmental education processes.

5.2.2.1

The research reflects an increase from 37% (2001) to 58% (2002), in terms of the organisation of environmental education processes reflected by the participants in their reports and responses. This again indicates that the more exposure schools get in terms of development and implementation of school environmental policies and management plans, the higher the achievement in terms of the organisation of environmental education processes.

5.2.2.2

The results per region in terms of the organisation of environmental education processes, also reflect an increase in terms of percentages in all regions.

5.2.2.3

In 2001 primary schools reflected the highest percentage in terms of the organization of environmental education processes and secondary schools reflected in 2002 the highest percentage. It should be noted that only 4 secondary schools participated, but all of them reported achievements in terms of the organisation of environmental education processes in 2002, as a result of the development and implementation of school environmental policies and

management plans. Primary schools had the highest number of participants, and it is clear from these results that achievements in terms of the organisation of environmental education processes as a result of the development and implementation of school environmental policies and management plans can be achieved by both primary and secondary schools.

5.2.2.4

The increase in percentage for secondary schools from 2001 to 2002 (100%), again reflects that the more exposure a school has in terms of the development and implementation of school environmental policies and management plans, the higher the achievements in terms of the organisation of environmental education processes.

5.2.2.5

The increase of 28% by other schools from 2001 to 2002 also reflects a great potential for the organisation of environmental education processes for these schools as a result of the development and implementation of school environmental policies and management plans.

5.2.2.6

The discussion of the results for this study - with specific reference to the development and implementation of school environmental policies and management plans in support of the organisation of school environmental education processes - reflects that a focus, such as an environmental policy, can provide teachers with a broad framework within which they can develop learning programmes relevant to their particular schools.

CHAPTER 6: ANALYSIS AND DISCUSSION OF RESULTS

6.1. Management of resources:

Environmental education activities should link with community development projects, commercial ventures and efforts towards improving the quality of life (Mosidi 2000:10), because individual actions are not sufficient for sustaining and enhancing the quality of life on our planet; the collective efforts of communities are necessary. School environmental policies and management plans could be a means of planning and organising individual efforts, as well as turning them into collective ones within a broader framework. These efforts could include better management of school resources, since a school environmental policy enables the development of such partnerships between learners, teachers, parents and the broader community. It has been noted that school environmental policies are opportunities for better links with the local community, most especially parents, who can play active roles in supporting various aspects of a school environmental policy (Le Roux 1999:291).

The efficient management of school resources, has become a particularly important issue in South African schools, because schools are now responsible for paying for the resources they use, including water and electricity.

Previously, government was responsible to pay these costs. Auditing has

come to be viewed increasingly, as a sensible business practice for managing a business effectively and there is an increase in pressure on educational institutions to follow commercial management practices. The efficient management of a school's resources, such as paper, water and electricity, through the implementation of well-organised policy plans, can lead to considerable savings for schools. Involving learners in water audits at school, can lead to the discovery of unnecessary waste of water due to, for example, leaking taps or large toilet cisterns. If an environmental policy is carefully managed, regularly evaluated and findings adequately reported, tangible benefits of environmental policy processes become evident (Le Roux 1999:292).

6.1.1 Analysis of results for management of resources:

The research for this study reflects the fact that the development and implementation of school environmental policies and management plans in Mpumalanga played a useful role in the management of resources in schools. The following table shows a total of 27 of the 43 schools (63%), which developed and implemented school environmental policies and management plans in 2001, reflected achievements in terms of management of resources in their reports and responses. A total of 31 of the participating 43 schools (72%) that developed and implemented school environmental policies and

management plans in 2002, reflected achievements in terms of management of resources in their reports and responses.

Table 6.1.

The results in terms of management of resources per region, are as follows:

<u>Region</u>	<u>Total number of schools</u>	<u>Management of resources 2001</u>	<u>Percentage 2001</u>	<u>Management of resources 2002</u>	<u>Percentage 2002</u>	<u>% Increase / decrease</u>
Ekangala	14	9	64%	11	78%	+ 15%
Ehlanzeni	16	9	56%	9	56%	same
Eastvaal	13	9	69%	11	84%	+15%

Table 6.2.

The results per type of school are as follows:

<u>Type</u>	<u>Total number of schools</u>	<u>Management of resources 2001</u>	<u>Percentage 2001</u>	<u>Management of resources 2002</u>	<u>Percentage 2002</u>	<u>% Increase / decrease</u>
Primary	32	22	69%	23	72%	+ 3 %
Secondary	4	1	25%	3	75%	+ 50%
Others	7	4	57%	5	71%	+ 14%

Table 6.3.

The sub-categories for management of resources, are reflected in the analysis of the type of resources that have been managed by the 2001 and 2002 participants in the following table:

<u>Type of resource</u>	<u>Number of schools that did management of resources 2001</u>	<u>Percentage in relation to number of schools that did management of resources 2001</u>	<u>Number of schools that did management of resources 2002</u>	<u>Percentage in relation to number of schools that did management of resources 2002</u>	<u>% Increase / decrease</u>
Water	19	70%	22	71%	+1%
Electricity	4	14%	6	19%	+ 5%
Paper	3	11%	4	12%	+1%
Soil	1	4%	2	6%	+2%

Some examples of management of resources as reflected by the participants in this study in 2001, include the following:

School 34:

“ The audit committee will look at the way water is used at school and how to improve it. Learners will read the meter every day and record the quantity of water used. Class teachers will have buckets in the classroom for every learner to wash hands when coming from the toilet. Learners should use a cup when

drinking water from the tap. A basin will be used for saving the spilt water from the tap. The following areas of concern are identified:

- Quantity of water used per day
- Quantity of water wasted per day
- Water pollution causes
- Consumption and cost of water. “

School 35:

“The school will make sure that water is not wasted and that waste is recycled.

- Class monitors to make sure that there are buckets of water for drinking during their classes.
- Group leaders from each class make sure that there is a basin with water for washing hands
- Grade 4 learners will sort waste differentiating between cans, bottles, papers, etc. for recycling every day.
- Grade 4 and 5 will use waste for projects, e.g. an elephant statue.”

Some examples of management of resources as reflected by the participants in this study in 2002, include the following:

School 2:

“ The school aims at making learners, educators and the community to promote the wisest ways of using and conserving water in a proper manageable and disciplined strategy:

In our school we have three water taps, one hosepipe and one sprinkler. We also have a large garden surrounding our classes, in which groups are involved in preparing and planting the environment. The whole of the school environment need to be watered and, thus, disciplined strategies are essential in managing the use of water. We use the pipe in the morning for two hours. During the course of the day - in the environment periods - we organise water buckets to cover all the areas not visited. Water taps are wisely closed after school and during weekends for not losing water.”

School 43:

“ All the people at the school will be conscious to be electro-wise and enable the school to save money by keeping the electricity bill low. People at the school should:

- switch off lights during the day and after school when classrooms and centres are occupied, as well as when daylight makes visibility clear during reading or writing.
- unplug electric cords when appliances are not being used

- switch off the geyser over the week-ends and during long holidays
- use only the correct amount of water sufficient for the number of people that are to be served when using the kettle or urn to boil water
- report faulty electric appliances without delay in order to have them repaired or replaced.

When drinking water:

- use a glass or cup or relevant container
- avoid drinking water by hand
- close the tap tightly after use
- keep a bucket under the tap to trap surplus water

When washing hands:

- use a basin with a plug
- use the trapped surplus water in the bucket under the tap
- avoid washing hands under a running water tap
- close the tap tightly after use

When watering the garden:

- do it either in the mornings or afternoons when the temperature is low and the wind is calm in order to avoid high evaporation rates
- use a watering can for smaller garden patches
- use water from the rain water harvest tanks when available

- do not allow water to run over
- close the tap tightly after use

When using the toilet:

- make use of toilet tissue or soft flushable paper material
- ensure that the flushing handle returns to its rightful position after flushing
- avoid using the toilet when there is no water in the cistern
- never use any hard or solid material which will not flush down the basin
- wash your hands after using the toilet

When washing dishes:

- use a plugged basin
- use an amount of water relevant to the number of dishes
- close the tap tightly after use

Leaking pipes and dripping taps:

- be on the look-out for dripping and leaking pipes
- report leaking pipes and taps that continue to drip even when tightly closed to the relevant school authority or enviro-conscious teacher
- repair or replace leaking pipes and dripping taps without delay.”

6.1.2 Discussion of results – management of resources:

6.1.2.1

The research reflects an increase from 63% (2001) to 72% (2002) in terms of achievements regarding management of resources, as reflected by the participants in their reports and responses. It is clear from this, that the more exposure schools get in terms of development and implementation of school environmental policies and management plans, the higher the percentage management of resources.

6.1.2.2

The results per region in terms of management of resources, also reflect an increase in terms of percentages in all regions.

6.1.2.3

In 2001 primary schools reflect the highest percentage in terms of resource management. Primary schools also had the highest number of participants and it is clear that the development and implementation of school environmental policies and management plans is very suitable to primary schools.

6.1.2.4

In 2002 secondary schools reflect the highest percentage in terms of resource management and it is clear that the development and implementation of school environmental policies and management plans is very suitable to secondary schools .

6.1.2.5

The 50% increase in percentage for resource management recorded for secondary schools from 2001 to 2002, reflects that the more exposure a school has in terms of the development and implementation of school environmental policies and management plans, the higher the percentage of resource management.

6.1.2.6

The increase of 14% in terms of resource management by other schools (pre-primary and special schools) from 2001 until 2002, reflects the potential for resource management through the development and implementation of school environmental policies and management plans.

6.1.2.7

The analysis of the types of resources that have been managed, reflects the fact that water is the resource mostly managed as a result of the development and implementation of school environmental policies and management plans.

The percentage in terms of the management of resources for water, increased from 70% in 2001 to 71% in 2002.

6.1.2.8

The management of electricity as a resource, increased from 14% in 2001 to 19% in 2002.

6.1.2.9

The management of paper as a resource, increased from 11% in 2001 to 12% in 2002.

6.1.2.10

The management of soil as a resource, increased from 4% in 2001 to 6% 2002.

6.1.2.11

The analysis of the results for this study, reflects the fact that the development and implementation of school environmental policies and management plans

played a useful role in the management of resources such as water, electricity, paper and soil at schools.

6.2. Addressing environmental issues through the development and implementation of solutions:

Many curriculum documents and journal articles, especially from the USA, start with the assumption that the goal of environmental education is to create environmentally responsible behaviour. This is, according to Fien (1993b:202), correct up to a point. Responsible environmental behaviour is a necessary, but nonetheless insufficient, purpose of environmental education, since the influential Tbilisi Intergovernmental Conference recommended five categories of objectives or general goals for EE. Besides awareness, sensitivity to and knowledge of the environment and its associated problems, these objectives included the motivation for actively participating in environmental improvement and protection, skills for solving environmental problems and participation in working towards the resolution of environmental problems (Stevenson 1993:304).

This opinion is shared by Hungerford (1990:13), since there has been a great deal of criticism about the lack of direction in EE over the past 15 years. The lack of emphasis upon objectives that focused on helping students actually

solving environmental problems and developing problem-solving skills, are contrary to the recommendations for environmental education objectives contained in both the 1977 Belgrade Charter and the 1977 Tblisi Intergovernmental Conference Report. The guiding principles which have been adopted for educational institutions to consider in EE curriculum planning, emphasise a similar problem-solving action orientation. These goals indicate that the contemporary aspirations of EE go beyond developing students' knowledge and awareness of environmental concerns, to active involvement in helping to resolve actual environmental issues. Such involvement first requires that students develop a position on specific policies or proposed actions by questioning, examining and building rationales or justifications for their positions or policy judgements. By using these objectives (Tblisi), we might define an environmentally responsible citizen as one who has:

- an awareness and sensitivity to the total environment and its allied problems (and/or issues)
- a basic understanding of the environment and its allied problems and/or issues
- feelings of concern for the environment and motivation for actively participating in environmental improvement and protection
- skills for identifying and solving environmental problems and/or, issues
and

- active involvement at all levels in working towards the resolution of environmental problems and/or issues (Hungerford 1990:9 ; Stevenson 1993:304).

Although the purpose of the process of environmental education should, therefore, be the creation of a citizenry who could help to resolve environmental issues (Monroe 1988:38 ; Tilbury 1995:203 ; Wals 1990:252) and record these in a survey as very important goals by environmental educators, skills for investigating and evaluating solutions to problems and taking action were, however, perceived as having the lowest degree of accomplishment in schools (Stevenson 1993 : 310). This situation has an impact on the effectiveness of environmental education, because, according to Pettus (1982:184), subsequent experiences in the process of environmental education should be designed to develop further understanding of environmental problems and issues and develop knowledge and skills for helping to solve environmental problems to provide effective environmental education for students.

One of the strategies of the African National Congress' sixth draft of the Reconstruction and Development programme (1994:19), include:

“environmental education programmes to rekindle our people’s love for the land, empower communities to act on environmental issues and to promote an environmental ethic.”

This reflects the South African government’s commitment to ensure that environmental education will assist in enabling South Africans to re-orientate themselves and their society to address environmental risks and take advantage of opportunities in order to achieve sustainable development (Mosidi 2000: 1) South African citizens are, however, not adequately empowered with the knowledge to enable them to maximise the value of environmental policies and laws. This highlights the importance of environmental education processes and not just education that would raise the awareness of issues, but also education about potential solutions and the ability to take actions towards such solutions (DEA&T 2001:14). Since education is a vehicle through which a nation prepares itself to carry its responsibilities, education must also be sensitive to environmental needs. It should help learners to develop the knowledge and skill to solve environmental problems (Mosidi 1997:16). According to Mabunda (1999: 319), issue-based studies, aiming to solve environmental problems, can be one of the more effective ways of introducing EE. Teaching close-to-home issues (as proposed by this study), both students and teachers become aware that they also contribute towards the deterioration

of the environment. This contributes to their realising that they can contribute towards the solution (Mabunda 1999: 322).

It has been argued that environmental education processes need to go beyond description and should address implications for action. Environmental education needs to do more than just describe environmental education processes. It should help people to find their own local (close to home) solutions. The school environmental policy and management plan process can be seen as one of developing plans of action and can be a good way of taking environmental education further than mere description towards meaningful action in local contexts. The school environmental policy process is a way of enabling children to contribute to something meaningful, worthwhile and of specific relevance to them. If learners are involved in the planning and implementation of their school's policy, they could become active contributors, rather than passive spectators (Le Roux 1999:292).

6.2.1 Analysis of the results for addressing of environmental issues

The research for this study reflects that the development and implementation of school environmental policies and management plans in Mpumalanga played a useful role in the addressing of environmental issues in schools. The following table shows a total of 40 of the 43 schools (93%) which developed and

implemented school environmental policies and management plans in 2001 and actually, reflected achievements in terms of addressing environmental issues in their reports and responses. A total of 42 of the participating 43 schools (98%), that developed and implemented school environmental policies and management plans in 2002, reflected achievements in terms of addressing of environmental issues in their reports and responses.

Table 6.4

The results in terms of addressing of environmental issues per region, is as follows:

<u>Region</u>	<u>Total number of schools</u>	<u>Addressing of environmental issues 2001</u>	<u>Percentage 2001</u>	<u>Addressing of environmental issues 2002</u>	<u>Percentage 2002</u>	<u>% Increase / decrease</u>
Ekgangala	14	13	93%	13	93%	same
Ehlanzeni	16	15	93%	16	100%	+7%
Eastvaal	13	12	92%	13	100%	+8%

Table 6.5

The results per type of school, are as follows:

<u>Type</u>	<u>Total number of schools</u>	<u>Addressing of env. issues 2001</u>	<u>Percentage 2001</u>	<u>Addressing of env. issues 2002</u>	<u>Percentage 2002</u>	<u>% Increase / decrease</u>
Primary	32	30	93%	31	97%	+ 4 %
Secondary	4	4	100%	4	100%	same

Others	7	6	86%	7	100%	+ 14%
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Table 6.6.

The sub-categories for environmental issues addressed, are reflected in the analysis of the type of environmental issue that was addressed by the 2001 and 2002 participants in the following table:

<u>Type of environmental issue</u>	<u>Number of schools that addressed env. issues 2001</u>	<u>Percentage in relation to number of schools that addressed env. issues 2001</u>	<u>Number of schools that addressed env. issues 2002</u>	<u>Percentage in relation to number of schools that addressed env. issues 2002</u>	<u>% Increase / decrease</u>
Greening	31	72%	39	91%	+ 19%
Waste management	24	56%	26	60%	+ 4%
Soil erosion	21	48%	22	51%	+ 3%
Recycling	6	14%	8	19%	+ 5%
Alien vegetation removal	5	12%	6	14%	+ 2%

Some examples of addressing environmental issues as reflected by the participants in this study in 2001, include the following:

School 9:

“ Our school has been built on the yard where there was a hostel. Some of the hostel foundation was left and in order for us to green the school, the foundation was to be removed, so that we could reach the soil and plant in it. We started by requesting the town council people to remove the foundation. We discussed the greening project with the local community. Later vegetable gardens were made and some of the produce are sold in order to alleviate poverty and reduce the rate of unemployment in our community.”

School 19:

“A part of our schoolyard was unbearable during rainy seasons. It was water-logged due to the run-off from the gutters. So, with little knowledge of permaculture principles, we started to design this area using some of the resources available to address this environmental issue. First we removed the Jacaranda trees which were growing here. These we used for logs for the cooking in the school since we still provide the feeding scheme to the kids. Because this part is always shady, we planted ground cover which prefer less sunlight to control the mud and stop our top soil being washed away. Furrows were dug to take away the water from this part. Natal Drift Nursery gave us some plants: shrubs, trees, flowers, wild banana and some ground cover to green this part. We have dug furrows from the gutters which divert the water to

our vegetable garden, flower garden and trees. In every gutter we have dug a water harvesting pit, filled with rocks to stop the spattering. On each pit we have made a mound and planted it with grass and ground cover.”

Some examples of the addressing of environmental issues as reflected by the participants in this study in 2002, include the following:

School 40:

“ Waste management through recycling:

All offices, classrooms and premises must be kept free of litter and hygienically clean. Relevant waste receptacles must be posted in each office, classroom, centre and strategic places within the premises. A green cage for plastic, paper and cardboard's must be made available within the premises. Separate containers for cans and bottles, respectively, must be made available.

Degradable food leftovers must be dumped in a compost trench next to the garden. A time schedule must be made available for classes to take turns in keeping the premises free of litter and hygienically clean. Waste management and recycling must be integrated in classroom learning areas and activities.

Greening of the school:

Educators, learners and workers must learn to appreciate and treat plants with great respect and care. The planting of indigenous trees, shrubs, grass and

flowers must be promoted. Learners and educators must be encouraged to know the names of the various major indigenous trees, shrubs, grass and flowers that grow within the school. An outline school map indicating buildings, sportfields, major indigenous trees, shrubs, grass, flowers, driveways, paths, parking, entrances and exits must be drawn and updated annually. Degraded and overused ground patches must be cordoned off to allow time for rehabilitation. Classes must be allocated trees, flower bedding and green areas to adopt and take care of. Classroom activities and learning areas must be integrated with the vegetation and greening plans of the school.”

School 11:

“On Fridays, learners are to clean the schoolyard, removing weeds and sort waste for recycling. To prevent soil erosion, water channels have been made to enable run-off water to move in the same direction. Stones and pieces of bricks are located into eroded area to fill them up and rehabilitate. To address litters around the school yard, a clean-up is held on a quarterly basis with the help/ assistance of volunteers from the nearby community.”

6.2.2 Discussion of results – addressing of environmental issues:

6.2.2.1

The research reflects an increase from 93% (2001) to 98% (2002) in terms of achievements regarding the addressing of environmental issues as reflected by the participants in their reports and responses. It is clear from this that the more exposure schools get in terms of development and implementation of school environmental policies and management plans, the higher the percentage of the addressing of environmental issues.

6.2.2.2

The results per region in terms of addressing environmental issues, also reflect an increase in terms of percentages, which supports the abovementioned result.

6.2.2.3

Secondary schools reflect in both 2001 and 2002, 100% in terms of the addressing of environmental issues and other schools reflect a 100% in 2002.

Primary schools had the highest number of participants and it is clear that the development and implementation of school environmental policies and management plans in terms of addressing of environmental issues is very suitable to both primary, secondary and other schools.

6.2.2.4

The 4% increase in the percentage of addressing environmental issues by primary schools from 2001 to 2002, reflects that the more exposure a school has in terms of the development and implementation of school environmental policies and management plans, the more the addressing of environmental issues will receive attention.

6.2.2.5

The increase of 14% in terms of the addressing of environmental issues by other schools (pre-primary and special schools) from 2001 to 2002, reflects the potential for the addressing of environmental issues through the development and implementation of school environmental policies and management plans.

6.2.2.6

The analysis of the types of environmental issue addressed, reflects that greening is the mostly addressed environmental issue as a result of the development and implementation of school environmental policies and management plans. The percentage in terms of addressing environmental issues related to greening increased from 72% in 2001 to 91% in 2002.

6.2.2.7

The addressing of environmental issues related to waste management, increased from 56% in 2001 to 60% in 2002.

6.2.2.8

The addressing of environmental issues related to soil erosion, increased from 48% in 2001 to 51% in 2002.

6.2.2.9

The addressing of environmental issues related to recycling, increased from 14% in 2001 to 19% in 2002

6.2.2.10

The addressing of environmental issues related to removal of alien vegetation, increased from 12% in 2001 to 14% in 2002.

6.2.2.11

The analysis of the results for this study reflects that the development and implementation of school environmental policies and management plans, played a useful role in the addressing of environmental issues such as

greening, waste management, soil erosion, recycling and alien vegetation
removal at schools.

CHAPTER 7: CONCLUSION

7.1 Introduction

In South Africa, as well as in the rest of the world, one of the responses to the environmental crises is environmental education (DEA&T 1999:40; Le Roux 2000:47; Yeld 1997:29). The diversity of the environment, however, poses a challenge globally and nationally to environmental education processes and, therefore, local environmental issues need to be addressed (Yeld 1997:28).

Environmental education strategies that respond to the diversity of local environmental issues, contribute towards the addressing of local environmental issues (DEA&T 2001:10) and, according to Howe (1991:7), environmental education programmes which focus on issues and the analysis thereof are more successful than those who have not included those experiences.

The successful introduction of environmental education into formal education needs to provide an education structure that is conducive to a holistic integrated approach (Fien 1993b:205 ; Schleicher 1989:265 ; UNCED 1992a: 2.15), which also caters for investigative, problem solving and environmental action skills. Research has, however, proved that within the school context, environmental education processes, as well as the addressing of local environmental issues, are fragmented and, therefore, do not meet the

requirements (DEA&T 2001:4; Le Roux 2000:289). The development of a school environmental policy and management plan provides a valuable framework for a holistic approach to the organisation of environmental education processes in schools, that is integrated with the curriculum, resulting in the effective management of resources and the addressing of local environmental issues (EECI 1999:17 ; Le Roux 1999:11; Lotz 199:7; Winter 1997:9).

Through this research, exposure to the implementation of school environmental policies and management plans in Mpumalanga, proved valuable in terms of the integration of environmental education processes in the curriculum, the organisation of environmental education processes in schools, the effective management of resources in schools, and the addressing of local environmental issues as reflected by the summary of research results.

7.2 Summary of research results

The research results reflected that the cross-curricular integration of environmental education and whole school curriculum development is achieved in schools in Mpumalanga which participated in this research. The research also reflects that the more exposure schools get in terms of development and implementation of school environmental policies and management plans, the

higher the integration with the curriculum (As reflected by the increase in percentages in terms of curriculum integration from 2001 to 2002). The development and implementation of school environmental policies and management plans with the aim of curriculum integration is most suitable to primary schools, although other schools also benefited. Natural Sciences is the learning area with the highest level of integration as a result of the development and implementation of school environmental policies and management plans in Mpumalanga. The learning areas of Life Orientation; Language, Literacy and Communication; Technology; Human and Social Sciences; Economic and Management Sciences; Arts and Culture and Mathematical Literacy and Mathematical Science, also reflected benefits in terms of curriculum integration. Increases from 2001 to 2002 for learning areas which have been integrated proves that more exposure to school environmental policies and management plans, the higher the percentage curriculum integration.

The research for this study reflects achievements in terms of the organisation of environmental education processes in schools in Mpumalanga, as a result of the implementation of school environmental policies and management plans, and reflects that a focus, such as an environmental policy, can provide teachers with a broad framework within which they can develop learning programmes relevant to their particular school. The research reflects that the

more exposure schools get in terms of development and implementation of school environmental policies and management plans, the higher the achievement in terms of the organisation of environmental education processes (as reflected by the increase from 2001 to 2002). Primary, secondary and pre-schools benefited in terms of the organisation of environmental education processes as a result of the development and implementation of school environmental policies and management plans in Mpumalanga.

The research for this study reflects that the development and implementation of school environmental policies and management plans in Mpumalanga played a useful role in the management of resources such as water, electricity, paper and soil in schools. It is clear from this research that the more exposure schools get in terms of development and implementation of school environmental policies and management plans, the higher the achievement in terms of management of resources. Water is the resource that received the most benefit in terms of environmental management, through the implementation of school environmental policies and management plans in schools in Mpumalanga. Primary, secondary and pre-schools benefited in terms of the management of resources as a result of the development and implementation of school environmental policies and management plans in Mpumalanga.

The research for this study also reflects that the development and implementation of school environmental policies and management plans in Mpumalanga played a useful role in the addressing of environmental issues in schools. The research, furthermore shows that the more exposure schools get in terms of development and implementation of school environmental policies and management plans, the higher the achievement in terms of addressing of environmental issues. Greening is the environmental issue that benefited most in terms of environmental management through the implementation of school environmental policies and management plans in schools in Mpumalanga. Other issues addressed were waste management, soil erosion, recycling and alien vegetation removal. Primary, secondary, and pre-schools benefited in terms of the addressing of environmental issues as a result of the development and implementation of school environmental policies and management plans in Mpumalanga.

7.3 Hypothesis confirmation

The aim of this research is to answer the following problem:

Can the implementation of a school environmental policy and management plan assist in curriculum integration of environmental education, the organisation of environmental education processes, the management of

resources and the addressing of environmental issues in schools in Mpumalanga?

As reflected in the summary of research results, the research proves that exposure to the implementation of school environmental policies and management plans in schools in Mpumalanga, contributed towards achievements in terms of curriculum integration of the environment, the management of resources, the addressing of environmental issues and the organisation of environmental education processes in schools.

7.4 Deductions

The implementation of school environmental policies and management plans assists with curriculum integration of environmental education, the organisation of environmental education processes, the management of resources and the addressing of environmental issues in schools. The more exposure a school gets in terms of implementation of school environmental policies and management plans the higher the achievement in the aforementioned areas. It can, therefore, be deducted that exposure to the implementation of school environmental policies and management plans will lead to the integration of the environment in the curriculum, the organisation of environmental education

processes in schools, the management of resources and the addressing of environmental issues in schools.

7.5 Limitations of this research and suggestions for future research:

7.5.1

This research focused on three types of schools, i.e. primary, secondary, and pre-schools. The same research, focusing on one type of school, e.g. secondary schools, may result in learning phase specific findings.

7.5.2

Research on the implementation of school environmental policies and management plans in special schools for children that are mentally or physically challenged, may result in specific findings for this group of learners. This type of school was not covered by this research.

7.5.3

This research involved schools from both urban and rural areas. The same research focusing on a smaller geographical area in either urban or rural areas, may result in specific recommendations and applications for rural and urban schools, since their available resources and environmental issues may differ.

7.5.4

Elements of the school environmental policy and management plan like enviro-clubs, community knowledge, adventure and culture, fieldwork, competitions and enviro-information have not specifically been focused on in this research.

The same research focusing on these elements may provide meaningful insight in the implementation of school environmental policies and management plans.

7.5.5

This research focused on schools in the Mpumalanga province. Similar research focusing on other geographical areas or provinces may prove to be very valuable.

7.6. Recommendations

7.6.1. Documentation

All subjects in this research were supplied with the Mpumalanga edition of the school environmental policy and management plan pack. This ensured that sufficient information was available to the participating subjects. Additional information (as described in chapter 4) was also made available to the subjects. It is recommended that schools and teachers who want to develop and implement school environmental policies and management plans in their

schools, be supplied with relevant documentation and support documentation to enable them to do so.

7.6.2. Capacity building

All subjects in this research received capacity building. A day workshop on the development and implementation of school environmental policies and management plans were held in all regions. The theoretical session was followed by a practical session during which the subjects were expected to develop and suggest plans for implementation of school environmental policies and management plans for their schools. This ensured that subjects were capacitated in terms of the development and implementation of school environmental policies and management plans. It is, therefore, recommended that development and the implementation of school environmental policies and management plans should be supported by capacity building.

7.6.3 Poverty alleviation potential

Poverty is one of the biggest problems facing South Africa. The potential of the development and implementation of school environmental policies and management plans to, as a secondary benefit to environmental management, alleviate poverty needs to be more widely understood and communicated. Secondary benefits like supplementing the school feeding scheme, generating

income through recycling, saving of water and electricity, etc. all impact positively on poverty alleviation and has the potential to create a better life for everyone.

7.7. Conclusion

In conclusion, the research of this study proves to be valuable and relevant to the present national perspective on environmental education that is evident from the broadening of the concept of environment, the introduction of environmental education into formal education, the NEEP programme and the emphasis on active participation in learning. The evaluation of the implementation of school environmental policies and management plans in Mpumalanga proves that the challenge posed by the White Paper on Education and Training (1995) for environmental education:

“Environmental education, involving an interdisciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of the education and training system in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources” (principle nr. 17:22).

can be met and in the process also meet some of the needs of the Reconstruction and Development Plan (1994) in terms of developing programmes that rekindles our people's love of the land, increase environmental consciousness amongst the youth, empower communities to act on environmental issues and promote environmental ethic.

Appendix A:

Data collection of 2001 and 2002 is reflected according to where, (region in Mpumalanga in which the school is situated), and type of school.

School	Region: Ekangala			Region: Ehlanzeni			Region: Eastvaal		
	Prim	Sec	Pre	Prim	Sec	Pre	Prim	Sec	Pre
School 1	*								
School 2	*								
School 3	*								
School 4	*								
School 5	*								
School 6	*								
School 7	*								
School 8	*								
School 9	*								
School 10	*								
School 11	*								
School 12		*							
School 13			*						
School 14			*						
School 15				*					
School 16				*					
School 17				*					
School 18				*					
School 19				*					
School 20				*					
School 21				*					
School 22				*					
School 23				*					
School 24				*					
School 25				*					
School 26				*					
School 27				*					
School 28						*			
School 29						*			
School 30						*			
School 31							*		
School 32							*		
School 33							*		
School 34							*		
School 35							*		

School 36							*		
School 37							*		
School 38							*		
School 39								*	
School 40								*	
School 41								*	
School 42									*
School 43									*
TOTAL	11	1	2	13	-	3	8	3	2

Appendix B:

Mpumalanga edition of the school environmental policy and management plan

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