# Implementation of Environmental Education in Senior Phase: A survey of Cluster Schools

**By**

**Angeline Jabulile Makhoba**

KwaDlangezwa

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**A Dissertation Submitted to the Faculty of Education in Partial Fulfilment of the Requirements for the Masters Degree in the Department of Mathematics, Science and Technology Education at the University of Zululand**

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## DECLARATION

I, Angeline Jabulile Makhoba, hereby declare that this dissertation: ***Implementation of Environmental Education in Senior Phase: A Survey of Cluster Schools,*** is my original work. All the sources that I have used or quoted have been indicated and acknowledged by means of complete references. It is further declared that this dissertation has not previously been submitted to any institution for degree purposes.

_____ _____

A. J. MAKHOBA DATE

I hereby declare that this dissertation has been submitted for examination with my approval.

_____ _____

DR. E.T. DLAMINI DATE

(Supervisor)

## DEDICATION

This dissertation is dedicated to my beloved family, for their support, encouragement and prayers. May this be a reminder to them that hard work and perseverance is the road to success.

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## ACRONYMS

| | |
|---|---|
| A & C | Arts and Culture |
| DAEA | Department of Agriculture and Environmental Affairs |
| DEAT | Department of Environmental Affairs and Tourism |
| DoE | Department of Education |
| EE | Environmental Education |
| EEIP | Environmental Education Impact Policy |
| EECI | Environmental Education Curriculum Initiative |
| EMS | Economic and Management Sciences |
| ES | Education for Sustainable Development |
| GET | General Education and Training |
| HIV/AIDS | Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome |
| IUCN | International Union for the Conservation of Nature |
| LLC | Language, Literacy and Communication |
| LO | Life Orientation |
| NCS | National Curriculum Statements |
| NEEP-GET | National Environmental Education Project- General Education and Training |
| NS | Natural Sciences |
| RNCS | Revised National Curriculum Statements |
| SADC (REEP) | Southern African Development Community – Regional Environmental Education Programme |
| SD | Sustainable Development |
| SS | Social Sciences |
| UN | United Nations |
| UNCED | United Nations Commission on Environment and Development |
| UNECED | United Nations Commission on Environmental and Development |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| WSSD | Word Summit on Sustainable Development |

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## ABSTRACT

The objective of this study was to investigate if educators in the Senior Phase implemented the teaching of Environmental Education (EE) in their learning areas. The study had to find out why some environmental themes were more interesting to teach as compared to others. The teaching methods used by educators in teaching environmental education were to be identified. The study was conducted amongst six (6) primary schools and two (2) high schools in one cluster. There were thirty (30) educators involved in the study.

The constructed objectives of the research study lead to the formulation of the following research hypotheses: (a) The frequency with which identified environmental themes are taught differs with respect to different learning areas; (b) Some identified environmental themes are more interesting to teach as compared to others; and (c) Educators use a variety of teaching methods when teaching environmental education in the senior phase.

A questionnaire was used to collect data. It followed eight (8) environmental themes to be used by the participants. The collected data was then analysed through the use of a computer programme called Statistical Packages for Social Sciences (SPSS).

In the analysis of results it was discovered that educators did implement environmental education in their learning areas, but to a limited extent. This seemed to agree with the hypothesis that educators do implement cross-curricular teaching of EE. It was discovered that some learning areas like

Economic and Management Science (EMS), Natural Science (NS) and Social Science (SS) were more flexible in teaching environmental education as opposed to Arts and Culture (A & C) and Life Orientation (LO). The analysis of results showed that some environmental themes were more interesting to teach, like Population and Human Health as compared to others like Deforestation and Waste and pesticides. It was discovered that educators used mainly the question and answer, discussion and narrative methods as opposed to projects, research and fieldwork. This finding is discussed in the light of the literature reviewed, some recommendations aiming at action that could be taken and further research is made.

# CHAPTER ONE

# ORIENTATION TO THE STUDY

## 1.1 INTRODUCTION

According to Wagiet (2002) environmental education is conceptualised as an integral formal facet of education, therefore, there is consensus that education at all levels is central for giving impetus to sustainable development. This study aimed at investigating whether educators do indeed integrate environmental topics in their learning areas so that learners may gain knowledge, awareness, values and skills to solve environmental problems. Environmental Education aims at preparing individuals to be responsive to a rapidly changing technological world, to understand contemporary world problems and to provide the skills needed to play an effective role in the improvement and maintenance of the environment (Ramsey, Hungerford, & Volk, 1992). For this reason, Environmental Education is important because it covers a variety of environmental aspects, including those of a scientific, aesthetic, economic, social, political or even spiritual nature (Loubser, 1997).

The General Education and Training (GET) band is composed of learners who are of compulsory school-going age (about 5 to fifteen years of age). As their school curriculum suggests that they should develop skills and values about the environment whilst at school, it is believed that they might be able to disseminate environmental information to the larger community while also

developing a positive attitude towards the environment. It is also believed that their concretisation about the environment might make them act more positively and responsibly towards the environment. In dealing with the topic of environmental education, Le Roux (2000) argues that we as individuals, parents, teachers, academics, schools, universities, communities, nations and peoples should help effect the transition from present day patterns of unsustainable development. Section 24(a) of the Constitution of South Africa states that every South African has a right to an environment that is not harmful to his or her health or well-being (RSA, 1996). This statement illustrates the concern of the national government regarding responses to the environmental crisis. The inclusion of 'environment' as a topic in all learning areas in the General Education Band (**GET)** is assumed to be a tool in ensuring that learners are environmentally literate and proactive.

## 1.2 MOTIVATION FOR THE STUDY

Environmental issues are a current concern and have a social, economic and political impact on the lives of citizens. It is encouraging to note that the United Nations Educational, Scientific and Cultural Organization (**UNESCO**) has an interdisciplinary approach to environmental education, whereby EE embraces all disciplines and covers all levels and types of education, including life–long learning (UNESCO-UNEP, 1990). According to their website (Environmental Education for Sustainable Development UNESCO. or/education/ en/e.849 **URL UNESCO'**s approach to EE favours enhancement of critical thinking, problem-solving and effective decision-making skills as well as teaching individuals to make informed and responsible decisions. In South Africa, it is assumed that links will be forged between formal EE curriculum and non-formal activities in

the communities in order to encourage learners to learn from real-life situations in their environment. It is essential that learners understand and use the term 'environment' as an interdisciplinary and integrated term, as explained by O'Donoghue (1993), in an EECI discussion document (2000). The diagram below by O'Donoghue, (1993) explains that the term environment is not only

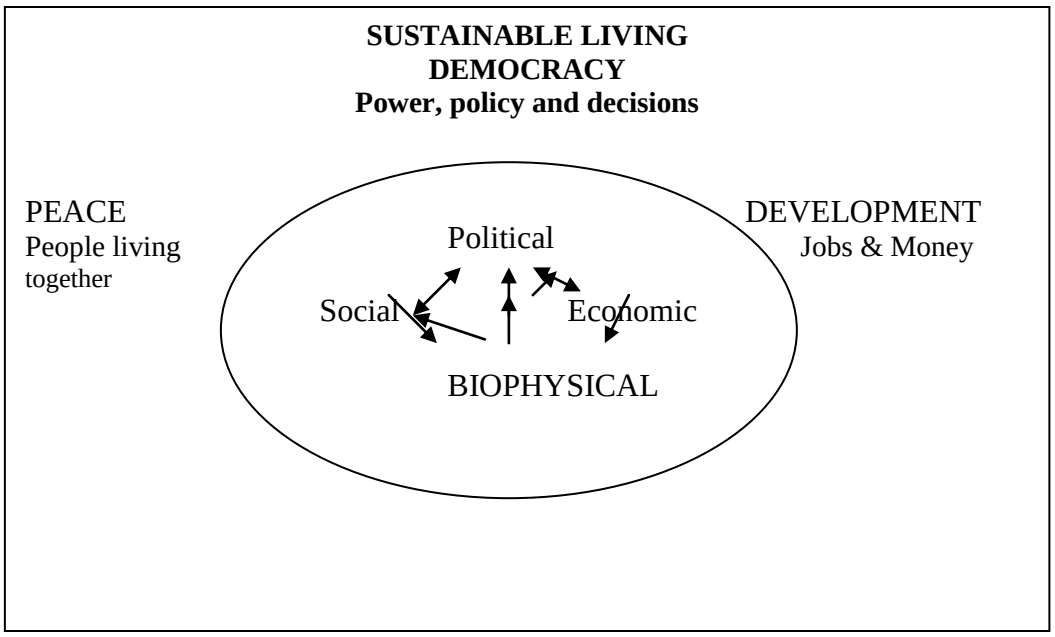


**FIGURE 1.1 A MODEL OF THE ENVIRONMENT**

[Source: O'Donoghue, (1993)]

about the biophysical dimension but encompasses the social, political and economical dimensions. In the formal education system, these dimensions are addressed in learning areas.

Educators who are teaching different learning areas are tasked with a role of ensuring that a particular learning are/subject plays a role in the work and life of citizens in South African society – particularly with regard to human rights and the environmental policy (Palmer & Neal, 1995). In the policy handbook for

educators A-52, educators are expected to work as a team to ensure that the leaner achieves the mastery of skills in an interdisciplinary approach. For instance, one of the critical outcomes in the GET band, states that it envisages learners who are able to demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation [**RNCS** Overview Policy Document (grades R – 9), 2003]. The teaching of environmental education across the curriculum is one way of assisting learners to discover that problem-contexts do not exist in isolation (Tbilisi Declaration, 1978).

## 1.3 STATEMENT OF THE PROBLEM

In Outcomes Based Education the curriculum and teacher development theories and practices have focused on the role of teachers as specialists in the development and implementation of effective teaching, learning and assessment practices and materials development (RNCS – Teachers' Guide 2003). With barriers to curriculum development, such as inadequate training of educators, resistance to change (educators and subject specialists), insufficient teaching and learning resources, poor language usage, lack of understanding of policies and poor school organisation, educators find themselves unable to develop effective curricula through interpretation and design of learning programmes. Environmental Education emphasises that *active learning should take place* – where an educator explores beforehand and elicits the learner's pre-instructional knowledge and understanding of concepts of the environment (Robertson, 1994). One of the fundamental aims of this study is to find out whether educators do indeed integrate environmental topics in their learning areas so that

learners may gain knowledge, awareness, values and skills to solve environmental problems

According to the Belgrade Charter (**UNESCO-UNEP**, 1990) the goal of environmental education is to develop a world population that is aware and concerned about the environment and its associated problems. It is further maintained that the population should have knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones".

Educators need to be capacitated to implement active learning with the "environment as a topic". There are, however, a number of questions in terms of educators' preparedness to integrate EE into all of the Learning Areas, including the question: Are all educators aware that EE should be integrated into all learning areas? Palmer & Neal (1995) have argued that the successful implementation of EE programmes relates to the educators' subject knowledge, enthusiasm, awareness and dedication to their tasks. A crucial question is whether educators do teach EE in an integrated approach. For instance, can educators identify environmental topics and relate these to their teaching? One wonders if all educators are aware that they need to design learning programmes that address local environmental issues so that the learners can be in a position to solve global environmental issues. We have to act locally, but think globally because the world has shrunk to such an extent that there are missing bits due to development in technology, that unsuitable activities in one part of the world eventually impacts negatively on other parts of the world.

The question arises: If curriculum 2005 emphasises that 'environment' forms a content of each learning area, does this imply that learners necessarily have an interest in environmental topics? The role of the teacher as a *curriculum designer, interpreter and implementer* cannot be overemphasised in this study. However, we also know that some teachers who were trained in the previous apartheid regime were not trained in curriculum development. There may, therefore, be major challenges for educators who want to integrate EE into their learning areas without having acquired the necessary skills to do so. Hence, the core intention of this research inquiry is to establish the extent to which educators are able to implement the teaching of EE across the curriculum.

## 1.4 THE PURPOSE OF THE STUDY

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 so as to ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources (SA White Paper on Education and Training, 1995). This approach to environmental education teaching needs to be facilitated by educators. Educators are expected to ensure that environmental education allows children the opportunity to understand the many and varied environmental issues that surround them; how decisions are made about the environment, and how people can have the opportunity of participating in the decision-making process (Palmer & Neal, 1995). In past years it was assumed that Environmental Education had nothing to do with Mathematics, Economics and Management Studies and Languages, yet the

recent definition of environment clearly states that all learning areas can integrate environmental education.

Due to lack of information on the part of educators, they find themselves not knowing how to promote cross-curricular teaching of environmental education. As a cross-curricular theme, environmental education is concerned about the environment, *learning in and through the environment and also learning for the environment* (Fien, 1994). The purpose of this study was to find out if educators do implement cross-curricular teaching of EE. The research sought to find out if educators do implement the teaching of EE across the curriculum. To investigate the problem, the researcher enumerated eight environmental themes as stated in Loubser (1997). Furthermore, the research aimed at finding out if educators teaching different learning areas in the senior phase, find other environmental themes more interesting to teach as compared to others and the associated reasons. The research additionally sought to find out which methods are often used by educators in the teaching of EE in their particular learning areas.

### *1.4.1 Statement of the research questions*

Specifically, this research study sought to answer the following fundamental research questions:-

a. How frequently are environmental themes identified and taught in different learning areas in the senior phase?
b. Are some environmental themes identified as more interesting to teach as compared to others?

c. Which teaching methods are often used by educators in teaching environmental education in the senior phase?

These questions represent the core of the intention or objectives of this research inquiry, which sought to investigate if educators in the Senior Phase implemented the teaching of Environmental Education (EE) in their learning areas.

### *1.4.2 Statement of hypotheses*

The above research questions led to the formulation of the following research hypotheses:

a. The frequency with which identified environmental themes are taught differs with respect to different learning areas.
b. Some identified environmental themes are more interesting to teach as compared to others.
c. Educators use a variety of teaching methods when teaching environmental education in the senior phase.

The above-stated hypotheses were calculated educated guesses, which sought to facilitate answering the research question. The hypotheses were subject to acceptance or rejection pending on the outcomes of data analysis. These hypotheses would also facilitate the process of arriving at interpretive findings and conclusions

## 1.5 DEFINITION OF MAJOR CONCEPTS

In order to promote an understanding of certain issues discussed in this study, it was essential to define the main terms used in this research project. The main

intention of this section was to eliminate or avoid ambiguity, duplication and other complexities of the terms used.

### *1.5.1 Biodiversity*

According to Mader, (2004) the term biodiversity refers to the total number of species, the variability of their genes and the communities in which they live. Therefore, biodiversity generally refers to genetics, species, and ecosystem diversity. This is the diversity of life upon which the environment depends.

Another definition from Wikipedia states that Biodiversity is the variation of taxonomic *life* forms within a given *ecosystem,* or for the entire *earth.* Biodiversity is often a measure of the health of *biological systems* (http://en.wikipedia.org.wil.biodiversity, 2008).

A definition mostly used by ecologists refers to "the totality of *genes, species* and *ecosystems* of a region." An advantage of this definition is that it seems to describe most circumstances and presents a unified view of the traditional three levels at which biodiversity has been identified. Some factors contributing to loss of biodiversity are: over- population, deforestation, pollution of air, water and soil, and global warming and human activity.

### *1.5.2 Waste management and treatment*

According to the Environmental News (2007), waste refers to all solid residuals that result from human activities and can be classified as *organic* or *inorganic* according to its chemical composition. Waste *treatment and management* refers

to the activities required to ensure that waste has the least practical impact on the environment.

### *1.5.3 Sustainable development*

Sustainable development is advocated as the best strategy to deal with environmental issues in an ongoing way without jeopardizing the chances of future generations. According to O'Donoghue (2008) sustainable development is a comprehensive concept seeking for the modernisation of living and working patterns. Furthermore, it aims at improving individual opportunities and achieving social prosperity, economic growth and environmental compatibility. This also entails that development is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs, can be met not only in the present, but also for future generations to come (http://en.wikipedia.org/wiki/sustainable.dev, 2008)

### *1.5.4 Pollution*

According to Mader (2004) pollution includes many types and points of focus. In its broadest sense, pollution can be described as the result of the release to air, water or soil from any process or of any substance, which is capable of causing harm to man or to other living organisms supported by the environment. Long lasting pollution can affect the physical environment by changing its characteristics through speeding up or slowing down natural processes. We are presently experiencing the effect of pollution in a visibly changing climate that is beginning to affect even the sceptics who always doubted climate change.

### *1.5.5 Urbanisation*

Urbanisation refers to a process in which an increasing proportion of an entire population lives in cities and in the suburbs of cities. Historically, it has been closely connected with industrialisation. When more and more inanimate sources of energy were used to enhance human productivity (industrialisation), surpluses increased in both agriculture and industry. Larger and larger proportions of the population could therefore live in cities. Economic forces were such that cities became the ideal places to locate factories and their workers. Urbanisation is the increase in the population of cities in proportion to the region's rural population (http://en.wikipedia.org/wiki/urbanisation, 2008).

A "city" refers to a place of relatively dense settlement, dense enough so that residents cannot grow their own food. The cities depend on rural areas to provide food from farms or smallholdings.

### *1.5.6 Curriculum*

Although there is lack of total agreement on how to define the concept 'curriculum', there are a number of different definitions ranging from those that emphasise the learners and their needs and those that are more abstract. Marks, Stoops & Kind-Stoops (1978: 457) sees the curriculum as

> '…the sum total of the means by which a student is guided in attaining the intellectual and moral disciplines requisite to the role of an intelligent citizen in a free society. It is not merely a course of study, nor is it a listing of goals or objectives; rather it encompasses all of the learning experiences that students have under the direction of the school'.

## 1.6 LIMITATIONS

By its very nature research can be easily affected by nature of variables that are involved in investigating the research problem. These variables may include the size, character, process and relevance of the research components. Considering that these research components are numerous, only a few pertinent ones are discussed in this study.

### *1.6.1 Size of the research sample*

The size of the research sample has implications for the outcomes of the research investigation. Notwithstanding that the teaching of environmental education is of global concern, the sample chosen for this study does not represent the globe, but only one section of the population, that is rural areas. The research results might be different if educators from various areas, such as urban, semi-urban and rural areas were involved in the study.

### *1.6.2 Data collection method*

The study could yield more reliable results if the researcher observed the educators teaching EE across the curriculum for a specific period and compared the observation with the questionnaire responses.

### *1.6.3 Financial resources and geographical constraints*

The schools that were involved in the survey are in deep rural areas where there are very bad gravel roads and general infrastructure. The schools are far apart from each other, meaning that it took considerable time reach schools in the study area. In this regard, it was not possible to include more schools in the

survey. The geographical spread of schools also implied that there was additional need for financial resources, for example to purchase petrol.

### *1.6.4 Choice of environmental themes*

Other possible topics that could have been included in the study are: global warming, alien and indigenous species, wetlands, marine life and conservation, which could have contributed to the better understanding of the Environmental Education issues under investigation.

## 1.7 DELIMITATION OF THE STUDY

The study was delimited to the northern part of KwaZulu-Natal in Zululand Service Centre in the Empangeni District, within Lower Umfolozi Circuit of Obuka Ward. The distance from Empangeni to the area where the schools are situated is about 78km. Schools under study are about 8km apart from each other. The choice of the six primary schools and their two feeder schools was necessitated by restrictions with regard to accessibility of transport within the area.

## 1.8 SIGNIFICANCE OF THE STUDY

Establishing whether EE is integrated into the existing curriculum at the senior phase would assist government education officials to decide on the type of developmental programmes to be offered to educators. The Department of Education is already working in partnership with the Department of Agriculture and Environmental Affairs (DAEA) to equip some educators with resources on

EE integration into the curriculum with the purpose of benefiting both educators and learners with regard to environmental issues.

It is hoped that the learners' interest in EE topics would be encouraged through learning that involves hands-on and minds-on activities. As learners belong to communities, it is assumed that the larger community would eventually benefit from learners' knowledge, attitude and awareness. The **DAEA** is already working with some schools in the establishment of environmental clubs, greening of schoolyards and in recognition of achievement, by means of environmental awards, for instance, for writing essays on environmental topics. These activities sensitise young people about environmental issues and stimulate discussion of solutions to these problems. They also help the learners to begin to understand complex issues related to sustainable development.

## 1.9 ORGANISATION OF THE STUDY

**Chapter 1**

This chapter presents the orientation of the study and also includes the motivation for the study, the statement of the problem, the purpose of the study, its objectives, definition of terms, delimitation and the limitations of the study.

**Chapter 2**

This chapter explains and analyses trends, which have emerged in the teaching of Environmental Education. The literature reviewed discusses international, Southern African and South African views on cross-curricular teaching of EE. Curriculum objectives and challenges associated with cross-curricula objectives

and challenges associated with cross-curricular teaching of EE were dealt with in the literature review.

**Chapter 3**

Basically this chapter describes the methodology pursued in this research study. It deals with how the data was collected in terms of the research methods, participants or sample, data collection instruments and the analysis and interpretation of data.

**Chapter 4**

In this chapter the collected data is analysed and interpreted and some conclusions drawn from the outcomes. On the whole answers were provided to questions posed, such as: How frequently are environmental themes taught in different learning areas in the senior phase? What teaching methods are widely used by educators and what reasons are associated with the educators' choices of teaching strategies? The chapter also pays attention to the hypotheses postulated.

**Chapter 5**

Pursuant to the analysis and interpretation of data, this chapter draws some conclusions from the findings of analysis, and provides pertinent recommendations for action which could be taken in future research.

## 1.10 CONCLUSION

This research investigation is a necessary instrument not only for matching theory with actual practices on the ground relation to utilisation of

Environmental Education in the entire curriculum. It may be seen as the fountain of discovery ready to provide answers and basis for initiating change in the South African education scenario. This chapter aimed at illustrating the importance of Environmental Education, including the delimitation of the study, the motivation behind the study, its purpose and objectives, a definition of major concepts, its limitations, significance, ethical issues and organisation of the study. The next chapter reviews and provides a theoretical framework or background associated with understanding Environmental Education.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 INTRODUCTION

The schools have a special role to play in promoting environmental education by including it to the existing curricula. This notion is confirmed by Molapo (1999) who states that implementation of environmental education within formal education can be greatly facilitated by its inclusion within the formal curriculum. This chapter aims at exploring the role played by educators in implementation of environmental education, using the general related literature as well as other authors' findings and suggestions.

## 2.2 ENVIRONMENTAL EDUCATION IN OUTCOMES BASED EDUCATION

When describing what Outcomes Based Education (OBE) entails, Spady, (1994) states that Outcomes Based Education means clearly focusing and organising everything in an education system around what is essential for all students to be able to do successfully, at the end of their learning experiences. When criticising the idea of Outcomes Based Education, McKernan, (1993), argues that knowledge and understanding can never be reduced to behaviours, lists of skills and observable performances. Therefore, to adopt Outcomes Based Education is to reduce knowledge to objective facts. Although McKernan (1993) criticises the idea of using OBE in schools, OBE can be given some credit in the sense that outcomes, when clearly unpacked

by educators for all learning areas, a balanced human being can be produced. Loubser (1997) states that one of the focal points of Outcomes Based Education, would be an integration of subjects. This integration is clearly illustrated in the GET band where the term 'environment' is found in all learning areas.

### *2.2.1 Cross –curricular teaching of EE in South Africa*

The new constitution of South Africa states that every South African citizen has a right to an environment that is not detrimental to his or her health or well-being (Republic of South Africa, 1996). Each and every institution in South Africa is therefore, mandated to abide by this phrase in the South African Constitution. The United Nations Millennium Goals, as stated in Lotz-Sisitka & Raven (2004), encourage reduction of child mortality, improving maternal health, combating HIV/AIDS and other related diseases, ensuring environmental sustainability. It, therefore, implies that if EE is effectively implemented in schools the learners, the local and global community is saved from a number of environmentally related problems for example HIV/AIDS, uncontrolled population growth, unnecessary waste, loss of biodiversity, soil erosion and pollution. These environmental issues can be addressed in different contexts by different educators. This would be more possible if educators are exposed to teacher empowerment programmes on EE implementation. Schools in South Africa should ensure that they produce learners who are environmentally literate and pro-active. For educators to equip learners with environmental knowledge, skills, awareness and ability to take action, they have to understand what the term environment means. When defining the term environment, the South African Environmental Education Policy Initiative (EEPI) in 1995, states that the environment is as much a matter of economic policy and social processes as

it is a matter of natural systems and resources. This description of the term 'environment' clarifies why environmental education can be integrated into any subject, be it economic and management sciences, natural science, social science, geography or arts and culture. The Outcomes Based Education approach to teaching addresses the issue of environmental education.

### *2.2.2 Revised National Curriculum Statement (R-9) and the environment*

The Revised National Curriculum Statements (RNCS) is a strategy of implementing Outcomes Based Education approach to education. The **RNCS** document (R-9) 2003 states that the curriculum aims at developing the full potential of each learner as a citizen of a democratic South Africa. It seeks to create a lifelong learner, who is confident and independent, literate, numerate and multi-skilled, compassionate, with respect for the environment and the ability to participate in society as a critical and active citizen. Educators are therefore faced with a problematical challenge to ensure that the optimistic objectives of RNCS are achieved. Loubser (1997) is of the opinion, however, that most teachers in South Africa will not be able to teach in a *cross-curricular* way, because this approach is a new development in education. In the RNCS and the **NCS** educators are expected to design their learning programmes in such a way that they are able to achieve the stated Learning Outcomes. Bauman (2001) views the role of educators (in the modernist forms of education) as that of translating value into social skills and therefore ascribes the phenomenon of social patterning to education, in which individual members of society are shaped into social beings. Educators have documents to use when embarking on a process of designing learning programmes, these are referred to as Learning Area Statements, which state the learning outcomes each learner should acquire in each grade.

In order to shape individuals with regard to EE, educators should be well trained. This is confirmed by the Environmental Education Curriculum Initiative (EECI, 2000), which states that higher education institutions will need to recognise the pedagogical (methodological) and knowledge implications associated with the resolution of environmental issues and risks.

### *2.2.3 Integration of EE in the RNCS learning Area Statement*

The RNCS aims at addressing the principles of human rights, healthy environment, social justice and inclusivity. Learners are, therefore, expected to be conscious of the importance of a healthy environment and to be critical thinkers in terms of environmental issues, risks and solutions. If learners are conscious and critical about environmental issues they would be able to take action for a better environment. In support of the idea of integration, Winebrake & Frysinger (2000), state that integration assists students to gain an appreciation for the true interconnection of disciplines.

Powers (2004) describes an EE infusion model in which infusion describes a process of integrating EE concepts, skills and strategies throughout an existing general education curriculum. In South Africa it means integrating EE across all the eight learning areas at the **GET** level. If educators can be trained to accept change, it is believed that EE integration into all learning areas can lead to the development of environmentally literate citizens who can take action on environmental issues locally, thus preventing (or at least minimizing) global environmental risks.

EE is assumed to be a good example of how cross-curricular teaching can be implemented. The integration approach was chosen by South Africa. Thus, as stated by Loubser (1997), one of the most important focal points (especially in the GET Phase) was to be the integration of subjects. Lotz,

Christians, Kelly & Reed (1994) have argued that integrated curricula offers an alternative way of developing curricula around common socio-ecological issues or topics of local relevance. According to these authors some of the advantages of integration are that it promotes critical and collaborative actions, dialogue and participation of learners, educators and community in solving common issue or problems in the local area.

Some learning outcomes that are stated in the Revised National Curriculum Statements for different learning areas, anticipate the kind of learners who are environmentally literate and pro-active. The discussion below describes these environmentally related learning outcomes. The Technology Learning Outcome 3 states or gives the relationship between technology society and the environment (RNCS, 2003i). This learning outcome is similar to the natural science learning outcome 3, which emphasises the relationship between science, technology and the society (RNCS, 2003g). In the Social Sciences, the whole learning area is about the relationship between people and the relationship between people and the environment (RNCS, 2003h). Economic and Management Sciences deal with the wise and equitable resource use which emphasises social justice and stresses that peoples' needs and lives should not be harmed regarding healthy environments (RNCS, 2003b). The Arts and Culture learning area studies the human rights and environmental issues, as well as the role of natural and cultural heritage in the society (RNCS, 2003a). Life orientation, learning outcome one, emphasises that learners should make informed decisions about personal health, community health and the environmental health (RNCS, 2003d). The learners need to use skills to read, write, speak and listen to communicate issues on the environment (RNCS, 2003c). Mathematical conclusions on environmental problems and risks should be drawn therefore mathematics should integrate environmental topics (RNCS, 2003f).

The Department of Education in collaboration with the Department of Labour has stated that 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. This policy approach is there in order to create environmentally literate and active citizens, so as to ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources (EECI, 2000).

The above discussion was aimed at highlighting why this study had to be undertaken. It therefore forms the theoretical framework for the study. The discussion further aimed at exposing that, if environmental education is implemented in a cross-curricular teaching strategy, it will promote the Millennium Development Goals of the United Nations, which address child mortality, maternal health, combating HIV/AIDS and other related diseases as well as ensuring environmental sustainability. It further seeks to emphasise that cross-curricular implementation of environmental education could be accepted as one strategy that aims at addressing the constitutional environmental rights for all citizens. It is assumed that if learners are provided with environmental knowledge and skills, they might contribute to the larger community to which they belong by displaying a positive attitude towards the environment and use their skills and knowledge to prevent and solve existing environmental problems.

## 2.3 EDUCATORS IN THE TEACHING OF EE THROUGH OBE

In order to shape individuals with regard to Environmental Education (EE), educators should be well trained. This viewpoint upheld in the Environmental Education Curriculum Initiative document (EECI, 2000), which states that higher education institutions would need to recognise the

pedagogical (methodological) and knowledge implications associated with the resolutions on environment related issues. The training of teachers in higher education institutions on EE teaching should be conducted both as a pre-service and in-service training process, so as to reduce the gap caused by the apartheid education system. Ketlhoilwe (2003) argues that educators in the Southern African schools should design learning programmes that address community related issues like human rights, life skills, HIV/AIDS, violence, drug abuse and poverty. These issues can be well addressed in all learning areas through Environmental Education. The Norms and Standards for Educators Policy (DoE, 2000) emphasises the practical, and foundational as well as the development of reflexive competences for educators. Some of these competencies for educators mention the role of the teacher in relation to the environment (EECI, 2000). These competences encourage the educators to promote human rights and the environment, develop political attitude and healthy life style in learners, understanding the key community problem and understanding the role each learning area plays in the work and life of citizens in South African society particularly, with regard to human rights and the environment.

The previous discussion highlights some challenges facing educators in promoting environmental education. Educators in the South African education systems are expected to take these roles into consideration when they design the Outcomes Based learning programmes for EE integration into the mainstream curriculum. In view of the challenges facing educators in the implementation of Outcomes Based Education (Mattson & Harley, 2003) maintain that Outcomes Based Education demands a high level of discipline, knowledge and expertise on the part of the teachers and is seen as being an extended view of professionalism. The idea of teacher training is emphasised by Chisholm (2000) when stating that inadequacy of teacher training which

focuses on ‘thin’ or procedural, that is ‘how to do’ knowledge at the expense of developing teachers’ understanding of the ‘why’. Robottom (1993:18) indicates a lack of understanding of environmental education processes and a lack of capacity for implementing EE by teachers as a challenge. Janse van Rensburg & Du Toit (2000) cite educators limited knowledge of local environmental issues owing to the fact that they lived and worked in contexts where a much stronger discourse of economic development does not clearly support or link with environmental objectives. This is at times observed when educators who are working and living in the rural areas attend workshops together with educators in an urban area, they seem to be operating at two different planets when certain issues are discussed. Educators who are not well informed about environmental issues cannot be effective in assisting learners to be environmentally sharp and responsible. In promoting effective teaching, Killen & Spady (1999) has suggested that teachers must consider their own knowledge, skills and attitudes relevant to the outcomes because these will influence how teaching is approached. Usually, workshops that aim at developing educators on educational issues address the cognitive and psychomotor domain, leaving out the educators’ effective domain, yet this has an influence on how the teacher teaches.

## 2.4 TEACHER EMPOWERMENT IN THE IMPLEMENTATION OF EE.

Although Biology and Geography teachers often seem to think that EE belongs to them, all other teachers should and can be environmental educators (Ferreira, 2001). The latter is the reason why the teacher empowerment initiatives programmes towards EE teaching were initiated. According to Irwin & Lotz-Sisitka (2005) these empowerment initiatives may be discussed under the following:

### *2.4.1 Environmental Education Policy Initiative (1992-1995).*

This initiative is aimed at introducing a participatory policy-making process on environmental education. The initiative is expected to incorporate many of the elements of EE and related learning areas.

### *2.4.2 Environmental Education Curriculum Initiative (1996-2000)*

This was a partnership project that enabled staff from the department of Environmental Affairs and Tourism, provincial government education departments and environmental education practitioners around the country to work together to debate and define environmental education in Curriculum 2005.

### *2.4.3 National environmental education project–General Education and Training (NEEP-GET) Implementation*

This was a donor-funded initiative that was aimed at providing professional development to curriculum advisors and teachers. In her speech in the National Environmental Education Project Colloquium, the then National Education Minister of South Africa, Naledi Pandor, appreciated the input by the **NEEP-GET** in professional development of teachers and curriculum advisors to promote successful implementation of EE in the GET Band [http://www.policy.org.za/article/pandor_coll. (2008)].

Although NEEP-GET has been such a productive project, it had to come to an end since it was started for a specific purpose. In the DEAT article [http://www.deat.gov.za/ProjProgr/2003NEEP/capacitybuilding.html. (2008)] it is stated that the EE co-coordinators in all the nine provinces, were tasked

with the responsibility to ensure that the project is sustainable, which does not seem to be happening.

Teacher empowerment seems to be an essential tool in ensuring that new curriculum development programmes are successful, although Fien (1994) doubts if educators who receive pre-service studies or in-service studies do meet the objectives of curriculum development. It is suggested that the teacher education programmes should ensure that the teacher is able to identify areas of knowledge, (COTEP, 1995).

The previous discussion shows that initiatives towards Environmental Education can play a major role if implemented consistently and continuously. Palmer (1998) states that even where well-designed and successful programmes of environmental education do exist, their impact on long-term thinking and action is not as great as that of other significant experiences and formative influences in people's lives. The impact on long-term thinking and action to learners' lives can be possible if educators employ suitable teaching methods.

## 2.5 TEACHING METHODS IN THE INTEGRATION OF EE IN FORMAL EDUCATION

The RNCS (R-9) overview document 2002 was envisaged to create a lifelong learner who is confident and independent, literate, numerate, multi-skilled, compassionate, with respect for the environment and the ability to participate in society as a critical and active citizen. In the Curriculum 2005 document unveiled by the Minister of Education, Prof. S. Bengu in February 1997, **OBE'**s utility was characterised as not only being about increasing the general knowledge of learners, but also and most importantly in its ability to

develop their skills, critical thinking, attitude and understanding (Ministry of Education, 1997). For learners to be able to study and solve environmental problems and to address environmental challenges, learners have to acquire certain skills for example, communication skills, research skills, analytical skills and co-operative skills. Lotz-Sisitka & Raven (2001) have stated that for learners to acquire diverse skills, active learning strategies should be used, that is, active learning, critical thinking and involvement in real issues. In a National Foundation for Educational Research Study, (Morris & Stoney, 1997) it was found that learners in schools with active environmental learning programmes were more likely to have skills to form judgments on environmental issues. In this regard then, active learning is therefore worth pursuing. Ketlhoilwe (2003) supports the use of learner-centred, participatory and active learning methodologies when teaching environmental education in formal education. A few of these methods include:

a) Role play
b) Active learning
c) Investigation/ experiential learning
d) Group work
e) Presentations
f) Demonstrations
g) Theatre and television
h) Demonstrations

When choosing teaching methods, educators should bear it in mind that learners are unique human beings with different learning styles. In Van Rooyen (2006) learners are categorized into auditory (learners learning through listening), visual (learners learning through seeing) and tactile (learners learning by touching, moving and doing). These learning styles require educators to implement teaching methods that develop listening,

touching and seeing skills like participatory, action based and problem solving teaching methods.

When educators develop learning programmes for EE, they should take into consideration the level of development of learners learning experiences. In the Tutorial letter MEDE-06 of the University of South Africa, it is mentioned that learners in Junior high schools should be engaged in activities which promote collective data, identifying variables, comparing, predicting, basic problem solving and decision making since these learners are in a position to link their experiences (UNISA, 2004).

In the Southern African education systems schools are faced with a challenge of over-crowding and shortage of teachers (Ketlhoilwe, 2003). This at times poses problems to educators in choosing learner centered methods, but if educators are knowledgeable about EE they can overcome barriers by designing programmes that link practice and theory as teachers in Australia are doing (Robottom, 1993).

Scoullous & Malotidi (2004) recommend the use of a combination of methods or strategies, because one method or strategy will probably not achieve all the learning outcomes and students may not equally respond in terms of learning and developing skills. The idea of the use of a range of methods to make a link between environment, learning areas and learning competencies is supported by Kabitura (2006). By engaging with these different kinds of learning and teaching methods in the context of a local environmental issue or environmental risk, learners can contribute to the discovery, uncovering and understanding of resource management through dialogue (talking), reflecting (informed thinking about) and encounter (hands on experience) (O'Donoghue & Janse van Rensburg, 1995).

It is, therefore, essential that educators choose teaching methods that cater for a range of learner-centred activities. McKernan (1993), maintains that curriculum development of learning programmes and materials should put learners first, recognising and building their knowledge and experience and responding to their needs. This must also be based on the way in which different cultural values and lifestyles affect the construction of knowledge, which should be acknowledged and incorporated in the development and implementation of learning programmes. Teaching methods can be linked to ideologies associated with EE teaching, namely teaching through/in, about and for the environment. These are highlighted by Le Roux (2000) as follows:

### *2.5.1 Education through the environment*

This type of education uses students' experiences in the environment as a medium of education. Teaching methods related to this learner-centred approach are solitaire, encounter, dialogue, discussion and reflection. Although these research methods are learner-centred, they seldom challenge learners to take action for sustainable living (Le Roux, 2000). This approach should, according to Greenall (1993) supplement learners' knowledge and facts about the environment. This approach to EE teaching can be of more benefit to learners who learn well through touching (tactile). Although field trips and outdoor activities which are associated with this approach are often planned in schools to expose learners to education through the environment, these activities cannot be effective if there is no environmental policy in each school. In support of the Environmental Policy initiative Molapo (1999) suggests that all schools should have a clear environmental policy that caters for all environmental activities within the school.

### *2.5.2 Education about the environment*

This type of education emphasises knowledge about natural systems and processes and the ecological, economic and political factors. Robottom (1987) sees this education as solely based on building learners' cognitive ability without any action taken to promote sustainable living. Methods associated with this approach are 'show' and 'tell', projects and the targeted communication. This approach can be utilised effectively if learners are provided with opportunities to do projects that allow them to find information about an environmental issue, learners can then analyse the information, compare, predict and draw conclusions based on the knowledge they have acquired.

### *2.5.3 Education for the environment*

This education emphasises issue-based, action-oriented and problem-solving approaches (Palmer, 1998). On the other hand, Ferreira (2001) stresses action research which includes audits, impact assessments, and participatory appraisal as action taking methods that promote education for the environment. This educational approach to EE provides a holistic understanding about EE, which is supported by Van Rooyen (2006) when stating that education for the environment promotes heuristic and issue-based learning which aims at insights, values, attitudes and skills for sustainable lifestyles. Action research is one of the methods that can be used by educators in showing that the approach of teaching education for the environment is effective. In support of this approach to EE teaching, Wals, Beringer & Stapp (1990) maintain that action research promotes continuous engagement of participants in the research about the environmental problem

under study. Action research helps learners to co-operate with the community in solving environmental levels.

This discussion on ideologies on EE teaching was aimed at clarifying how educators can use them to choose relevant teaching methods for EE. Hungerford & Volk (1990), report that the present environmental education in public school curricula can often be characterised by loose organisation and little sense of direction. Clacherty (1989), states that the school curricula are already filled up to the brim and the inclusion of environmental education as a subject must be ruled out completely. The idea that environmental education in school curricula can often be characterized by loose organisation and little sense of direction does not hinder public schools in all parts of the world to implement EE in their teaching.

## 2.6 ENVIRONMENTAL EDUCATION IN OTHER SOUTHERN AFRICAN COUNTRIES

Ketlhoilwe (2003) states that in Southern African schools there are problems concerning EE implementation, that is, lack of information from the curriculum development unit, untrained teachers, the attitudes of teachers and lack of facilities. The author outlines the state of environmental education in the SADC. In the Southern African countries like Botswana, Malawi, Mozambique, Zambia and Zimbabwe, environmental education is taught as a cross-curricular theme in all levels of education.

Although the South African Development Community (SADC) does advocated implementation of environmental education in formal education, a few challenges are mentioned by Ketlhoilwe (2003) as follows:

a) School management at times inhibits integration of EE.
b) School management sometimes prohibits teachers from practicing EE in schools.
c) Educators' existing knowledge, experience and approach may often be a challenge.
d) Lack of commitment of teachers on environmental issues.

## 2.7 ENVIRONMENTAL EDUCATION IN INTERNATIONAL SOCIETIES

Palmer (1998) gives a comprehensive view of how other international societies implement EE in their curriculum, by categorising those schools that teach EE as a cross-curricular theme like Hong Kong and Spanish schools, whereas others have no clear policy on EE teaching, like Taiwan and Norwegian schools. Jensen (1995) encourages educators to engage learners in community projects like the Norwegian-Latvian Project (NORTM), which aims at helping schools to work with communities in greening the schools in Norway. The SEEDS Foundation aimed at greening of Schools in Canada and the Jupiter Project aimed at maintenance of gardens in the United Kingdom are examples of how other schools in other parts of the world involve themselves in community projects. This is one way that they use to implement EE. Such projects provide knowledge, skills, awareness and action to learners and the community. They also develop ownership and pride in their schools. The integration model used by schools provide learners with a holistic view of what EE is, whereas those schools that have no clear policy on EE deprive learners the right to information, awareness and skills on what EE entails. Robottom (1996), states that in the United Kingdom, schools place a strong emphasis on the grounding of EE within the scientific domain as opposed to humanities, languages and arts. This

approach seems to differ completely to that applied in the South African Education System, that is, to opt for an integrated approach to EE teaching.

## 2.8 SUMMARY

The chapter has attempted to give a theoretical and literary framework, specifically relating to the state of EE in South African and other Southern African schools as well as schools in other parts of the world. The topics on the integration of EE into existing curricula, methods of teaching and challenges faced by educators in teaching, have constituted the bulk of the discussion in this chapter. It is evident therefore that many of the EE related theoretical challenges proposed in the literature, have to be given some empirical analysis or reality check in the South African education landscape. The chapter that follows, therefore, discusses the methodology that was employed and found relevant in the study.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 INTRODUCTION

On the one hand, research methodology has been seen as a systematic and objective process of gathering, recording and analysis data for purposes of resolving some problem (Bless & Higson-Smith, 1995; Babbie, *et al.* 2001). On the other hand, Bailey (1982: 4) sees research as a systematic and organised effort to investigate a specific problem that needs a solution. In a number of definitions of research, there is always an implicit assumption that research has to discover something new or make an original contribution to the development knowledge or phenomenon. Without doubt the methodology employed in this research study presents a way of translating theory into reality by using valid techniques of collecting, analysis and interpreting data.

This chapter on research methodology, therefore, aims at explaining how the research was conducted. It identifies the research design, research method, participants, ethical issues, the measures that were followed to ensure trustworthiness amongst participants and the instruments used to collect data. It also states why these research methodology components were chosen in this particular study. Mouton (1996) has stated that the objective of a research design is to plan, structure and execute the relevant project in such a way that validity of the findings is maximised. For purposes of this research inquiry, the

researcher used the survey technique since it was conceived to be the best method available. According to Babbie, Mouton, Payze, Vorster, Boshoff, & Procesky. (2000) the survey research technique is the best instrument to the social researcher who is interested in collecting original data for describing a population too large to observe directly.

## 3.2 RESEARCH APPROACH

The research approach or design refers to a strategic framework for action that serves as a bridge between research questions and the execution or implementation of the research (Durheim & Terre Blanche, 1999). The research approach guides the arrangement of conditions for collection of data in a manner that aims to combine relevance to the research purpose with economy in procedure. The research approach for this study was the quantitative approach, which served to explain quantitatively those aspects that were measurable. The frequency of environmental themes taught per learning area was verifiable through the quantitative approach. The number of environmental themes that were more interesting to teachers and learners respectively was verifiable through this approach. The methods and skills frequently used by the educators were subsequently analysed.

The researcher was interested in quantifiable results. A descriptive survey was chosen as the research method for this study. The researcher was interested in describing how the teachers were implementing EE in their various learning areas and methods that dominate their teaching as well as the skills they intend their learners to acquire. In supporting why a ‘quantitative paradigm’ is used in

environmental education research, Marcinkowski (1993) has put forward the following reasons:

a) It seeks to establish patterns and causes of social phenomena (description, prediction and explanation).
b) The researcher remains detached from the setting to avoid bias and tends to rely upon instruments as an intermediary device for data collection.
c) It takes the position that 'truth' consists of verifiable and observable facts.

Macmillan & Schumacher, (2006) argues that the quantitative study can yield more reliable and valid results if a qualitative study is used to supplement it. Because the study is a mini-dissertation the researcher chose to use the quantitative method only.

### *3.2.1 Population*

Integration of environmental themes in the existing curriculum in Grade 7 is a national concern. Therefore, Grade 7-9 educators form a population of interest for the study. An estimated population of the study in particular consisted of about 20 schools comprising 54 educators responsible for Grades 7-9.

### *3.2.2 Sample*

The participants were a sample of educators teaching Grade 7-9 in eight schools in Obuka Ward - Mkhandlwini Cluster. The sample selected is, therefore, a cluster of schools, that is, six primary schools and two high schools. The criteria

used to choose this cluster in a ward were that it was the biggest cluster and had two high schools, whereas other clusters had one high school and four primary schools each. All eight schools shared similar features since they are all public schools and situated in deep rural areas. The educators in these schools were of mixed gender, but female educators tended to be in the majority. This factor was not considered in the analysis of results but was included in the questionnaire to show that the gender was well represented. For reasons of confidentiality, the educators were not required to give their names or school names in the questionnaire. The total sample consisted of 30 educators.

### *3.2.3 The instrument*

Data for the study were collected using a questionnaire that consisted of Section 1, 2, 3 and 4. Imenda & Muyangwa (2006) cite the following strengths of using questionnaires in research:-

a) The researcher can get a large sample relatively easily and cheaply;
b) The respondents can provide frank responses especially if confidentiality and anonymity are guaranteed;
c) Because the researcher is able to use relatively larger samples, generalisation in terms of ecological, external and population is enhanced.

Other important guiding principles used in designing the questionnaire involved a procedure where a small sample of subjects was used to assist in pre-testing the final questionnaire. This method included the following steps:

a) Selecting a sample of individuals who are representative of the population to be studied.

b) Administering the pre-test and checking for weaknesses in the returned trial questionnaires.
c) Analysing the results to assess the effectiveness of the trial questionnaire to yield the information desired.
d) Making the appropriate adjustment to the questionnaire retaining good questions and changing the deficient ones.

For this study, the researcher was able to administer questionnaires to a group of educators in each school. This saved time and costs. The group administered questionnaires have advantages such as (UNISA, 2004):

a) Respondents present in a group complete a questionnaire on their own;
b) Respondents share the same stimulus;
c) Researcher conducts discussion with the whole group before respondents answer the questionnaire;
d) Researcher clarifies the instructions and uncertainties.

The researcher adhered to this data collection method because educators who were grouped together were from one school and were teaching different subjects, therefore, the issue of embarrassment could not be considered since educators are used to each other. Group administered questionnaires were assumed to be more suitable for this research as it was conducted in a deep rural area. Usually schools in deep rural areas are largely characterised by a shortage of educators, this meant that the researcher minimised frequent absenteeism of educators from classes, in order to maximise a positive attitude on the part of educators and School Management Teams. The researcher confirmed appointments with the principals at least two weeks before the selected date;

therefore the School Management Teams could sort out the venue within the school. All respondents could read and write and they were knowledgeable on the issues required in the questionnaire. The questionnaire was structured as follows:

(a) Section 1 sought the biographical details of respondents.

(b) Section 2 consisted of a table, based on eight environmental themes, which are:

i. Population
ii. Pollution
iii. Biodiversity
iv. Waste and Pesticides
v. Urbanization
vi. Soil and soil erosion
vii. Human health
viii. Deforestation

The educators had to state environmental themes which they had taught in their lessons and the teaching methods they had used to teach these themes. These environmental themes were chosen from the study guide by Loubser (1997) on cross-curricular teaching of environmental issues. These issues are referred to by the author as the most serious problems in the world. These environmental themes are also cited in the sustainable development challenges that Southern African Environment of Sustainable Development (SED) practitioners are responding to (Kabitura, 2006).

In the questionnaire each respondent had to state his or her own answers, as a result the questionnaire contained open-ended questions. The open-ended questions gave the respondents the opportunity of writing any answer. The researcher chose to use the open-ended questions because she intended to get a

maximum response on how educators implement EE teaching in the Senior Phase. Although Gorard (2001), states that the drawback on the use of open-ended questions comes when they are subjected to systematic analysis, the researcher preferred using them, because it was clear how the responses would be analysed.

The questionnaire had a section, which aimed at finding out the three environmental themes in which educators were more and less interested to teach respectively and reasons thereof. The researcher included this section because this was a descriptive survey and wanted to give a detailed description of how EE is implemented in the Senior Phase as well as factors impacting on the implementation. Educators interact with learners in the teaching and learning processes, the researcher included a section where the educators would identify environmental topics which were of more or less interest to learners.

Owing to the fact that the study is based on what is happening on daily basis in the classroom, the researcher wanted to know how the departmental officials that is, School Management Teams, and Senior Subject specialists at district levels could intervene in ensuring that EE is implemented in formal education. The researcher requested the respondents to identify three environmental themes in which they needed professional development. This section was not analysed but could be used to make recommendations to the departmental officials on EE implementation in the Senior Phase.

### *3.2.4 Data analysis*

Data was analysed using a computer based statistical programme such Microsoft Office Excel 2007. This programme was used to generate frequency tables and

graphs. Responses on each questionnaire were coded in order to facilitate the analysis and interpretation of the data. Responses were quantified by counting the number of times each response occurred or the response frequency. The information analysed was then represented by means of bar graphs, pie charts and tables. The emerging graphs and tables were constructed in such a way that they could be easily interpreted. The outcome of the interpretation facilitated the confirmation or rejection of the hypotheses postulated.

### *3.2.5 Use of analysed data*

The research followed a descriptive method by describing if educators in the Senior Phase implement EE in their specific learning areas. The analysed data was used to describe in which learning area EE was integrated the most or the least. This information would help the School Management Teams especially Heads of Departments and Senior Subject specialists at District levels to understand to what extent EE is integrated into the curriculum and plan the intervention programmes. The analysed data would alert the Senior Phase educator of the emphasis placed on EE teaching in the RNCS thus improve their engagement on this aspect.

## 3.3 ETHICAL ISSUES

The following ethical standards were strictly observed when conducting this research investigation:

(1) Permission to conduct research at the schools was requested from the following authorities:

(a) Superintendent of Education, Management: Obuka Ward (Appendix 1).

(b) Principals, School Management Teams and the Educators concerned (Appendix 2).

(2) The subjects' right to privacy, confidentiality and dignity was considered at all times.

(3) Honesty, transparency, empathy and objectivity were maintained throughout the study.

## 3.4 TRUSTWORTHINESS

Trustworthiness and validity of the results was facilitated and sustained in the following ways:

- The researcher motivated the participants to contribute towards the research so that the researcher might be able to provide curriculum development on the EE initiative, and mainly based on the needs of the participants.
- The fact that the researcher, similar to all the participants, was an educator in the same geographical area. This fact inspired participants to give reliable information since they knew that the researcher might have access to more information.

## 3.5 SUMMARY

This chapter has described the field research methodology used in this study. The research approach or design was explained by describing the population and sample size, instrument or questionnaires construction, and the collection and

analysis data. The methodology used should be seen as a chain and each link is essential to attain the research goal. Each stage is built on the preceding one. The research methodology used in this study has helped in revealing how the research was designed to attain the valid results. The design was also assured through setting up acceptable ethical standards and levels of trustworthiness and validity of the research results. The next chapter deals with the analysis and interpretation of the actual data described in this very section.

# CHAPTER FOUR

# DATA ANALYSIS AND INTEPRETATION

## 4.1 INTRODUCTION

According to Mouton (1996) the outcome of research data analysis and interpretation results in certain conclusions which must follow logically from the evidence, if it is to be regarded as 'valid' conclusions. The results obtained from analysis and interpretation of data, provide feedback on the tenability or amenability of the original research hypotheses. The results of the analysis and interpretation also lead to either the acceptance or rejection of the hypotheses. It should be noted, however, that even if the results obtained from the analysis and interpretation are in agreement with the hypotheses, this does not necessarily mean that the theory is finally and irrefutably proven to be correct, but is only provisionally supported as there is no other theory which may explain the results obtained (Bless & Higson-Smith, 2000).

This chapter presents the results of the study. Data that was collected from the educators answered the following research questions:

(a) How frequently are environmental themes identified and taught in different learning areas?

(b) Why are some environmental themes more interesting to teach as compared to others?

(c) Which methods are frequently used by educators in teaching EE?

## 4.2 THE TEACHING OF ENVIRONMENTAL THEMES

The first research question sought to establish how frequently are environmental themes identified and taught in different learning areas. Relating to this research question, the data collected showed that educators do integrate environmental themes into their learning areas but at different levels. In the Senior Phase, there are eight learning areas that are taught. Table 4.1 summarises how frequently environmental themes are taught in different learning areas.

| | NUMBER OF LESSONS TAUGHT PER ENVIROMETNAL THEME | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Learning Area** | **Populatio** | **Biodivers** | **Soil &** | **Pollution** | **Urbaniza** | **Waste** | **Deforesta** | **Human** | **Total** | **Percenta** |
| **Language** | 5 | 0 | 0 | 2 | 3 | 2 | 3 | 1 | 16 | 13 |
| **SS** | 4 | 4 | 2 | 2 | 0 | 1 | 2 | 2 | 17 | 14 |
| **NS** | 2 | 3 | 3 | 4 | 1 | 1 | 2 | 2 | 18 | 15 |
| **Math** | 6 | 0 | 1 | 0 | 2 | 3 | 1 | 2 | 15 | 13 |
| **EMS** | 5 | 0 | 3 | 4 | 3 | 3 | 1 | 2 | 21 | 18 |
| **A&C** | 3 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 11 | 9 |
| **LO** | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 4 | 09 | 8 |
| **Tech** | 4 | 2 | 1 | 1 | 0 | 2 | 1 | 1 | 12 | 10 |
| **Total per L/A** | 30 | 10 | 12 | 15 | 12 | 15 | 11 | 14 | 119 | 100 |
| **% Per L/A** | 25 | 8 | 10 | 13 | 10 | 13 | 9 | 12 | 100 | 100 |

**Table 4.1: A summary of the frequency of environmental themes taught in eight learning areas**

The purpose of raw data [Table 4.1] is to show which topics are taught the most and those that are not taught at all, but the pie chart below [Figure 4.1] represents the summary of the frequency of teaching environmental themes as expressed in percentages. The raw data shows that some environmental themes had more attention compared to others.

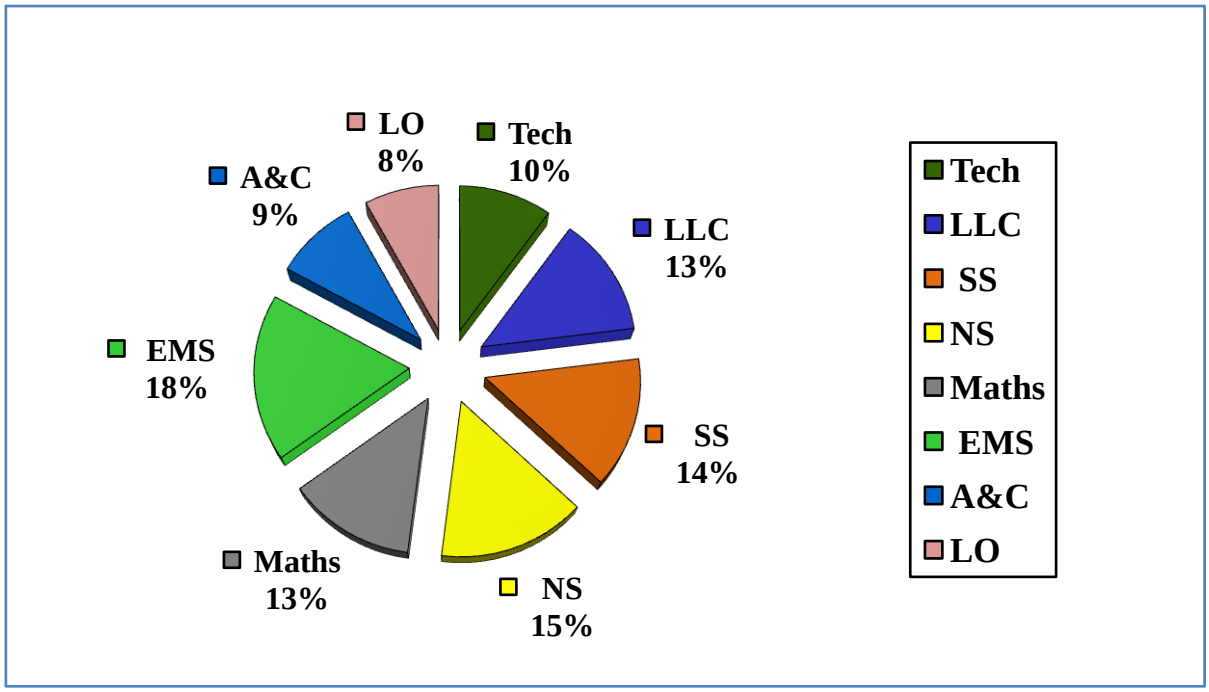


**Figure 4.1: Frequency of the environmental themes in lessons taught per learning area**

The analysis revealed that out of 119 lessons that were taught on environmental education in the eight learning areas, 12 lessons were from Technology, 16 from Language, 17 from SS, 18 from NS, 15 from Mathematics, 21 from EMS, 11 from A&C and 9 from LO. These numbers are converted to percentages therefore EMS-18%; NS-15%; SS-14%; Language-13%; Mathematics-13%; Technology-10%; A&C-9% and LO-8%.

Furthermore, Figure 4.1 shows how frequently identified environmental themes are taught in learning areas. Language was not divided into LLC1; LLC2 or LLC3 but all these were treated as one learning area. From the Table, it is clear that educators are making some effort to integrate EE into the different learning areas, although efforts in doing this vary significantly. The investigation yielded interesting results by showing that EMS is the learning area that most teaches EE. This raises hopes that teachers have a wider understanding of the environment as a multidisciplinary construct as stated by O'Donoghue (1993) as opposed to traditional views, which associated the term environment with nature study, conservation studies, ecology and outdoor education (Dreyer, 1996).

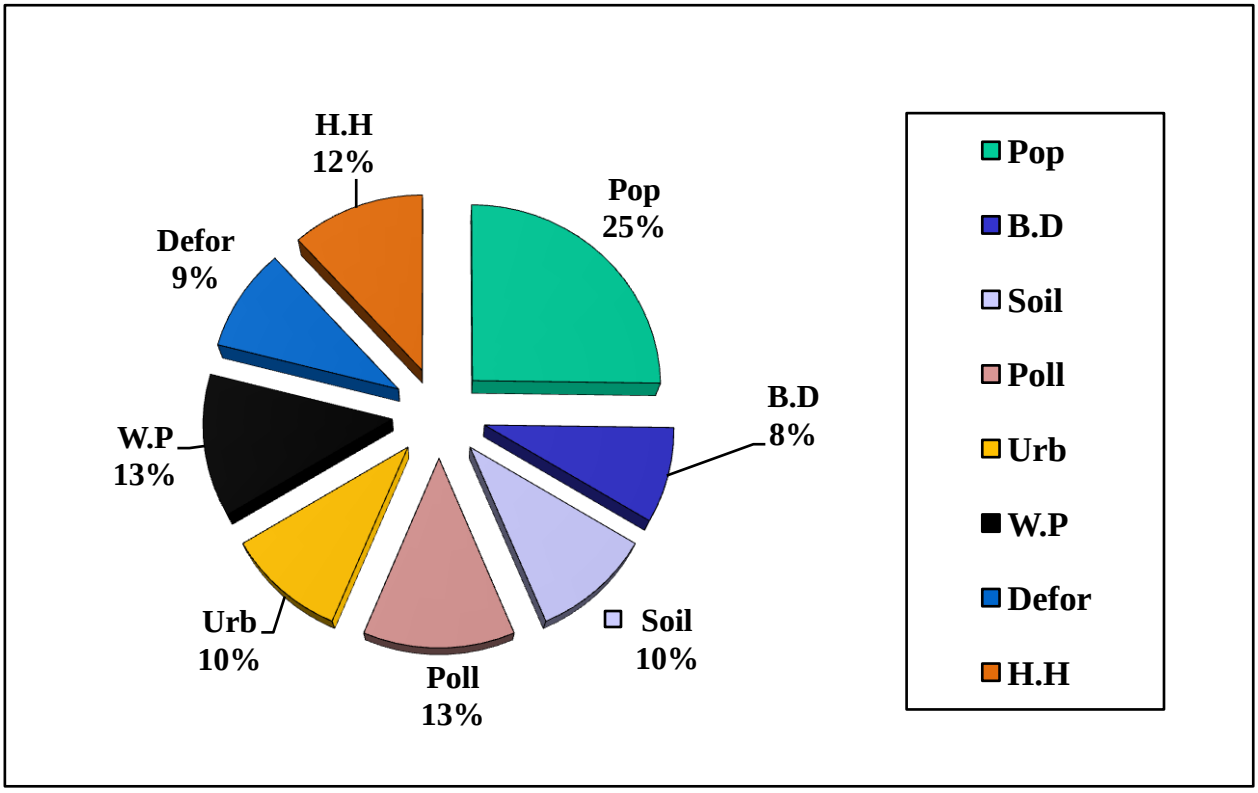


**Figure 4.2: Frequency with which environmental themes are taught in all eight learning areas.**

The chart [Figure 4.2] shows that population is the most popular theme that is taught across the curriculum and human health seems to be the second most popular theme. On the other hand, biodiversity is the least taught. This is possibly due to the fact that in other learning areas biodiversity was not taught at all.

| Learning Areas | Population | Biodiversity | Soil Erosion | Pollution | Urbanization | Waste | Deforestation | Human health | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Language** | 31.25 | 0 | 0 | 12.5 | 18.75 | 12.5 | 18.75 | 6.25 | 100 |
| **Social Science** | 23.53 | 23.53 | 11.76 | 11.76 | 0 | 5.88 | 11.76 | 11.76 | 100 |
| **Natural science** | 11.11 | 16.67 | 16.67 | 22.22 | 5.56 | 5.56 | 11.11 | 11.11 | 100 |
| **Mathematics** | 40.00 | 0 | 6.67 | 0 | 13.33 | 20 | 6.67 | 13.33 | 100 |
| **EMS** | 23.81 | 0 | 14.29 | 19.05 | 14.29 | 14.29 | 4.76 | 9.52 | 100 |
| **Arts & Culture** | 27.27 | 0 | 18.18 | 18.18 | 18.18 | 18.18 | 0 | 0 | 100 |
| **Life Orientation** | 11.11 | 11.11 | 0 | 0 | 11.11 | 11.11 | 11.11 | 44.44 | 100 |
| **Technology** | 33.33 | 16.67 | 8.33 | 8.33 | 0 | 16.67 | 8.83 | 8.33 | 100 |

**Table 4.2: Representing percentages of environmental themes in each learning area**

The raw data reflected in Table 4.2 explains what is clearly summarised from Figure 4.3 through to Figure 4.10 contains. In these figures each learning

area is analysed to reveal the environmental themes that are popular or not with the educators, as well as whether they are predominantly selected or not.

### *4.2.1 Natural Science in the teaching of environmental themes*

The Natural Science learning outcomes is known to be strongly related to the environmental education theme. In this section it was necessary to find out how environmental themes shown in Figure 4.3 relate to Natural Science learning area.

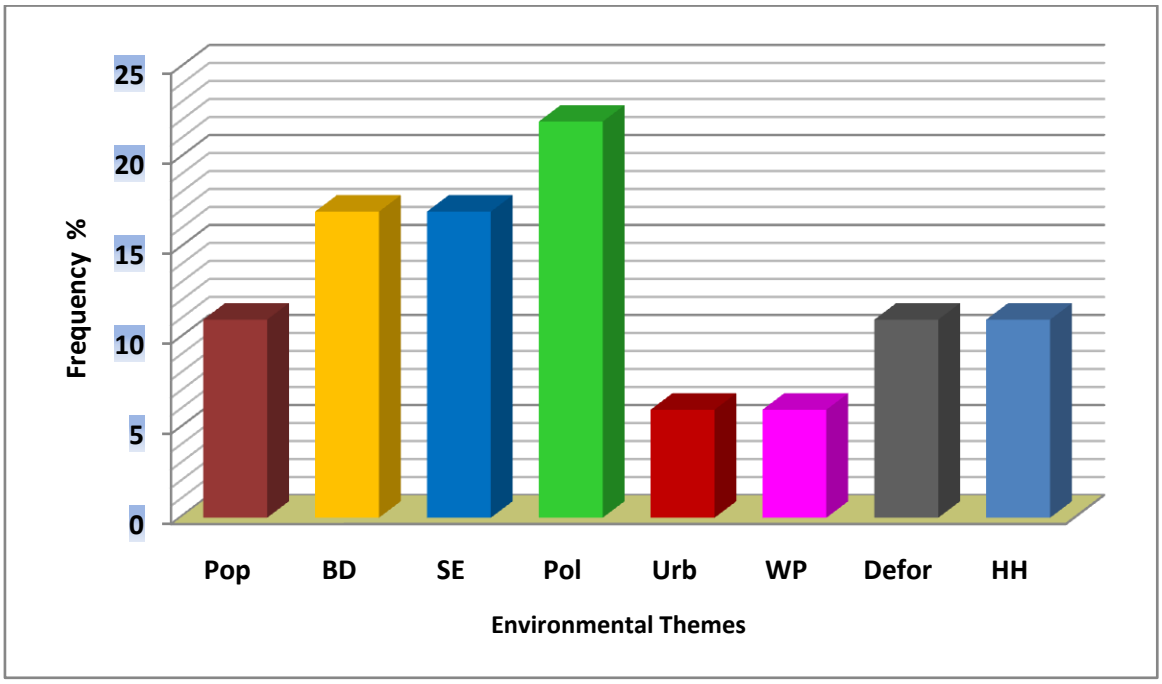


**Figure 4.3: EE themes taught in the Natural Sciences**

The analysis of results as displayed in Figure 4.3 shows that all environmental themes had been taught in the Natural Science lessons. The reason that all the environmental themes had been taught in Natural Science might be based on the fact that Environmental Education originated from Nature Study, Conservation Education and Outdoor Education (Dreyer 1996). These subjects are closely related to Natural Science, which suggests that EE should incorporate many aspects of the environment (natural and

manmade), technological, social, economic, political, cultural and aesthetical. Although Environmental Education is defined in this way, most educators still maintain that EE is suitable for inclusion mainly in the Natural Sciences.

Ferreira (2001) agrees with the notion that there has been a tendency for environmental education to be primarily infused into science areas and not into all disciplines as necessary for truly effective integration of EE. This view seems to be in line with what Dreyer, (1996) has maintained, in saying that environmental education has its origin on nature study and conservation education. This study views conservation education as focusing on human resources and the natural sciences which are taught in Outcomes Based Education. These two components relate to nature study and conservation.

### *4.2.2 Social Science and the teaching of environmental themes*

In the Social Sciences, the whole learning area is known to focus on the relationship between people and the environment. In this section we seek to find out how environmental themes [Figure 4.4] relate to the Social Sciences.

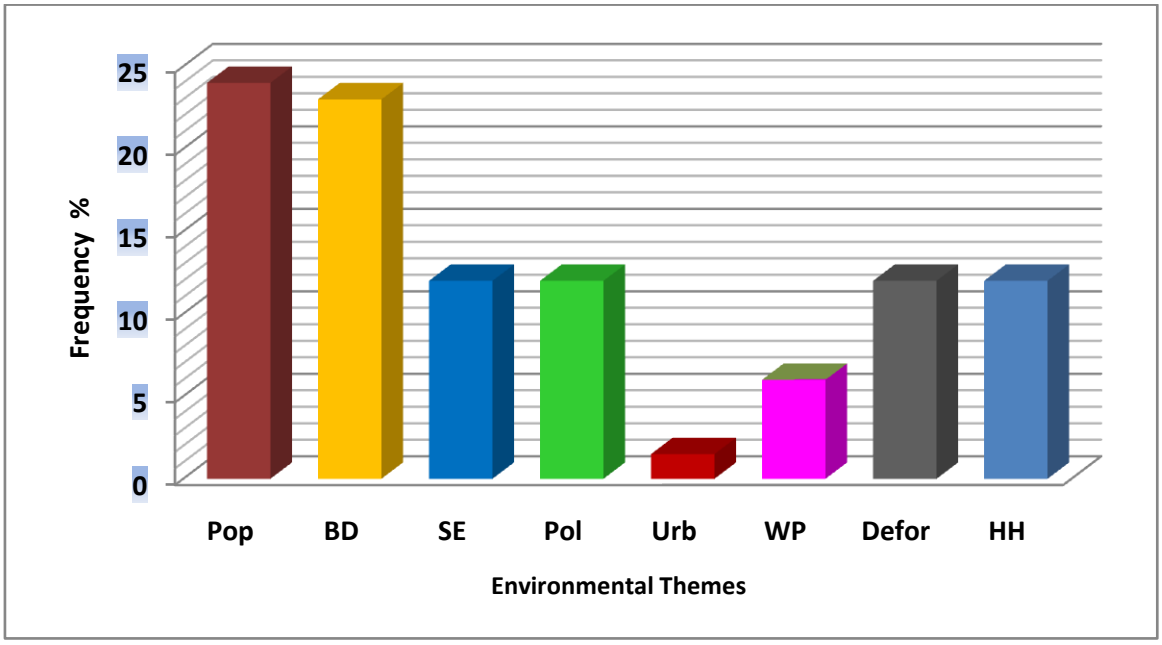


**Figure 4.4: Environmental Education themes taught in Social Sciences**

In this study it was discovered that seven out of eight environmental themes had been taught in Social Sciences *with the exception of Urbanisation.* This result was unexpected because it is assumed that urbanization is more suitable for Social Sciences. Urbanisation studies human settlement (slums, squatter camps etc.) and also looks at apartheid, democracy, transportation, social inequities and development, which are themes that are closely linked with the Social Sciences.

### *4.2.3 EMS and the Teaching of Environmental Themes*

Learning Outcome Number 2 in EMS specifies exactly what senior phase learners should acquire in relation to environmental education. It states that, '*learners will explore responses to the problem that the inequalities of the past and present – especially the extremes of poverty and wealth cannot be adequately addressed by conventional socio-economic polices alone' (*RNCS, 2003b).

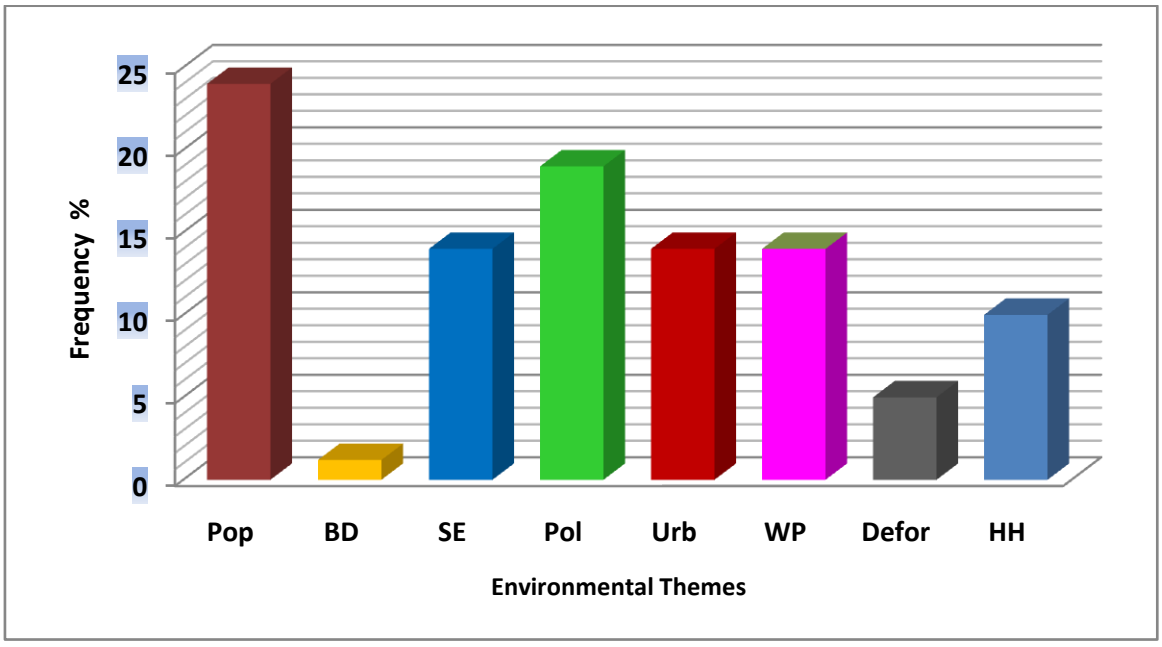


**Figure 4.5: Environmental themes taught in Economic Management Sciences**

In this study Economic Science educators were able to conduct lessons significantly on seven out of eight environmental themes. There were virtually no lesson on Biodiversity, 99% of EMS educators in the survey cited the biodiversity theme as an irrelevant theme for EMS. It appeared as if EMS educators had a problem contextualizing their teaching to events that occur in their local environments. EMS educators ought to know, for instance, that forestry generates a lot of business opportunities in the timber pole market. According to a flyer on Forestry Sub-Sector Studies timber poles compete with steel and concrete poles in building, fencing, electricity, transmission and fixed telephone line applications [www.fao.org forestry/13467-en (2005)]. The poles form a significant component in the establishment of fixed infrastructure. However, educators are expected to be aware that although timber is good for economic growth, it affects biodiversity like water quality and soil fertility.

Writing in the Forest Sector Transformation Charter launch, the former Minister of Water Affairs and Forestry, Mrs. Hendricks, stated that the forestry sector adds value to rural areas and to the downstream industries such as timber processing, furniture, pulp and paper [www.polity.org.za (2007)]. The Minister further stated that, because forestry is primarily a rural activity, the sector has an enormous potential to contribute to the development of the rural economy. In other words, timber, as a biological product, plays a significant role in our economy and is therefore part and parcel of sustainable development. Educators, therefore, need to understand that EE is a broad concept, which embraces all aspects of the natural and built environment, including social and economic issues.

Population and pollution themes seemed to be the most attended to as compared to other environmental themes. The reason might be that

population factors have a direct impact on the economy which forms a pillar of EMS. Pollution is related to industries, transportation and other related aspects of the economy, and, therefore, forms a direct link to EMS – and the educators acknowledged this.

The legacy of apartheid made sure that there were many careers that were not open to Black people. Now, in an era of democracy, learners need to know about all the careers that they can freely choose from. Therefore, while treating deforestation, teachers need to highlight the importance of careers in forestry. According to the Forestry Careers pamphlet supplied by the Water Affairs and Forestry Department, forestry is an important contributor to the South African economy. The use of forest goods also provides numerous benefits to rural communities [www.sabie.co.za/careers. (2006)]. For the learners it would be interesting to learn about careers in forestry because it widens their choices in this regard. According to the pamphlet of Forestry careers, the role of a forester and forestry scientist is to manage commercial forestry estates and natural forests in a sustainable manner. The forestry practitioners need to have the necessary skills to protect the natural resource base while establishing and promoting the growth of planted trees. They must understand and be aware of forest pests and tree diseases and be able to control them.

### *4.2.4 Technology and the teaching of Environmental themes*

The relationship between technology, society and the environment is stated clearly in Learning Outcome 3 in the Technology Learning Area. It requires learners to show an understanding of the relationship between Science, Technology and the Environment. Technology educators used seven environmental themes in their teaching [Refer to Figure 4.6]. This seemed

interesting since Technology is a new learning area; most teachers who are teaching Technology were not trained in the teaching of this learning area. This achievement might be attributed to the fact that most technology teachers are also teaching Natural Science or Mathematics, whereas Technology requires scientific and mathematical skills. The Department of Education (National) has also taken an initiative in developing educators in Mathematics, Science and Technology teaching (MSTP). This might have a positive impact on the teaching of Technology.

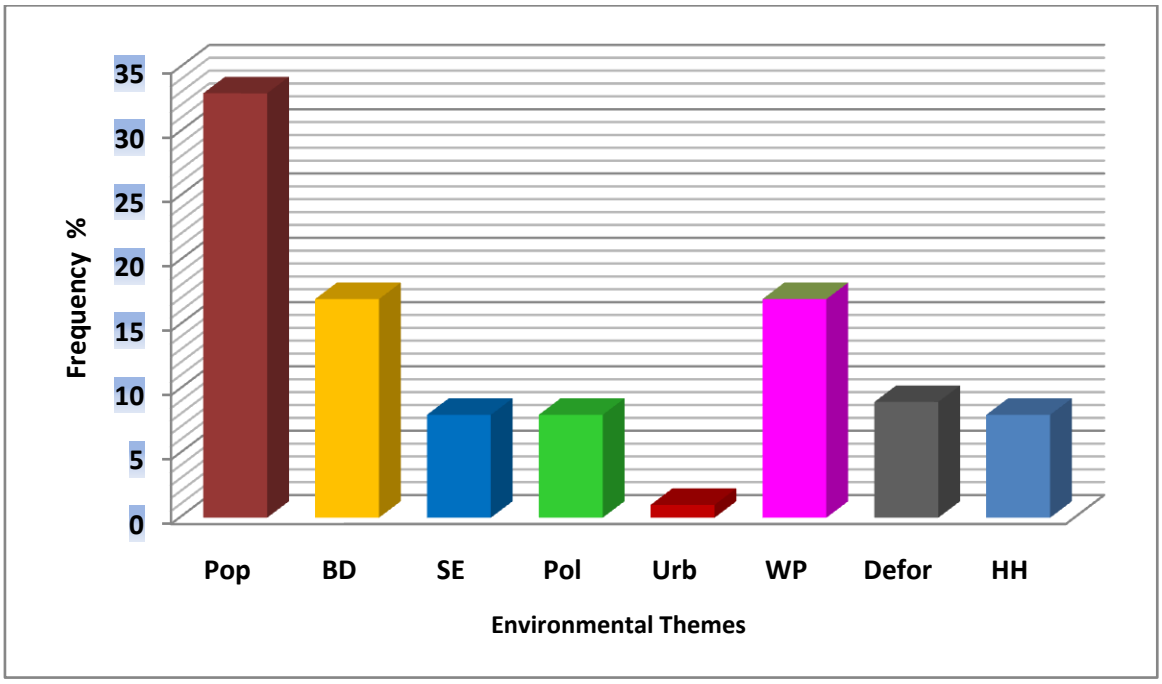


**Figure 4.6: Environmental themes taught in Technology**

The environmental theme 'Urbanisation' was not used in any Technology lesson. One major problem of rapid urbanisation is the lack of proper dwelling houses for poor people. For instance, in South Africa there are many informal settlements. The technology educators and learners are supposed to come up with creative ideas on how to build cheap but durable homes for the poor people. There is also need for cheap alternative technology to uplift the lives of people in informal settlements. The

technology component of design emphasises the implication and significance of using natural materials, while the design component develops the ability to use them economically and creatively as a means of environmental conservation. This also provides learners with a medium for understanding and expressing ideas about their local environments.

### *4.2.5 Languages and the teaching of Environmental themes*

The Arts and Culture learning area, which encompasses language, studies the human issues, human rights and environmental issues, as well as the role of natural and cultural heritage in the society (RNCS, 2003a). The analysis in this section [See Figure 4.7] reveals that the languages teachers were able to design lessons using six out of eight environmental themes. Languages promote listening, speaking, writing and reading skills and obviously would fulfil the requirements of environmental education.

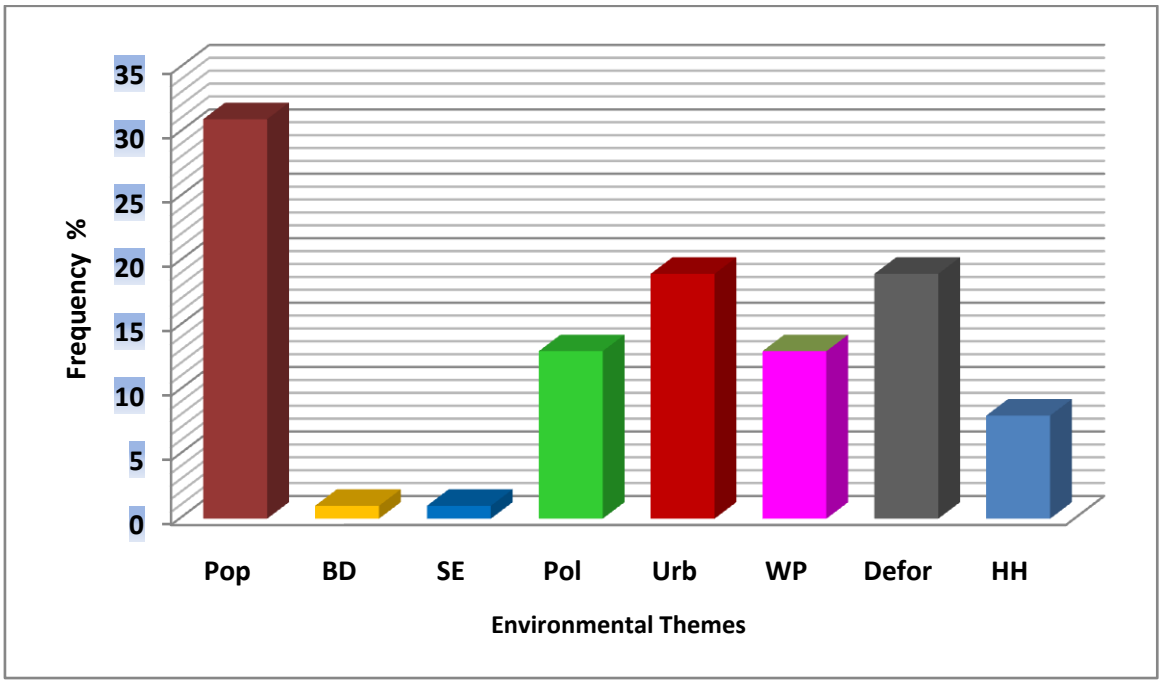


**Figure 4.7: Environmental themes incorporated into Language teaching.**

Competency in language skills enables South African citizens to draft policies, while imagining and visualizing what a healthier environmental may be like. Biodiversity and Soil and Soil Science environmental themes were not taught in any language lessons. The language educators totally missed the point because language can be used effectively to communicate different kinds of environmental messages to learners. The situation is similar to South Africa with many schools located in rural areas without libraries. Language educators could play a significant role in finding suitable reading materials on various issues on the environment, using available resources, such as old newspapers. The use of plants, animals and soil to develop learners' poetic and artistic skills to learners cannot be overemphasized.

### *4.2.6 Mathematics and the Teaching of Environmental Themes*

Mathematics is an important analytical tool for probing natural, economic, social and environmental problems. Therefore it is imperative that mathematics should integrate environmental topics (RNCS, 2003f).

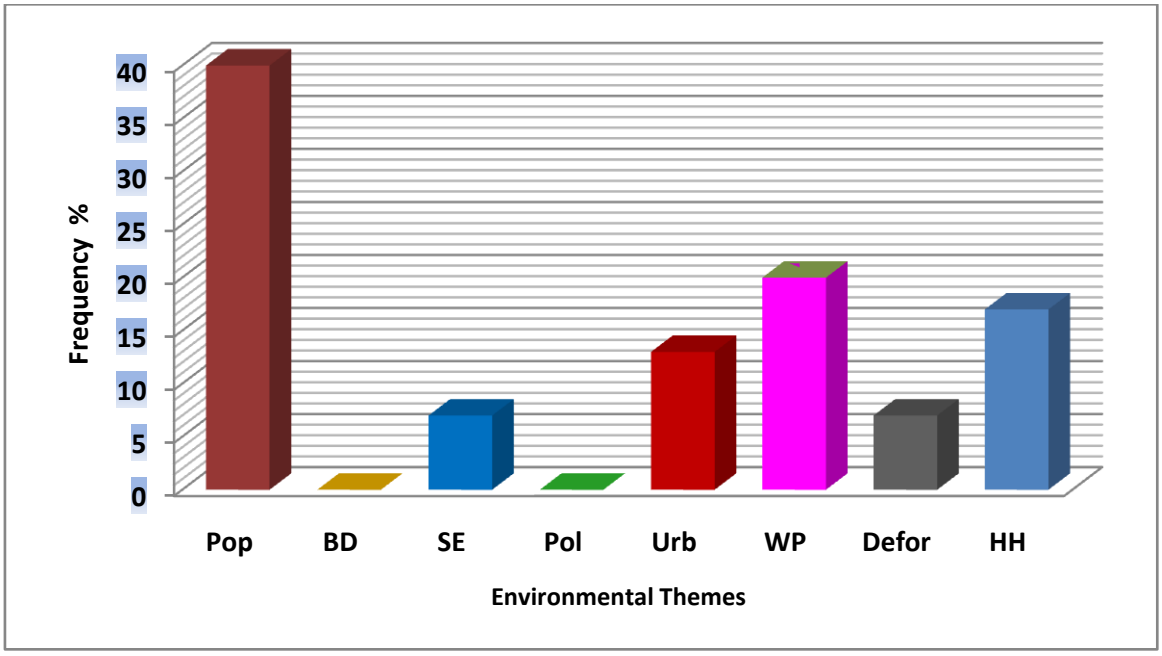


**Figure 4.8: Environmental themes integrated into Mathematics teaching**

Respondents teaching Mathematics identified six environmental themes that they taught. In these Mathematics lessons they did not have lessons on Pollution and Biodiversity. In pollution one studies concentrations in parts per million units and this requires mathematical understanding. The loss of Biodiversity is about quantification of how much of the species we lose through over-utilization, over-hunting or over-harvesting. Quantification methods at Senior Phase level are important for analysing information about the environment. There are therefore opportunities for inclusion of biodiversity and pollution.

### *4.2.7 Arts and Culture and the Teaching of Environmental Themes*

The Arts and Culture learning area, studies the human rights and environmental issues, as well as the role of natural and cultural heritage in the society (RNCS, 2003a). Five environmental themes were used in Arts and Culture lessons. *Biodiversity*, *Deforestation* and *Human Health* were not used to design lessons in Arts and Culture.

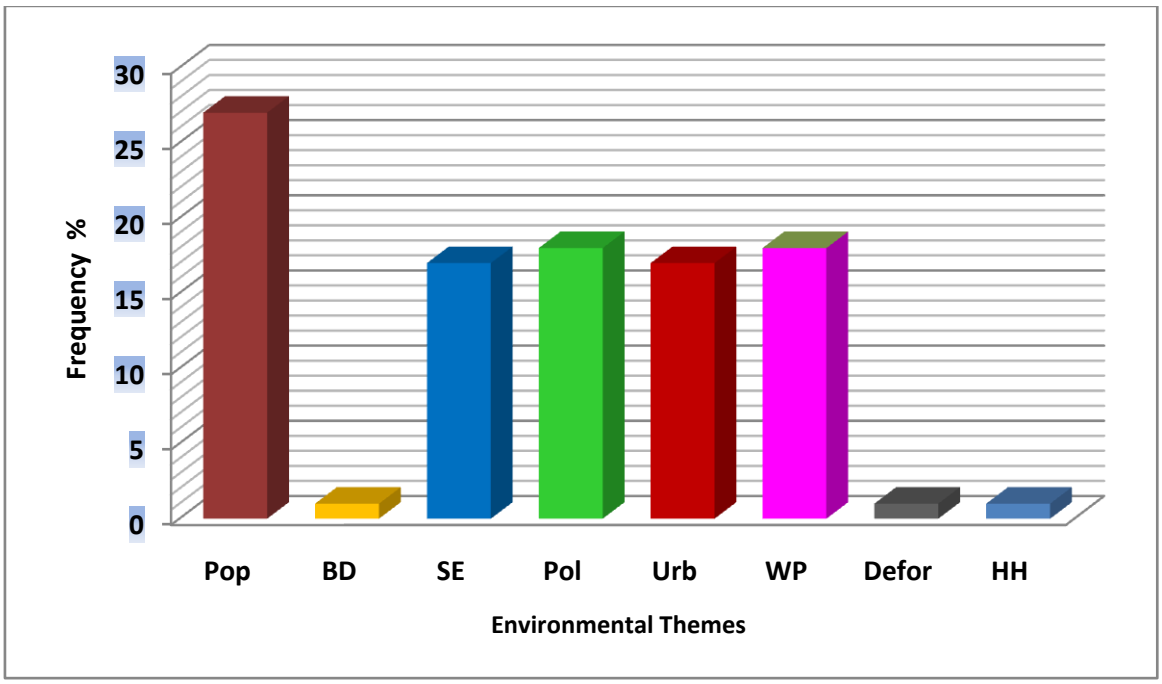


**Figure 4.9: Environmental themes integrated into Arts and Culture**

Most teachers in the survey had not been trained to teach Arts & Culture. This might be a contributing factor in the poor integration of EE into Arts and Culture. The implication is that while the educators struggled with the teaching of Arts and Culture, they would also find it difficult to integrate concepts of a new learning area that they do not understand. Arts and Culture explores the aesthetic side of learning while developing the skills of admiring nature. In rural areas learners develop skills to carve wood and to make creative artefacts. If educators were fully developed, it could be assumed that they would have had many lessons on plants and animals, which are part and parcel of the Arts and Culture. Cultural beliefs based on plants and animals could form part of lessons. Most artists use wood from trees for their sculptures, which promotes deforestation. The Arts and Culture educators have an enormous potential of including indigenous knowledge in their lessons.

### *4.2.8 Life Orientation and the Teaching of Environmental themes*

It was reported earlier in this study that Life Orientation, as learning outcome one, emphasises that learners should make informed decisions about personal health, community health and the environmental health (RNCS, 2003d). The Life Orientation learning area is one of those which deal with learning outcomes for learners who are environmentally literate and pro-active.

In this study the respondents to the Life Orientation and environmental education have shown that they focused more on Human Health as an environmental theme [Refer to Figure 4.10]. Other environmental themes received minimal attention with the exception of Pollution, Biodiversity and Soil Erosion. It is not clear why Life Orientation educators did not look at pollution, since it has a negative impact on Human Health.

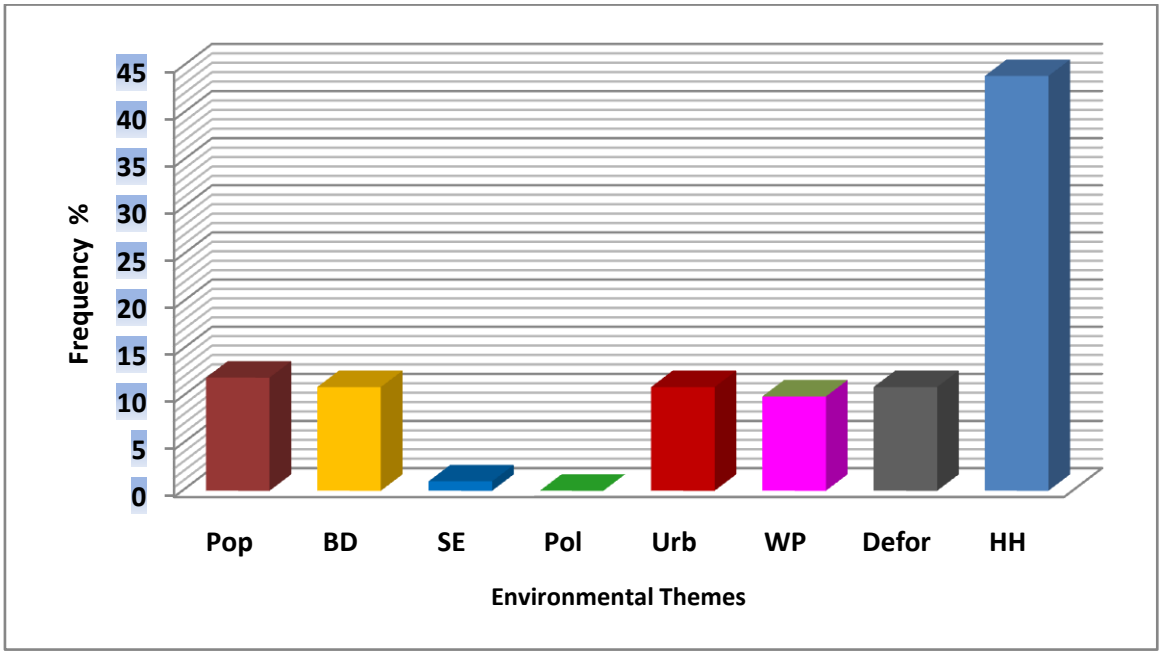


**Figure 4.10: Environmental themes incorporated in Life Orientation**

The area under study is close to Richards Bay where there are many industries. According to the articles on Green Clippings, complaints about industrial air pollution in the Richards Bay area have more than doubled in the last decade. The air-pollution is also related to odours from Foskor and Mondi, [http://www.greenclippings.co.za/gcmain/article.php/story. (2003)]. Similar to the Arts and Culture educators, Life Orientation educators did not have any qualification that entitled them to teach this learning area. This is due to the fact that when the Arts and Culture and Life Orientation learning areas were introduced, schools phased out subjects such as Afrikaans, Biblical Studies and History, educators who were trained to teach these subjects were deployed to Arts & Culture and Life Orientation. This might be a contributing factor to lack of integration of EE in Life Orientation. For educators who are not confident in teaching their present subjects, it is going to be very difficult to be creative enough to incorporate EE. It is clear that there is a great need to empower the educators with skills to incorporate EE themes in their teaching.

## 4.3 ENVIRONMENTAL THEMES THAT ARE INTERESTING TO TEACH

Of the eight environmental themes, Population and Human Health environmental themes seem to be more interesting to teach. The table below [Table 4.3] shows the responses of educators relating to their interest in teaching environmental themes:

| **Environmental theme** | **Response** | **Percentage** |
|---|---|---|
| Population | 15 | 25 |
| Human health | 12 | 23 |
| Urbanization | 7 | 13 |
| Biodiversity | 7 | 13 |
| Pollution | 5 | 10 |
| Soil and Soil Erosion | 4 | 8 |
| Deforestation | 3 | 6 |
| Waste and Pesticides | 1 | 2 |
| **Total** | **52** | **100** |

**Table 4.3: Environmental themes for teaching**

Eighty percent (80%) of educators linked their interest to practicality and relevance of the theme to their learning areas. Eight percent (8%) felt that their learners' willingness and background made it possible for them to teach with ease, thus developing interest. Twelve percent (12%) linked interest with their qualifications.

Waste and Pesticides and deforestation appeared to be the least interesting to teach as opposed to population and Human Health.

## 4.4 METHODS USED IN TEACHING ENVIRONMENTAL THEMES

In the analysis of results it was discovered that educators used mainly the question and answer, discussion and narrative methods in teaching the identified environmental themes. A limited number of lessons were taught using the participatory and action-based methods like research and discovery methods. The table below shows a quantified analysis of methods that were used by educators.

| **Method** | **Frequency** | **Percentage** |
|---|---|---|
| Question and answers | 42 | 36 |
| Discussion | 28 | 24 |
| Narrative | 22 | 18 |
| Discovery | 9 | 8 |
| Demonstration | 4 | 3 |
| Field trip | 4 | 3 |
| Research | 3 | 3 |
| Investigation | 2 | 2 |
| Project | 2 | 2 |
| Experimental | 1 | 1 |
| **Total** | **117** | **100** |

**Table 4.4: Methods used in teaching EE themes**

In the analysis of results it was discovered that some educators showed lack of understanding of what a teaching method was all about. The possible

reason for this arises in that respondents mentioned ‘teaching and learning’, ‘hands-on’ and ‘process’ as teaching methods.

## 4.5 SUMMARY

This chapter has focused on the analysis and interpretation of responses regarding: the frequency with which environmental themes are taught in different learning areas; why some of these themes were found more interesting to teach than others, and finally the methods frequently used by educators to teach environmental education. The analysis and interpretation of data was achieved in the process of addressing the objectives of the study. The emerged findings of the study would lead to some recommendations presented in the next chapter.

In the analysis of results it has transpired that educators do teach the identified environmental themes to a limited extent. EMS seemed to be the learning area that most teaches EE whereas Life Orientation is the least that teaches EE. Population and Human Health Environmental themes were identified to be the most interesting to teach as compared to Deforestation and Waste and Pesticides. The idea of practicality and relevance of the environmental theme to the learning area seems to be the factor that contributed the most to the environmental theme being the most or least interesting to teach. Educators were found to be mainly using the question and answer, discussion and narrative method as opposed to exploratory, discovery and experimental methods

The next chapter draws conclusion of the study and attempts to provide a summary of recommendations.

# CHAPTER FIVE

# SUMMARY AND CONCLUSIONS

## 5.1 INTRODUCTION

It must be remembered that the fundamental aim of this research study was to investigate whether educators do indeed integrate environmental topics in their learning areas so that learners may gain knowledge, awareness, values and skills to solve environmental problems. The latter was with the belief that environmental education aims at preparing individual learners to be responsive to a rapidly changing technological world, to understand contemporary world problems and to provide the skills needed to play an effective role in the improvement and maintenance of the environment (Ramsey, Hungerford, & Volk, 1992). To that effect, this research study has analysed the educators' responses to the frequency of environmental education teaching, the level of interest in themes and the preferred method of teaching.

It has been argued that in South Africa that integrating environmental education across all the eight learning areas at the **GET** level, is a priority exercise that needs to be achieved. If educators can be trained to accept change, it is believed that integrating environmental integration into all learning areas can lead to the development of environmentally literate citizens who can take action on environmental issues locally, thus preventing global environmental risks.

This chapter therefore, gives a summary of the findings and related recommendations pertaining to the outcomes of the research study. To reiterate, the study had aimed at investigating whether educators do indeed integrate environmental topics into their learning areas.

## 5.2 GENERAL CONCLUSIONS

As mentioned earlier, the main objective of this research inquiry was to investigate educators' viewpoints about integrating environmental topics into their learning areas. In this regard, the general conclusions associated with this study may be presented in terms of three areas: the literature reviewed; the empirical findings and the integrated conclusions.

### *5.2.1 Conclusion from the literature study*

This paragraph aims at drawing a conclusion on what is contained in the literature review of this research. Imenda & Muyangwa (2000) emphasise that the literature review in a scientific research aims at providing the researcher with the means of getting to the frontiers of knowledge in his or her particular field of knowledge, by allowing him or her to develop a thorough understanding and insight into previous work and the trends which have emerged in the field.

The study explained the state of environmental education in formal education in South Africa in relation to the new Constitution of South Africa's concern about every South African citizen's right to a healthy environment. The literature review explained the initiative by the Department of Education in South Africa in consultation with the Department of Labour in ensuring that environmental education is a vital element for all levels and programmes of

the education and training system. It emerged that the introduction of learning outcomes based on the environment in the GET-Band was one way of ensuring that EE is taught at an early stage to all learners. These learning outcomes are mentioned in the Revised National Curriculum Statement documents for 2003.

The Department of Education's commitment is further seen through a clear statement of educator's environment based competences. Although these competences are spelt out, most educators have not been trained on how to apply and demonstrate them because most of them were trained in the apartheid era, where no mention of such competences was made. For educators to implement EE in their teaching, they should have a broader understanding of the term 'environment' on which environmental education is based. It transpired that educators should place learners at the centre of their teaching when they integrate EE in to their learning areas. This means that teaching methods should be learner-centred as much as possible so that learners might benefit from the environmentally-related lessons. However, results showed that most of the lessons taught were far from learner-centred.

Poor training of educators was viewed as a cause for poor designing of learning programmes in EE. Previous initiatives by the Department of Education and other Departments like Agriculture and Labour in collaboration with Non Governmental Organizations have proved to be effective in developing teachers on EE implementation, although it cannot be guaranteed that all teachers have been exposed to such initiatives. The literature review mentioned that environmental education has been seen to be more related to science studies like geography and biology (Palmer, 1998).

The literature reviewed showed that implementation of environmental education is not only an issue of South Africa but other Southern Africa and Western Countries and states are also engaged in the process of integrating EE into their curriculum. Environmental Education is actually a global imperative for all human beings. In the literature review, it was discovered that other countries and states integrated EE in both pre-primary and secondary school, others either in pre-primary or secondary schools and others chose subjects in which EE could be integrated (Robottom, 1996).

### *5.2.2 Conclusion from the research findings*

What is presented in this section is the empirical finding of the study. The basic findings of the study were that the educators in the Senior Phase do implement EE in their learning areas through the use of the RNCS documents. However, it transpired that the educators could implement EE to a limited extent. Some learning areas were more flexible in EE as opposed to others.

Educators involved in the study could identify those environmental themes they were more and less interesting to teach and the reasons thereof. Educators seemed to be more interested in teaching those environmental themes that were more practical and relevant to their learning areas, as a result other environmental themes were the most or least taught. Learners' interest and motivation towards specific learning areas and teacher qualifications were found to be playing a role to the educators' interest in teaching certain environmental themes.

The educators were found to be mainly using the question and answer, narrative and discussion teaching methods. The discovery, demonstration,

field trip, research, investigation, project and experimental methods were used to a low extent.

### *5.2.3 The integrated conclusions*

Educators involved in the study were able to recognise that they have to centre their teaching and learning around what is essential for students to implement at the end of their learning experiences. These educators could implement environmental education through their specific learning areas, although to a limited extent through the use of RNCS - Grade R-9 policy documents (RNCS, 2003). The educators are tasked with the challenge of practicing the competences as spelt out in the Norms and Standards for educators, therefore the educators in the study were also expected to show that they had expertise in environment-related fields. The teachers' existing knowledge, experience and approach based on teacher qualification was identified as posing a challenge to their ability to implement environmental education in their learning areas.

Some of the educators in the study could not use other environmental themes because they assumed that they were not relevant to their learning areas although there was good content for their learning areas. This could be due to the fact that educators in the Outcomes Based Education system are not yet used to developing their learning programmes, since they were used to the idea of implementing the prescribed syllabi in the Traditional Education system. It transpired from the study that as the educators in the survey were struggling to integrate EE into their learning areas, their Southern African and colleagues in the international arena were also engaged in the same process (Ketlhoilwe, 2003). It also emerged from the study that educators felt more motivated to teach some environmental themes as compared to

others. Some of the reasons attached to this were poor training of teachers, no clear policy on how to implement EE and failure of educators to identify relevant content to teach on the environmental themes.

In view of the fact that environmental education seeks to develop learners' knowledge, skills, awareness and action on environmental issues, it was discovered that the methods that were used by educators in the study did not cater for all the skills. There were few or no lessons on practical implementation of EE, like action research and projects that aim at engaging learners in community development projects. The study further showed that educators were less interested in teaching environmental themes like Waste and Pesticides, to learners. The poverty level in rural areas means that families do not generate great amounts of waste because they do not have money to buy things that tend to accumulate and form waste. However, the little waste that is actually generated in rural areas is usually very poorly handled, forming a health hazard for children as well as animals and as a result diseases like cholera are usually found in these areas.

The educators were expected to have topics on the Waste and Pesticide theme because the area under study does not have dumping sites, toilets and running water. These topics would allow learners to participate in action-based learning. Stevenson in Robottom (1987) argues that individual action is not sufficient for sustainable enhancement of the quality of planet Earth but that the collective efforts of communities are necessary. Lack of community-based projects and research in lessons taught by educators, shows that educators lack knowledge on how to make their teaching as practical as possible.

Environmental themes such as Deforestation and Soil Erosion were also identified to be irrelevant to most learning areas. However, in rural areas deforestation often takes place because humans use trees for healing, firewood and building. Deforestation can therefore be linked to all learning areas at different degrees. Deforestation and Soil Erosion themes are closely related. This inadequacy of educators can be linked to poor understanding of the term 'environment' from which environmental education is derived. From the research findings it can be deduced that the initiatives by the National Government of South Africa in collaboration with Non Governmental Organizations that aim at empowering teachers to integrate EE have to be continued or spread to all educational institutions.

## 5.3 SUMMARY AND RECOMMENDATIONS

In summary, the research study set up its objectives recounting on the educators' inclination to integrate environmental topics in their learning areas, with a view of getting learners to acquire relevant knowledge, awareness, values and skills. An analysis of responses of educators was carried out and yielded findings, which are described earlier in this chapter. It was also concluded that Educators in the study do implement EE to a limited extent, use mainly traditional teaching methods and think that other environmental themes are irrelevant to their learning areas. This shows that educators need the intervention of the Department of Education officials in ensuring that they receive support because if learners are not environmentally literate they might not be in a position to assist in the attainment of the Millennium Goals of development as stated by Lotz-Sisitka (2004).

The recommendations are presented as a contribution to the formulation of strategies for integrating environmental education themes in various learning

areas. Some of the pertinent recommendations associated with the findings of this study include the following:

- It is recommended that educators in the senior phase be empowered to conduct cross curricular implementation of EE through workshops at school and district levels.
- It is recommended that educators be encouraged to register for some specialist qualification in EE related themes associated with more difficult and less-mundane learning areas.
- In an effort to shape individuals with regard to EE, educators should be well trained, and higher education institutions should recognise the pedagogical (methodological) and knowledge implications associated with the resolution of EE matters.
- The educators should be empowered by getting them involved in EE related activities and environmental issues of a practical nature in local schools.
- It is recommended that the teacher education programmes should ensure that the teacher is able to identify areas of knowledge related to EE, and that these educators should receive pre-service studies or in-service studies, which would meet the objectives of related curriculum.
- That South Africa as part of SADC must be encouraged to liaise or collaborate with SADC countries in teaching environmental education using the cross-curricular themes in all levels of education, as is already practiced in other countries.

## 5.4 CONCLUSION

This chapter has attempted describe and overview the concluding elements of this research study, mainly covering the general conclusions of the study,

focusing on research findings, and the summary and recommendations of the study. Furthermore, the chapter has through the analysis and interpretation of objectives given in Chapter Four, attempted to address the more practical recommendations associated with integrating environmental education into the learning areas, by transforming the teaching process.

Finally, many of the recommendations cited in this chapter imply that the challenge and commitment to achieve EE related transformation results remains the primary responsibility of the education authorities and policy-makers.

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## APPENDIX A

## TRANSMITTAL LETTER TO THE SUPERINTENDENT OF EDUCATION MANAGEMENT

Box 1859

Empangeni
3880
14 March 2006

The SEM
Obuka Ward
P/Bag x14
Empangeni Rail
3910

Dear Sir/ Madam

**RE: REQUEST FOR A PERMISSION TO CONDUCT A RESEARCH**

I, A.J. Makhoba, a student at the University of Zululand in the Department of Education wish to request for a permission to conduct a research in some of the schools in Obuka schools.

The targeted schools are:

- Bonomunye Primary School
- Zibone primary School
- Emkhandlwini Primary School
- Mashoba Primary School
- Ngqungqu Primary School
- Gobihlahla Primary School
- Manzimhlophe High School
- Nkosithandile High School

The research is a mini-thesis towards a Masters' Degree in Environmental Education. It aims at finding out how educators in the Senior Phase integrate EE in the existing curriculum.

The research will assist in the identification of a support strategy towards targeted schools. Ethical issues like confidentiality, rights to privacy, dignity, honesty, transparency and objectivity will be maintained. Dr. E.T. Dlamini (UNIZUL) is the supervisor for this research. Her contact number is 083 359 0403

Your positive regard on this matter will be highly appreciated.

Yours faithfully
A.J. Makhoba

# APPENDIX B

## RESPONSE LETTER FROM THE SUPERINTENDENT OF EDUCATION MANAGEMENT

## APPENDIX C

## TRANSMITTAL LETTER TO PRINCIPALS

Box 1859
Empangeni
3880
14 March 2006

The Principal
Empangeni
3880

Dear Sir/ Madam

RE: REQUEST FOR A PERMISSION TO CONDUCT A RESEARCH

I, A.J. Makhoba, a student at the University of Zululand in the Department of Education wish to request for a permission to conduct a research in your school

The research is a mini-thesis towards a Masters' Degree in Environmental Education. It aims at finding out how educators in the Senior Phase integrate EE in the existing curriculum.

The research will assist in the identification of a support strategy towards your school.

Ethical issues like confidentiality, rights to privacy, dignity, honesty, transparency and objectivity will be maintained.

Dr. E.T. Dlamini (UNIZUL) is the supervisor for this research. Her contact number is 083 359 0403

Your positive regard on this matter will be highly appreciated.

Yours faithfully

---
A.J. Makhoba

## APPENDIX D

## QUESTIONNAIRE

*Questionnaire on Educators implementation of Cross curricular Teaching of Environmental Education in the senior phase.*

1

| ***GENDER*** | | | | | **HIGHEST QUALIFICATION IN LEARNING AREA (S)** |
|---|---|---|---|---|---|
| ***M*** | ***F*** | **LEARNING AREA (S) TAUGHT** | **EXPERIENCE IN LEARNING AREA (S)** | **GRADE(S) TAUGHT** | |
| | | 1.<br>2.<br>3. | 1.<br>2.<br>3. | 1.<br>2.<br>3. | |

***2. Which of the following Environmental themes have you taught in the last two years****?*

| **Environmental Theme** | **Grades** | **2 topics covered** | **Methods Used** | **Skills developed** | **Link with learning area (S)** |
|---|---|---|---|---|---|
| *POPULATION* | **7** | | | | |
| | **8** | | | | |
| | **9** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **BIODIVERSITY** | **7** | | | | |
| | **8** | | | | |
| | **9** | | | | |
| **SOIL AND SOIL EROSION** | **7** | | | | |
| | **8** | | | | |
| | **9** | | | | |
| **POLLUTION** | **7** | | | | |
| | **8** | | | | |
| | **9** | | | | |
| **URBANIZATION** | **7** | | | | |
| | **8** | | | | |
| | **9** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **WASTE AND PESTICIDES** | **7** | | | | |
| | **8** | | | | |
| | **9** | | | | |
| **DEFORESTATION** | **7** | | | | |
| | **8** | | | | |
| | **9** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| HUMAN HEALTH | **7** | | | | |
| | **8** | | | | |
| | **9** | | | | |

**General Comments:**

_____

_____

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_____

## 3. ENVIRONMENTAL THEMES OF EDUCATORS' INTEREST

3.1. Which two of the eight environmental themes identified above do you find more interesting to teach?

3.1.1---------- and 3.1.2----------

3.1.3 Give reasons why you find the theme in 3.1.1 more interesting to teach? -

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3.1.4. Give reasons why you find the theme in 3.1.2 more interesting to teach? --

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3.2. Which two of the eight environmental themes identified above do you find less interesting to teach?

3.2.1 ----------and 3.2.2----------

3.2.2 Why do you find the theme in 3.2.1 less interesting to teach?

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Why do you find the theme in 3.2.2 less interesting to teach?----------

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## 4. ENVIRONMENTAL THEMES OF LEARNERS' INTEREST

4.1 Which two of the eight environmental themes are more interesting to most learners?

4.1.1 ----------and 4.1.2----------

4.1.3 Why do you think most learners find the theme in 4.1.1 more interesting?

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4.1.3 Why do you think most learners find the theme in 4.1.2 more interesting?

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4.2 Which two of the eight environmental themes identified in 2 are less interesting to most learners?

4.2.1 ----------and 4.2.2----------

4.2.3 Why do you think most learners find the theme in 4.2.1 less interesting ?--

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4.2.4 Why do you think most learners find the theme in 4.2.2 less interesting?--

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**5. ON WHICH THREE of the EIGHT ENVIRONMENTAL THEMES DO YOU NEED MORE DEVELOPMENT?**

5.1 _____

5.2 _____

5.3 _____

**THANK- YOU FOR YOUR COOPERATION!!!**