KEY ISSUES AND CHALLENGES IN INTEGRATING ENVIRONMENTAL EDUCATION INTO THE SCHOOL CURRICULUM

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2003

KEY ISSUES AND CHALLENGES IN INTEGRATING ENVIRONMENTAL EDUCATION INTO THE SCHOOL CURRICULUM: PRIMARY SCHOOL EDUCATORS' VIEWS IN MAFIKENG DISTRICT IN NORTH WEST PROVINCE.

BY

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A dissertation submitted in fulfilment of the requirements for the degree of

MASTER OF EDUCATION

In the

Department of Educational Planning and Administration in the Faculty of Education

At the

UNIVERSITY OF NORTH-WEST

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Date Submitted: **September 2003**

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TABLE OF CONTENTS

CONTENTS		PAGE
ACKNOWLEDGEMENT		i
DECLARATION		ii
ABSTRACT		iii
LIST OF ABBREVIATION		v
LIST OF FIGURES		vii
LIST OF TABLES		viii
CHAPTER 1		
1.	ORIENTATION OF THE STUDY	1
1.1	Introduction	1
1.2	Statement of the problem	1
1.3	Rationale of the study	5
1.4	Aims of the study	6
1.5	Research methodology	7
1.5.1	Literature study	7
1.5.2	Instrumentation	7
1.5.3	Population and sampling	7
1.6	Data analysis	8
1.7	Definition of terms	8
1.8	Summary	9
1.9	Chapter arrangement	9
CHAPTER 2		
2.	NATURE AND SCOPE OF INTEGRATION OF ENVIRONMENTAL EDUCATION INTO THE SCHOOL CURRICULUM	10
2.1	Introduction	10
2.2	Further definition of terms	11
2.2.1	Environmental education	11

2.2.2	Outcomes-based education	15
2.2.3	Integration	18
2.3	Legal framework	23
2.3.1	The Constitutional Provision	24
2.3.2	The National Environmental Management Act	25
2.3.3	Reconstruction and Development Programme	25
2.3.4	White Paper on Education and Training	25
2.3.5	The NQF, Outcomes-based education and New Qualifications	26
2.3.6	Revised and Streamlined Curriculum	26
2.3.7	The Norms and Standards for Educators	27
2.4	Theoretical conceptualisation	28
2.4.1	Historical framework	28
2.4.2	Curriculum development in environmental education in South Africa	32
2.4.3	Outcomes-based education and its compatibility with environmental education	35
2.4.4	Tensions between environmental education and outcomes-based education	37
2.5	Curriculum integration	39
2.5.1	Rationale for curriculum integration	40
2.5.1.1	The advantages of integration approach	40
2.5.1.2	The disadvantages of integration approach	43
2.5.2	Barriers to curriculum integration	43
2.5.2.1	Possible barriers to curriculum integration and suggestions for overcoming	44
2.5.3	Barriers to integration of environmental education into the outcomes-based education curriculum	48
2.5.4	Keys to successful integration	51
2.5.5	Issues and challenges facing educators in curriculum integration	52
2.6	Models of curriculum integration	57
2.6.1	The interdisciplinary model	58
2.6.2	The problem-based model	59
2.6.3	The theme-based model	60
2.6.4	The immersed model	61

2.6.5 The webbed model 62
2.6.6 The threaded model 62
2.6.7 Integration of environmental education within learning area 63
2.6.7.1 An outcome/thematic approach 65
2.6.7.2 A thematic/outcome approach 65
2.6.7.3 Issue-based approach 66
2.7 Learning theories that support curriculum integration 69
2.7.1 Theories of knowledge that support curriculum integration 69
2.7.2 Theories of teaching-learning process that support curriculum integration 71
2.8 Research on integration of environmental education into the curriculum 74
2.8.1 An overview of integration of environmental education in developed countries 74
2.8.1.1 Environmental education in Japan 74
2.8.1.2 Environmental education in Norway 77
2.8.1.3 Environmental education in Wisconsin 79
2.8.1.4 Environmental education in Netherlands 80
2.8.2 An overview of integration of environmental education in developing countries 82
2.8.2.1 Environmental education in Mexico 82
2.8.2.2 Environmental education in Malawi 84
2.8.2.3 Environmental education in Lesotho 85
2.9 Summary 87

CHAPTER 3

3. RESEARCH METHODOLOGY 89
3.1 Introduction 89
3.2 Research tools (Instrumentation) 89
3.2.1 Questionnaire as a research tool 90
3.2.1.1 Close-ended questionnaires 91
3.2.1.2 Open-ended questionnaires 92
3.2.2 Questionnaire construction 94

3.2.2.1 The layout and content of the questions 94
3.2.2.2 Development of questionnaire items 95
3.2.2.3 Format and content of questionnaire 95
3.2.3 Pilot study 97
3.2.4 Final questionnaire 98
3.2.5 Covering letter 98
3.3 Questionnaire distribution 99
3.3.1 Direct contact with respondents 99
3.3.2 Administrative procedures 100
3.4 Follow-up 101
3.5 Population and sampling 102
3.6 Response rate 102
3.7 Data analysis 103
3.8 Summary 103

CHAPTER 4

4. DATA ANALYSIS AND INTERPRETATION 104
4.1 Introduction 104
4.2 Biographic and demographic data 104
4.2.1 Gender of respondents 106
4.2.2 Designation of educator 107
4.2.3 Age of respondents 107
4.2.4 Teaching experience in years 107
4.2.5 Highest academic qualification of the respondents 108
4.2.6 Settlement type of school 108
4.2.7 Main teaching learning area/responsibility 108
4.3 Environmental education: Educators' attitudes and teaching practices 109
4.4 Educators' views on integration of environmental education into the school curriculum 113
4.5 Capacity building and support 123
4.6 Summary 125

CHAPTER 5

5	**SUMMARY, FINDINGS, RECOMMENDATIONS, AND CONCLUSION**	**127**
5.1	Introduction	127
5.2	Summary	127
5.3	Research findings	128
5.3.1	Findings on Aim 1	128
5.3.2	Findings on Aim 2	129
5.3.3	Findings on Aim 3	130
5.4	Recommendations	131
5.5	Conclusion	132
BIBLIOGRAPHY		**134**

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ACKNOWLEDGEMENTS

Firstly I wish to thank the Almighty God for making the completion of this research project possible. It is through his guidance, love and protection that I lived up to the challenges posed by this study.

I also wish to thank my dedicated team of supervisors, Ms D. L. Boemah, Ms M. N. Morake and Prof. M. W. Legotlo for long hours and effort spent guiding, revising, correcting and giving accuracy to the project. It was a great privilege to work under their expert supervision.

My very special thanks go to my family. First, to my husband, Tshepiso for he has been a source of encouragement and provided whatever was needed to see this work through. Secondly, to my daughter, Rekhotso who has been a source of inspiration and motivation. I love you guys!

To my housekeeper, Kebitsaone, thank you for your support, dedication and patience. I will always cherish the contribution that you made by being there for my family, especially my daughter.

Thanks again to all those who might have in one way or the other contributed earnestly to the success of this study.

DECLARATION

I, **KENEILWE LETSELELA** declare that the dissertation for the degree of Master of Education at the University of North-West hereby submitted, has not previously been submitted by me for a degree at this or any other university, that it is my work in design and execution and that all material contained herein has been duly acknowledged.

ABSTRACT

The purpose of this study was to determine the views of educators regarding integration of environmental education into the school curriculum in the Mafikeng District of the North-West Province.

The survey population was drawn from the Mafikeng District of the North West Province. The respondents for this study were drawn from the six education circuits in the Mafikeng District. There are 102 primary schools in the Mafikeng District. Out of 102 primary schools, fifty-two (n =52) were randomly selected. In each circuit, fifty percent (50%) of the primary schools were randomly selected to participate in the study. In each school, six educators were also randomly selected to participate in the study. A total number of participants for this study was 312 (n = 312).

A questionnaire was the primary tool used for collecting data for this study. Both open and closed-ended questions were used. The aim of the questionnaire was to obtain information on issues and challenges facing educators in integrating environmental education into the outcomes-based education curriculum. The questionnaire was administered to 312 (n = 312) educators. Out of the total sample, 219 (70%) respondents returned usable questionnaires. For data analysis, content analysis method was employed. Frequencies, percentages and tables were also used in the analysis of data.

The findings revealed that respondents were aware of the importance of incorporating environmental learning into school curriculum. However some of them stated that integration of environmental education should only happen in certain learning areas such as Human and Social Sciences and Natural Sciences where environmental aspects are self-evident and obvious. The study also revealed that some educators struggle to integrate environmental education into their learning areas because they still encounter problems in implementing the present curriculum, that is Outcomes-Based Education (OBE). Furthermore, it was revealed that the challenges facing integration of environmental education into the school curriculum included lack of

both physical and human resources and lack of knowledge and understanding of environmental education.

It was concluded that the success of integration of environmental education into the school curriculum would depend on a number factors. The most pressing one was better access to resources, especially learning support materials and more in-service training for more knowledge and information about environmental education. Furthermore, putting in place school-based support services to conduct workshops regularly, will enhance the integration process of environmental education into the school curriculum as this will minimise the gap between in-service training and long waited periods for follow-ups, are recommended.

LIST OF ABBREVIATIONS

C2005	Curriculum 2005
CEM	Council of Education Ministers
DANCED	Danish Cooperation for Environment and Development
DoE	Department of Education
DEA&T	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
DoH	Department of Health
EE	Environmental Education
EECI	Environmental Education Curriculum Initiative
EEPI	Environmental Education Policy Initiative
GCSE	General Certificate of Secondary Education
GET	General Education and Training
IEEP	International Environmental Education Programme
IUCN	International Union for the Conservation of Nature and Natural Resources
JC	Junior Certificate
LAC	Learning Area Committee
LEESP	Lesotho Environmental Education Support Project
LfS	Learning for Sustainability
NAAEE	North American Association for Environmental Education
NEE	Nature and Environmental Education
NEEP	National Environmental Education Programme
NEMA	National Environmental Management Act
NGOs	Non Governmental Organisations
NQF	National Qualification Framework
OBE	Outcomes-Based Education
RDP	Reconstruction and Development Programme
SA	South Africa
SAQA	South African Qualification Authority
SEDUME	Secretaria' de Desarrallo Urbano y Ecologia
SEP	Secretaria' de Educatio'n Publica
SLO	Dutch Curriculum Development Service

UNEP	United Nations Environment Programme
UNESCO	United Nations Education Science Cultural Organisation
UK	United Kingdom
WEEB	Wisconsin Environmental Education Board

LIST OF FIGURES

FIGURES		PAGE
Figure 2.1:	A diagrammatic representation of the environment	13
Figure 2.2:	The interdisciplinary model	58
Figure 2.3	The problem-based model	59
Figure 2.4:	The theme-based model	60
Figure 2.5:	The immersed model	61
Figure 2.6:	The webbed model	62
Figure 2.7:	The threaded model	63
Figure 2.8:	An indication of how an environmental orientation to learning may influence learning programme development and the attainment of specific outcomes across learning areas	64
Figure 2.9:	A constructivist model	73

LIST OF TABLES

TABLES		PAGE
Table 3.1:	Percentage of all circuits participated in the study	102
Table 3.2:	Response rate based on circuits	102
Table 4.1:	Biographic and Demographic Information	104
Table 4.2:	Environmental Education: Educators' attitudes and teaching Practices	109
Table 4.3:	Understanding of the concept "environmental education"	113
Table 4.4:	Respondents' reasons for the introduction of environmental Education into the curriculum	114
Table 4.5:	Responses with regard to the importance of integrating environmental education into all learning areas	115
Table 4.6:	Responses regarding the success of integration of environmental education into the curriculum	117
Table 4.7:	Knowledge about the integration approach	118
Table 4.8:	Benefits of the integration approach	119
Table 4.9:	Challenges faced by educators in integration of environmental education into the school curriculum	121
Table 4.10:	Suggestions for improving the situation	122
Table 4.11:	Department' s participation on the integration process of environmental education into the school curriculum	123
Table 4.12:	Responses on further training required	125

CHAPTER 1

1. ORIENTATION OF THE STUDY

1.1 INTRODUCTION

Education has always been viewed as the salvation of pending environmental problems (Shongwe, 1992: 9). The level of education also determines the way in which individuals understand the complex and dynamic forces that determine the structure and the quality of the environment in which they live and work and those of the wider world. This in turn determines the level to which individuals understand their own role in this process, and therefore their ability to contribute effectively to the resolution of environmental concerns, whether these are local or global. Therefore, if education is to fulfill its complete social role and if there is to be any realistic chance for current environmental concerns to be resolved, it must upgrade the quality of environmental awareness, understanding, insight and skills throughout society. The formal education structures must prepare learners for their roles as environmental decision makers (Martin, 1993: 21).

Within the context of this study, a statement of the problem is provided. Thereafter the research methodology is given and the definition of terms relevant to the study is provided.

1.2 STATEMENT OF THE PROBLEM

Educational reconstruction in South Africa has become imperative, as the complex interplay of social, environmental and educational dilemmas have reached crisis proportions. Most of these can be attributed to either poor education or miseducation or a combination of the two. Firstly, poor education with its predominantly political roots has affected the majority of South Africans, as incalculable damage has been done by the grossly discriminatory dispensation of apartheid funding, proper training and educational facilities. This has resulted in a situation where millions of people had scant or no access to basic education (Schreuder, 1995: 18).

Schreuder (1995:19) further states that the education policy of the previous governments exploited the educational philosophy of fundamental pedagogics supported by the hegemonic ideology of Christian National Education mainly for its bureaucratic appeal. This has alienated and marginalised the majority of the people, thereby further aggravating the crisis. Curricular typical of the era of apartheid were designed to reproduce those values and ideologies that best suited the minority in power. In addition, as is the case in most modernistic education systems, these curricular further commonly reproduced the values and beliefs of the dominant social paradigm. This explains why even the 'priviledged' minority who had access to the best education the country could offer, was subjected to poor education (DoE, 1997: 8). This sector of the community is therefore also characterised by environmental illiteracy, overt consumerism, and a general lack of environmental sensitivity and overexploitation of natural resources.

Miseducation, which is very characteristic of modern education systems, is the product of many myths within the theories and practices of modern education. The roots of these myths can be traced to a number of philosophical positions that show remarkable parallelism to the grand narratives (philosophical positions) of modernism. All the global environmental risks such as global warming, ozone depletion, acid rain, industrial pollution, nuclear warfare, uneven distribution of wealth, political instability and many others are socially constructed and the underpinnings of the crisis can ultimately be considered, features of modernity (Schreuder, 1995: 19).

After the 1994 general election, the new dispensation entered into consultative meetings with officials of the Netherlands, Australia and Canadian governments to assist in recasting the education system for the new South Africa. Emanating from these meetings, South Africa decided to launch a system of education, namely outcomes based education, the objective being to establish a culture of lifelong learning for all South Africans. This is a revolution that moves from objectives to outcomes. It is a new paradigm that focuses on transforming educational practice, making education relevant, effective and bringing educational changes that are in line with the desired goals of the Reconstruction and Development Programme of the democratic government (DoE, 1997: 1).

One of the goals of the Reconstruction and Development Programme (RDP) of South Africa (SA, 1994) is to increase environmental consciousness among the youth, to coordinate environmental education policy at all levels, and to empower communities to act on environmental issues and to promote an environmental ethic.

Government policy in this regard was reflected in education policy. The goal of the RDP is clearly seen in the White Paper on Education and Training (SA, 1995), which indicates educational policy that aims at engaging learners and communities to learn about and take environmental action at all levels and programmes of the education system. This is emphasised by Principle No. 17, which states that Environmental Education (EE), involving an interdisciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of the education and training system, in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources.

In South Africa, Outcomes-Based Education (OBE) is intended to be a vehicle for achieving the integration of education and training as well as access to lifelong learning for all. Issues such as development, equity, participation and redress should therefore be central to an OBE system in South Africa. The appeal of OBE for South Africans is that it is a learner-centred, results-oriented design based on the belief that all individuals can learn (DoE, 1997: 17).

Environmental Education (EE) lends itself to an outcomes-based approach to teaching and learning. It seeks to provide learners with more than factual knowledge about the environment. It also aims to develop creative and critical thinking, promote an integrated approach to learning, and facilitate problem-solving and further understanding of values and attitudes. It can comfortably accommodate and promote the essential outcomes that have been proposed for the South African education (Hughes, 1996: 57).

Outcomes–Based Education focuses on the learner and virtually guarantees every learner education. In theory, both Outcomes-Based Education and Environmental Education focus on relevance to the needs of society as well as relevance to learners'

present and future needs. Both ideas also take a holistic approach to curriculum and emphasise the importance of integration and cross-curricular approaches. In both approaches the development of the whole person is of paramount importance. Outcomes–Based Education and Environmental Education are values–orientated and are concerned with the integration of knowledge, skills and values (Tbilisi Declaration, 1977; NQF, 1996).

Both Outcomes-Based Education and EE are learner–centred and encourage active learning on the part of learners, involving them in real and simulated action, and both also emphasise the importance of lifelong learning (Tbilisi Declaration, 1977; NQF, 1996). Critical thinking is also a central part of both of these approaches to education. Although in theory the links between Outcomes–Based Education and environmental education seem clear, it is contended that in practice, the links may be difficult to clarify in the light of the South African state's questionable policy and curriculum initiatives (le Grange and Reddy, 1997: 14).

Obviously, a move towards outcomes–based education would mean a new role for educators in South Africa. The implications are that educators will have to undergo a major paradigm shift with respect to their role. The educator that would have to emerge to meet the challenges of outcomes–based education should deliberately change approach to teaching and learning. Lifelong learning would require a replacement of the approach of learning the facts of the new curriculum quickly. The old talk and chalk approach should be replaced completely by more learner involvement and participation. The intended outcomes of learning will have to occupy a central position in the educator's planning and preparation. Above all, learner centredness, and learner–paced approach to education will have to direct all classroom practice (DoE, 1997).

With regard to the involvement of educators in teaching and learning of environmental education, The Norms and Standards for Education policy, require teachers to fulfil a community citizenship role and to identify and respond to social and environmental issues through their educational practice (DoE, 2000: 22).

Educators are at the centre of any curriculum implementation process. The success or failure of any curriculum framework highly depends on them as practitioners. Therefore, it would be very important and useful to understand issues and challenges facing them (educators) during the implementation process. Hence in the researcher's view, identifying and addressing these issues and challenges would inform all concerned with respect to the extent to which environmental education is integrated in South African classrooms.

Environmental education is, at its heart, an integrative undertaking. Environmental educators are expected to teach across disciplines, linking the methods and content of natural and social sciences, arts, mathematics, and humanities to help learners fully understand and address complex environmental issues. Environmental educators need the ability and the commitment to keep the whole picture in mind as they guide learners toward environmental literacy (NAAEE, 2000: 10).

The manner in which educators are expected to integrate environmental education into the outcomes–based curriculum to facilitate learning becomes a problem worth investigating through the following questions:

- What is Environmental Education?
- Why should Environmental Education be integrated into the school curriculum?
- What are issues and challenges facing educators in integrating Environmental Education into the school curriculum (Outcomes–Based Education)?

1.3 RATIONALE OF THE STUDY

South Africa is currently characterised by broad socio-political change. All sectors of the public and of private life are engaged in the open–ended process of transforming towards new, more equitable and democratic political, economic and social structures governed and guided by the Constitution of the country. Some ways in which this Constitution and other emerging policies differ from previous policy are that they

include environmental and social justice and human rights as fundamental principles (Du Toit and Sguazzin, 1999: 5).

In terms of education, the outcomes–based education has been introduced. The new outcomes-based education is based on a structure that begins by recognising the critical skills, knowledge and values that are important for all South Africans to acquire. The concept OBE acknowledges that everyone can learn. It is intended to be a vehicle for achieving integration of education and training as well as access to lifelong learning for all. Issues such as development, equity, participation, redress and healthy environment should be central to an OBE system in South Africa (DoE, 1997: 17).

With the introduction of OBE in South Africa, educators need to be more innovative. Moving away from the old system requires that one should be able to utilise other means through which lessons will become more meaningful and learner–oriented. Educators need to ensure that integration of subjects and of theory and practice take place.

The problem is, due to the fact that OBE curricula have only recently been introduced in the school system, educators are not yet experienced in the implementation of the principles as outlined in the OBE framework, integration being one of them (Bjerg-Hansen and Sguazzin, 2000: 18). Hence, this study is aimed at investigating issues and challenges facing educators in integrating environmental education into the outcomes–based education.

1.4 AIMS OF THE STUDY

AIM 1: To determine from literature the nature and scope of integration of environmental education into the outcomes – based education curriculum.

AIM 2: To determine from literature possible problems preventing effective curriculum integration.

AIM 3: To determine empirically issues and challenges facing educators regarding the integration of environmental education into outcomes–based education curriculum.

1.5 RESEARCH METHODOLOGY

1.5.1 Literature study

A thorough study of primary and secondary sources was made. Electronic search through Internet sources was also used with a view of gathering relevant information about the integration of environmental education into outcomes–based education curriculum. The following key words were used to conduct a dialogue – search:

- Environmental education
- Outcomes–based education
- Curriculum
- Integration and education
- Implementation in education

1.5.2 Instrumentation

A questionnaire was developed and pre–tested to eliminate any problems, flaws, bias and ambiguity. It was further self administered to primary schools in the Mafikeng District in the North West Province. The aim of the questionnaire was to gather information on issues and challenges facing educators in integrating environmental education into the outcomes–based education curriculum.

1.5.3 Population and sampling

The survey population was drawn from the Mafikeng District of the North West Province. With the help of the Department of Education in the North West Province, a list of primary schools in the district was made available. The respondents for this study were drawn from six education circuits in the Mafikeng District namely: Botshabelo, Dithakong, Makgobistad, Mmabatho, Montshiwa and Stadt circuits. There are 102 primary schools in the Mafikeng district. Out of 102 primary schools, fifty-two (n=52) were randomly selected. In each circuit, fifty per cent (50%) of the schools were randomly selected to participate in the study.

1.6 DATA ANALYSIS

In this study, the majority of questions were open-ended; therefore the content analysis method was employed. Content analysis sorts qualitative data into categories. The strategies that were used to analyse data were categorising strategies and contextualising strategies. Frequencies, percentages and tables were also used in the analysis of data.

1.7 DEFINITION OF TERMS

- **Environmental Education:** Environmental Education is a complex concept open to various interpretations. Based on the definition of EE in IUCN (1971), environmental education is the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among people, their culture and their biophysical surroundings. Environmental education also entails practice in decision–making and self–formulation of a code of behaviour about issues concerning environmental quality (Neal and Palmer, 1990: 3).

- **Curriculum:** A curriculum is taken to be all those activities designed or encouraged within the school's organisational framework to promote the intellectual, personal, social and physical development of its learners. A formal curriculum comprises the academic intentions of the course of study, what is supposed to be taught and learned in schools (Preedy, 1989).

- **Outcomes–Based Education:** The Department of Education (1996: 64) in South Africa defines Outcomes–Based Education as an approach to education whereby education is driven by the outcomes displayed by the learners at the end of an education experience or process.

- **Integration:** To integrate is to combine parts into whole or come into full membership of a community. Integrated curriculum involves making connections between the various elements of learning – between the (subjects) components of a programme, between activities in an institution and outside it, and between past,

present and future experience (Preedy, 1989). Within this context, integration is when environmental issues are dealt with throughout the total curriculum by being incorporated into any subject matter.

1.8 SUMMARY

In this proposal, a brief orientation to the study is provided, outlining the problem to be investigated and the aims of the study. The major focus of the study is to determine empirically issues and challenges facing educators on the integration of environmental education into the outcomes–based education curriculum.

1.9 CHAPTER ARRANGEMENT

Chapter 1: Orientation of the study
Chapter 2: Literature study
Chapter 3: Research methodology
Chapter 4: Data analysis and interpretation
Chapter 5: Summary, findings, recommendations and conclusion.

CHAPTER 2

2. NATURE AND SCOPE OF INTEGRATION OF ENVIRONMENTAL EDUCATION INTO THE SCHOOL CURRICULUM

2.1 INTRODUCTION

There can be little doubt that we are living in a time of environmental crisis. South Africa's environmental problems include widespread poverty, unemployment, water shortages, air pollution and soil erosion (le Roux, 1997: 47). The varied nature of the crisis means that everyone is affected in some way, although some suffer impacts more directly, while some are better equipped to deal with adversities, than others. Le Roux (1997: 47) states that one of the responses to the environmental crisis is environmental education. Environmental education is in no doubt seen as one of the most important factors that can contribute to redressing the crisis (Shongwe, 1996).

Environmental Education (EE) is one of the current priorities of any education system. The goal of producing an environmentally concerned citizenry is justified by the evidence of the accelerated process of environmental deterioration (Corral-Verdugo et al, 1996: 23). Internationally, it has been recognised that environmental education should not be viewed as a 'separate subject' but rather as an integrated, cross-curricular focus of all learning areas (McKay, 2000: 7).

In South Africa, environmental education is a critical element of all education and training programmes at all levels of the system (White Paper on Education and Training, 1995). This is recognised in the Outcomes-Based Education (OBE) curriculum through the inclusion of environmental concerns across learning areas for all phases in the General Education and Training (GET) curriculum. Educators therefore need the competence to integrate environmental education processes in a range of learning programmes. For example; environmental education processes in science and technology learning, in social studies, in language learning, in arts and culture studies, in Mathematics and mathematical numeracy learning and in life orientation learning (McKay, 2000: 7).

Establishing issues and challenges facing educators in integrating environmental education into the outcomes-based education curriculum is very important for an approach as new as this. Because the school is where educational policies are put into practice and is thus at the heart of educational transformation, issues and challenges facing educators are inevitably important for they can be very influential towards the success and/or failure of any curriculum framework.

The purpose of this chapter is to review the nature and scope of integration of environmental education into outcomes-based education curriculum. Also presented in this chapter is the definition of terms "environmental education, outcomes-based education and curriculum integration" which feature prominently in the study. The compatibility of outcomes-based education with environmental education and an overview of research on integration of environmental education into curriculum in both developed and developing countries are also presented.

2.2 FURTHER DEFINITION OF TERMS

2.2.1 Environmental education

Before one can understand better what environmental education involves, it is necessary to understand the term "environment". Environment is a term that is used in everyday conversation but its actual meaning is perhaps uncertain.

Environment means different things to different people. For some, it means separating the garbage into burnable and non-burnable items. To others it means saving on electricity or using less water. The term environment may be associated with restoring the vitality of tropical rain forests, maintaining biodiversity and arresting desertification. All of these views are right in their own way, and are united in its concern for the effects that the environment has on the day-to-day lives of current and future generations.

Di Chiro (cited in Gold Fields Course Notes, 1996: 2) define environment as the use of individual and culturally imposed interpretative categories, and it exists as the environment the moment individuals name it and imbue it with meaning. Therefore,

the environment is not something that has reality outside or separate from the social situation. Rather, it should be understood as the conceptual interactions between the physical surroundings and the social, political and economic forces that organise us in the context of these surroundings. It is in this sense that we can say that the concept 'environment' is socially constructed".

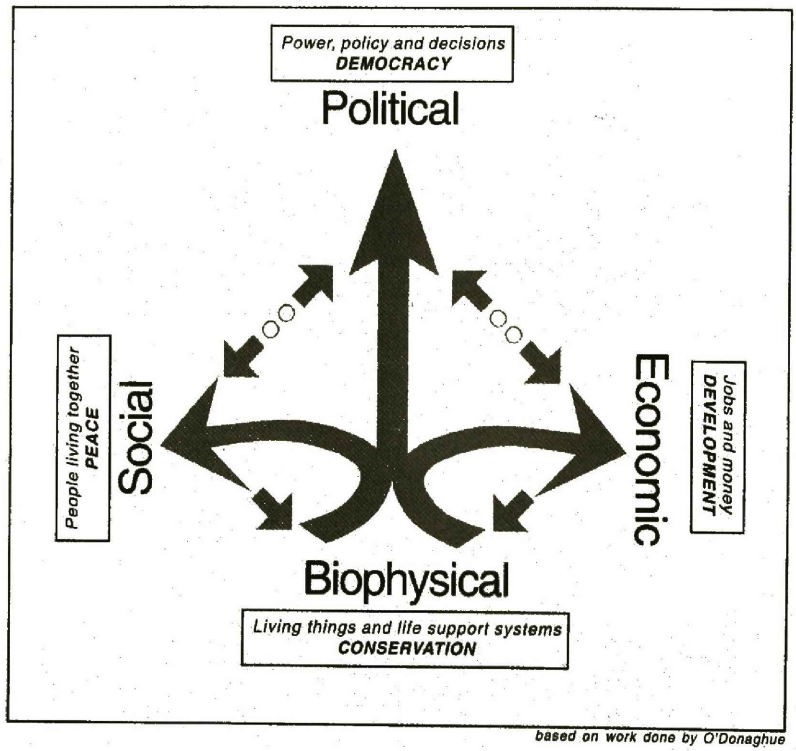
Fien (cited in Gold Fields Course Notes, 1996: 2) follows this view (Di Chiro's) by defining the environment as a social construct referring to the interactions between social and biophysical systems.

According to Allaby (1997), the environment is the complete range of external conditions, physical and biological, in which an organism lives. Environment includes social, cultural and (for humans) economic and political consideration, as well as the more usually understood features such as soil, climate and food supply.

Similarly, Holden (2000:17) defines the environment as anything outside an organism in which the organism lives. It can be a geographical region, a certain climatic condition, the pollutants or the noise that surrounds an organism. Man's environment will include a country or region or town or house or room in which he lives, a parasite's environment will include the body of the host, a plant's environment will include a type of soil at a certain altitude.

O'Donoghue (in Du Toit and Sguazzin, 1999: 9) also explains the environment as consisting of four dimensions, namely biophysical, economic, social and political. The author developed the following 4-dimension model of the environment as shown in Figure 2.1, in which he presents the concept as a four interdependent realm of meaning.

FIGURE 2.1 A diagrammatic representation of the environment



Source: Du Toit and Sguazzin (1999: 9).

Figure 2.1 illustrates the different aspects of the environment and the links between them. In the past, when people spoke of the environment, they usually referred only to the biophysical aspects of the environment. The move towards sustainability means that all aspects of the environment such as economic, political and social need to be recognised and taken into account. Only if they are properly integrated and work in balance and harmony, will the switch to sustainability be possible (Du Toit and Sguazzin, 1999: 9).

Depending on the circumstances and contexts and the different understanding of the term 'environment', the concept 'environmental education' is defined differently by different individuals and groups. This may explain the many different statements about what environmental education is. One of the most popular and internationally

recognised definition of environmental education is that of the International Union for the Conservation of Nature and Natural Resources (IUCN, 1971) which states that environmental education is the process of recognising values, and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality (Neal and Palmer, 1990: 3; Shongwe, 1992:4).

Environmental education can be defined as a process aimed at developing a world population that is aware of and concerned about, the total environment and its associated problems and which has the knowledge, attitudes, skills, motivation, and commitment to work individually and collectively towards solutions of current problems, and the prevention of new ones (Tyson, 1994: 10; Tbilisi Declaration, 1977).

Environmental education is aimed at providing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems and motivated to work toward their solution (Stapp et al, 1987 cited in www.gdrc.org).

The Bicentennial Australian Studies School Project define environmental education as an across the curriculum approach to learning that is useful to individuals and groups in coming to understand the environment with the ultimate objective of developing caring and committed attitudes that will foster the desire to act responsibly in the environment. Thus, environmental education is concerned about knowledge and also feelings, attitudes, skills and social action (Report of the Working Party on EE to the Board of Teacher Registration, 1993: 22).

Environmental education is an approach to education that seeks to interest and involve students in world problems. The mounting social concerns over environmental matters make it vital that education addresses this major issue and that the potential impact of environmental issues on the future be assessed (Tema, 2000).

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The objectives of Environmental Education can be summarised as follows:

- **Knowledge:** to help students acquire basic understanding of the biosphere, the principles of an ecosystem and how it functions, how people and the environment interact and how problems and issues arise;
- **Skills:** to assist students to acquire skills for solving environmental problems;
- **Awareness:** to help students acquire an awareness of and sensitivity to the total environment and its allied problems;
- **Attitudes:** to help students to acquire social values, strong feelings of concern for the environment and the motivation for actively participating in its protection and improvement; and
- **Participation:** to help students develop a sense of responsibility and urgency with regard to environmental problems, to ensure appropriate action to solve problems (Gebreab and Bak, 2000: 8).

2.2.2 Outcomes-based education

In the public domain, outcomes-based education and Curriculum 2005 (C2005) are often conflated and seen as interchangeable. There is seldom a discussion of Curriculum 2005 without a discussion on outcomes-based education and there is rarely a debate on outcomes-based education without reference to Curriculum 2005 (Chisholm, 2000: 7). Yet, Curriculum 2005 should rather be seen as a curriculum framework influenced by the principles of outcomes-based education (Maila, 2000: 5).

Official documentation links the new curriculum to national goals and does not distinguish clearly between Curriculum 2005 and outcomes-based education. The vision of linked national, curricula and learning outcomes are embedded in most official presentations of C2005. In 1997, the Department of Education (1997a), for example, defined C2005 as: an outcomes-based education curriculum derived from nationally agreed on critical cross-field outcomes that sketch the vision of a transformed society and the role education has to play in creating it.

For Spady, cited in Gultig et al (1998: 24) a major influence on curriculum thinking in South Africa since 1994, outcomes-based education means clearly focusing and organising everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experiences. This means starting with a clear picture of what is important for students to be able to do, the organising curriculum, teaching and assessment to make sure this learning ultimately happens.

Outcomes-based education is a way of learning and teaching in which pupils do most of the work themselves and teachers are mere guides and assessors of their charges' progress. Outcomes-based education is also cited as an education system that encourages the development of pupils as creative, critical and independent-minded individuals who are at home in team activities, which are designed to build their all-round growth as assertive individuals (Mecoamere, 2002: 4).

The concept 'outcomes-based education' acknowledges that everyone can learn. It defines what learners are to learn, emphasises learning not teaching, measures learner progress based on actual achievement and helps learners to develop innate skills. It is a set of principles and guidelines that provides the means to seek truth and knowledge of reality, the causes and nature of things and of the principles governing existence, the material universe and human behaviour, it allocates enough time for maximum potential development (Department of Education, 1997b: 17).

The draft document, A Lifelong Learning Development Framework for Genera and Further Education and Training in South Africa reflects about the different outcomes-based education approaches, which include Traditional OBE, Transitional OBE, and identifies Transformational OBE as the approach preferred in South Africa (Department of Education, 1999: 9).

According to the above mentioned document, **Traditional OBE:**

- Is strictly speaking not outcomes based, as the starting point in most cases is the existing curriculum from which outcomes are derived; and

- This approach could rather be seen to present curriculum-based objectives. The outcomes are synonymous with traditional, content-dominated categories that do not relate to real life demands and experiences of outcomes based education.

Transitional OBE:

According to C2005 transitional OBE is as follows:

- Lies in the twilight zone between traditional subject matter, curriculum structures and planning processes and the transformational OBE;
- This approach gives priority to higher-level competencies, such as critical thinking, effective communication, technological applications and complex problem solving, rather than to particular kinds of knowledge or information;
- Broad attitudinal, effective, motivational, and relational qualities or orientations are also emphasized; and
- It extends beyond the traditional form, as subject matter becomes more of a vehicle to assist in the cultivation and integration of higher order competencies.

Transformational OBE:

C2005 describes transformational OBE as follows:

- Is a collaborative, flexible, transdisciplinary, outcomes-based, open-system, empowerment-oriented approach to learning;
- It aims at equipping all learners with the knowledge, competence, and orientations needed for success after they leave school or have completed their training;
- Hence, its guiding vision is that of a thinking, competent future citizen; and
- Success in the learning environment for example, is of limited benefit unless the learners are equipped to transfer that success to life in a complex, challenging and transforming society.

The important characteristics of **Transformational OBE** are:

- It involves the integration of concepts in a cross-curricula approach which embraces not only the structure of the curriculum, but also the methods by which instruction is delivered and meaningful assessments made;
- Curriculum development should put learners first, recognising and building on their knowledge and experience and responding to their needs;
- Leaner-centredness is an important principle to the approach and gives considerable emphasis to constructivist approaches to learning;
- Promotion of cooperative learning that is regarded as one of the key elements to learning success;
- Progress is demonstrated through integrated tasks and the application of skills to real world problems and is monitored through multi-dimensional methods of assessments;
- Includes all learners;
- It remains the responsibility of educators to construct meaningful learning experiences that leads to the mastery of outcomes; and
- Learners do not fail but progress towards the mastery of outcomes at their own rate, and therefore at different rates (Malcolm, 1999: 77).

In outcomes-based education, content is considered as important as the process of learning itself, and both the process and the content of education, or learning and teaching, are emphasised by spelling out the outcomes to be achieved at the end of the process (Mecoamere, 2002: 4).

2.2.3 Integration

Integrated approaches towards education and training are now a major international trend in curriculum development and the reform of qualification structures. Education is seen as the area of learning where a learner gains knowledge. Training is seen as the area of learning where you gain skills (DoE, 1997: 12; NQF, 1996: 15).

An integrated approach to education and training links one level of learning to another, and enables successful learners to higher levels without restriction from any

starting point in the education and training system (White Paper on Education and Training, 1995: 18).

South Africa has embarked on transformational outcomes-based education. This involves the most radical form of an integrated curriculum. There are several forms of integration. This most radical form implies that not only is integration across disciplines into Learning Areas, but also across all eight Learning Areas in all educational activities. The outcome of this form of integration will be a profound transferability of knowledge in real life (DoE, 1997: 29).

The concept "integrate" derives from a Latin word that means to make whole or renew. The American Heritage dictionary (1996)'s definitions of integrate include "to join as to form a larger, more comprehensive entity" and "to blend, harmonise, synthesise, arrange, incorporate, unify, coordinate and orchestrate". From these definitions, it is evident that integration is a very appealing notion. But beyond its general appeal, educators have argued that integrated instruction is more authentic because it parallels real world tasks and not those developed solely for schooling (Gavelek et al, 2000: 1).

The very notion of integration incorporates the idea of unity between forms of knowledge and respective disciplines (Loepp, 1999: 1). According to curriculum scholars (Gavelek et al, 2000: 5), an integrated curriculum is intended to bring into close relationship such elements as concepts, skills and values so that they are mutually reinforcing.

Others (Iowa School-to-Work SBL Task Group, ASCD. H.H. Jacobs, Fogarty, NCRVE, SRS, Perkins and Primary Program, cited in www.stw-tac.k12.ia.us) define integration as:

- Holistic approach to learning that connects concepts, principles, content and applications across all areas;
- Making connections across disciplines;
- Spectrum of possibilities from fragmented to networked;

- Providing all students with the occupational, academic and higher-order thinking skills needed to function in society, the market place, and an information-based economy;
- Sequencing of courses and re-focusing of service to provide for transitions and an area of focus;
- To bring together the discipline perspective and focus on the investigation of a theme, issue, or a problem; and
- Curriculum designed so that related concepts, generalisations, contents, and/or processes are brought together and organised for learners.

An integrated curriculum is generally defined as an educational approach that cuts across and draws on multiple subject areas for learning and instruction. Its purpose is to realistically link various disciplines in the study and exploration of certain aspects of the world (www.purduenc.edu, 2003). This site further states that curriculum integration is not simply an organisational device requiring cosmetic changes or realignment in lesson plans across various subject areas. Rather, it is a way of thinking about what schools are for, about the sources of curriculum and about the use of knowledge. Curriculum integration begins with the idea that the sources of curriculum ought to be problems, issues and concerns posed by life itself.

Beane (1997) identifies the following four aspects or meaning of integration that can and should feature at some point in any programme that might claim to be truly integrative.

- **Integration of experience**

New experience becomes part of our existing knowledge and ways of seeing things. Past experience is used to help one understand and solve new problems. Experience whether 'primary' as in gathering data or doing observations, or 'secondary' as in processing the data and observation in a base, is the raw material for developing knowledge and understanding, and for developing and applying the skills essential for effective learning (Beane, 1997).

- **Social integration**

In social integration, learners apply the ideas and understanding they have developed in their daily lives and to the lives of others and they learn by interacting with others. The curriculum is organised around personal and social issues, problems and concerns identified in, or developed from the lives of the learners in the world in which they live. To be integrated socially is to learn socially, and this in its turn requires that the learner understand that society is greater than and exists prior to the individuals who live in and contribute to it. All learning is thus social learning and to learn effectively involves working with others as well as on one's own. For this reason too, good curriculum designs are collaborative or socially integrated designs. The participation of young people in curriculum planning follows from the democratic concept of participatory, collaborative governance and decision-making. The inclusion of personal issues alongside social problem follows from the democratic possibility of integrating self and social interest (Beane, 1997).

- **The integration of knowledge (and skills)**

When students begin to see that knowledge, skills and values are connected, they also begin to see the big picture of learning. They can then more easily and readily make new connections and apply their knowledge. Learning in this integrated way contrasts with fragmented learning that inhibits a student's ability to see how learning tasks might be connected one to the other and then to situations that are real, not only to themselves but also to the community.

The integration of knowledge in this sense involves students making and seeing connections in their minds as well as in the reality of projects, tasks and assignments. To achieve both kinds of knowledge integration, the teacher needs to work with and alongside students, to have conversations in which the students explain and demonstrate what they know and understand. Teaching in this integrative-conversational sense, involves the teacher becoming the learner, listening to the students, being inquisitive, empathising in order to understand

connections as the students see them and, thereby more effectively influencing their development (Pigdon and Woolley, 1995).

- **Integration as curriculum design**

Integration in this sense encourages students and teachers alike to explore, gather, process, refine and present information about the topics they want or need to investigate, not being constrained by the boundaries of subjects. These, more often than not, serve to disintegrate knowledge and understanding than to connect or integrate it. Specifically, a design is integrated when all the individuals involved in learning and teaching an integrated curriculum actively participate in the design processes and achieve consensus about what is to be done and why.

The process might include for instance, the identification of an issue, topic or interest to be studied, the clarification of knowledge and skills to be applied and developed with programme goals sent accordingly, the construction of learning activities and the selection or creation of authentic tasks and assessment procedures. Consistent with Dewey, Piaget and Bruner, such an approach acknowledges that students (especially when very young) can, and should be included in the curriculum design process. When included, the designs for their learning are more likely to be perceived by them as relevant, interesting and personally worthwhile (Beane, 1997).

Another term that is often used synonymously with integrated curriculum is interdisciplinary curriculum. Interdisciplinary curriculum is defined in the Dictionary of Education as "a curriculum organisation that cuts across subject matter lines to focus upon comprehensive life problems or broad based areas of study that brings together the various segments of the curriculum into meaningful association (Lake, 1994).

The similarity between this definition and those of integrated curriculum is evident. Lake (1994) defines interdisciplinary as a knowledge view and curricular approach that consciously applies methodology and language from more than one discipline to examine a central theme, issue, problem, topic, or experience. Lake (1994) further

defined interdisciplinary curriculum as one that combines several school subjects into one active project since that is how children encounter subjects in the real world combined in one activity.

The definitions presented in this discussion support the view that integrated curriculum is an educational approach that prepares children for lifelong learning. There is a strong belief among those who support curriculum integration that schools must look at education as a process for developing abilities required by life in the twenty-first century, rather than discrete, departmentalised subject matter. In general, definitions of integrated curriculum or interdisciplinary curriculum include:

- A combination of subjects;
- An emphasis on projects;
- Sources that go beyond textbooks;
- Relationships among concepts;
- Thematic units as organising principles;
- Flexible schedules; and
- Flexible student groupings (Lake, 1994).

2.3 LEGAL FRAMEWORK

The final third of the twentieth century has been a time characterised by increasing recognition of the severity and scale of environmental problems. It has become apparent that environmental stress has not only led to large scale biophysical destruction but also to a corresponding decline in quality of life as a consequence of the complex social, economic and political meshing of environmental issues (Hughes, 1998: 14).

One response to the environmental crisis has been a call for environmental education as a key means to address these issues. International policies have set a precedent for an environmental education orientation to education (Lotz-Sisitka, 2002; McKay, 2000, and Hughes, 1998).

The importance of environmental education has been emphasised at a number of international conventions. Two of these international meetings about the environment have been particularly significant to environmental education, producing the Tbilisi Principles for Environmental Education (Tbilisi, 1977).

Agenda 21, another significant document produced at the Rio Conference, devoted an entire chapter (Chapter 36) to the role of education as a response to the environmental crisis. South Africa is a signatory to Agenda 21, which means that it has agreed in principle to implement environmental education as education for sustainable development (Lotz-Sisitka, 2002; McKay, 2000). In addition, many countries, including South Africa, have ratified a number of other international conventions on specific environmental issues and this has influenced local policies and practice, including education (Lotz-Sisitka, 2002). At national level the government has responded to the environmental crisis by developing a range of new policies.

- **The Constitutional Provision**

According to Legotlo (2000: 16), the final Constitution Act 108 of 1996 is the supreme law of the country. It provides a general frame for laws in the country. Any law that is inconsistent with the Constitution is null and void. Legotlo (2000: 16) further states that the Bill of Rights found in Chapter 2 of the Constitution of the Republic of South Africa protects everyone's defined rights against violation. Section 24 of the Bill of Rights states that every South African has the right:

- ❖ To an environment that is not harmful to their health or well-being, and
- ❖ To have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that:
  - Prevent pollution and ecological degradation,
  - Promote conservation, and
  - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (RSA, 1996: 11).

- **The National Environmental Management Act**

The National Environmental Management Act (NEMA) promulgated in 1998, commits the South African government to sustainable development. One of the principles of NEMA emphasises that community well being and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means (Department of Environmental Affairs and Tourism, 1998). This policy provides guidelines for environmental education to encompass the objectives of sustainable development.

- **Reconstruction and Development Programme**

Concern for environmental issues in South Africa were reflected in the Reconstruction and Development Programme (RDP) document of 1994 which advocated programmes to rekindle the people's love of the land, to increase environmental consciousness among the youth, to coordinate environmental education policy at all levels and to empower communities to act on environmental issues and to promote an environmental ethic (RDP, 1994).

- **White Paper on Education and Training**

The White Paper on Education and Training (1995) states the need to integrate environmental education at all levels and phases of the education and training systems. This is emphasised by Principle No. 17 which states 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 systems, in order to create environmentally literate and active citizens and to ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources.

- **The NQF, Outcomes-based education and New Qualifications**

Further policies that influenced environmental education processes in formal education include the South African Qualification Authority (SAQA) Act (1995), introducing the establishment of the National Qualification Framework (NQF), a new system of qualifications that is outcomes-based. The shift to outcomes-based education (OBE) in South Africa led to the design of a new curriculum for General Education and Training (GET), namely Curriculum 2005 between 1996 and 2000. Policy Statements for the Foundation Phase, the Intermediate Phase and Senior Phase were developed by the Provincial Department of Education. The National Department of Education developed illustrative learning programmes for application in provinces. An emphasis on environmental learning was included in the Curriculum 2005 framework in the Human and Social Sciences (HSS) and Natural Sciences (NS) learning areas, and through a cross-curricula phase organiser on environment, (National Environmental Education Programme (NEEP) Project Document, 2000: 13).

- **Revised and Streamlined Curriculum**

Due to many difficulties experienced in implementing Curriculum 2005, the Minister of Education commissioned a Review of Curriculum in February 2000. The brief of the review team was to review Curriculum 2005, not Outcomes-based Education (NEEP Project Document, 2000: 14; Jansen and Christie, 1999).

The Curriculum Review indicated the following key requirements for a strengthened implementation process of outcomes-based education in the General Education and Training Sector (Chisholm, 2000: 4):

- A revised and streamlined outcomes-based curriculum framework is needed;
- A national teacher education strategy that locates teacher education in the higher education institution is needed;
- The production of learner support materials (especially textbooks);
- Ring fenced budgeting for the curriculum;

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- Reorganisation and reinforcement of curriculum functions in the DoE and in the provinces;
- Relaxation of the pace of implementation; and
- A managed process of phasing out the old structural features of Curriculum 2005 and phasing in the new streamlined curriculum (Chisholm, 2000: 4).

The Review noted the need to incorporate environmental issues in the new curriculum. The Council of Education Ministers (CEM) adopted most of the above recommendations, and agreed to set in place a process of re-designing the curriculum. The CEM recommended that special attention be paid to the incorporation of environmental education across the curriculum (Chisholm, 2000: 5; NEEP Project Document, 2000: 14).

- **The Norms and Standards for Educators**

The Norms and Standards for Educators policy requires teachers to fulfill a community citizenship role and to identify and respond to social and environmental issues through their educational practice (DoE, 2000: 22).

These are some of the policies that advocated for the implementation of environmental education in South Africa. It is therefore the obligation of formal education to ensure that all learners in South Africa contribute to the care and wise utilisation of natural resources by integrating environmental education throughout the curriculum for the GET band. The challenge for environmental educators in South Africa is to realise the potential that the new education and training system offers South Africans and to ensure that learners are able to participate actively in the search for sustainable living patterns and social justice.

2.4 THEORETICAL CONCEPTUALISATION

2.4.1 Historical framework

Environmental Education (EE) is probably as old as human civilisation. Through the centuries, people have learned how to interact with their surrounding environment. Growing up has always involved building up knowledge of the interactions between the various elements of the natural environment. People have been forced to learn how to survive in a world where the environment is more powerful than human beings and how to make use of that environment. For centuries, there have been ethic groups that lived in harmony with the environment. They possessed a profound understanding of how to manage natural resources in a sensible way and they have passed on their knowledge from generation to generation. Thus, in the early days, environmental education mainly consisted of learning how to master and make wise use of the natural environment. Nevertheless, nature has also often been perceived as an unlimited reserve of resources. Developments such as urbanisation and industrialisation have led to a sometimes-irreversible over-exploitation of these resources (Vinke, 1992:40).

The initial impetus to a worldwide interest in environmental education was given at the United Nations Conference on Human Environment held in 1972 in Stockholm. The conference designated the 5th of June as World Environment Day and encouraged governments to celebrate the day each year by organising activities aimed at promoting environmental protection. Every year the United Nations Environment Programme (UNEP) chooses a theme for the day. The theme for 1990, for example, was "Children and the Environment". World Environment Day is now celebrated in more than 100 countries throughout the world, including many developing countries (Vinke, 1992: 41).

More specifically, the Stockholm Conference called for the establishment of an International Environmental Education Programme (IEEP). Two years later, in Tbilisi, an Intergovernmental Conference on Environmental Education was organised to define environmental education, to formulate its goals and objectives and to evolve strategies for its development. The conference recommended that environmental

education should be directed to the general public at every age, at all levels of formal education and at specific occupational or social groups such as administrators and planners, industrialists and agriculturalists, through both formal and informal education (Tbilisi Declaration, 1977).

The Brundtland Report (1975) identifies both formal and informal environmental education as tools for achieving sustainable development: Environmental education should be included in and should run throughout the other disciplines of the formal education curriculum at all levels to foster a sense of responsibility for the state of the environment and to teach students how to monitor, protect, and improve it. These objectives cannot be achieved without the involvement of students in the movement for a better environment, through such things as nature clubs and special interest groups. Adult education, on-the-job training, television, and other less formal methods must be used to reach out to as wide a group of individuals as possible, as environmental issues and knowledge systems now change radically in the space of a lifetime (McKay, 2000: 38).

Formal school education, even if it has not always included environmental education as such, has probably always included topics with an environmental dimension. Plant and animal life, for example, are typically covered in biology classes and issues such as climate and the water cycle are dealt with in geography. Outside the formal education systems, documentaries about nature broadcast on radio or television, books about nature, environmental reporting by newspapers, have also for many years and an educational function. In developing countries, furthermore, environmental education has sometimes more or less implicitly been included in development activities such as agro-forestry or public health projects. Only in the 1970s, however, together with the growing public concern about environmental issues and the launching of the IEEP, has environmental education started to become a discipline or concern in its own right (Vinke, 1992: 41).

In this country as in most parts of the world, environmental education emerged from conservation education (Shongwe, 1997: 53). The main emphasis was on ecological instruction and simplistic notions of attitude change through awareness creation so as to change behaviour. Such views were strongly influenced by the notion that the

environment was in a crisis in terms of ecosystems being at risk and endangered wildlife which was to be protected in nature reserves. Therefore, people needed to experience nature in the wild protected areas and had to be provided with information and simply made aware. O'Donoghue and Janse van Rensburg (1995: 4) state that the idea was simply to make people aware of the environment as natural ecosystems. Teaching ecology and environmental education were seen as the same thing and the environment was simply 'nature at risk'.

This one-sided approach, as well as the existing political situation in South Africa at that time, sparked a negative attitude towards conservation. The impression that people were mostly excluded from conservation areas, that they gained very little benefit from their establishment and the feeling that the areas were established at their expense, contributed to this negativity. Conservation was viewed as a means to deprive people of their land for the sake of animals (Ferreira, 2001: 290).

The inclusion of environmental education into the curriculum was characterised by the following approaches:

- The extracurricular activity approach;
- The separate subject approach; and
- The integration approach.

- **The extracurricular activity approach**

The extracurricular activity approach, also known as the non-formal approach is primarily associated with awareness-generation activities. Instituting school-based eco-clubs, camping, trekking, visiting industrial areas and pollution treatment plants, and developing audiovisual aids and other supplementary material are popular activities (Pande, 2001: 48). The publication of school magazines on the environment is also one of the activities. These magazines typically contain information, stories, illustrations, quizzes, games and competitions. In several countries, ecological organisations produce such magazines and send them to schools, (Vinke, 1992: 55).

- **The separate subject approach**

Another way of including environmental education in school curriculum is to present it as a separate discipline. The advantage of this approach is that it allows for a more in-depth study of the subject. In practice, this is rarely done, because existing curricula usually leave no room for the inclusion of an entirely new subject. An additional or alternative space needs to be created in existing timetables, which are already tight. There are other possible difficulties in attempting to introduce environmental education as a separate subject, for example:

- Environmental education might become isolated from other subjects from which it draws skills, knowledge and understanding; and
- This approach requires teachers that have been sufficiently trained to teach environmental education as a separate subject (Pande, 2001: 48; Vinke, 1992: 55; Dunlop, 1992: 96).

- **The integration approach**

The integration approach is based on the belief that environmental concerns affect every aspect of life, thus each school subject must have an environmental orientation. Administratively, this approach is easier to implement than the separate subject approach, because the content of existing school subjects only need to be readjusted to provide an environmental orientation (Pande, 2001: 47).

The chief shortcoming of the integration approach is that, although it encourages awareness of environmental problems, it does not focus adequately on the students' immediate habitat and does not present the spectrum of a habitat's problem in a holistic manner, thus students are unlikely to be motivated to solve such problems. Another drawback to the integration approach is a bias in the curriculum towards urban and industrial problems and a tendency to ignore rural problems. Deforestation, for example, is treated in such an abstract manner that is often incomprehensible to a rural child who looks to the village forest for basic daily needs (Pande, 2001: 47).

Regardless of the shortcoming and drawback that this approach might have, it has been seen as the most appropriate approach that will enhance environmental learning. Currently, the integration of environmental education into existing curricula has become central to the educational policies of large numbers of developed and developing countries and has also emerged as an important aspect of international discussion about how best to respond to the environmental crisis (Vinke, 1992: 55).

2.4.2 CURRICULUM DEVELOPMENTS IN ENVIRONMENTAL EDUCATION IN SOUTH AFRICA

The inclusion of environmental education in curricula in South Africa marks a holistic shift from the past where it was marginalised from the mainstream formal education (Le Grange and Reddy, 1997: 12). The following initiatives represent the major national curriculum intervention in environmental education curriculum development work:

- The first attempt to include environmental education in the formal curriculum was the 1989 White Paper on Environmental Education. The White Paper's inclusion of the guidelines adopted at the international conferences held in Belgrade (1975) and Tbilisi (1977) was an encouraging shift from interpretations of environmental education held up to that point. However, this policy was not broadly inclusive and resulted in little implementation in formal education (Le Grange and Reddy, 1997: 13).

- In 1992, the Environmental Education Policy Initiative (EEPI) was started as a more inclusive process of gathering and developing environmental education policy options for formal education in South Africa (Lotz-Sisitka, 2002: 97; Hughes, 1998: 15; Le Grange and Reddy, 1997: 13). A significant outcome of this process was the inclusion of environmental education in the most recent Government White Paper (1995) on education and training policy in a new South Africa. The principle states: "Environmental education, involving an interdisciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of the education and training systems, in

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order to create environmentally literate and active citizens and ensure that all South Africans present and future, enjoy a decent quality of life through the sustainable use of resources".

- Education and Training reform led to the recognition amongst concerned environmental educators of the need to take the work of the EEPI further, from policy to curriculum development. The shift in 1996 from national education policy development to curriculum development necessitated the need for a curriculum initiative in environmental education. This prompted the establishment of the Environmental Education Curriculum Initiative (EECI), to take the work of the EEPI from policy to curriculum development (Lotz-Sisitka, 2002: 98; Hughes, 1998: 15; Le Grange and Reddy, 1997: 13).

  Since its establishment in 1996, the EECI has been given opportunities to formally contribute to the new curriculum for South Africa. These included participation in the Department of Education's national workshops, official representation on the national Learning Area Committee (LAC) for Human and Social Sciences, representation at all Co-ordinating Committee meetings, in reference groups for the technical committees and on phase committees working on the development of Learning Programmes (Le Grange and Reddy, 1998: 13).

  Through these various means of participation, the curriculum imitative in environmental education (EECI) has been involved in attempts to ensure the inclusion of environmental education as a cross-curricular concern in the new curriculum framework, which is OBE for the General Education and Training (GET) band of the National Qualification Framework (NQF) (Hughes, 1998: 15).

- The Learning for Sustainability (LfS) Pilot Project, a donor funded pilot project (1997-2000), was a pilot project aimed at supporting the implementation of environmental education in the formal education system in South Africa. This was done through support from the provincial curriculum

development process in Gauteng and Mpumalanga. The project was funded by the Danish Cooperation for Environment and Development (DANCED). The intention of the LfS project was to pilot an environmental education curriculum development process and professional development model which wouldl contribute to educational transformation in South Africa, and through this process, make a contribution to more sustainable living patterns and a healthy environment. The project focused its activities on testing or piloting ways in which holistic and integrated environmental education with a cross-curricular approach can best support the implementation of outcomes-based education. Its major pilot activities focused on three main integrated areas: curriculum development, professional development and resource material development (Lotz-Sisitka, 2002: 98; Bjerg-Hansen and Sguazzin, 2000: 4; Du Toit & Sguazzin, 2000: 4; Janse van Rensburg, 1998: 62).

- From 2000 to date, the Ministry of Education has established a National Environmental Education Programme (NEEP). This programme aims to support the integration of environmental education in all levels and all phases of the education and training system, in accordance with the principles of the White Paper on Education and Training system (1995) which states that environmental education should be a vital element of all levels and programmes of the education system. NEEP facilitates the focus on active learning through OBE; improve school management and school-community links. The programme (NEEP) is guided by the institutional and policy framework of the Department of Education (DoE), with the aim of establishing a transectoral strategy to integrate environmental learning in the OBE system, through building upon emerging partnerships between Department of Education, Department of Environmental Affairs and Tourism (DEA&T), Department of Water Affairs and Forestry (DWAF), Department of Health (DoH) and the stakeholders, under the co-operative governance brief of the government (NEEP Project Document, 2000: 10).

The NEEP builds on the eight years (1992-2000) state-civil society alliance known first as the Environmental Education Policy Initiative (EEPI) and then the Environmental Education Curriculum Initiative (EECI), the aim being the

incorporation of environmental education in the formal education and training system (NEEP Project Document, 2000: 10).

2.4.3 OUTCOMES-BASED EDUCATION (OBE) AND ITS COMPATIBILITY WITH ENVIRONMENTAL EDUCATION (EE).

According to Materechera (2002: 50), OBE has been implemented in South Africa as the new curriculum to facilitate the transformation of the education system in general. First impressions indicate many common areas or parallels between environmental education and outcomes-based education (Le Grange & Reddy, 1997: 14). In theory, both outcomes-based education and environmental education focus on relevance to the needs of society as well as relevance to learners' present and future needs (Tbilisi, 1977; NQF, 1996). Both ideas also take a holistic approach to curriculum and emphasise the importance of integration and cross-curricular approaches (Tbilisi, 1977; NQF, 1996). In both approaches the development of the whole person is of paramount importance.

Outcomes-based education provides opportunities for people to gain the skills, knowledge, experience, understanding, attitudes and values necessary to build a strong, productive, skilled workforce. Environmental education is a process in which individuals gain awareness of their environment and acquire knowledge, skills, values, experiences, attitudes and also the determination, which will enable them to act individually and collectively to solve present and future environmental problems (DoE, 1997: 18; www.gdrc.org. 2003).

Establishing the conditions and opportunities within the system that enable and encourage everyone regardless of their environment, ethnicity, economic status, or disabling condition to learn and achieve these essential outcomes is one of the most important features of outcomes-based education (Baxen and Soudien, 1999: 133). One of the principles of environmental education emphasise that environmental education must involve everyone. Because of its very nature and importance, environmental education cannot be confined to any one group in the society. It is a responsibility for everyone, government, industry, the media, educational institutions, community

groups, children with disabilities, right down to the level of the individual and the man on the street, (www.ea.gov.au. 2003; Maila, 2001: 3).

Outcomes-based education supports a system of education which develops the potential of all learners and which is relevant to the political, social and economic needs of the society (The Educators' voice, 2002: 1). Environmental education recognises the importance of effective learning within the context of human influences, incorporating an examination of economics, culture, political structure and social equity, as well as natural processes and systems. Ultimately, the goal of environmental education is to develop an environmentally literate citizenry (Vymetal-Taylor, 1997:5).

Outcomes-based education provides opportunities for everyone to learn regardless of age, circumstances and the level of education and training one may have. It allows one to learn on an ongoing basis. This is called lifelong learning (NQF, 1996: 6). Guiding principles for environmental education state that environmental education should be a continuous lifelong process, beginning at the preschool level and continuing through all formal and non-formal stages (Tbilisi, 1977).

Both approaches (Outcomes-based education and Environmental Education) are learner-centred and encourage active learning on the part of learners, involving them in real and simulated action. Critical thinking is also a central part of both of these approaches to education (Tbilisi, 1977; NQF, 1996).

In summary, it is evident that both approaches (OBE and EE) have the same characteristics, which are:

- **Learner – focused.**
- **Holistic:** Considering natural, human-living, technological and social environments where the latter category would also include economic, political, cultural, ethical and aesthetic aspects;
- **Universally oriented:** Not only for the ecosystem of the earth, but for the entire universe;

- **Future – orientated:** Demonstrating concern not only for the present, but for future inhabitants as well;
- **Issue – oriented:** Examining issues through all perspectives – local, regional, national, international and universal;
- **Action – oriented:** Directly involving participants in the resolution of local problems and issues;
- **Continuous:** Serving students in all subject areas at all grade levels;
- **Interdisciplinary:** Drawing content from all disciplines; and
- **Experientially oriented:** Employing a diverse array of learning environments, situations and instructional approaches, utilizing direct experience whenever possible.

Although in theory the links between outcomes-based education and environmental education seem clear, other environmental education practitioners contend that in practice the links may be difficult to clarify in the light of the South African state's questionable policy and curriculum initiatives (Le Grange and Reddy, 1997: 14). The complex links between environmental education and outcomes-based education will be discussed below.

2.4.4 TENSIONS BETWEEN ENVIRONMENTAL EDUCATION AND OUTCOMES-BASED EDUCATION

Le Grange and Reddy (1997: 15) argue that attempting to marry environmental education and outcomes-based education in South Africa will be particularly difficult for the following three reasons. Firstly, there are inherent tensions between environmental education and outcomes-based education. Secondly, the tensions are compounded by the centrist, technicist policy and curriculum development processes taking place in South Africa. Thirdly, the fragile culture of learning and resource poor context may further compound clarifying the links between the two.

The authors state that outcomes-based education has been criticised for its instrumentalist view of knowledge. They argue that the justification for education lies within process itself and that there are some learning activities or educational

encounters that are worth doing for reasons other than serving some instrumental purpose as a means to a predetermined outcome. Environmental education is concerned with process. In taking social action (action for the environment), one cannot have predetermined outcomes. Environmental outcomes are developed through a process of interaction with others in specific environmental contexts.

Naidoo, Kruger and Brookes (1990: 13) argue that the implementation of environmental education in South Africa failed previously because the education system espoused a mechanistic and reductionist epistemology. The authors advocated environmental education as a transformation agent in bringing about a better education based on a new epistemology. As has been argued, the shift from a content-based education to an outcomes-based education does not only guarantee new opportunities for a better education. The epistemology associated with OBE remains mechanistic and reductionist. The shift to OBE in this country may mean nothing more than "new say and old do".

Another criticism of OBE is its moulding of learners through behaviour modification. Behaviourist orientations have been discredited throughout the world for treating people like machines to be processed by an outside authority. Behaviourist approaches to environmental education have also been widelyk critiqued (Le Grange and Reddy, 1997: 16). Questions begging answers are, can environmental education transcend a behaviourist orientation in an OBE curriculum model? Can OBE survive its roots in behaviourism (Jansen, 1999: 146)? Can we avert narrow interpretations to environmental education outcomes and behaviourist classroom practices in a resource poor context and a fragile culture of learning (Jansen, 1999: 146; Le Grange and Reddy, 1997: 16).

Furthermore, outcomes-based education has also been critiqued for its reductionist view of knowledge. Le Grange and Reddy (1997: 16), argues that the translation of the deep structure of knowledge into simple outcomes is a gross distortion. He states that knowledge and understanding cannot be reduced to behaviours, list of skills and observable performances. For him knowledge is an open-ended inquiry, not some outcome to ultimately attain. Such a reductionist view of knowledge is an antithesis of the understanding of knowledge in environmental education circles worldwide, in

which knowledge is viewed holistically. OBE in South Africa will reduce environmental knowledge to critical outcomes, specific outcomes, assessment criteria, range statements and performance indicators (Le Grange and Reddy, 1997: 16).

According to Jansen (1999: 149), outcomes based education is sold as a solution to universal and deeply entrenched pedagogical problems. He further states that the claim that OBE will bring about a shift from transmission modes of teaching to learner centred approaches represents a conceptual leap of staggering proportions from outcomes to dramatic changes in social relations in the classroom. Having environmental education concerns reflected in outcomes is no guarantee that this will bring about a critical pedagogy enabling the development of knowledge, skills, attitudes or action competencies in line with the aims of environmental education.

Outcomes-based education focuses on what a student can demonstrate given a particular set of outcomes. These outcomes can be achieved through the use of any content that gives the impression that content does not matter (Le Grange and Reddy, 1997). Jansen (1999) argues that knowledge; skills and values are not achieved by learners in a vacuum and should be linked to relevant and appropriate content. Values linked to sustainable living and sound environmental practices can only be developed in learners through the use of relevant content knowledge. Baxen and Soudien (1999) argue that outcomes-based education is not a neutral text but indeed political. They state that in South Africa, OBE serves to assimilate the previously disadvantaged into a world system, silencing rival epistemologies of the modern world and more subversively, rival epistemologies of knowing the world. Surely this must be of great concern to environmental educators in South Africa.

2.5 CURRICULUM INTEGRATION

Successful modern economies and societies require the elimination of artificial hierarchies in social organisation, in the apportionment and management of work, and in the way in which learning is organised and certified. An integrated approach to education and training implies a view of learning that rejects a rigid division between academic and applied knowledge, between theory and practice, between knowledge and skills and between head and hand. Sometimes separateness consumes so much

time and energy that certain distinctive necessities may actually block progress towards learning outcomes. Integration as a curriculum strategy could facilitate the achievement of particular aims in more effective and less time-consuming ways (Gultig et al., 1998: 7).

2.5.1 RATIONALE FOR CURRICULUM INTEGRATION

The main goal of integration is to help students synthesise discreet information and to connect such knowledge to the needs of everyday living (Mathison and Freeman, 1998). Curriculum integration allows for the application, rather than accumulation of knowledge (Beane, 1997).

2.5.1.1 The advantages of integration approach

According to Lake (2001); Joyce and Taylor (2001); Mathison and Freeman (1998); Beane (1997); and Jacobs (1989) there are positive educational outcomes for students:

- An increase in understanding, retention and application of general concepts;
- A better overall comprehension of global interdependencies, along with the development of multiple perspectives points of view and values;
- An increase in the ability to identify, assess and transfer the significant information needed for solving problems;
- The promotion of co-operative learning, a better attitude toward self as a learner and a meaningful member of the community;
- Increased motivation;
- It takes note of student background and experiences;
- It encourages higher-level thinking;
- Students plan with teachers and develop more sense of ownership;
- Links/connections are made with the real world;
- It is broad based learning;.
- Fewer topics are studied but in greater depth;
- It allows for narrative pedagogy, encouraging participation of children from culturally diverse backgrounds and facilitating memory;
- Learning activities are deliberately varied to utilise students' diverse ways of learning; and

- Ensures power and decision making are shared between teachers and students.

They also emphasised that for teachers, the benefits are:

- Improved and more meaningful relations with students, important in an era of increasing dissatisfaction amongst students especially at older ages;
- More curricular flexibility and less schedule and subject fragmentation;
- Better overall integration of new and rapidly changing information with increased time efficiency;
- Increased collegiality and support between teachers and wider comprehension of the connections between disciplines; and
- Relevance to the needs of thee twenty-first century.

Maurer (1994) also identifies the following ten reasons for using integration curriculum:

- It teaches students how to transfer knowledge;
- It involves the entire community as a learning environment;
- It teaches students how to analyse, explain and apply knowledge;
- It is result oriented;
- It teaches students how to make decisions;
- It teaches students how to work cooperatively with others;
- It encourages individual and diversity;
- It improves students' retention of knowledge;
- It provides meaning to students' experience; and
- It is fun.

A rationale for integrating environmental education into the school curriculum

South Africa has a history of socially unjust conservation laws and the protection for land for the benefit of the few, to the detriment of others. The majority of the population was disadvantaged with regard to access to natural resources. They were also disproportionately affected by environmental degradation such as soil erosion, and water pollution and unhealthy work and living areas. Over time, however, the relationship between social justice and ecological sustainability became clearer, as did the links between sustainable development and care for the natural resources. When

the Constitution was adopted, it linked environmental issues to human rights and social responsibilities. Giving recognition to citizens' rights to an environment that is not detrimental to their health or well being, the Constitution signaled a national commitment to environmental action (DoE & DEAT, 2003: 3).

Various government sectors responded with policies to protect the South African environment and thus the health of its citizens and future economic development (cf: 2.3). With regard to education and curriculum, SAQA gave recognition to "environment" as a critical cross-field concern and the critical outcomes of Curriculum 2005 include responsibility towards the environment and health of others, as well as an understanding of the interrelatedness of systems as a context for problem-solving (which include environmental systems and problems).

Environment as a 'strengthening focus' in each Learning Area gives a particular (contextual, integrating and motivating) meaning to such learning outcomes. Providing context and thus relevance strengthens learning towards critical outcomes. For example, developing problem-solving skills cannot take place in a vacuum. When it takes place in the context of an environmental problem (say how to make the school's recycling system work better), the educator creates an opportunity for the development and integration of other relevant skills (collecting, analyzing and evaluating information about different recycling options), value (participating as a democratic citizen in the management of the school environment), and concepts (recycling, local authority, private enterprise, management, budget, committee) in a meaningful, relevant context (DoE and DEAT, 2003: 9).

As a sensitising focus, environmental education processes might bring a re-orientation to a Learning Area. For example, in Economics and Management Sciences, the practice of accounting for environmental costs such as pollution as an externality can be revisited. Learners and educators who have been sensitised to the environment in their learning area would re-think the values of previous models and practices in the light of environmental issues and risks.

2.5.1.2 The disadvantages of the integration approach

Joyce and Taylor (2001); and Lake (2001) consider the following as the disadvantages of integration approach:

- Curriculum integration, from a social studies perspective, can be counterproductive. The authors have observed that activities described as ways to integrate social studies with other subjects at times either lack educational value in either subject, or promote progress towards significant goals in another subject but not in social studies. (This is a frequent concern in all traditional curriculum integration, that one subject gets 'lost' in another).
- Scientific knowledge can be neglected altogether and may be 'viewed as atextual and unrelated to cultural values'.
- Integrative teaching involves more time, requires flexible timetables and teams that are able to work together. Lake (2001) suggests that it is better to make gradual rather than sudden change to ensure involvement and commitment from all teachers.
- Selection of the topic and task design is important. A poor choice will not promote greater understanding, nor will a 'little bit of everything' approach. Joyce and Taylor (2001) suggest that good themes generate questions that children want answered. Appropriate topics and tasks often referred to as 'real' or 'authentic', tend to be interdisciplinary because referring to just one discipline cannot solve most problems people face.

2.5.2 BARRIERS TO CURRICULUM INTEGRATION AND SUGGESTIONS FOR OVERCOMING SUCH BARRIERS

Although curriculum integration is increasingly seen as an idea whose time has come, for a variety of reasons, there are some barriers that emerge and can hinder the successful implementation of the curriculum integration process. These include resource allocation, scheduling, teacher culture, teacher knowledge, public knowledge, institutional culture, expectations, risk factors, fear of change, fear of failure, lack of common language and lack of vision and goal (Lake, 2001).

2.5.2.1 Possible barriers to curriculum integration and suggestions for overcoming

Schmidt et al. (1992) identify the following three kinds of possible barriers to curriculum integration: administrative, school and teacher. Their work is particularly helpful because they suggest a variety of ways to counteract each potential roadblock.

❖ **Administrative barriers**

Administrators may not provide time during the day or provide incentives for teachers to exchange ideas and work together. The following are suggestions for overcoming this barrier:

- Provide open, unstructured time for teachers to share ideas in a relaxed atmosphere;
- Provide incentives for teachers to become involved and to implement innovative strategies for integrating curriculum;
- Move classroom locations, whenever possible for integrating teachers so they will have more ready access to one another; and
- Provide teachers who are teaching integrated curriculum and who are working in teams with common planning periods.

Support from administrator may not be evident. The following are suggestion for overcoming this barrier:

- Assure that all administrators display commitment to the concept of integration; and
- Let teachers know of administrative support for the changes in instruction through informal as well as formal channels of communication.

Implementation of the integration process may begin with insufficient planning defeating the process before it is begun. The following are suggestions for overcoming this barrier:

- Work with the business community to determine competencies needed by local employers;
- Contact school districts that have already implemented the integration process;

- Involve all teachers and counsellors in the change process;
- Have teachers assume as many leadership responsibilities as possible; and
- Publicise to the students, parents and community the purposes and anticipated outcomes of the cooperative efforts being undertaken by teachers (Schmidt et al., 1992).

❖ **School Barriers**

Schools may not allow equivalent credit toward finishing for applied subjects. The following are suggestions for overcoming this barrier:

- Define the benefits to students, teachers, and taxpayers of granting equivalent credit;
- Provide for content accountability, that what a school proposes will be taught in a subject will actually be taught;
- Take measures to assure that subjects are not watered down;
- Determine which curriculum areas are most conducive to allowing equivalent credit;
- Form a curriculum committee to determine desired outcomes and to define subject competencies;
- Match learning objectives between integrated subjects to determine credit possibilities;
- Build trust and communication among teachers as well as with other school personnel; and
- Monitor the equivalent crediting application process.

Most school districts have limited resources available for staff development, teacher released time, and other expenditures required to implement curriculum integration. The following are suggestions for overcoming this barrier:

- Apply for state grants to fund teacher released time, staff development, and needed equipment and materials;
- Work cooperatively with local institutions to provide staff development activities at a reasonable cost; and

- Work with local businesses that may be willing to provide necessary equipment, staff development and expertise.

The traditional time structure imposed on schools may not allow the flexibility needed for integrating some classes. The following is a suggestion for overcoming this barrier:

- Curriculum integration takes time. Change the mandatory time requirements to allow teachers to select themes, explore resources, discuss student learning styles and needs and coordinate teaching schedules.

The traditionally separate subjects areas may be difficult to overcome. The following are suggestions to overcome this barrier:

- Eliminate the dichotomy of subject areas by having teachers work together to focus on the needs of students rather than on content;
- Provide for extensive staff development, with clearly defined outcome goals that involve all subject teachers;
- Move classroom locations whenever possible, of integrating teachers so that they will have more ready access to one another;
- Have teachers of different subjects areas serve on a different area advisory committee;
- Encourage teachers to borrow books and curriculum guides from one another; and
- Have teachers share equipments (video cameras and computers) on a regular basis (Schmidt et al., 1992)

❖ **Teacher barriers**

Many teachers feel inundated with the paperwork and time spent outside of the classroom. They may express a concern over the additional time required for integration. The following are suggestions for overcoming this barrier:

- Provide open, unstructured time for teachers to share in a relaxed atmosphere; and

- Pair up teachers so they can work as a team. Schedule their planning periods at the same time so they can work together daily or weekly.

Some teachers may perceive curriculum integration as just another passing fad. Therefore, they may not want to waste their time getting involved. The following is a suggestion for overcoming this barrier:

- Have teachers who are in the implementation process to visit sites that have already integrated the curriculum.

If the integration begins as a pilot project in only a few classes, other teachers may feel isolated and uninvolved. The following are suggestions for overcoming this barrier:

- Ensure that teachers feel they are part of the integration movement by involving them in the development of integration goals and objectives from the outset; and
- Give the teachers as many leadership responsibilities as possible.

Some teachers may feel threatened by change. They may feel they are losing control or being pushed out. The following is a suggestion for overcoming this barrier:

- Provide staff development opportunities for all the teachers involved in curriculum integration.

Some teachers may be hesitant to work with teachers in other disciplines. The following are suggestions for overcoming this barrier:

- Ask teachers who have already worked with integration to serve as mentors for teachers in other disciplines; and
- Assign teachers to work in teams. Have team meetings at least once a month for teachers to share ideas, make plans and evaluate their progress.

Some teachers may have negative attitudes and tend to blame others if something goes wrong. The following are suggestions for overcoming this barrier:

- Pair up teachers so they can work cooperatively;

- Establish a positive climate for change process and involve all teachers in it; and
- Provide an atmosphere where teachers are allowed to experiment and make mistakes without fearing retribution.

Some teachers have a limited educational background with restricted certificates. Some individuals in administration and academic perceive this as a lack of academic capability. The following are suggestions for overcoming this barrier:

- Provide staff development opportunities for teachers to enable them to be certified to teach other classes; and
- Eliminate the dichotomy by having teachers work together to focus on the needs of the students that teachers have in their classes.

Adapted from: Schmidt et al, 1992.

2.5.3 BARRIERS TO INTEGRATION OF ENVIRONMENTAL EDUCATION INTO THE OUTCOMES-BASED EDUCATION CURRICULUM

In South Africa, one of the major problems is teachers' inability to integrate environmental education into the outcomes-based education curriculum. This problem is exacerbated by the rapid and difficult process of transformation to an OBE curriculum, by inadequate professional development for teachers, teacher educators and curriculum support staff, little or no experience of environmental education in the previous education system and by the many legacies of the apartheid regime's policies of discrimination and inequality (NEEP Project Document, 2000: 22).

Uncertainty and changes in curriculum policy, teacher education and problems experienced in the implementation and transformation of curricula at school level require an environmental education intervention that is holistic and multi-facetted, and which is aimed at maximising South Africa's resource base (human and material) to incorporate environmental learning into the OBE systems, at policy, professional development and school-based implementation levels. This should better equip South African educators, learners and their communities to respond to environmental issues

and integrate sustainable development practices in their daily lives (NEEP Project Document, 2000: 22).

Mosidi (1997) argues that teachers have to learn new jargon related to outcomes-based education and environmental education. Jansen (1999) also argues that the language of outcomes-based education innovation is too complex, confusing and at times contradictory. He states that a teacher attempting to understand outcomes-based education in South Africa will not only have to understand more than fifty different concepts but would also have to keep track with changes in meaning of these concepts.

The Learning for Sustainability (LfS) (c.f. 2.4.2) pilot project adopted an integrationist approach to working with environmental issues in the curriculum in line with the recommendations of:

- The White Paper on Education and Training (DoE, 1995);
- International recommendations for 'holistic', 'integrated' approaches to environmental education in the curriculum (Tbilisi, 1977); and
- Integration features of outcomes-based education.

As observed by Lotz-Sisitka (2000), achieving curriculum integration is not necessarily a classified matter. The recommendations of the Report on the Review of C2005 as cited by Chisholm (2000) place less emphasis on integration and more emphasis on learning area content. Lotz-Sisitka (2000: 106), in the LfS pilot project was able to highlight the dimensions and difficulties associated with curriculum integration, drawing on environmental issues. They are as follows:

- Environmental education is not a 'thing' to be attached or 'added in' to existing curriculum processes. Environmental Education processes require a re-thinking of educational processes in the light of environmental issues and risks. The re-thinking requires a deeper understanding of pedagogical processes and their conceptual underpinnings, a good understanding of environmental issues and risks, as well as the ability to bring these two sets of insight together;

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- Integrating environmental education should enable the development of critical thinking in context, to expose the causes and impacts of environmental issues and risks, which are often hidden. Processes of critical thinking need to be accompanied by the introduction and application of available knowledge and experience, to provide substance to the critical thinking processes and the application of pedagogical knowledge;
- The process of re-thinking educational processes in the light of environmental issues and risks requires a deeper understanding of these issues and risks. This includes a deeper understanding of important 'environmental oriented' guiding or steering concepts, like 'sustainability' and 'biodiversity', and the capacity to apply this knowledge in local contexts through curriculum processes (for example, investigations and action projects at a local level); and
- Curriculum integration need not detract from the learning area knowledge, but should enhance it. Including environmental issues and risks in curriculum work would seem to require teachers to have a clear understanding of the substance and pedagogical processes of particular learning areas. So, for example, teachers and learners would be able to apply scientific process skills in curriculum processes to investigate water pollution issues, or technology knowledge and skills to respond to issues and risks through practical solutions. In other words, teachers should be able to identify and develop environmental education processes integral to specific learning areas, and through this process, integrate different dimensions of curriculum work. Integration that takes place at a superficial, associative level only does not appear to provide any substantial learning opportunities within or across the learning areas.

In the light of the above, it seems important to engage 'environmentally' with the recommendations of the Review of Curriculum 2005, particularly in relation to:

- Appropriate environmental education processes that are integral to the different learning areas, and how these can be 'associated' or 'integrated' across the curriculum;
- Integration of the meaning, interpretation and application of key environmentally focused concepts for example, sustainability and biodiversity in the context of the learning areas and the associated learning outcomes; and

- Identification of sources of information and pedagogical practice (resource materials) to provide substance and depth to environmental education processes in diverse contexts, this has implications for resourcing policies and practices implemented to support curriculum work in schools (for example, textbooks, resource-based learning).

  (Adapted from: Lotz-Sisitka, 2000: 106-107).

2.5.4 KEYS TO SUCCESSFUL INTEGRATION

According to Shongwe (1992: 17) the introduction of integrated studies is not merely equivalent to introducing a new syllabus but implies a radical change of emphasis in the organisational context and thinking. For environmental education to be fully incorporated and integrated with other disciplines or subjects, certain conditions need to be met. Some basic components are necessary to create a sound and successful programme. Those conditions to be met include:

- Need to be given appropriate team planning time to create and develop strategies;
- Communication;
- Cooperation and coordination among teachers of different discipline and grades;
- Support from administrators and supervisors;
- Teachers need to be actively involved in planning and implementing an integrated curriculum;
- Often matter of negotiation; and
- Need to develop a sense of ownership.

Beane (1997) also identifies the following seven recurring features that define programmes, which are successfully integrated:

- Programmes based in topics of substance and significance;
- An emphasis on students seeing connections in and purposes for learning;
- Developing big ideas that excited the imagination of students and teachers alike;
- A desire for the learning process to be active and participatory;

- Developing skills and knowledge in contexts real to the students; and
- Building on and extending a student's personal knowledge and experience.
- Developing sustained programmes or work in contrast to one-off, unrelated lessons.

2.5.5 ISSUES AND CHALLENGES FACING EDUCATORS IN CURRICULUM INTEGRATION

Lankard (1994) states that although most educators support the concept of integration and recognise the benefits it affords learners, implementation of integrated curriculum and instruction is seen as problematical. The author cites disciplinary specialisation, status differences among educators and lack of leadership as some of the obstacles. He further highlights the myths and realities and some of the tales that discourage integration and discusses the truths about what is involved in the implementation process.

2.5.5.1 Myth: successful integration relies solely on teacher commitment and cooperation.

Although teachers play a significant role in integrating curriculum, they cannot effect significant change in the teaching and learning process without administrative, institutional, community and state support. Traditionally, the curriculum has been offered in significantly different ways. To merge traditional areas in an integrated approach to education requires new forms of organisational delivery. Integration involves restructuring, wherein the administrator becomes more of a facilitator than a director, providing teachers with opportunities that will empower them in their efforts (Lankard, 1994).

According to Lankard (1994), some activities recommended to facilitate integration are the following:

- Appoint a variety of teachers from all subject areas to serve on committees so that each is equally represented;

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- Bring together a team of teachers to write curriculum in teamwork sessions, thereby providing opportunities for teachers to learn from each other and to develop mutual respect for their unique areas of expertise; and
- Provide professional development opportunities to help teachers develop the competencies required for integrating curriculum and instructional methods.

No matter how enthusiastic and committed the teachers are to the concept of curriculum integration, their success demands that they acquire new skills and expand their knowledge to include information across the disciplines. Since team teaching is a requirement of most integrated courses, teachers must receive training in ways to integrate learning concepts. Workshops to address these issues should be initiated and encouraged for teachers' professional development. For example, teachers who have had training and experience in integrating curriculum might offer workshops for teachers new to the process on such topics as team building, networking, collaboration, and problem solving, or on content-specific topics relevant to joint efforts (Lankard, 1994).

2.5.5.2 Myth: integration will result in the loss of teaching positions.

Enrichment rather than elimination describes the nature of teaching positions in an integrated education system. Teachers must recognise and experience personal benefits as a result of team teaching and interdisciplinary teamwork so they can develop confidence in the value of their performance in integrating curriculum. Those who fear loss of position due to integration will be reluctant to give it their full support. Professional development is one way to expand the expertise and confidence of teachers entering into a new form of education delivery (Lankard, 1994).

Other activities to expand teacher awareness and competencies for integrated teaching and learning include cross-programme visitations and workplace internships. By observing working models of integrated instruction and participation in the application of such models, teachers are able to recognise the importance of teaching all students problem-solving, teaming, communication, and technology skills (Lankard, 1994). Teacher certification requirements may be a concern to some

teachers if the requirements do not reflect support of integrated curriculum and instruction. It is important that these teachers be afforded staff development opportunities so they can be certified to teach other classes and subject areas (Schmidt et al., 1992).

In the Learning for Sustainability (LfS) pilot project in South Africa, some teachers also requested for certification. However, not all the project staff supported the introduction of formal accreditation into the project. Some believed that attention on certificates detracted from what was really important: the development of teachers' professional capacities towards better teaching and environmental education. The view that certified knowledge was of more value than non-certified knowledge seemed to run counter to the epistemological perspective promoted in the project (Janse van Rensburg and Lotz-Sisitka, 2000: 55).

Molose (2000) argues that this perspective ignored the contextual nature of learning. In this context, where re-deployment meant that teachers' jobs were on the line, regardless of their orientation to knowledge and learning, they desired the security of a certificate. On the other hand, observations elsewhere suggest that 'the paper chase' is about more than money and jobs. It also draws on a political epistemology in which formally recognised knowledge comprises an authoritarian, immutable text, the reader of which has earned unquestionable respect and status.

Although the curriculum integration places varied demands on teachers, their joint effort is critical in the implementation process. Each type of teacher brings unique and specific skills and expertise to the integration process. The goal is not to eliminate one or the other, but to bring them together to provide the most comprehensive programme.

2.5.5.3 Myth: integration results in the majority imposing their will on the minority.

Partnerships are key to successful integration efforts. Team teaching, collaborative curriculum development by teams of teachers, policy and practice committees composed of representatives of teachers, all require teachers to have expertise in

group process skills. Finch et al. cited in Lankard (1994) suggest that teachers can be aided in becoming full partners in schooling by acquiring knowledge and skills in areas such as team building, problem-solving, collaborative curriculum development, student learning across the curriculum, and outcome assessment. Specifically, teachers will need assistance so they can shift from instructing in an independent and autonomous manner to becoming participating members in the total school enterprise.

Lankard (1994) argues that strong leadership can bring balance to the integration process and help to overcome social, intellectual, and even physical barriers that can exist between staff. Administrators can facilitate respect and involvement of teachers across various disciplines by involving all teachers in the integration process from the very start. Additionally, facility or environmental integration can be encouraged by changes in buildings or laboratory settings such that two or more disciplines are taught together.

Loepp (1999) outlines the following as some of the challenges that confront teachers when implementing an integrated curriculum:

- First, teachers must shift their belief system from one that is primarily didactic in nature to one that has a foundation in constructivism. Rather than asking students to follow the steps of procedure, memorise facts, or verify given principles or laws, students work together to discover knowledge, applying their knowledge as they solve real world problems;

- Second, an extensive amount of professional development is needed for teachers. This includes a significant intervention of knowledge development in curriculum areas other than the one they are certified to teach. Also, this professional development must include extensive practice in the use of constructivist-oriented pedagogy;

- Third, teachers need to become members of learning communities. At one level this means working with one's peers to improve education. At another

level, teachers work with their students in solving problems that have multiple answers;

- Fourth, teachers need to become skilled in facilitating small group learning. Research has shown that learning is a social process and that students learn a great deal by interacting with one another;

- Fifth, teachers need to manage experiential-oriented instruction. This includes inventorying and storing materials, the safe operation of instrumentation, machines, and equipment and leading students toward efficient progress;

- Sixth, teachers need to learn to use authentic assessment strategies such as portfolios, performance exams, and rubrics to document student progress;

- Seventh, administrators and school boards need to be oriented so the necessary resources and ongoing support can be provided to the teachers; and

- Eighth, public information strategies need to be implemented in order to inform the community and parents that a new paradigm of education is being used. The expectation is for teachers to provide education as it has always been, and unless the public is informed of changes to be made, there is likely to be resistance.

Each of these elements needs to be considered as teachers look at curriculum integration. It is necessary for each school to determine the best procedure to meet the needs of the particular student body. Rather than move from a traditional, subject-specific curriculum to an integrated curriculum in one sudden sweep, schools find more success when they make gradual changes, making sure that everyone involved feels a sense of ownership of and commitment to the changes.

For environmental education to be fully incorporated and integrated with other disciplines or subjects, certain conditions need to be met. UNESCO (1985) maintains that full incorporation of environmental education into the curriculum, teaching and

learning process demands a realistic and practical renewal of an educational system to educate teacher-educators and teachers. Also, the teacher must be involved in the conception, formulation and implementation of new innovations. Teachers need themselves to be well orientated and possess the knowledge and skills to cope with the implementation process.

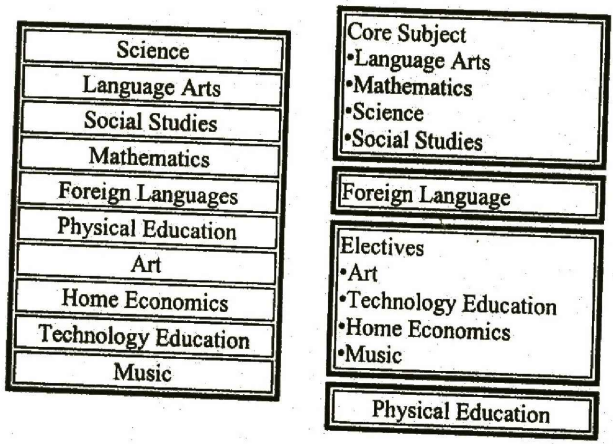
In general, the preparation of environmental education teachers needs special programmes that provide information about the obtainability of different environmental education resources, allows application of different methods and strategies with opportunities for practising and building confidence and provision of skills to overcome educational and administrative constraints for the practice of new methodologies (UNESCO, 1985). Also, teachers may need to be trained to adapt to new conditions in which environmental education as a new approach may be implemented. The most effective means of improving learning experiences for children is to improve the preparation of their teachers. In Southern Africa, the need for environmental education teacher training is identified as vital for the effective integration of environmental education into schools (Shongwe, 1992: 18).

2.6 MODELS OF CURRICULUM INTEGRATION

Over the past decade, several models of curriculum integration have evolved. A review of the literature revealed that far more curriculum integration occurs at the lower level of education than at the high school and college levels. The emerging trend is for primary schools to build interdisciplinary and integrated curricula around themes, whereas in high schools and colleges, integrated curricula are more likely to be based around problems (Loepp, 1999). The following discussion presents some of the models that can be tried for curriculum integration.

2.6.1 The interdisciplinary model

Figure 2.2: The interdisciplinary model



Source: Loepp (1999)

In the interdisciplinary model, Loepp (1999) states that schools group traditional subjects into blocks of time, assign a given number of students to a team of teachers, and expect the teachers to deliver an interdisciplinary or integrated curriculum. For example, in Figure 2.2 the core team consists of four teachers who have approximately 110 students for a block of four periods a day. They are given one hour of common planning time and another hour to learn on their own.

The administration empowers teachers to use block of time (approximately 175 minutes) in anyway they wish. The most typical daily schedule involves groups of approximately 30 students rotating through the four disciplines. Occasionally, the teachers may decide to introduce a new theme to the entire group at the same time, or, they may take all of their students on a field trip (Loepp, 1999).

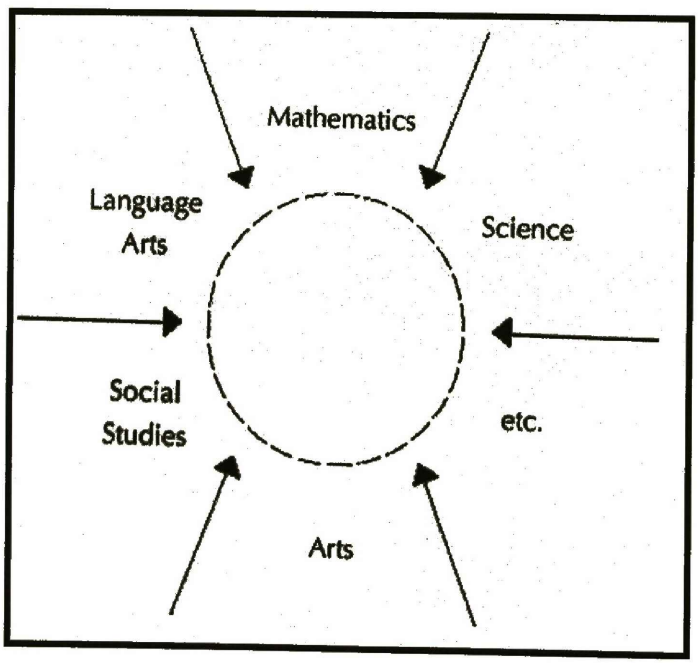
The interdisciplinary model offers several advantages: teachers are given time to work together, they have a limited number of students and this model can support a traditional curriculum while offering scheduling flexibility to the team. One disadvantage of the model is that it is easy for teachers to simply continue doing what

they have always done with little or no attention given to the interdisciplinary or integrated curriculum.

The biggest disadvantage is that standards-based, integrated curricula across the disciplines are scarce, which means that teachers need to develop the curriculum on their own. Since the process of curriculum development is time consuming, they are able to implement an integrated curriculum for only a small portion of the school year (Loepp, 1999).

2.6.2 The problem-based model

Figure 2.3: The problem-based model



Source: Loepp (1999)

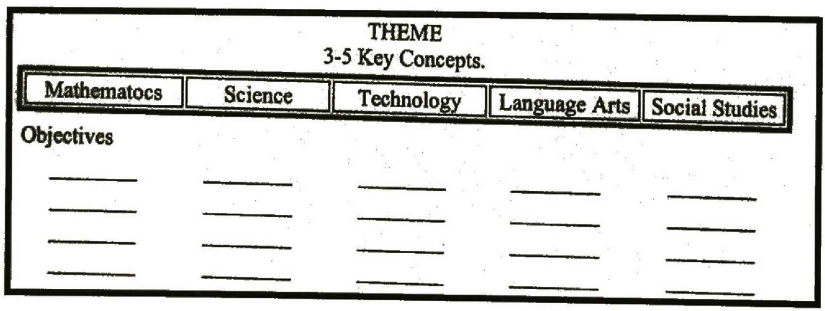
Ideally, Figure 2.3 places technology education at the core of the curriculum. Since one live in a highly technological society and technology is a human endeavour, this

is a natural way to design the curriculum. With a technological problem at the centre, disciplines lend their support in helping to solve the problem. An example of such a problem might be to determine how the waste produced in a community could be turned into an asset. In this instance, the social studies class can address the role of local government in collecting and disposing of waste, in science the emphasis would be on reducing materials to their basic elements and recombine them and in Mathematics, one could study measurement, area, volume and so forth. In technology education, Loepp (1999) argues that the focus might be on the various technologies used to separate waste into categories as well as the transformation of waste into usable materials.

The author argues that advantage of this model of integration is that it offers high potential for the identification of relevant, highly motivated problems. On the other hand, a disadvantage of this model is the difficulty of assuring that state frameworks and/or national standards are fully addressed in a given grade level.

2.6.3 The theme-based model

Figure 2.4: The theme-based model



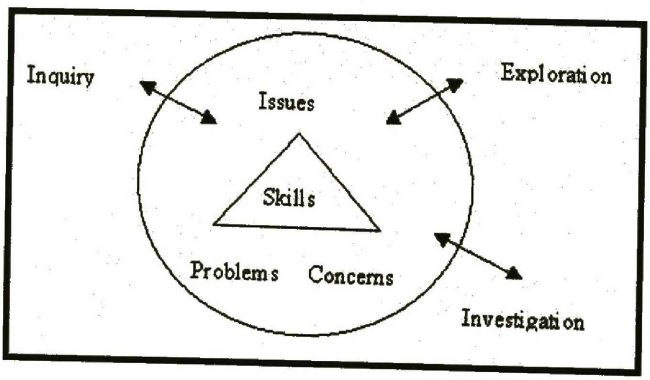
Source: Loepp (1999)

In the theme-based model, learners are provided with sequential learning experiences rather than fragmented approaches and exploration of topics in depth is possible (Janse van Rensburg and Lotz, 1998: 43).

The advantages of this model represented in Figure 2.4 are that teachers can still identify with a given discipline, it is easier to connect the curriculum with national standards and frameworks and students are able to make connections among objectives from various disciplines. There could be a tendency, however, for a given theme and/or key concept to have little relationship with a specific discipline, causing the tendency for teachers to engage students in shallow or irrelevant learning (Loepp, 1999).

2.6.4 The immersed model

Figure 2.5: The immersed model



Source: Lake (1994)

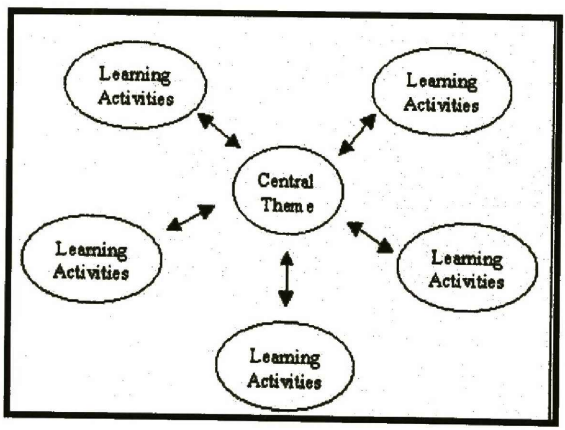
Lake (1994) states that this model (presented in Figure 2.5) takes real issues, problems and concerns to the students and real in the community as the essential building blocks (topics for study) of the curriculum. Students and teachers work together to select a specific topic of interest to them and together they plan how, when and why they will pursue it. The focus is on active student participation and decision-making. Together with their teacher and individually, the students explore or investigate the issue in order to understand it better and perhaps to propose a solution, suggest a new direction and report their results to a significant audience. Teachers, as enablers and facilitators, focus on helping students to develop essential skills intrinsic to their study and learning. Key skills may be formulating questions, creating

hypotheses, working out ways to collect data, and reporting on what has been learned. Subject content and knowledge comes into lay after, rather than before deciding what is to be studied and how (Lake, 1994).

According to Lake (1994), the advantage of this model is that integration takes place within the learner and one disadvantage is that it may narrow the focus of the learner.

2.6.5 The webbed model

Figure 2.6: The webbed model

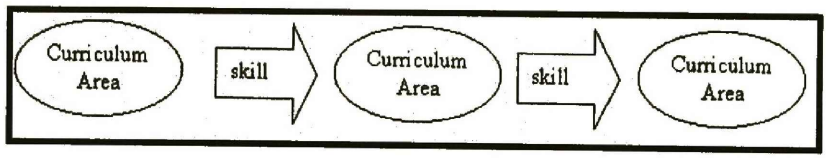


Source: Lake (1994)

This model in Figure 2.6 involves thematic teaching, using a theme or topic as a base for instruction in many disciplines. Teachers ask, "What learning activities will contribute to the student's understanding of this theme?" At the same time, the activities allow students to represent and develop their ideas in different areas of the curriculum. The webbed model helps teachers to plan in ways that maximise opportunities for learners to make connections across the curriculum and between ideas. On the other hand, a disadvantage of this model is that themes must be carefully and thoughtfully selected to be meaningful, with relevant and rigorous content (Lake, 1994).

2.6.7 The threaded model

Figure 2.7: The threaded model



Source: Lake (1994)

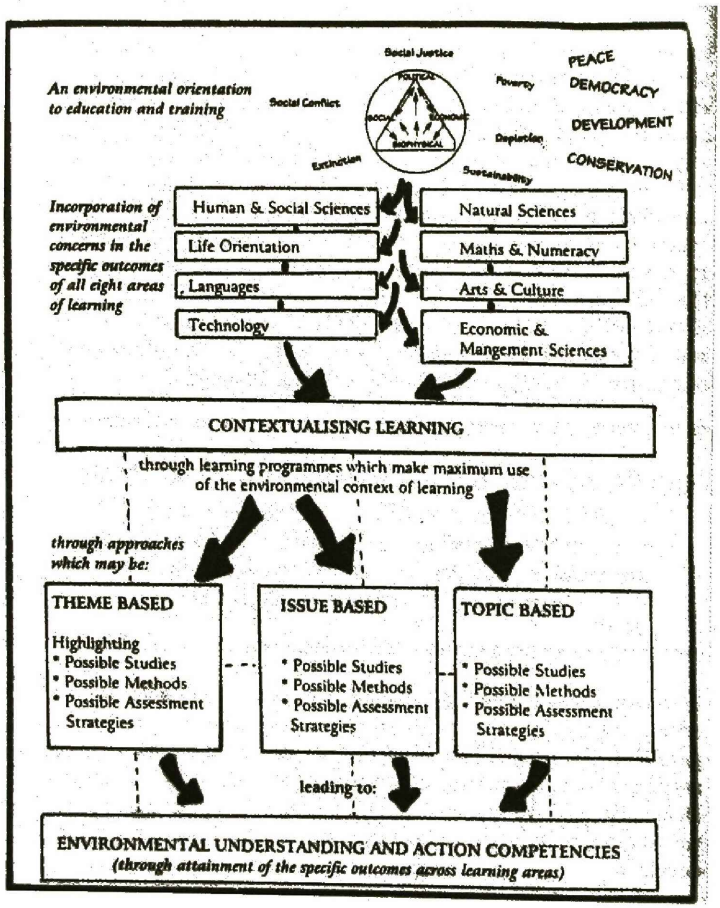
In terms of Figure 2.7, thinking skills, social skills, study skills and/or multiple intelligences are "threaded" throughout the disciplines. This model of curriculum integration focuses on meta-curriculum that overlays subject content matter. For example, prediction is a skill used to estimate in Mathematics, forecast a future perspective in social studies, anticipate the end of a story in English and hypothesise during a science investigation. The focus for teaching is to help students to learn how they are learning, facilitating future transfer of learning. The disadvantage of this model is that disciplines remain separate (Lake, 1994).

2.6.8 Integration of environmental education within learning areas.

To maximise the development potential of South Africa in a way, which will ensure a healthy environment for present and future generations, all learners will need to develop environmental action competencies consisting of:

- An understanding of social, economic, political and biophysical systems and their interactions;
- The nature and effects of environmental issues;
- The nature of, and need for, sustainable resource use; and
- The capacity to address environmental problems and develop practical ways to move our society towards sustainability, thus ensuring the well being of its citizens and its place as a contribution to, not a recipient of, the international economy (Janse van Rensburg and Lotz, 1998: 13).

Figure 2.8: Indication of how an environmental orientation to learning may influence learning programme development and the attainment of specific outcomes across learning areas.



Source: Janse van Rensburg and Lotz (1998: 15).

Figure 2.8 shows how the development of these action competencies can be integrated into programmes of learning through consideration of the environmental context of learning. The environmental context of learning, if viewed with "learning area lenses" shows how environmental concerns are an integral part of each learning area, and thus demonstrates the cross-curricular nature of environmental education. In the above

figure, three possible ways of contextualising the specific outcomes are offered as approaches to learning programme development. These are: a topic-outcomes approach, a thematic-outcomes approach and an issue-based approach (Janse van Rensburg and Lotz, 1998: 14).

2.6.8.1 An outcome/thematic approach

An outcome/thematic model offers an example of how clustering of specific outcomes can be done through clustering themes or contexts within the learning area. If the purpose of clustering of specific outcomes is to achieve an integrated curriculum with integrated, holistic learning programmes, this can best be achieved by incorporating 'segments' of varying weightings drawn from different learning areas, into a specific programme where appropriate and relevant (Janse van Rensburg and Lotz, 1998: 36).

For example, one may have a learning programme which is primarily science and technology based, but which draws from and makes links with the outcomes of the human and social sciences (weighting of the orientation of this learning programme may for example be 75% science-based, 20% technology-based and 5% human and social-science based). This appears to be a simplistic and technicist way of concerning learning programme orientations, but serves as an example to illustrate the principle of an integration model, which profiles certain learning areas (Janse van Rensburg and Lotz, 1998: 36).

2.6.8.2 A thematic/outcomes approach

In this approach, units of work are presented through an integrated thematic approach to learning. Through clustering of specific outcomes and related areas of content into themes of work (which are process-based and are guided by the achievement of specific outcomes from different areas of learning), programmes of learning can be developed in which:

- Learners are provided with sustained, sequential learning experiences rather than fragmented approaches, which originate from discipline orientations to learning programme development.

- Logical links between curriculum areas and specific outcomes are made.
- Exploration of topics in depth is possible (Janse van Rensburg and Lotz, 1998: 43).

As the themes of work will not necessarily draw upon all curriculum areas, this represents a good option for learning programme development if specific outcomes from a group of learning areas are to be clustered. In this approach, care should be taken not to lose sight of the original intentions and context of the specific outcomes. Whilst the themes of work will present an integrated approach to learning, clarity on how specific outcomes will be covered through the themes of work must be maintained to ensure balanced programmes of learning. The development of programmes of learning based on theme/outcome approaches should be flexible enough to enable teachers to develop the themes in keeping with the needs and interests of learners (Janse van Rensburg and Lotz, 1998: 44).

2.6.8.3 Issues-based approach

In this approach, learning programmes can be derived from a study of real issues in an environmental context. Through using one particular environmental focus (for example, water pollution), a range of specific outcomes from a range of learning areas can be clustered. This form of clustering is a 'natural approach' to clustering, as the inclusion of the specific outcomes are determined by the nature of the issue being addressed and the nature of involvement in the issue by the learners.

This model of learning programme development is particularly appropriate for use in local contexts and offers a wide-ranging flexibility to teachers and learners. A further advantage of this model is that through an issue-based approach to learning programme development, the learning experiences are contextualised through the learners' interaction with the issue, and are thus likely to be relevant to learners (Janse van Rensburg and Lotz, 1998: 49).

The following section discusses briefly how to conceptualise potential environmental learning for the individual Learning Areas.

- **Languages**

The role of the languages in environmental learning should not be reduced merely to language learning around an 'environmental theme'. Languages are expressions of social beliefs and value orientations including deeply held cultural views regarding our surroundings. Another dimension of environmental learning in the Languages is that the action competence to address environmental issues includes the ability to find and work with textual information about environments and environmental issues (investigate) as well as the ability to articulate and report environmental problems and potential solutions (DoE and DEAT, 2003: 11).

- **Social Sciences**

The Social Sciences involve the study of human-environment interactions and relationships over time, with particular emphasis on the role of historical and contemporary social processes and practices in the development of environments. The environmental education facilitates the integration of geographical and historical strands in the Social Sciences. Throughout history, natural resources have provided the basis for social and economic development and thus have a bearing on the social structures and practices that form the focus of this Learning Area (DoE and DEAT, 2003: 12).

- **Technology**

Environments are shaped by human interactions with the biophysical world, which are in turn mediated by technology. Such a perspective on how environmental learning is integral to the Technology Learning Area goes beyond simply raising environmental awareness. Numerous technological processes (for example; nuclear and oil-based energy production) have devastating effects on human environments. Emerging technologies such as the genetic modification of seed crops have implications for food and social security. On the other hand, new technologies and techniques are required to address environmental issues and appropriate indigenous knowledge can be revived (DoE and DEAT, 2003: 13).

- **Mathematics**

Mathematical skills are important for the environmentally literate citizen's action competency to identify, interpret, address and prevent environmental problems. The ability to use mathematical skills critically in calculating environmental impacts (for example; measuring, doing surveys and analyses of environmental issues and risks) is critical. The environmental context of developing mathematical competence provides relevance to abstract learning, the ability to critically analyse findings, and commitment to apply Mathematics to wider social benefit (DoE and DEAT, 2003: 14).

- **Natural Sciences**

The Natural Sciences include the study of the life-sustaining processes and systems of the biophysical world. To understand environmental issues, one need not to understand ecological systems and the physical and chemical processes, which sustain them. Understanding eco-systems is vital to understanding the impact of economic, political, and other human activities on the earth's life support systems (air, water, soil and plant life). The Natural Sciences are thus integral to developing the knowledge and concepts and providing the tools for establishing environmental risks and conserving, developing, managing and utilising natural resources responsibly.

- **Arts and Culture**

The development of cultures over time has had a shaping effect on human-environment interactions. An understanding of culture and how it changes contributes to an understanding of the dynamic nature of environmental concerns. Fundamentally, in order to address environmental issues, one needs to see that they arise in worldviews and related cultural practices. Seeing environment as integral to Arts and Culture is clearly more than using nature as inspiration for artistic and cultural expression. However, encouraging learners to observe natural and built environments can sensitise them to the surroundings and at the same time, develop appropriate ways of expressing an appreciation or critique of the relationship between environmental concerns and the aesthetic quality of life (DoE and DEAT, 2003: 16).

- **Economics and Management**

The impact of economic activity on the environment and careful management of the natural resource base of economic development, are increasingly important to the Economic and Management Sciences. Environmental management is a growing field that adds a new dimension to the Learning Area, so does a range of tools and concepts from environmental economics. These concepts include resource utilisation in relation to development and social justice, and a critical understanding of the notion of sustainability in relation to economic models, production, poverty and unemployment, consumption and growth (DoE and DEAT, 2003: 17).

- **Life Orientation**

Life orientation aims to empower learners to live meaningful lives. If an environment is detrimental to the health and well being of people, they will not be able to live meaningful lives. Issues of environmental health and environmental rights are thus central to this Learning Area. It is vital that learners develop an understanding of how issues related to environmental health (water, air, foods, radiation, chemicals, aesthetic) impact on personal health and community well being and know that these are constitutional issues. Similarly, learners' lifestyle choices (for example; excessive consumption, smoking, risky sexual behaviour) have impacts on the environment and health of other community members (DoEand DEAT, 2003: 18).

2.7 LEARNING THEORIES THAT SUPPORT CURRICULUM INTEGRATION

The following theories of learning support curriculum integration.

2.7.8 Theories of knowledge that support curriculum integration

What happens to the disciplines in interdisciplinary/integration? What vision of knowledge is reflected in the integrated classroom? It seems like a continuum rather than a discrete set of definitions answers these questions best. This continuum may be divided into three basic ways of knowing that represent varying levels of disciplinary blending. Knowledge moves from being related to being shared to being reconstructed along a continuum in which the disciplines moves from being distinct and separate, to

being combined with boundaries preserved, to being blended until disciplinary distinctions are no longer evident. This model attempts to create a frame that organise the theoretical models that correspond to reports of interdisciplinary or integrated education in practice (www.purduenc.edu).

Related knowledge represents a first move beyond the traditional disciplines in integrated education. This vision of knowledge retains traditional disciplinary ways of thinking but attempts to demonstrate broad-based connections between and among subjects. Petrie (1992 cited in www.purduenc.edu), suggests that from a related knowledge perspective, any integration is simply assumed to take place in the heads of individual students rather than there being a carefully thought-out system of general education.

As this perspective blends into the **shared knowledge** perspective, thematic or webbed conceptions of knowledge emerge in which "a fertile theme is webbed to curriculum contents and disciplines" (Fogarty, 1991 cited in www. purduenc.edu). Thematic instruction is a general feature of interdisciplinary/integrated curricula and is not restricted to any particular epistemological perspective. Shared knowledge, the second perspective on the epistemology continuum, focuses upon knowledge as something to be actively shared between disciplines. Shared knowledge is characterised by overlapping concepts and emergent patterns and mutually supportive disciplines that retain their own identities (www.purduenc.edu).

Reconstructed knowledge is the third basic epistemological perspective underlying integrated curriculum. Reconstructed knowledge begins with a problem, idea, or concept and builds knowledge from a variety of areas without regard to disciplinary boundaries. This perspective is perhaps best represented by the term synthesis. Reconstructed knowledge is also represented as fused, describing a new subject that explores issues or concepts from two or more disciplines (www.purduenc.edu).

2.7.9 Theories of teaching-learning processes that support curriculum integration

Constructivists (for example, Dewey, Piaget, Vygotsky) have argued that one learn by actively constructing meaning from the situationally embedded experiences. This theory suggests that the construction of knowledge is dynamic and depends on making links and perceiving patterns, relationships, and applications among ideas/experiences. While Piaget bases this construction on operations on objects/things, Vygotsky suggests that the impact of the sociocultural/historical context and verbal interactions with more knowledgeable others leads construction and development (www.purduenc.edu).

The constructivist classroom is strongly contrasted with the traditional classroom. The traditional classroom is based on behaviourist-oriented theory that assumes that learning proceeds from part to whole (Pollard and Tann, 1994: 106). In the constructivist classroom, learning proceeds from whole to part through experience and inquiry. In terms of constructivist education, learner participation is associated with a learner-centred approach and a move away from rote learning, encouraging active engagement and thus the construction of new understandings (Janse van Rensburg, 2000: 22).

Perkins (1991 cited in www.purduenc.edu) suggests that the constructivist theory requires teaching for understanding and must entail three principles:

- The curriculum must be constructed out of generative topics that are deeply engaging and encourage making links among ideas;
- Teaching for understanding must occur in ways that lead students into building performances that demonstrate understanding; and
- Assessment must occur in authentic contexts using complex authentic tasks.

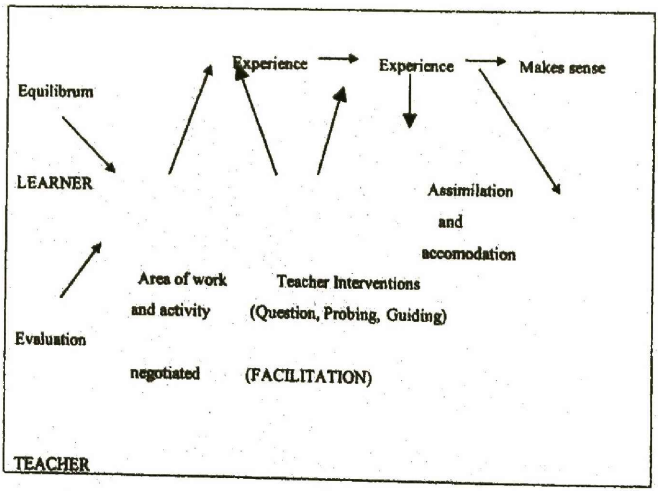
Du Toit and Sguazzin (1999: 10) see constructivist pedagogy as having the following characteristics:

- Knowledge is integrated;
- Pedagogy integrated with content knowledge;

- Learner knowledge and experiences are important sources of information;
- Theory and practice are integrated;
- Variety of modes of instruction including investigation and problem-centred learning;
- Learners are non-violent, caring, ethical, responsible citizens;
- Learners as empowered active constructors of knowledge;
- Learners question answers;
- Teachers as facilitators and co-learners;
- Curriculum that is authentic, active and contextual;
- Off-site experiences;
- A place where professionals work and network in the community as a whole;
- A place where professionals see themselves as a community of learners and where continuous growth is an expectation;
- Accommodating a diversity of learning styles and multiple intelligences;
- Parents are informed and engaged partners in their own and children's learning;
- A broad range of assessment tools: performance-based, portfolios, projects;
- Continuous assessment uses a variety of strategies; and
- Governance that is democratic and inclusive of all clients and employees.

Subsequently Pollard and Tann (1994: 109), suggest that a constructivist model of roles in the teaching and learning process involves a learner and teacher negotiating area of work and activity which leads to some experience by the learner who probes for further experience and makes sense through accommodation and assimilation process. Ultimately the two (educator and learner) evaluate together the effect of the process. This is presented in Figure 2.9.

Figure 2.9: A constructivist model



Source: Pollard and Tann (1994: 109).

The constructivist theory seems to be in line with outcomes-based education. The original negotiation could be by clarifying outcomes and then having some activities for the teacher and learners respectively. Evaluating would involve reflecting on the process to identify gaps as well as future anchors for further learning.

Environmental education in South Africa has been strongly influenced by educational ideas associated with constructivist theory (Janse van Rensburg, 2000: 24). Abrahams (1997: 22) asserts that such an approach would enable students to pursue the ecological and other content of environmental problems and to engage the problems in a much more satisfactory and meaningful context. Constructivist pedagogy acknowledges the importance of learners' actively constructing meaning. From this point of view, learners' answers are all valuable, because they all reveal something about the learners' process of construction. This point is often made to help teachers see that it is not useful to teach towards 'one right answer'. In the simplistic ways in which such ideas are often shared, however, the idea that 'there is no right answer' could be inverted to 'there is no wrong answer', and all learners' constructions could be happily accepted (Janse van Rensburg and du Toit, 2000: 36).

Winter and Reddy (1996: 27), explore the application of a constructivist approach to environmental education because of its potential to integrate the teaching and development of environmental knowledge, attitudes and behaviour. Learners construct environmental phenomena and these conceptions influence the way in which they are likely to interact with the world (Winter and Reddy, 1996: 27).

2.8 RESEARCH ON INTEGRATION OF ENVIROMENTAL EDUCATION INTO THE CURRICULUM

2.8.8 An overview of integration of Environmental Education in developed countries

2.8.8.1 Environmental education in Japan

There is a growing trend towards environmental education in Japan, as in other countries. Education plays one of the leading roles in the Japanese environmental protection. At the elementary, junior and senior high school levels, Japan has a nation wide system of education and a National Standard Curriculum, set by the Ministry of Education. Through this system, environmental education has become more widespread and is activated at elementary and high schools all over Japan (Okuda, 1998: 207).

- **The Japanese Education System**

In Japan, the Constitution sets the basic national education policy, which is that all shall have the right to receive an equal education corresponding to their ability. At present, Japanese education is established and operated on the basis of educational laws and statutes. The fundamental Law of Education sets out in more detail the aims and principles of education in accordance with the spirit of the Constitution. The following are established as specific national principles of education: equal opportunity, compulsory education, co-education, school education, social education, prohibition of partisan political education, prohibition of religious education in the public schools and prohibition of improper control of education (Okuda, 1998: 207).

The Minister decides the course of study on the basis of recommendations from the Curriculum Council, which is composed of teachers, researchers and other persons of appropriate learning and experience. Each school organises its own curriculum on the basis of the course of study, taking into consideration the actual conditions of the community and the school itself and the developmental level and characteristics of the learners. There is another very important council called the Central Council for Education. This is a minister's advisory council, which reviews, discusses and makes plans for education in Japan. In the July 1996 report of the Central Council, four special topics were chosen as needing urgent attention: environment, information science, scientific technology and internationalisation (Okuda, 1998: 207).

- **Report of the Central Council for Education**

One part of the report on environmental education state: "The expansion of socio-economic activities and the increase in the human population have exceeded the restorative capacity of the environment. Environmental problems such as global warming, breakdown of the ozone layer, desertification, reduction in natural biological species, acid rain and others, affect the very foundation of human existence. In addition, the problems of various kinds of pollution associated with urban lifestyles, including atmospheric pollution, excessive noise and garbage disposal remain as before very serious issues". Environmental problems such as those mentioned above are very broad in scope hence it is necessary for environmental education to encompass a wide range of issues from everyday familiar things to global problems and for the range of the learning content to extend from the natural and social sciences to problems of individual emotions and perceptions. Also, in one sense, there are issues that touch on the lifestyles of every individual child (Okuda, 1998: 209).

The report of the Central Council for Education states that it is also very necessary to promote environmental education while taking account of the following points:

- In elementary and secondary education, while paying due attention to the developmental stages of children, there is an urgent need, at the same time as developing links between different subjects, deepening understanding of the environment and encouraging the growth of sensibilities that see the

environment as valuable and important, to train and develop practically oriented attitudes, abilities and aptitudes that will encourage each child to do whatever is possible within his or her immediate surroundings and to engage in activities aimed at conserving the environment and creating a more pleasant environment in which to live.

- In order to develop in children emotions and sensibilities that regard the environment as valuable and important as well as practically oriented attitudes conducive to engaging in environmental preservation and environmental amenity creation, it is necessary to make efforts to offer a variety of learning opportunities concerned with the framework of the local community.

In line with what has been indicated above, the ministry considered environmental education under three broad perspectives. Points to be given special consideration in respect of each of these are as follows:

- Environmental problems cover a broad, interdisciplinary range, hence when promoting environmental education in each school, it is very important to aim at fostering links between all subjects as well as with special areas such as moral education. Measures designed to get grips with environmental problems should be implemented across all educational activities on a whole-school basis. In each school, should aim at establishing a common understanding among teachers.

- At the same time as deepening understanding of the inter-relationships between people on the one hand and the environment and nature on the other, children should be encouraged to develop feelings of consideration for nature and the environment and to value these highly. They should develop practically oriented attitudes that are likely to lead to their taking the lead in preserving the environment and creating environmental amenities.

- Environmental education must place emphasis on experiential or hand-on activities, which must be given due consideration in the course of classroom instruction. In addition, stress should also be placed on implementing from time to time, learning activities within the local community or in rich natural

surroundings, enabling students to learn what kinds of actions give rise to environmental problems, what kinds of measures can be taken with a view of finding solutions and what they personally must do (Okuda, 1998:210).

To summarise, in the context of school education in Japan, children have learned about the environment through various subject areas, such as 'social studies', 'science' and 'health and physical education' at the elementary and lower and upper secondary school levels. Today, schools teach children about the importance of nature through studies focusing on environmental problems in the community and through varied forms of hands-on learning in natural environments. The Ministry of Education supports these efforts and is implementing a variety of measures to place an increased emphasis on environmental education. Help with the content of each subject area is being enhanced and the Ministry of Education is implementing the following measures:

- Preparation of teacher's reference materials: preparation and distribution of material for lower and upper secondary schools and for elementary schools.
- Designation of model municipalities for promoting of environmental education.
- Implementation of environmental education fair.
- Seminars for teachers in charge of environmental education.

Environmental education in Japan has gradually improved. Now, with a clear perspective given by the Central Council for Education, it hopes to accelerate in fulfilling the need of environmental education in Japan (Okuda, 1998: 212).

2.8.8.2 Environmental education in Norway

The Ministry of Education, Research and Church Affairs aims to make environmental education interdisciplinary and naturally integrated in all subjects and at all levels within the education system. Environmental education takes place in Norway in the context of the recommendations of the Brundtland Report and so combines coverage of environmental issues with the closely related development issues. Some 500

schools (about 50 per cent of all schools) are affected to some extent by the Ministry's initiative, affecting young people between the ages of 7 and 18 years (Dunlop, 1992: 87).

One of the notable features of the Norwegian approach to environmental education is that it involves the mobilisation of teachers and seeks to find ways of helping counties, schools and teachers produce their own local plans for the environment. Some money from the Ministry can be made available but the whole process is philosophically and in practical ways dependent upon local initiatives, which interpret local environmental interests and needs. While some may see this as anarchy, the model's structure incorporates resource people, knowledgeable in environmental matters who work as contacts and facilitators alongside teacher trainers and curriculum developers (Dunlop, 1992: 88).

In practice, the County-based model conducts and encourages environmental education in the following ways:

- The Parliament states that most teachers in the upper secondary schools shall be offered in-service training in environmental issues.
- The in-service training model is applied to each individual school, to all or most of the teaching staff and to the school administration.
- The local environment provides the laws for the course content and working methods in which pupils are expected to participate actively.
- The environmental education should be interdisciplinary.

The costs of the environmental education provision advocated by central government involve the appointment of: environmental supervisor, resource persons able to act as instructors and facilitators in addition to which are administrative costs, costs of educational materials and teacher costs. These should be shared between the Ministry and the County authority on a 50:50 basis (Dunlop, 1992: 88).

Despite the scale of the Norwegian effort, the provision of resources, the attention being given to schools and teacher education, the commonly found discrepancy between teachers' sincere interest in environmental issues on the one hand and

teachers' knowledge and understanding of these on the other, might still prevail. Schools however, have to work out their own solution to environmental questions. Any deficiencies in teachers' knowledge and understanding can be overcome, it is claimed, by putting teachers in contact with Teacher Education Colleges or by remedying deficiencies in knowledge and understanding by working these out locally (Dunlop, 1992: 88).

The question of whether environmental education might be best approached through subject inserts, through interdisciplinary methods or by creating a multidisciplinary subject recurs in Norway as elsewhere. No simple solution to cross-disciplinary approaches exists. But the Norwegian endeavour is committed to finding workable and sustainable interdisciplinary approaches to environmental education for which a selection of subjects in made according to the nature of the topic study. Sustainable interdisciplinary methods take time to plan properly and so the role of a co-ordinator is of crucial importance in the process of planning, co-ordination and implementation (Dunlop, 1992: 88).

2.8.8.3 Environmental education in Wisconsin, USA

The Wisconsin Environmental Education Board (WEEB) defines environmental education as a "lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, ethical awareness and sensitivity for the relationship between humans and the environment, and commitment to engage in responsible individual and co-operative actions. By these actions, environmentally literate citizens will help ensure that an ecologically and economically sustainable environment.

Wisconsin's historical commitment to environmental education is well known. Beginning in the 1930's Wisconsin citizens recognised the need for environmental education to be an integral part of a young person's schooling. By requiring instruction in the conservation of natural resources at both the elementary and secondary levels as well as the teacher preparation programmes, the groundwork was laid for an environmentally conscious and responsible citizenry. Since 1983, the

people of Winconsin, through their elected officials, have achieved important environmental education goals, including:

- Establishing a requirement that every school district develop and implement a written, sequential curriculum plan incorporating instruction in environmental education into all subject area curriculum plans, with the greatest emphasis in plans for art, health, science, and social studies education (Dawson, date unknown).

The state of Wisconsin has made a concerted effort to infuse environmental education concepts into its school system. In 1990, the Wisconsin legislature passed Act 299, which requires the periodic assessment of the environmental literacy of Wisconsin's teachers and learners. Pre-service teacher environmental education preparation is mandated and environmental education concepts are considered in the development, implementation and evaluation of school-district curriculum plans. Wisconsin teachers also receive in-service opportunities in environmental education (Smith-Sebasto and Smith, 1997: 27).

2.8.8.4 Environmental education in the Netherlands

Until the mid-1980s, approaches to environmental topics in Dutch schools were tentative and haphazard. Any materials that existed were untested and used by teachers in a completely random manner. Such teachers were invariably enthusiastic and the materials of dubious quality. The Ministry of Education was convinced that resources were needed to improve the situation and so efforts were made through chemistry, physics, biology and geography. Simultaneously, efforts were directed at the central government by environmental non-governmental organisations (NGOs) to pay more attention to national environmental problems which, although real enough, were often misrepresented or sensationalised in the press and broadcasting media. Political support was gained to help put environmental matters into a proper perspective (Dunlop, 1992: 86).

Currently, six government ministries have combined to make funds available. This is recognised as a major allocation of public funds intended to improve the quality of Environmental Education in the Netherlands. Prior to the injection of these public

funds, a foundation had been laid by the SLO (Dutch Curriculum Development Service) for "Nature and Environmental Education" (NEE). Some of the NEE discussion documents are recognised as good starter papers although they lack precision due to the scarcity of research into the appropriateness of certain concepts and the manageability of environmental education at certain school levels. The government's initiative might help offer the opportunity to attend to these problems in order to encourage better teaching and to aim Environmental Education practice at all teachers (Dunlop, 1992: 86).

Since the mid-1980s, the national examination system has been revised quite substantially and as a result, the three science subjects and geography now include environmental topics. Attempts too, had been made at environmental education "across the curriculum" but, in practice, this meant attempts at co-ordinating inputs from these four subjects. In primary schools, no systematic Environmental Education exists; therefore, environmental education is to most primary teachers who bother with it at all, interpreted as nature study. Some teachers, however, ventured to cover well-publicised global issues such as acid rain or the greenhouse effect. In practice, such topics were either taught very superficially or badly due to the teacher's lack of knowledge (Dunlop, 1992: 86).

Within SLO, environmental education had its origin in 1989. Since then, discussion papers have been written and foundations laid on which to erect conceptual frameworks. Three forms of current environmental education practice have been identified: extra-curricular/extramural, cross-curricular and school-based activities, which focus on specific issues or themes, interpreted through existing subjects. Whereas the last two were reliant upon schools' policy towards EE and on project initiatives, the former was serviced by several of the Dutch Environmental NGOs. At best, a minority of schools had evolved policies towards sustainable development with varying intensities for the green option (Dunlop, 1992: 86).

Some attention has been given to environmental education practices in primary and secondary schools. Many primary schools are doing 'something', for the most part, small-scale projects. Few schools are, however, doing anything systematic or structured. Many Dutch NGOs try to assist schools but the quality of their educational

materials varies greatly and does not readily fit schools' curricular practices. While some teachers are motivated to attempt to teach major global issues using NGO materials, most concentrate on local nature studies during the summer term. Little is done in teacher education contexts to redress the lack of training of primary teachers in environmental studies. There are a few in-service courses in nature study, which have some attraction to those teachers already interested in environmental topics (Dunlop, 1992: 87).

At secondary level, environmental education had its home in the sciences. It is however, spreading to the social subjects, notably economics and history. As yet, other subjects such as the arts do not recognise the relevance of environmental topics. In discussing the manageability of cross-disciplinary approaches to environmental topics, difficulties were admitted. What is needed is a set of key concepts that are not subject-specific and a common language understood by different school subjects. With the average secondary school teacher as a subject specialist encapsulated in his own definable world, it is hard to make meaningful connections between subjects. Moreover, cross-disciplinary techniques do not always result in the integration of discrete elements (Dunlop, 1992: 87).

2.8.9 An overview of integration of Environmental Education in developing countries

2.8.9.1 Environmental education in Mexico

After the 1910 Mexican revolution, the government granted constitutional status to education. The 1917 Mexican Constitution declared that education is compulsory, free and secular at the preschool and primary levels (ages 4-11). Since 1993, secondary education has been compulsory for three years (ages 12-14). By the 1920s, many sectors of society saw education as a liberal process. The pedagogical approaches centred on helping oppressed people become creative and productive citizens. In 1921, the government founded the Secretari'a de Educatio'n Publica (SEP-Ministry of Public Education). This ministry designed the content of the national curriculum for all Mexican schools-urban and rural, public and private. The SEP organised a literacy programme for the rural population. For the first time, environmental policy teachers

were taught about the importance of natural resources (Beltran, 1967 cited in Barraza, 2001: 32).

During the 1930s, the Mexican government supported these educational activities. The government paid special attention to higher education, training the technicians and professionals who would support national productivity. An emphasis was placed on revision and the actualisation of the official programmes, which were designed to promote social awareness and critical participation among the school population. In the 1940s, and 1950s, governmental policies were oriented toward the progress of industry, commerce, and urbanisation. In primary education, a strong emphasis was placed on interesting children in Mexico's environment, economy, and social and cultural structures. Educators and academics viewed schools as agents of participation, conservation, and development of values (Barraza, 2001: 32).

During the late 1950s, however, a social and political conflict in education resulted in military intervention. A new era for education was consolidated in the 1960s after the government promoted a national debate about education. As a result, the SEP created a programme to expand and improve primary education. This plan was established during an 11-year period (1961-1972) and was supported by the use of national textbooks. By the 1980s, the government announced a major education reform. The reform introduced a new structured curriculum. For the first time, environmental education was supposed to be included in discussions about the curriculum. Nevertheless, this did not happen because a specific plan was not developed to implement this initiative (Wuest, 1992 cited in Barraza, 2001: 32).

In 1983, the Mexican government created the Secretaria de Desarrallo Urbano y Ecologia (SEDUE-Ministry of Urban Development and Ecology), which included a department exclusively to promote environmental education. This crucial step emphasised the importance of developing an environmental education policy. In early 1986, serious thermal inversions covered Mexico City with high levels of air pollution. As a consequence, Mexico's president, Mignel de la Madrid, announced in February 1986 that the SEP should establish a methodological basis for initiating an ecological approach to formal education. Thus schools started developing environmental education policies (Barraza, 2001: 32).

The governmental period of 1988-1994 was a time of educational modernisation. Public education began to work with other government and social organisations in response to the demands of the citizens, who wanted to modify the model of development. Mexicans wanted the development to be more open, equal, homogeneous and participatory, they demanded education for rural communities and adult education. As a result, SEP established new educational reforms, including, recognising environmental education in the curriculum. In 1990, Mexico engaged in an educational-political debate. Because of this discussion, educational authorities started incorporating the environmental dimension into primary education. This dimension covered two areas: knowledge about and formation of environmental values and attitudes. The teaching and learning process would enable students to understand the origin and development of environmental problems as well as the different levels of individual and collective responsibility and participation required for a new relationship between society and nature (Barraza, 2001: 33).

Although environmental education is not included as an independent topic in the primary-level national curriculum, environmental issues are strongly represented in natural and social science textbooks. The programmes for primary-level natural sciences are based on a formative view of schools. The major goal of the programme is to help students acquire knowledge, capacities, attitudes, and values that can be expressed by the development of a responsible relationship with the environment. The goal suggests that the study of natural science is not designed to educate children as scientists in a disciplinary and formal way, instead, students are encouraged to observe, question, and formulate, simple explanations about what happens in their surroundings (Barraza, 2001: 33).

2.8.9.2 Environmental education in Malawi

Malawi is endowed with a diversified natural resource base, which includes most of the fertile soils for agricultural use in Southern Africa. However, the alarming rate of environmental degradation is causing a lot of concern among policy makers in the sector of environmental education. Therefore, the role of environmental education through the promotion of environmental awareness and educating the general public about the benefits of environmental sustainable management, including the

consequences of misuse of renewable natural resource is an indispensable policy objective and legislative mandate (Russo, 2002: 5).

Since environmental education is not merely messages, knowledge and subject, but a way of ensuring survival and improving quality of life through sustainable use of natural resources, Malawi has been integrating environmental education in the National Environmental Action Plan. The aim is to increase environmental awareness, education, training and communication in order to create understanding of the need to protect natural resources. For that purpose, the government of Malawi has established a number of environmental education initiatives that include increasing public awareness and participation, integrating environmental education processes into formal education system, improving the quality of environmental information and access to such materials (Russo, 2002: 5).

Although a number of learning support materials have been produced for the formal education sector, there is still a need to develop more materials tailor-made for the Malawian environmental set up and context. Materials recently produced include, for example, an environmental education and communication strategy document, environmental education training materials and environmental calendars (Russo, 2002: 5).

2.8.9.3 Environmental education in Lesotho

The curriculum reforms that took place in the United Kingdom (UK) during the 1980s, led to the move from O'Level to the General Certificate of Secondary Education (GCSE). The 1980s curriculum and assessment reforms in the UK forced Botswana, Lesotho and Swaziland to reconsider their curriculum and assessment systems since they were following the O'Level system (Mokotso and Ntoi, 2001: 47; Mokuku and Janse van Rensburg, 1997: 31). As a result, Lesotho began to initiate localisation of the O'Level curriculum and assessment systems.

Localisation of O'Level in the context of Lesotho in defined as "taking charge and control of all activities and responsibilities over curriculum and assessment (Ministry of Education, 1995 cited in Mokotso and Ntoi, 2001: 47). The main reason put

forward for localising O'Level was the issue of relevance. Basotho educators saw localisation as an opportunity to reform the curriculum and assessment to meet the needs and circumstances of Lesotho. It was thought that localisation would lead to alignment between the Junior Certificate (JC/grade 9) and O'Level/grade 12 curriculum and assessment as well as improves quality if instruction (Mokotso and Ntoi, 2001: 47).

Lesotho began localising matters relating to examinations, such as training of markers, marking of scripts, computerising examination data, grading and awarding certificates, in 1989. Upon localising the curriculum, the science panel aimed at closing the gap that was observed to exist between JC and O'Level. They also tried to conceptualise the science content as well as acknowledge global issues in curriculum and assessment. These issues among others included technology, environment, population and family education, gender issues and AIDS. Furthermore, the panel aimed at improving the methods of teaching science (Mokotso and Ntoi, 2001: 47).

The development of Environmental Education in Lesotho

Below are outlined recent developments in environmental education in Lesotho as stated in the Lesotho Environmental Education Support Project Document 2000, (cited in Mokotso and Ntoi, 2001: 48-50).

1992 – A Basic Education Clarification Seminar, which strongly recommended that environmental education and development issues be incorporated into the basic education curriculum.

1994 – A National Action Plan to implement Agenda 21, following the Rio de Janeiro Summit Conference in 1992. In this plan the inclusion of environmental education in all levels of education is listed as a priority area for attention.

1995 – National Seminar on Clarification of Policy on Secondary Education and Localisation of O'Level Curriculum strongly recommended the inclusion of environment and development issues in secondary education. The integration of environmental education in Lesotho Secondary education was primary based on the National Goals of Secondary Education as stipulated by this report.

The method of integration of environmental education in both Primary and Secondary Education is across existing subjects identified as carrier subjects. In Secondary Education, the identified carrier subjects are Agriculture, Health and Physical Education, Home Economics, Science (Physical and Biology) and Social Sciences (Geography and Development Studies) (Mokotso and Ntoi, 2001: 50).

The national environmental education initiative (the Lesotho Environmental Education Support Project – LEESP), aims at improving environmental understanding at school levels. This project is divided into three components that include curriculum, teacher and material development. The immediate objective of this project is to improve the capacity of the relevant educational authorities to assure that such understanding will take place. This is currently being done by developing capacity of the relevant bodies concerned with curriculum development as well as developing capacity on institutional level for in-service training and pre-service training for improving the implementation of environmental education processes (Russo, 2002: 5).

Another component of the project is the establishment of model schools with the purpose of creating a considerable resource of practicing and experienced teachers for diffusion of environmental education (Russo, 2002:5). Incorporation of environmental issues in schools' curriculum is without a question a commendable effort on the part of Lesotho Government. It is also a proof of a genuine admission that there is a problem that needs to be addressed (Mphale, 2001: 64).

2.9 SUMMARY

This chapter examined the nature and scope of integration of environmental education into the curriculum with particular attention paid to: definition of major concepts in this study, the advantages and disadvantages of curriculum integration, curriculum integration models and theories and research overview of integration of environmental education into the curriculum in developed and developing countries.

From the literature reviewed, it is evident that integration of environmental education into the curriculum is such a challenge. However, many nations are ready to face the

challenges as outlined in this chapter. As for South Africa, there is a significant determination to integrate environmental education into the outcomes-based education curriculum as South Africa's response to establish a healthy and caring society. This is evidenced by various White Papers, policies and legislations.

CHAPTER 3

3. RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the method of the study. It explains the rationale behind the methodology employed, how the research was conducted and what strategies were used to ensure the validity and reliability of the study. The guiding issue in this investigation was the aim of the study, which was to investigate issues and challenges facing educators regarding the integration of environmental education into school curricula.

The first aim was to determine from literature the nature and scope of integration of environmental education into the outcomes-based education curriculum and the second aim was to determine also from the literature the possible problems preventing effective curriculum integration as subsequently documented in Chapter 2. The review of literature played an important the construction of the questionnaire.

3.2 RESEARCH TOOLS (INSTRUMENTATION)

According to Legotlo (1996: 20); Borg and Gall (1989: 418) and Tuckman (1994: 14), many studies in education and allied fields rely on questionnaire and interviews as their main source of data collection. Van Dalen (1979: 127) argues that there is no single instrument that is perfect, each has its own limitations. As such a researcher has to be aware of the advantages and disadvantages and limitations of each instrument, its reliability, objectivity and validity. The researcher has to weigh the merits of various procedures for collecting evidence and determine which approach yields the form and kind of data, necessary to test his or her research question or hypothesis. The researcher then chooses the tools that are most appropriate for his or her purpose (Van Dalen, 1979: 127). In this study, a questionnaire was used as the primary instrument for data collection.

3.2.1 Questionnaire as a research tool

A questionnaire is a data collection instrument containing a selected group of questions chosen because of their relevance and carefully worded for clarity. The questions are asked in such a manner that they elicit relevant data. They are a creative means to tap subjects for ideas. To gather information requires an artistic touch, which may be fostered by carefully re-creating the best types of questions, which one has used in everyday life. One should be creative in developing a questionnaire (Baker, 1988: 166).

Questionnaires are used to convert into data the information given by the subjects (Legotlo, 1996: 20). These approaches were used in this study to measure what the subjects knew (knowledge and information) about integration of environmental education and what they thought (attitudes and beliefs) about integration of environmental education into the school curriculum. According to Tuckman (1994: 197), questionnaires are a way of getting data about persons by asking them rather than watching them behave or by sampling a lot of their behaviour.

For many good reasons, the questionnaire is the most likely used technique for obtaining information from subjects. A questionnaire is relatively economical, has standardised questions, can ensure anonymity and questions can be written for specific purposes. Questionnaires can use statements or questions, but in all cases, the subject is responding to something written (Schumacher and McMillan, 1993: 238).

Guy et al. (1987: 229) argue that researchers use questionnaires to collect data from a person by providing access to what in inside a person's need. A questionnaire is a powerful instrument of survey research. It makes it possible to measure what a person thinks and what experiences had taken place and what a person likes or dislikes and what a person's experiences had been.

In as much as questionnaires might be the most common tools used in educational research, the self-report approach incorporated in questionnaires does present certain problems. Tuckman (1994: 197) reports the following problems:

- Respondents must co-operate when completing a questionnaire;

- ❖ They must tell what is rather than what they think ought to be or what they think the researcher would like to hear; and
- ❖ They must know what they feel and think in order to report it.

There are two types of questions to be considered, the close-ended (structured) questions and the open-ended (unstructured) questions. Each of these types has its special functions, advantages and disadvantages. The researcher should consider carefully whether it would be of value to use either close-ended or open-ended questions in the questionnaire (Frankfort-Nachmias and Nachmias, 1996: 253).

3.2.1.1 Close-ended (structured) questionnaire

In a close-ended question, respondents are offered a set of answers and asked to choose the one that most closely represents their views (Fankfort-Nachmias and Nachmias, 1996: 253).

❖ **Advantages of close-ended questionnaire**

According to Legotlo (1996, 36) and Baker (1988: 173), the advantages are as follows:

- It is easy to complete;
- It is less time consuming;
- It promotes objectivity;
- It is easy to score, code and tabulate;
- There is specification of the frame of reference for the subjects; and
- It is quick to answer and straight forward.

❖ **Disadvantages of close-ended questionnaire**

The researcher may fail to restructure the responses. Close-ended questionnaires fail to reveal the respondents' motives, do not yield information of sufficient scope or depth and may not discriminate between fine shades of meaning. Fixed alternative responses may make respondents take stands on issues about which they have crystallised opinions, or they may force them to give answers that do not accurately express their ideas. The listed alternative answers may be written in a way that encourages the respondents to reply in accordance with their wishes. Another

drawback is that they may introduce bias, offering the respondents alternatives that might not have otherwise come to mind (Frankfort-Nachmias and Nachmias, 1996: 254).

3.2.1.2 Open-ended (unstructured) questionnaire

Open-ended questions are not followed by any kind of specified choice, and the respondents' answers are recorded in full. Open-ended questions leave the participants completely free to express their answers as they wish, as detailed and as complex, as long or as short as they feel appropriate. No restriction, guidelines, or suggestions for solutions are given (Cohen and Manion, 1989: 313; Frankfort-Nachmias and Nachmias, 1996: 254;). Open-ended questions are in fact essay types (for example, What major problems face your country today? What is your future plan?), and such questions if properly constructed may create a captive audience (Adams and Cook, 1985: 202).

Open-ended questions provide opportunities for the researcher to ascertain lack of information on the part of the respondents. They are to be worded carefully so as to present standardised questions to all respondents. Standardisation is important because the researcher will want to compare the responses (Adams and Cook, 1985: 202). The virtue of the open-ended question is that it does not force the respondents to adapt to preconceived answers. Once respondents understand the intent of the question, they can express their thoughts freely, spontaneously and in their own language. If the answers to open-ended questions are unclear, the reseaecher may probe by asking the respondents to explain further or to give a rationale for something stated earlier (Frankfort-Nachmias and Nachmias, 1996: 254).

❖ **Advantages of open-ended questionnaires**

- It imposes no restrictions on respondents response;
- Could be used when the researcher is uncertain or has limited knowledge on the subject matter;
- Also used where a wide range of opinions are expected;
- It is more appropriate for a pilot work, and could be used to explore the area with the intention of constructing structured questions;

- Could be used to find out which information are the respondents prepared to divulge; and
- It helps to get down to more details, and more deep-rooted motives.

❖ **Disadvantages of open-ended (unstructured) questionnaires**

Open-ended questions are difficult to answer and still more difficult to analyse. The researcher has to design a coding frame in order to classify the various answers. In this process, the details of the information provided by the respondents might get lost (Frankfort-Nachmias and Nachmias, 1996: 254).

The appropriateness of either close-ended or open-ended questions depends on a number of factors. Frankfort-Nachmias and Nachmias (1996: 255) suggested that researchers use the following considerations to determine appropriateness:

❖ *The objectivity of the questionnaire.* Close-ended questions are suitable when the researcher's objective is to lead the respondents to express agreement or disagreement with an explicit point of view. When the researcher wishes to learn how the respondents arrived at a particular point of view, an open-ended question is likely to be more appropriate.

❖ *The respondent's level of information about the topic in question.* Open-ended questions provide opportunities for the researchers to ascertain a lack of information on the part of the respondents, whereas close-ended questions do not. Obviously, it is futile to raise questions that are beyond the experience of respondents.

❖ *The extent to which the respondent has thought about the topic.* The open-ended question is preferable in situations where respondents have not yet crystallized their opinions. Using a close-ended question in such situations involves the risk that in accepting one of the alternatives offered, respondents may make a choice that is quite different from the opinion they would otherwise have expressed had they gone through the process of recalling and evaluating their past experiences.

❖ *The ease with which respondents can communicate the content of the answers or the extent to which respondents are motivated to communicate on the topic.* The close-ended question requires less motivation to communicate on the part of the respondent, and the response itself is usually less revealing (and hence

less threatening) than in the case of the open-ended question. The researcher who uses close-ended questions tends to encounter refusals to respond less frequently.

3.2.2 QUESTIONNAIRE CONSTRUCTION

The questionnaire must be of a professional appearance and should give the impression of a document that deserves respect and evokes feeding of responsibility. The questions should be presented in a way that encourages the respondents to complete and return it. The questionnaire should be presented as a complete document with an inviting and reassuring introductory covering letter including note-containing instructions regarding the return of the questionnaire. The size should be kept to a minimum, and restricted to as many questions as necessary (Sarantakos, 2000: 239).

Some of the rules for constructing a questionnaire as indicated by Borg and Gall (1989: 430); Legotlo (1996: 22) are as follows:

- Clarity, that is items must mean the same to all respondents;
- Short items are preferable;
- Negative items should be avoided;
- Double-barreled items which require the subject to respond to two separate ideas with a single answer should be avoided; and
- Biased questions are to be avoided.

3.2.2.1 The layout and content of the questions

Sarantakos (2000: 238) describes the following layout and content of the questionnaire:

❖ **Layout**

The questions must be well presented in the questionnaires, easy to read and easy to follow. Clear instructions regarding the way of answering the questions must be given for example, circle the appropriate number or tick the correct box). Sufficient space should be left for the respondent to make relevant remarks if required.

❖ **Content**

- Every question must be relevant to one or more aspect of the study;
- Leading, double-barreled and presuming questions should not be employed;
- Ambiguous, non-specific and hypothetical questions are to be avoided;
- Vague words and academic jargon should not be used;
- The language of the respondent should be employed. Thus a simple language should be used without slang or complicated expressions;
- Easy flow and logical progression in the questionnaire should be assured; and
- Each question should ask what is supposed to ask.

3.2.2.2 Development of questionnaire items

Some of the strategies that were employed in the development of the questionnaire items in this study included:

- Thorough examination of issues raised in the literature on curriculum integration, with specific reference to integration of environmental education into the school curriculum. After which, questionnaire items were selected that were in line with the research questions;
- Identifying the main issues of integration of environmental education into the school curriculum, and then from there, the concepts of the issues that were going to be tested were identified; and
- Questions from other authors on similar topic were considered (Shongwe, 1992; Smith-Sebasto and Smith, 1997: 31).

3.2.2.3 Format and content of questionnaire

The questionnaire in this study was divided into four sections namely:

Section A (1 – 7)

The purpose of this section was to gather biographical and demographic information about each respondent. This information was essential to determine the experience of the respondents as well the background information they possessed.

Section B (8- 8.8)

This section was designed to gather information regarding the respondents' attitudes and teaching practices as they relate to environmental education. A four-point Likert-type scale was used. For each item, the respondents were asked to indicate their level of agreement or disagreement regarding their attitudes towards their abilities and reasons for teaching environmental education concepts in the classroom. The four-point Likert-type scale was interpreted as follows:

1=Strongly Disagree (SD)

2=Disagree (D)

3=Agree (A)

4=Strongly Agree (SA)

Section C (9.1 – 9.8)

The questions in this section were in an open-ended form. The purpose of this section was to obtain a wide range of views regarding integration of environmental education into the school curriculum. Some questions asked the respondents to give some challenges facing educators regarding integration of environmental education. Furthermore, the questions required that respondents give reasons and solutions to what can be done to address such challenges. Other questions required Yes or No answers, but the respondents were asked to comment further.

Section D (10.1 – 10.3)

The purpose of this section was to obtain information on the level of involvement of the government in the integration process of environmental education into the school curriculum. Open-ended questions were also employed.

Thus, these sections (C and D) had some characteristics of open-form questions, which according to Van Dalen (1979: 155) give the subjects an opportunity to reveal their motives and attitudes and specify the background or provisional conditions upon which their answers are based. However, Van Dalen (1979: 155) and Frankfort-Nachmias and Nachmias (1996: 254) point out that if respondents are capable of providing a wealth of pertinent information, the task of categorizing, tabulating and summarising their many different, detailed and complex answers may be extremely

difficult and time consuming. The researcher has to design a coding frame in order to classify the various answers.

3.2.3 PILOT STUDY

A questionnaire should be pre-tested on a small number of people in what is called a pilot-study. It is best to test it on people of a type similar to that of the intended sample so as to anticipate any problems of comprehension or other sources of confusion. When sending out the questionnaire, the researcher should courteously invite the recipients to complete it and encourage them by explaining the purpose of the survey, how the results could be of benefit to them and how little time it will take to complete. Simple instructions on how to complete the responses are also required. Some form of thanks and appreciation of their efforts should be included at the end (Walliman, 2001: 238).

The pilot study gives the researcher a chance to discover unforeseen problems of the administration, coding and analysis of the questionnaires. It is conducted to test the instrument for ambiguous or misleading questions, and offers the researcher an opportunity to evaluate the effectiveness of the survey instrument prior to its general distribution. The pilot study often indicates whether a question in a survey does elicit the desired information. It also forewarns the researcher if the instrument is too long or too complex for an average respondent to complete (Guy et al., 1987: 235).

Pre-testing helps to detect deficiencies and flaws as well as suggestions. It also provides the statistical methodology of the survey, and determines whether it is necessary for re-organisation of the study. The information may suggest new channels of enquiry and inspire ideas about additional questions that may enrich the research (Legotlo, 1996).

Additionally, the pilot survey enables the researcher to:

- Make amendments necessary to maximise returns and minimize the error rate in answers;
- Categorise the open-ended questions to a reasonable degree;

- Perform the analysis on the pilot sample and test out all the computational procedures and produce some initial hypotheses; and
- Evaluate the adequacy of the data for the research questions (Saunders et al., 2000).

It was necessary to run a pilot test to pre-test the questionnaire and to revise it based on the results of the test. A sample of 20 (n=20) educators was selected to fill the questionnaire and their comments were helpful to shape the final questionnaire.

3.2.4 FINAL QUESTIONNAIRE

The final questionnaire was administered to 312 (n = 312) educators of primary schools in the Mafikeng District in North-West Province.

3.2.5 COVERING LETTER

A covering letter is a means to introduce the questionnaire officially to the respondents. It gives the respondents directives on how to return the questionnaire to the researcher (Legotlo, 1996: 168). The covering letter must succeed in convincing the respondents to fill in the questionnaire. It should explain what the questionnaire is all about, inform the respondents why is it important that they fill in the questionnaire, and assure them that the answers will be held in strict confidence (Frankfort-Nachmias and Nachmias, 1996: 228).

Sarantakos (2000: 225) also emphasises the same idea stating that the main aims of the cover letter are to introduce the respondents to the research topic and research team, to neutralise any doubt or mistrust respondents might have about the study, to motivate them to participate in the study and to answer the questions, and to assure them of anonymity and confidentiality. He further states that a covering letter has been recognised as one of the factors that influence the response rate. The way the questionnaire is presented and introduced and the type of assurance given to the respondents determine largely whether the respondents will complete the questionnaire or not, and whether they will answer all the questions.

A simple and straightforward covering letter was written to go along with the questionnaire (See Appendix B). The purpose of this letter was to explain clearly the purpose of the study, arouse interest of the respondents in contributing accurate information, promised to protect the confidentiality of the data and informed the participants why they were chosen. The researcher also used the same letter to introduce herself and what she was doing at the time.

3.3 QUESTIONNAIRE DISTRIBUTION

There are various ways to consider when distributing and administering a questionnaire. The atmosphere should be sufficiently serious to complete the questionnaire objectively. The light mood could have serious effects on the results of the questionnaires. A researcher should consider whether the tool has been properly used (Baker, 1988: 177). According to Van Dalen (1979: 153) and Frankfort-Nachmias and Nachmias (1996: 224), questionnaires may be presented to respondents in two ways: through the mail or by delivering them personally to the respondents. In this study, questionnaires were administered directly to the respondents.

3.3.1 DIRECT CONTACT WITH RESPONDENTS

In the case of direct contact, the researcher goes around personally and presents the questionnaire to the relevant respondents. The researcher has the opportunity to explain the purpose and significance of the study and even clarifies some points. He or she may also be in a position to clarify and answer questions asked by the respondents and motivate respondents to answer questions carefully and truthfully (Van Dalen, 1979: 153).

- **Advantages of direct contact with respondents**

The researcher has an opportunity to make personal appeals to the respondents for assistance in order for the study to become successful because such an appeal is effective. The potential respondents may turn to become sympathetic and show good co-operation in filling in the forms (Baker, 1988: 178).

If the respondents are less educated or less interested, they may be inducted to participate positively. The presence of the researcher might change the attitude of such respondents and change the return rate substantially. The respondents should be made to feel that the information could not be easily obtained. In order to convince the respondents, the questionnaire should be clear, attractive and easy to fill in. The researcher should arouse the interest of the respondents to contribute accurate information. The respondents should also feel important why they were chosen for such a research (Van Dalen, 1979: 154).

❖ **Disadvantages of direct contact with respondents**

Van Dalen (1979: 153) outlines the following disadvantages of direct contact with respondents:

- Bringing a group together to fill in questionnaire is often difficult;
- Meeting members individually may be excessively costly and time-consuming;
- The return may be bias and subjective due to the influence and the presence of the researcher;
- The researcher may give false promises in order to get his or her work done;
- Persuasiveness may have a negative impact on the questionnaire and affect the reliability of the results; and
- Precision, consistency or stability may also be affected negatively.

3.3.2 ADMINISTRATIVE PROCEDURES

Permission to conduct research was first requested (See Appendix A) from the Department of Education-District Office. The reply was in favour of the research and permission was granted under the provision that teaching and learning may not be interrupted at schools during data collection.

In this study, direct contact approach was employed. The questionnaire was directly administered to fifty-two (n=52) primary schools in the Mafikeng District. The researcher first visited the schools and explained the purpose of the study and verbal arrangement was further made with each school about when to collect the questionnaires. In most schools, the questionnaires were given to the site managers to

administer them to educators, but in case where the site managers were busy, the researcher was allowed to administer questionnaires personally to the respondents.

To facilitate contact, a list of all primary schools in the Mafikeng District, their site managers' names and their addresses and telephone numbers were obtained from the district office.

3.4 FOLLOW-UP

Follow-up activities may be employed to increase the return rate. Usually follow-up activities begin shortly after the deadline for the responding has passed. Those who did not respond might have meant do so but had forgotten. The action that is taken should not be that of scolding the non-respondents. They should be provided with an acceptable reason for their non-response. The significance and purpose of the study should be repeated. The researcher should be creative and the respondents may come to appreciate his or her standpoint and persistence. Creative activities may lead to an increased percentage of returns (Gay, 1992: 229).

Telephone may be used to remind subjects or inquire whether they had misplaced the questionnaire. Additional follow-up may increase returns substantially. The researcher should develop an effective method of increasing returns (Legotlo, 1996: 170).

In this study, follow-up was made telephonically. Arrangements were first made by telephone to set a time and day when completed questionnaires would be collected.

3.5 POPULATION AND SAMPLING

The survey population was drawn from the Mafikeng District in North-West Province. Because of the vastness of the district, the researcher used the probability sampling. The distinguishing characteristic of probability sampling is that for each sampling unit of the population, the researcher can specify the probability that the unit will be included in the sample. In its simplest case, all the units have the same probability of being included in the sample (Frankfort-Nachmias and Nachmias, 1996: 183).

The respondents for this study were drawn from six educational circuits in the Mafikeng district namely: Botshabelo, Dithakong, Makgobistad, Mmabatho, Montshiwa and Stadt circuits. There are 102 primary schools in Mafikeng district. Out of 102 primary schools, fifty-two (n=52) were randomly selected. In each circuit, fifty per cent (50%) of the schools were selected to participate in the study. Table 3.1 below shows the percentage of all the circuits that participated in the study.

Table 3.1: Percentage of all the circuits participated in the study

Circuit	Total No. of schools	Sample	Percentage
Botshabelo	25	13	25%
Dithakong	16	8	15.4%
Makgobistad	22	11	21%
Mmabatho	15	8	15%
Montshiwa	8	4	8%
Stadt	16	8	15.4%
Total	**102**	**52**	**100%**

3.6 RESPONSE RATE

Three hundred and twelve (312) copies of the questionnaire was distributed around all six circuits. In each school, the instrument was administered to six respondents (educators). Table 3.2 shows the response rate.

Table 3.2: Response rate based on circuits

Circuits	No. of schools	n	Response	%
Botshabelo	13	78	46	60
Dithakong	8	48	35	73
Makgobistad	11	66	40	61
Mmabatho	8	48	44	92
Montshiwa	4	24	18	75
Stadt	8	48	36	75
Total	**52**	**312**	**219**	**70**

Table 3.2 indicates that the total sample size (312) to which the questionnaires were distributed, 219 (70%) usable questionnaires were returned. The reason for this good response could be that the bulk of questionnaires were administered by direct contact.

3.7 DATA ANALYSIS

In this study, the majority of questions were open-ended, therefore the content analysis method was employed. Content analysis sorts qualititative data into categories. Broadly defined, content analysis is any technique for making inferences by systematically and objectively identifying specified characteristics of messages (Frankfort-Nachmias and Nachmias, 1996: 324). The actual categories the researcher develops must be mutually exclusive and exhaustive. That is, each response should clearly fall into only one category (mutually exclusive), and every response must fall into a category (exhaustive). Researchers must also ensure that the categories they choose are not so broad that important differences are obscured (Frankfort-Nachmias and Nachmias, 1996: 336). Frequencies, percentages and tables were also used in the analysis of data.

3.8 SUMMARY

In summary, this chapter has presented the methodology employed in this study. It has given the rationale of why such methods were used. The questionnaire was the main instrument used to collect data.

CHAPTER 4

4. DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

This chapter presents the empirical results of issues and challenges facing educators regarding integration of environmental education into the school curriculum in the Mafikeng District. It presents the analysed data and the interpretation thereof.

The total number of questionnaires distributed was 312 out of which 219 (70%) usable questionnaires were returned. According to Gay (1992: 229), the response rate should at least be about 80 percent to be regarded as adequate for analysis and reporting. A response of 70 percent should strive for a relatively high rate. If the returns are less than 70 percent, the validity of conclusions will be weak and questionable.

In this study, a mixture of closed and open-ended questions was posed to educators in respect of the survey. That resulted in a mixture of quantitative and qualitative data that have been categorised and contextualised, in order to generate an explanation of the responses received from the participants. The following section is a presentation of the analysis of data obtained from the questionnaires that were administered to educators of primary schools in the Mafikeng District in North-West Province.

Number of respondents = 219 (70%)

Percentages rounded off to the nearest 10

4.2 SECTION A: BIOGRAPHICAL AND DEMOGRAPHIC DATA

This section reflects experience and background information of respondents with regard to integration of environmental education into the school curriculum. Table 4.1 presents the biographic and demographic data of the respondents.

Table 4.1 Biographic and Demographic Information

		f	%
1. Gender	1.1 Male	86	39.3
	1.2 Female	133	60.7
Total		**219**	**100**
2. Designation of educator	2.1 Educator	163	74.4
	2.2 Principal	13	5.9
	2.3 Deputy Principal	19	8.68
	2.4 Head of Department	24	10.96
	2.5 Other (Specify)	-	-
Total		**219**	**100**
3. Age	3.1 25 and below	-	-
	3.2 26 – 30	23	11
	3.3 31 – 35	53	24
	3.4 36 – 40	55	25
	3.5 41 – 45	36	16
	3.6 46 – 50	33	15
	3.7 51 – 55	12	6
	3.8 56 and above	7	3
Total		**219**	**100**
4. Teaching experience in years	4.1 0 – 5	14	6.4
	4.2 6 - 10	55	25.1
	4.3 11 – 15	49	22.4
	4.4 16 – 20	38	17.4
	4.5 More than 20	63	29
Total		**219**	**100**

5. Highest Qualification	5.1 Diploma in Education	88	40.2
	5.2 Postgraduate Diploma	19	9.0
	5.3 Bachelors Degree	44	20.1
	5.4 Honours Degree	26	12.0
	5.5 Masters Degree	19	9.0
	5.6 Other (Specify)	23	11.0
Total		**219**	**100**
6. Settlement type of school	6.1 Rural	167	76.0
	6.2 Urban	52	24.0
Total		**219**	**100**
7. Main teaching learning area	7.1 Arts and Culture	14	6.4
	7.2 Languages	51	23.3
	7.3 Economic and Management	11	5.0
	7.4 Mathematics	39	18.0
	7.5 Human and Social Sciences	32	14.6
	7.6 Technology	10	4.6
	7.7 Life Orientation	20	9.1
	7.8 Natural Sciences	42	19.2
Total		**219**	**100**

4.2.1 Gender of respondents

Table 4.1 shows the gender distribution of the respondents. Most 133 (60.7%) of the respondents were females while 86 (39.3%) were males. As shown by the results, there are more female educators than male educators in primary schools. The fact that female respondents outnumbered the male representatives in this study suggests that the issue of gender equality is receiving more attention in schools. In this study, the issues and challenges that female educators face with regard to the integration of environmental education into the school curriculum were not different from male educators. The study revealed that both (female and male) educators thought that main challenges in integrating environmental education into the school curriculum are lack of resources and knowledge.

4.2.2 Designation of educator

Of the total respondents, 163 (74.0%) were educators, 24 (11.0%) were heads of departments, 19 (9.0%) were deputy principals and 13 (6.0%) were principals as reflected by Table 4.1. This shows that more educators participated in this study. This finding implies that relevant respondents who are involved in the teaching and learning process on a daily basis, where integration of environmental education is taking place, provided those responses to the questionnaire items in this study. Educators are at the centre of any curriculum implementation process. The success or failure of any curriculum framework highly depends on them as practitioners. Therefore, it would be very important and useful to understand issues and challenges facing them with regard to the integration of environmental education into the school curriculum.

4.2.3 Age of respondents

The respondents recorded their age by selecting one of the seven age groups. From Table 4.1, it is noted that 167 (76.0% combined) of the respondents were between 26 and 45 years old and only 62 (24.0% combined) of the respondents were 46 years and over. This suggests that most of the respondents had adequate experience and therefore could provide valid responses about curriculum integration. This also suggests that they are matured, meaning that they are in a position to identify their needs in the integration of environmental education into the school curriculum.

4.2.4 Teaching experience in years

The respondents were also asked to state their teaching experience in years. Table 4.1 shows that 14 (6.4%) of the respondents had up to 5 years of experience, while 55 (25.1%) of the respondents had up to 6 to 10 years experience, 49 (22.4%) of the respondents had 11 to 15 years experience and 38 (17.4%) of the respondents had 16 to 20 years of teaching experience. The majority 63 (29%) of the respondents had more than 20 years of experience. This finding is important because the number of years the respondents have in teaching system can be of great importance in helping educator acquire knowledge and information on environmental issues. Their experience can be of great value if successfully utilised. However, apart from the respondents having many years of experience, they also indicated that they still

encounter some problem with the present curriculum, which is outcomes-based education curriculum.

4.2.5 Highest academic qualification of the respondents

Table 4.1 shows that majority 88 (40.2%) of the respondents held Diplomas, while 44 (20.1%) held Bachelors Degree, 19 (9.0%) of the respondents held Postgraduate Diplomas, 26 (12,0%) held Masters Degree as the highest qualification, only 23 (11.0%) of the respondents had STD 10 plus PTC. This implies that the highest academic qualification of the respondents could have a positive influence on the integration of environmental education into the school curriculum, because some of them might have done an intensive study on environmental education. They are therefore well equipped with the theory of what is expected in environmental learning. This finding seem to confirm the finding in Item 8.7 in which the majority (70,5%) of the respondents agreed that pre-service educators should be required to take an environmental education methods course which will equip them with the knowledge and experiences about environmental issues.

4.2.6 Settlement type of school

Table 4.1 shows that out of 219 the respondents, 167 (76.0%) were from rural schools, and only 52 (24.0%) were from urban schools. This implies that the majority of the respondents taught in rural schools. This suggests that, remoteness of the school can have an effect on integration of environmental education, as there is likely to be lack of resources. In this study, many respondents (76.0%) were from rural schools and lack of resources was the main challenge provided for not integrating environmental education effectively.

4.2.7 Main teaching learning area/responsibility

The respondents were asked to state their main teaching learning areas. Table 4.1 indicates that 14 (6.4%) of the respondents were teaching arts and culture, while 51 (23.3%) were responsible for languages, 11 (5.0%) of the respondents were teaching economics and management, and 39 (18.0%) of the respondents were teaching mathematics. Thirty-two (14.6%) of the respondents were responsible for human and social sciences, while 10 (4.6%) were teaching technology, 20 (9.1%) were responsible for life orientation and 42 (19.2%) of the respondents were responsible for

natural sciences. This finding is important because it presents different learning areas. This implies that their views about integration of environmental education into the school curriculum can be appreciated and be implemented because of their active involvement in the teaching and learning process. Educators are expected to integrate environmental education processes in a range of learning programmes. For example, environmental education processes in a science and technology learning, in social studies, in language learning, in arts and culture studies, in mathematics learning and in life orientation learning.

4.3 SECTION B: ENVIRONMENTAL EDUCATION: EDUCATORS' ATTITUDES AND PRACTICES

This section is based on close-ended questions. The researcher designed this section to gather information regarding respondents' attitudes and teaching practices as they relate to environmental education. Table 4.2 shows respondents' attitudes and teaching practices with regard to environmental education. The scale used was as follows:

1=SD: Strongly Disagree

2=D: Disagree

3=A: Agree

4=SA: Strongly Agree

Table 4.2: Educators' attitudes and teaching practices.

	SD		D		A		SA		TOTAL	
	f	%	f	%	f	%	f	%	f	%
8.1 Educators should help learners develop values and feelings for the environment	3	1.4	11	5.0	77	35.2	128	58.4	**219**	**100**
8.2 It is important to integrate EE into my learning area	7	3.2	34	15.5	78	35.6	100	45.7	**219**	**100**
8.3 Educators should provide learners with opportunities to gain knowledge, skills, understanding and experience about environmental issues.	15	7.0	17	8.0	72	33.0	115	53.0	**219**	**100**
8.4 A goal of my teaching is to increase learners' level of environmental responsibility.	24	11.1	25	11.5	90	41.5	78	36.0	**217**	**100**

8.5 EE should be considered a priority in our education system	22	10.0	31	14.2	98	44.7	68	31.1	**219**	**100**
8.6 I am effective at integrating the study of environmental concepts and issues related to my learning area.	43	19.6	64	29.2	80	36.5	32	15.0	**219**	**100**
8.7 Pre-service educators should be required to take an EE methods course.	27	12.4	37	17.1	95	43.8	58	26.7	**217**	**100**
8.8 The main reason I teach learners about the environment is because it is mandatory.	42	19.2	67	31.0	77	35.2	33	15.1	**219**	**100**

Item 8.1: Educators should help learners develop values and feelings for the environment.

From Table 4.2, it is noted that of the total respondents, majority 205 (93.6%) agreed that educators should help learners develop values and feelings for the environment, and only 14 (6.5%) of the respondents disagreed to the statement. The implication is that most educators realize the importance of positive attitudes towards the environment. Therefore, proper integration of environmental education into learning areas could enhance learners' values and feelings for the environment.

Item 8.2: It is important to integrate environmental education into my learning area.

Table 4.2 shows that of the total respondents, majority 178 (81.3%) agreed that it was important to integrate environmental education into their learning areas, and only 41 (18.7%) of the respondents disagreed to the statement. This implies that most of the educators are willing and prepared to integrate environmental education into their learning areas regardless of the type of learning area. Environmental problems cover a broad, interdisciplinary range, hence when promoting environmental education in each school, it is very important to aim at fostering links between all learning areas.

Item 8.3: Educators should provide learners with opportunities to gain knowledge, skills, understanding and experience about environmental issues.

Table 4.2 indicates that most 187 (85.0%) respondents agreed that educators should provide learners with opportunities to gain knowledge, skills, understanding and experience about environmental issues, while 32 (15.0%) disagreed to the statement.

This finding implies that educators agree to involve learners in environmental issues and encourage active participation by providing them with opportunities to know, understand and experience environmental issues. This finding is in line with The Norms and Standards for Educators policy, which requires educators to fulfill a community citizenship role, and to identify and respond to social and environmental issues through their educational practice.

Item 8.4: A goal of my teaching is to increase learners' level of environmental responsibility.

Table 4.2 shows that 217 respondents gave their views on the above statement. One hundred and sixty eight (77.5%) agreed that the goal of their teaching is to increase learners' level of environmental responsibility, and only 49 (22.6%) disagreed to the statement. This implies that some educators do not see their teaching as part of increasing learners' level of environmental responsibility. Although integration of environmental education into the school curriculum is increasingly seen as an idea whose time has come, for a variety of reasons, some educators might not see it as part of their teaching responsibilities for some reasons. These include a thought that environmental learning is not related to their learning areas and the difficulty to overcome the traditionally separate subject areas.

Item 8.5: Environmental education should be considered a priority in our education system.

From Table 4.2, out of 219 the respondents, 166 (75.8%) agreed that environmental education should be considered a priority in their education system, and 53 (24.2%) of the respondents disagreed. The implication is that most educators understand the importance of learners learning about their environment and it is for this reason that environmental education be considered a priority in their education system.

Item 8.6: I am effective at integrating the study of environmental concepts and issues that are related to my discipline into my learning area.

As shown from Table 4.2, about 112 (51.5%) of the respondents agreed that they were effective at integrating the study of environmental concepts and issues that are related to their discipline into their learning areas, while 107 (48.8%) respondents disagreed to the statement. The fact that there are respondents who disagreed to not being

effective at integrating the study of environmental concepts and issues that are related to their discipline into their learning area is crucial for the implementation of integration of environmental education into the school curriculum.

This indicates that more training is needed on the integration of environmental education into the school curriculum. When more educators are effective at integrating environmental learning into the curriculum, then the goal of promoting an environmentally literate and active citizen could be easily reached.

Item 8.7: Pre-service educators should be required to take an environmental education methods course.

Table 4.2 shows that 217 the respondents gave their views on the above statement. One hundred and fifty three (70.5%) of the respondents agreed that pre-service educators should be required to take an environmental education methods course, and only 64 (29.5%) disagreed to the statement. This implies that through pre-service training, educators can be equipped with the knowledge, skills, understanding and experiences about environmental issues that can assist them in the integration of environmental education into the school curriculum.

Item 8.8: The main reason I teach learners about the environment is because it is mandatory.

As shown from Table 4.2, 110 (50.3%) of the respondents agreed that the main reason they taught learners about the environment was because it was mandatory and 109 (50.2%) of the respondents disagreed to the statement. This finding may suggest that many educators feel that environmental education is not relevant to their disciplines. There is a need that they should be motivated to participate in this integration process.

To sum up, item 8.1 – 8.8 indicates that most educators agreed that it was important to integrate environmental education in the school curriculum, but contradictory, a significant number of them were just offering it because it was mandatory. The overall finding may suggest that although educators understand the importance of integrating environmental education in the school curriculum, some of them do not see themselves as people responsible for teaching it.

4.4 SECTION C: EDUCATORS' VIEWS ON INTEGRATION OF ENVIRONMENTAL EDUCATION INTO THE SCHOOL CURRICULUM.

This section is based on open-ended questions. The purpose of this section was to obtain a wide range of views regarding integration of environmental education into the school curriculum. Below is a presentation of each item in this section. The content analysis method was used to categorise and contextualise responses.

Item 9.1: What do you understand by the concept "environmental education"?
Table 4.3 shows categorised responses of the above question.

Table 4.3: Understanding of the concept "environmental education".

RANK	CATEGORY	f	%
1	Deals with practical aspects, for example: trees, food, animals, education about pollution, keeping the environment (house, yard, surrounding area) clean, learners must take care of their environment, clean it and use it effectively	119	54.3
2	Conservation/use of natural resources; management of the environment	42	19.2
3	Concerned with how human beings interact with their environment	20	9.1
4	Deals with the social, political, economic and biophysical and links them	15	6.8
5	No response	23	10.5
TOTAL		**219**	**100**

The question "what do you understand by the concept environmental education" was presented to the educators. The majority 119 (54.3%) of the respondents viewed environmental education as the study that deals with practical aspects such as trees, animals and how to care for the environment, that is keeping it clean. Several 15 (6.8%) educators provided a very useful and well-informed view of environmental education (rank 4 of Table 4.3). Twenty (9.1%) respondents viewed environmental education as a study concerned with the interaction between man and his

environment. The above analysis however indicates that 23 (10.5%) of the respondents did not respond to the question.

It is very important for educators to understand what environmental education entails, because their knowledge will enable them to integrate environmental concepts in their learning areas. The finding also revealed different understandings of environmental education, which could result in different aspects of environmental learning integrated into the school curriculum.

Item 9.2: What do you think are the reasons, why environmental education has been introduced in the school curriculum?

Table 4.4 reveals reasons for the introduction of environmental education into the school curriculum.

Table 4.4 Respondents' reasons for the introduction of environmental education into the school curriculum.

RANK	CATEGORY	F	%
1	To know the importance of nature and natural resources, such as water, plants, animals, soil.	58	26.5
2	So that learners become aware of their environment and how to care for it.	47	21.5
3	For learners to develop values and feelings for their environment.	32	14.6
4	Environment is influential towards the development of a human being.	31	14.2
5	No response	35	15.9
6	Don't know	16	7.3
TOTAL		**219**	**100**

Table 4.4 shows that 58 (26.5%) of the respondents think that the main reason why environmental education was introduced in the school curriculum was to teach learners about the importance of natural resources, 47 (21.5%) of the respondents believe that it has been introduced to make learners aware of their immediate

environment and how to care for it, that is, keeping it safe and clean. Thirty-two (14.6%) respondents stated that environmental education was introduced in the school curriculum to develop learners' values and feelings for the environment. This response is in line with the objectives of environmental education as outlined in the Tbilisi Principles which states that a basic aim of environmental education is to succeed in making individuals and communities understand the complex nature of the natural and the built environments resulting from the interaction of their biological, physical, social, economic, and cultural aspects, and acquire the knowledge, values, attitudes and practical skills to participate in a responsible and effective way in anticipating and solving environmental problems, and in the management of the quality of the environment. Lastly, 31 (14.2%) of the respondents believe that environmental education has been introduced in the school curriculum because of the influence the environment has towards the development of a human being. The implication is that many educators are aware of the importance of having environment learning in the curriculum. Environmental education as a cross-curricula approach to learning is useful to individuals and groups in coming to understand the environment with the ultimate objective of developing caring and committed attitudes that will foster the desire to act responsibly in the environment.

Item 9.3: Do you think it is important to have environmental education integrated into all learning areas? Yes or No.

Table 4.5 reveals the percentage of respondents who agreed and disagreed to the question.

Table 4.5: Responses with regard to the importance of integrating Environmental Education into all learning areas.

	f	%
Yes	89	40.6
No	88	40.2
No response	42	19.2
Total	**219**	**100**

According to Table 4.5, only 177 (80.8%) responded to this question. Eighty-nine (40.6%) of the respondents agreed that it was important to have environmental education integrated into all learning areas, while 88 (40.2%) disagreed to the question. The number of respondents who did not respond to the above question 42 (19.2%) indicates that some educators did not know why environmental education was integrated into all learning areas. This number 42 (19.2%) seems to confirm the previous findings about the number of respondents who do not know the reasons for the introduction of environmental education 16 (7.3%) as well as those who did not respond to the same question 35 (15.9%). The results therefore reflect a lack of environmental education knowledge by some respondents. The following were comments given by respondents about integration of environmental education in all learning areas:

- You don't have to dwell so much in environmental education.
- Some educators will not give EE more attention and the learners will not be aware of it. This will just be a waste of time.
- Environmental education is largely embraced in some learning areas, therefore only a little will be done in other learning areas.
- Environmental education should only be part of Human and Social Sciences and Natural Sciences, but not all learning areas.
- When all educators integrate environmental learning in their learning areas, learners will become interested, understand better and learning will be easier.
- Environmental education should be a shared speculation with pupils on those forms of technology and social organisation that can enable people to live in harmony with one another and with the natural world.
- By integrating environmental education into all learning areas, the learners will realise that the world is a set of related systems, therefore problem-solving contexts do not exist in isolation.

The above assertions give a variety of perceptions about integrating environmental education into all learning areas by educators in different learning areas. The finding suggest that some educators think that environmental education should not be integral to all the learning areas of the outcomes-based education curriculum, but to certain learning areas that already possess environmental learning. These include Human and

Social Sciences and Natural Sciences. Perhaps this is a signal that educators need to be trained to adapt to new conditions in which environmental education as a new approach may be implemented. The most effective means of improving learning experiences for children is to improve the preparation of their educators.

Item 9.4: Do you think the integration of environmental education into the curriculum is succeeding?

Table 4.6 shows the results for this question.

Table 4.6: Responses regarding the success of integration of environmental education into the curriculum.

	f	%
Yes	78	35.6
No	102	47
No response	39	17.8
Total	**219**	**100**

Table 4.6 shows that majority 102 (47.0%) of the respondents thought that integration of environmental education into the school curriculum was not succeeding. The type of responses received for this question was: " insufficient support from the department which result to the fact that educators are not sufficiently empowered to integrate environmental education in their learning areas"; " Many educators lack information, and therefore they are unable to teach environmental education".

Only 78 (35.6%) of the respondents thought that integration of environmental education into the school curriculum was succeeding. However, most of the respondents thought that the process is very slow. The examples of responses such as the following were given: "Yes, but at a very slow rate, at the moment some schools attended workshops on the matter. Training was conducted by the Department of Education". Some respondents however felt that the process is gradually succeeding, and given resources (study guides), they will be able to refer to the guides to see exactly what we are supposed to do". The other response that was given was: "The

fact that OBE is succeeding with policy on integration, environmental education is succeeding".

This finding implies that most educators do not see integration of environmental into the curriculum succeeding. For environmental education to be fully incorporated and integrated with other disciplines or learning areas, certain conditions need to be met. The full incorporation of environmental education into the curriculum, teaching and learning process demands a realistic and practical renewal of an education system to educate educators. In addition, the teacher must be involved in the conception, formulation and implementation of innovations. Educators need themselves to be well orientated and possess the knowledge and skills to cope with the implementation of integration of environmental education into the school curriculum.

Item 9.5: What do you know about the integration approach?

Table 4.7 indicates respondents' views about integration approach.

Table 4.7: Knowledge about the integration approach.

RANK	CATEGORY	f	%
1	Environmental education being incorporated into all the learning areas.	85	38.8
2	Making connections across disciplines.	43	19.6
3	No response	91	41.6
TOTAL		**219**	**100**

As shown in Table 4.7, majority 91 (41.6%) of the respondents did not answer this question. Eighty-five (38.8%) respondents thought that integration has to do with incorporation of environmental issues into all the learning areas. Only 43 (19.6%) of the respondents gave a more appropriate and well-informed response, which was more related to theme in Rank 2. The following were some of the responses given:

- Integration approach means teaching or introducing environmental education whilst busy teaching other discipline;

- Learning areas are integrated according to the relevance of concepts taught, considering the specific outcomes, assessment criteria, and the performance indicators. When integrating, weighting is of vital importance;
- This is the inclusion of all learning areas, to draw a link in what the learners acquire in all learning areas;
- It is the system that ensures that all learning areas are combined and share the same aspects within the curriculum; and
- Integration approach refers to the way or method that can be used to merge learning areas and disciplines.

The above responses about what an integration approach is give a variety of views from educators. These responses reflect an understanding from the educators' part of what an integration approach is. The new education system, which is outcomes-based education, is intended to be a vehicle for achieving the integration of education and training. Issues such as equity, healthy environment, social justice and inclusivity are therefore central to an outcomes-based education curriculum. It is for this reason that educators' understanding of the present curriculum concepts such as integration approach is important to enable an effective implementation of integration of environmental education into the school curriculum.

Item 9.6: What benefits do you think this (integration) approach will bring to the curriculum?

Table 4.8 reveals the benefits that the integration approach will bring to the curriculum.

Table 4.8: Responses regarding the benefits of the integration approach.

RANK	CATEGORY	F	%
1	More curricular flexibility	49	22.4
2	Improves learners' retention of knowledge	47	21.5
3	It is broad based learning	29	13.2
4	It increases support between educators	22	10.0
5	It is fun	19	8.7
6	No response	53	24.2
TOTAL		219	100

In Table 4.8, about 53 (24.2%) of respondents did not answer this question. The overwhelming majority 166 (75.8% combined) of the respondents gave different advantages of integration approach. This finding suggests that even though educators are not fully and perfectly integrating disciplines, they at least know generally what the integration approach is, and what is its benefit. Presented below is a list of some of the benefits:

- It modifies the curriculum;
- It is a vehicle that enables educators to plan together in order to achieve the total development of learners, by sharing themes in a developmental and progressive way;
- It will help to address the holistic approach to the curriculum;
- This approach will make curriculum more effective, relevant, flexible and interesting to the South African society;
- It broadens the scope of teaching and learning; and
- Curriculum is no longer going to come pre-packed and ready to be implemented. The curriculum will be flexible.

The benefits that curriculum integration affords the learners are many. This is evidenced by various responses given by educators. An integrated approach to curriculum implies a view of learning that rejects a rigid division between academic and applied knowledge, between theory and practice, between knowledge and skills and between head and hand. Sometimes separateness consumes so much time and energy that certain distinctive necessities may actually block progress towards learning outcomes. Integrating environmental education into the curriculum will equip educators, learners and their communities to respond to environmental issues and integrate sustainable development practices in their daily lives.

Item 9.7: What do you think are the challenges facing educators in integrating environmental education into the school curriculum?

Table 4.9 shows challenges facing educators in integrating environmental education into the school curriculum.

Table 4.9: Challenges faced by educator in integration of environmental education into the school curriculum.

RANK	CATEGORY	f	%
1	Not enough resources	59	26.9
2	Not enough knowledge/background	53	24.2
3	Not enough preparation time	32	14.6
4	OBE is very confusing and demanding/load of work	24	9.5
5	Not related to my learning area	21	9.5
6	Lack of interest	12	5.4
7	No response	18	8.2
TOTAL		**219**	**100**

The respondents were asked to mention the challenges facing educators with regard to integration of environmental education into the school curriculum. Different respondents revealed different challenges. The most highly ranked of the above challenges was lack of resources 59 (26.9%), followed by lack of knowledge, which is 53 (24.2%). Thirty-two (14.6%) of the respondents revealed that they did not have enough preparation time, and 24 (9.5%) of the respondents indicated that new curriculum (OBE) was still a problem to educators. Twenty-one (9.5%) of the respondents stated that environmental education was not related to their learning areas, and only 12 (5.4%) revealed that lack of interest in the discipline could also be one of the challenges facing educators with regard to integration of environmental education into the school curriculum.

According to the results in Table 4.9, lack of knowledge and of resources seem to hinder the process of integration of environmental education into the school curriculum. Integration curriculum is an educational approach that cuts across and draws on multiple learning areas for learning and instruction. Curriculum integration takes it into consideration that the sources of curriculum ought to be problems, issues and concerns posed by life itself. It is for these reasons that environmental education is integrated into the school curriculum. Environmental problems such as pollution, desertification, poverty and global warming are very broad in scope, hence it is necessary for environmental education to encompass a wide range of issues from

everyday familiar things to global problems and for the range of learning content to extend to all learning areas of the education system.

Item 9.8: What do you think should be done to improve the situation?

Table 4.10 shows respondents' suggestions to improve the situation.

Table 4.10: Suggestions on improving the situation.

RANK	CATEGORY	F	%
1	Better access to resources	62	28.3
2	More in-service training	60	27.4
3	More preparation time	32	14.6
4	More support from the department	26	11.9
5	Appointing more staff	22	10.0
6	No response	17	7.8
TOTAL		**219**	**100**

The respondents suggested ways and means of dealing with such challenges. The most highly ranked was better access to resources followed by more in-service training. Sixty-two (28.3%) of the respondents thought that better access or availability of resources would improve the situation, 60 (27.4%) respondents thought that more in-service training will enable educators to integrate environmental education into their learning areas. Thirty-two (14.6%) educators suggested that one way of improving the situation was by allocating more preparation time. Twenty-six (11.9%) respondents thought that the department must give them enough support in this integration process, and 22 (10.0%) respondents suggested that more educators should be appointed to improve the situation. Examples of responses for this question were: "More training is needed, workshops should not only take one week, four weeks at least, and follow ups should be made". Another response was: "We are teaching big numbers of learners in the classroom, therefore more schools should be built and more educators should be employed to reduce the load of work done by other educators".

According to the results in Table 4.10, educators need more resources and more in-service training to be able to implement the integration of environmental education into their learning areas.

4.5 SECTION D: CAPACITY BUILDING AND SUPPORT

The purpose of this section was to obtain information on the level of involvement of the government in the integration process of environmental education into the school curriculum. Open-ended questions were also employed and the content analysis method was used to categorise and contextualise the response.

Item 10.1: In your opinion, is the department communicating adequately with schools in introducing the integration of environmental education into the curriculum?

Table 4.11 reveals responses with regard to the above question.

Table 4.11: Department's participation in the integration of environmental education into the school curriculum.

	F	%
Yes	46	21.0
No	116	52.9
No response	57	26.0
Total	**219**	**100**

A significantly large number 116 (52.9%) of the respondents indicated that the department was not communicating adequately with them with regard to introduction of environmental education into the school curriculum. Most of them did not explain further but those who did responded that: "No support is given by the department of education, no communication and no workshops on the integration of environmental education". Another response was: "The department must visit our schools to check whether educators are integrating environmental education, because many educators are not integrating because they do not know nothing about environment, maybe only

those in Natural Sciences". The other response was: "OBE introductory workshops are the only exposures given to educators and nothing else happens thereafter, this is not enough".

Only 46 (21.0%) of the respondents agreed that the department was communicating adequately with their schools. The type of responses for this question are indicated in this example: "Our school is involved in the National Environmental Education Project for General Education and Training Band (NEEP-GET) in the Department of Education (cf: 2.4.2), which helps educators to integrate environmental education into their learning areas". Another responded that: "The Department of Education sometimes organizes permaculture workshops where schools are taught how to improve their school grounds by developing school gardens". Perhaps this is a signal that more schools should be involved in the project for environmental education to be effectively integrated into the school curriculum.

Item 10.2: Have you ever received any in-service training to help you integrate environmental education into the school curriculum?

Many respondents 143 (65.3%) disagreed to the question and very few respondents agreed to have received in-service training to help them integrate environmental education into the curriculum. Those respondents 57 (26.0%) that agreed were asked to explain further in Item 10.2.1. Only 19 (8.7%) did not respond to the question.

Item 10.2.1: If yes, how did the training help you prepare for integration of environmental education?

A few respondents 57 (26.0%) who agreed with Item 10.2 indicated that the training they received was from NEEP-GET Project. The type of responses received for this question was: "The coordinator from the department assisted me in developing lessons plans that included environmental learning outcomes that are related to my learning area". Other respondents only indicated that the project helped them but they did not indicate how it helped them..

An extensive amount of professional development and in-service training is needed for all educators to equip them with the relevant information on how to integrate environmental education into the outcomes-based education curriculum.

Item 10.3: Would you like further training on the integration process?

Table 4.12 shows the results of the above question.

Table 4.12: Responses regarding further training required on the integration process.

	f	%
Yes	167	76.3
No	33	15.1
No response	19	8.7
Total	**219**	**100**

A significantly large number 167 (76.3%) of the respondents agreed that they would like further training on the integration of environmental education into the curriculum. The type of responses given for this question was; "There are still some aspects of environmental education that I would like to have clarity on". Another respondents indicated that: "Integrating environmental education will help learners to understand and know their environment better therefore, the training of educators on effective integration will benefit the learners". The other response was: "It will assist educators and guide them to be in the right track and to develop the love for it, as well as giving the learners the right knowledge". Only 33 (15. 1%) responded that they did not need to be trained but no further explanation was given.

The results in Table 4.12 indicates that educators are interested in integrating environmental education into the curriculum, what they need is training that would help them to be effective in integrating environmental learning into their learning areas.

4.6 SUMMARY

This chapter has outlined the findings of the empirical investigation conducted to establish issues and challenges facing educators with regard to integration of environmental education into the school curriculum in Mafikeng district. Results of

the study showed that respondents perceived that integration of environmental education into the school curriculum requires among other things:

- Training of educators;
- More preparation time; and
- Both human and physical resources.

There were also key issues in the integration of environmental education into the school curriculum that were revealed in the study. Those include:

- Communication problems: the Department is not communicating adequately with the educators;
- Inadequate workshops;
- Overcrowded classrooms;
- Lack of knowledge; and
- Difficulty in overcoming traditionally separate subject areas.

Suggestions for improvement include:

- An extensive amount of professional development is needed for educators;
- The educators need to become members of learning communities. At one level this means working with one's peers to improve education. At another level, educators work with their learners in solving problems that have multiple answers. The outcomes-based education curriculum encourages educators to plan together in order to identify common areas in their disciplines and learning areas. This will also provide opportunities for educators to learn from each other and to develop mutual respect for their unique areas of expertise.

CHAPTER 5

5. SUMMARY, FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION

This chapter presents a brief summary of the study. Furthermore, it presents major findings as well as recommendations on how integration of environmental education can be successfully implemented.

5.2 SUMMARY

In Chapter one, the aims and rationale for the study are provided. The main concern expressed is about integration of environmental education into the school curriculum being a new philosophy to South Africa and therefore presenting particular challenges. In an attempt to identify and bring to surface these challenges, the researcher's aim was to establish views and perceptions of educators on some of the aspects of integration of environmental education into the school curriculum that would make it a success.

Chapter two outlines the nature and scope of integration of environmental education into the curriculum. Literature consulted included the Constitutional provision (cf: 2.3.1), curriculum development in environmental education in South Africa (cf: 2.4.2), rationale for curriculum integration (cf: 2.5.1), barriers to integration of environmental education into the outcomes-based education curriculum (cf: 2.5.3), keys to successful integration (cf: 2.5.4) and issues and challenges facing educators in curriculum integration (cf: 2.5.5). Models and learning theories that support curriculum integration (cf: 2.6 and 2.7) were also discussed and lastly, an overview of integration of environmental education into the curriculum from other developed and developing countries (cf: 2.8) were presented. This suggests that there is hope that integration of environmental education into the curriculum can be implemented in South African education system with success. Literature has furthermore revealed that if good communication strategies and in-service educator education are put in place, integration of environmental education would surely be a success. Although

curriculum integration is viewed as a challenge, it benefits learners. It helps learners synthesise discreet information and to connect such knowledge to the needs of everyday living.

Chapter three outlines the research methodology of the study. It presents the rationale behind the methodology employed, how the research was conducted and what steps were taken to ensure validity and reliability of the study. The tool used to gather information was the questionnaire, which contained both close and open-ended questions.

In Chapter four, data analysis and interpretations were done. The quantitative and qualitative data collected through the investigation were summarised and discussed. From the empirical investigation, it became evident that most educators have not grasped or do not have sufficient insight about the integration of environmental education into the school curriculum except those that are involved in the National Environmental Education Project. Perhaps the study gave the people the long awaited opportunity to voice their challenges and issues about the new curriculum framework (OBE). These are presented in the next section.

5.3 RESEARCH FINDINGS

There are several findings that were essential for the integration of environmental education into the school curriculum. Each finding will be discussed in relation to the aims of the study.

5.3.1 Findings on Aim 1

With regard to Aim 1, namely, to determine from the literature the nature and scope of integration of environmental education into the curriculum (cf: 1.4), the findings that were made are summarized as follows:

- Environmental education is regarded as a key response to readdressing the environmental crisis (cf: 2.3).

- Environmental education cannot take place in isolation. It has to be integrated at all levels and programmes of the education and training system in order to create environmentally literate and active citizens (cf: 2.3.4).
- Environmental education and outcomes-based education have many common areas. Both approaches are learner-centred and encourage active learning on the part of learners, involving them in real and simulated actions (cf: 2.4.3).

- Finally, integrating environmental education into the school curriculum is more than just schooling. Schools are only part of education which begins in the family and continues throughout life. Environmental education is future orientated. It demonstrates concern not only for the present, but for future inhabitants as well (cf: 2.4.3).

5.3.2 Findings on Aim 2

Concerning Aim 2, which was to determine from literature possible problems preventing effective curriculum integration, it was found that educators do not perform their duties adequately because of the following reasons:

- Integrative teaching involves more time, requires flexible timetables and teams that are able to work together. Some educators may be hesitant to work with educators in other disciplines (cf: 2.5.2.1).

- Support from administrators may not be evident (cf: 2.5.2.1).

- Implementation of the integration process may begin with insufficient planning defeating the process before it began (cf: 2.5.2.1).

- Most schools have limited resources available for staff development, and other expenditures required to implement curriculum integration (cf: 2.5.2.1).

- The traditionally separate subjects areas may be difficult to overcome (cf: 2.5.2.1).
- Many teachers feel inundated with the time spent on paper work and time spent outside of the classroom (cf: 2.5.2.1).

- If the integration process begins as a pilot project in only a few schools, other teachers may feel isolated and uninvolved (cf: 2.5.2.1).

- Teachers' inability to integrate environmental education into the curriculum is exacerbated by the rapid and difficult process of transformation to an outcomes-based education (cf: 2.5.3).

5.3 3 Findings on Aim 3

Regarding Aim 3, which was to determine empirically the issues and challenges facing educators regarding integration of environmental education into the school curriculum, the following findings were made:

- The empirical investigation revealed that most educators are not aware of the integration of environmental education into learning areas except those involved in the NEEP-GET Project (cf: 2.4.2) and those teaching Human and Social Sciences. Most of them lack information concerning environmental learning and how it is integrated into different learning areas.

- Furthermore, it was revealed that some educators (40.2%) think that integration of environmental education should only happen in certain learning areas such as Human and Social Sciences and Natural Sciences where environmental concepts are self-evident and obvious.

- It was found that some of the educators still encounter problems in implementing the present curriculum (OBE) and this obviously prevents them from integrating environmental learning in their learning areas. This problem is exacerbated by the rapid and difficult process of transformation to an outcomes-based education curriculum, by inadequate professional development for educators and little or no experience of environmental education in the previous education system.

- The study also revealed that support from the Department of Education is not adequate, in-service training is minimal. Overcrowded classes and lack of resources prevent educators to perform their duties effectively.

5.4 RECOMMENDATIONS

The following recommendations were made from the study.

Recommendation 1

In-service training on the integration of environmental education would be necessary for the educators.

Motivation

Educators are at the center of any curriculum implementation process. The success or failure of any curriculum framework highly depends on them as practitioners. The responsibilities for educators are so important and complex that an educator cannot be expected to discharge them effectively without some training going beyond the normal process of picking up the job by doing it. More needs to done, nationally, provincially and locally, to raise the competence of educators, individually and collectively. More and better training will be of crucial importance to educators to enable them to implement the principles outlined in the OBE framework, integration being one of them. In-service training is needed to ensure that integration of subjects and of theory and practice takes place, such as integration of environmental education into the outcomes-based education curriculum.

Recommendation 2

Schools must be empowered by the appropriate authority to conduct workshops that train educators regarding integration of environmental education into the school curriculum.

Motivation

Conducting workshops on integration of environmental education at school level may result in more educators and learners becoming aware and motivated to have environmental education integrated into their learning areas. Having this arrangement at the school will not only benefit the process of integrating environmental education into the school curriculum, but all the issues, such as social-justice, inclusivity and human rights that should be central to the OBE system in South Africa through an integration approach. This arrangement will also close the gap between in-service training and long waited periods for follow-ups.

Recommendation 3

All schools should be involved in projects that introduce changes and initiatives to the school curriculum.

Motivation

If the integration begins as a pilot project in only few schools, other educators may feel isolated and uninvolved. They may not understand the reason behind selection of such schools and this might result in negative attitudes towards the department's initiatives. For example, in this study it was revealed that few educators that were integrating environmental education into their learning areas were those involved in the NEEP-GET Project and that resulted in others feeling left out and not prepared to integrate even though OBE curriculum that they are implementing, emphasises integration.

Recommendation 4

Strengthen relationship with other stakeholders.

Motivation

The Department of Education in the North-West Province should strengthen its relationship with other stakeholders such as Department of Environmental Affairs and Department of Water Affairs and Forestry, which are more involved in environmental issues, to promote effective integration of environmental learning into the school curriculum.

5.5 CONCLUSION

The success of integration of environmental education into the school curriculum will depend on a number of factors. The most pressing one is better access to resources especially learning support materials and more knowledge and information about environmental education. The reason for integration of environmental education into the school curriculum is to prepare people for their roles as environmental decision-makers. Environmental education seeks to provide learners with more than factual knowledge about the environment. It aims to develop creative and critical thinking, promote an integrated approach to learning, and facilitate problem-solving and further

understanding of values and attitudes. It can comfortably accommodate and promote the essential outcomes that have been proposed for South African education.

In conclusion, the study revealed that most educators still lack knowledge about environmental education and how environmental learning is integrated into different learning areas. The realisation of the objective to integrate environmental education as an interdisciplinary approach will therefore not be satisfactorily achieved because of this lack of knowledge. What is needed for them is more training and workshops on how to implement this (integration) approach. Although many educators are still behind with this process, it was very interesting to note that the few respondents who received training from the National Environmental Education Project for General Education and Training Band (NEEP-GET) reported positively the role played by NEEP-GET Project in promoting improved environmental learning in schools. This shows that over some time, many South Africans citizens will be environmentally literate and active.

BIBLIOGRAPHY

BOOKS

ADAMS, K. & COOK, D. 1985. Understanding research methods. New York: Longman.

ALLABY, M. 1997. Dictionary of the environment. London: Macmillan Press Ltd.

BAKER, T. L. 1988. Doing social research. Tokyo: McGraw-Hill Book Company.

BAXEN, J. & SOUDIEN, C. 1999. Outcomes-based education: Teacher identity and the politics of participation. In: Jansen, J & Christie, P. (Eds.). Changing curriculum: Studies on outcomes-based education in South Africa. Cape Town: Juta & Co. Ltd.

BEANE, J. 1997. Curriculum integration: Designing the core of democratic education. New York: Teacher College Press.

BJERG-HANSEN, K. & SGUAZZIN, T. 2000. Sustainable stories? Using the Scottish storyline approach for environmental learning in South African schools. Learning for Sustainability Project. Johannesburg.

BORG, L. G. & GALL, M. D. 1989. Educational research: an introduction. New York: Longman.

COHEN, L. & MANION, L. 1989. Research methods in education. 3rd. Edition. New York: Routledge.

DU TOIT, D. & SGUAZZIN, T. 1999. Camera and context: Using camera to explore environment and curriculum development. Learning for Sustainability Project. Johannesburg.

FRANKFORT-NACHMIAS, C. & NACHMIAS, D. 1996. Research methods in social sciences. 5th Edition. London: Arnold.

GAY, L. R. 1992. Educational research: competencies for analysis and application. 3rd Edition. Merrill: Macmillan Publishing Company.

GULTIG, J ET AL. (Eds.). 1998. Understanding outcomes-based education: Teaching and assessment in South Africa. Cape Town: Oxford University Press.

HOLDEN, A. 2000. Environment and tourism. London: Routledge.

JANSEN, J. 1999. Why outcomes-based education will fail: An elaboration. In: Jansen, J. & Christie, P. (Eds.). 1999. Changing curriculum: Studies on outcomes-based education in South Africa. Cape Town: Juta & Co. Ltd.

JANSEN, J & CHRISTIE, P. (Eds.). 1999. Changing curriculum: Studies on outcomes-based education in South Africa. Cape Town: Juta & Co. Ltd.

JANSE VAN RENSBURG, E. & LOTZ, H. 1998. Enabling environmental education as a cross curricular concern in outcomes-based learning programmes. Howick: Share-Net.

JANSE VAN RENSBURG, E. 2000. The Learning for Sustainability Project: An overview of the conceptual framework. Learning for Sustainability Monograph. Johannesburg.

JANSE VAN RENSBURG, E. & DU TOIT, D. 2000. 'Sustainability' from constructivist and socially critical angles. Learning for Sustainability Monograph. Johannesburg.

LEGOTLO, M. W. 1996. Some elements of research: student handbook. Mmabatho: University of North-West.

LOTZ-SISITKA, H. 2000. The Learning for Sustainability Project: Insights into policy implementation in South Africa. Learning for Sustainability Monograph. Johannesburg.

LOTZ-SISITKA, H. 2002. Curriculum patterning in environmental education: A review of development in formal education in South Africa. In: Janse van Rensburg, E. (Ed.). Environmental education, ethics and action in Southern Africa. Environmental Education Association of Southern Africa Monograph. Pretoria: Human Science Research Council Publishers.

MALCOLM, C. 1999. Outcomes-based education has different forms. In: Jansen, J. & Christie, P. 1999. Changing curriculum: Studies on outcomes-based education in South Africa. Cape Town: Juta & Co. Ltd.

MCKAY, I. 2000. Enabling environmental education processes in teacher education: A resource to support teacher educators to interpret policy and change curricula. Pretoria: DEA&T.

NEAL, P. & PALMER, J, 1990. Environmental education in the primary school. London: Basil Blackwell Ltd.

PIGDON, K. & WOOLLEY, M. (Eds,). 1995. The big picture: Integrating children's learning. Australia: Heinemann.

POLLARD, A. & TANN, S. 1994. Teaching and learning in the primary school. London: Routledge.

PREEDY, M. (Ed.). 1989. Approaches to curriculum management. Philadelphia: Open University Press.

O'DONOGHUE, R. & JANSE VAN RENSBURG, E. 1995. Environments and methods: A brief look at a developing picture of better and more varied ways of doing environmental education. Howick: Share-Net.

OKUDA, S. 1998. Educational reform and environmental education in Japan. In: Graves, N. (Ed.). Education and the environment. London: World Education Fellowship.

SARANTAKOS, S. 2000. Social research. New York: Palgrave Publishers Ltd.

SAUNDERS, M. N.; LEWIS, P. & THORNHILL, A. 2000. Research methods for business students. 2nd Edition. Harlow: Prentice Hall.

SCHUMACHER, S. & MCMILLAN, J. H. 1993. Research in education. New York: Harper Collins College Publishers.

TUCKMAN, B. W. 1994. Conducting education research. 4th Edition. New York: Harcourt Brace Company.

VAN DALEN, D. B. 1979. Understanding educational research: an introduction. 4th Edition. New York: McGraw-Hill Book Company.

VINKE, J. 1992. Actors and approaches in environmental education in developing countries. In: Scheider, H. (Ed.). Environmental education: An approach to sustainable development. France: Head of Publications Service, Organisation for Economic Cooperation and Development (OECD).

WALLIMAN, N. 2001. Your research project: a step-by-step guide for first time researcher. London: SAGE Publication Ltd.

JOURNAL ARTICLES/BULLETIN ARTICLES

BARAZZA, L. 2001. Environmental education in Mexican schools: The primary level. *The Journal of Environmental Education,* 32(3), 31-36.

CORRAL-VERDUGO, V. ET AL. 1996. Predictors of environmental critical thinking: A study of Mexican children. *The Journal of Environmental Education,* 27(4), 23-27.

GEBREAB, F. & BAK, N. 2000. The status of environmental education in Eritrean Junior Secondary School. *Environmental Education Bulletin,* (20), 8-12.

HUGHES, B. 1996. Alternative assessment methods: Implications for environmental education. *Southern African Journal of Environmental Education,* (16), 57-67.

HUGHES, B. 1998. Still in an environmental education curriculum research story. *Southern African Journal of Environmental Education,* (18), 14-18.

JANSE VAN RENSBURG, E. 1998. "We're just teaching in a vacuum". Teaching in context in the Learning for Sustainability Project. *Southern African Journal of Environmental Education,* (18), 62-73.

LEGOTLO. M. W. 2000. An overview of educator's rights in South Africa: Marching to the same drum. *Australia & New Zealand Journal of Law and Education,* 5(1), 15-25.

LE GRANGE, L. & REDDY, C. 1997. Environmental education and outcomes-based education in South Africa: A marriage made in heaven? *Southern African Journal of Environmental Education,* (17), 12-18.

LE ROUX, K. 1997. Towards sustainable conversation: Developing environmental education processes. *Southern African Journal of Environmental Education,* (17), 47-52.

MAILA, W. 2000. Ongoing questioning of the South African education system. *Environmental Education Bulletin,* (20), 5-7.

MAILA, W. 2001. Environmental education and the 'inclusion' approach to formal education. *Environmental Education Bulletin,* (21), 3-6.

MOKUKU, T. & JANSE VAN RENSBURG, E. 1997. Reflecting on socially transformative environmental literacy for Lesotho. *Southern African Journal of Environmental Education,* (17), 31-38.

NAIDOO, P. ET AL. 1990. Towards better education: Environmental education's pivotal role in the transformation of education. *Southern African Journal of Environmental Education,* (11), 13-17.

PANDE, A. 2001. Environmental education in rural central Himalayan schools. *The Journal of Environmental Education,* 32(3), 47-53.

MARTIN, P. 1993. Education, the environment and sustainable development. *Southern African Journal of Environmental Education,* (13), 21-27.

SCHREUDER, D. 1995. Delusions of progress: A case for reconceptualising environmental education. *Southern African Journal of Environmental Education,* (15), 18-22.

SHONGWE, D. 1997. Environmental education programmes offered by Delta Environmental Centre: Some research findings. *Southern African Journal of Environmental Education,* (17), 53-59.

SMITH-SEBASTO, N. J. & SMITH, T. L. 1997. Environmental education in Illinois and Wisconsin: a tale of two states. *The Journal of Environmental Education,* 28(4), 26-36.

TYSON, B. 1994. Regional issues in environmental education. *Southern African Journal of Environmental Education,* (14), 10-19.

WINTER, K. & REDDY, S. 1996. The development of environmental conceptions: An evaluation of the B. Ed. Environmental Education Course at UCT. *Southern Journal of Environmental Education,* (16), 26-32.

OFFICIAL PUBLICATIONS

DEPARTMENT OF EDUCATION. 1996. A curriculum framework for General and Further Education and Training: Discussion document. Pretoria: Government Printer.

DEPARTMENT OF EDUCATION. 1997a. Outcomes-based education in South Africa: Background for educators. Pretoria: Government Printer.

DEPARTMENT OF EDUCATION. 1997b. Curriculum 2005: Implementing OBE-1, Classroom practice. Pretoria: Government Printer.

DEPARTMENT OF EDUCATION. 1997c. Foundation phase (Grades R to 3): Policy document. Pretoria: Government Printer.

DEPARTMENT OF EDUCATION. 1997d. Senior phase (Grades 7 to 9): Policy document. Pretoria: Government Printer.

DEPARTMENT OF EDUCATION. 1998. Curriculum frameworks for OBE General and Further Education and Training: Information workshop on the outcomes-based education. North West Province.

DEPARTMENT OF EDUCATION. 1999. Curriculum 2005 – Towards a theoretical framework. Pretoria: Government Printer.

DEPARTMENT OF EDUCATION. 2000. Norms and standards for educators. Pretoria: Government Printer.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM. 1998. National Environmental Management Act. Pretoria: Government Printer.

NATIONAL QUALIFICATIONS FRAMEWORK. 1996. Understand the National Qualifications Framework: A guide to lifelong learning. Johannesburg: Heinemann Educational Publishers.

NATIONAL ENVIRONMENTAL EDUCATION PROJECT DOCUMENT. 2000. National Environmental Education Project (NEEP) for General Education and Training in South Africa. Pretoria: Government Printer.

SOUTH AFRICA. 1994. Reconstruction and Development Programme. Pretoria: Government Printer.

SOUTH AFRICA. 1995. White Paper on Education and Training. Pretoria: Government Printer.

SOUTH AFRICA. 1996. The constitution of the Republic of South Africa: Act 108 of 1996. Pretoria: Government Printer.

DISSERTATIONS AND THESES

ABRAHAMS, M. F. 1997. A case study of the development of the environmental education section of the Western Cape standard six general science interim syllabus (1995) and the related learner material of the science education project. M. Ed. Dissertation, University of Stellenbosch.

MATERECHERA, E. K. 2002. Inclusive education: Perceptions of special and regular/"normal" schools' management teams in North West Province. M. Ed. dissertation, University of North-West, Mafikeng.

MOLOSE, V. I. 2000. Materials in flexible learning teacher education courses in environmental education: An evaluative case study. M. Ed. (Environmental Education), Rhodes University, Grahamstown.

SHONGWE, D. 1992. Environmental education in primary schools in Bophuthatswana: A case study in curriculum implementation. M. Ed. Dissertation, Rhodes University, Grahamstown.

SHONGWE, D. 1996. Environmental education offered by Delta Environmental Centre: An evaluative case study of a programme in Environmental Education. D. Ed. (Environmental Education). Thesis, Rand Afrikaans University, Johannesburg.

NEWSPAPER ARTICLES/NEWSLETTERS/REPORTS

Environmental Education: An agenda for preservice teacher education in Queensland. 1993. Report of the working party on environmental education to the Board of Teacher Registration. Toowong.

From intention to action. 2002. *The Educators' Voice,* 6 September: 1.

GOLD FIELDS COURSE NOTES. 1996. Rhodes University. Grahamstown.

MECOAMERE, V. 2002. How outcomes-based education works. *Sowetan,* 26 April: 4.

TEMA, W. 2000. From environmental education to education for sustainable development: A transitional growth. *Kalahari Conservation Society,* (66), Summer: 16-18.

RUSSO, V. (Ed.). 2002. National environmental education activities: Newsletter of the Regional Environmental Education Programme. *EE Mail,* 5(2), 4-9.

UNESCO, 1985. A comparative survey of environmental education into school curriculum. Germany: UNESCO-UNEP International Environmental Education Programme. Series 17.

CONFERENCE PAPERS

FERREIRA, J. G. 2001. The role of environmental education in biodiversity, sustainable development and sustainable consumption. (A paper presented at the 19th annual conference of the Environmental Education Association of Southern Africa). Lesotho.

JOBO, M. E. 2001. An investigation of the key issues for integrating environmental education components into the agriculture syllabus for teacher trainees in Lesotho. (A paper presented at the 19th annual conference of the Environmental Education Association of Southern Africa). Lesotho.

MOKOTSO, B. & NTOI, L. 2001. Localisation and the integration of environmental education into the secondary science curriculum: The case of Lesotho. (A paper presented at the 19th annual conference of the Environmental Education Association of Southern Africa). Lesotho.

MOSIDI, S. 1997. Infusion confusion? Environmental education in the new outcomes-based education in South Africa. (Paper presented at the 15th annual conference of the Environmental Education Association of Southern Africa. Pretoria.

MPHALE, M. 2001. An analysis of environmental education programme for appropriate utilisation of natural resources in Lesotho. (A paper presented at the 19th annual conference of the Environmental Education Association of Southern Africa). Lesotho.

INTERNET

CHISHOLM, L. 2000. Report of Curriculum 2005 Review Committee. Department of Edcuation. Pretoria. [Online]. Available at http://education.pwv.gov.za/policies-reports/reports-2005/chisholm-2005.htm. [Accessed 22 May 2002].

Curriculum integration. [Online]. 1998. Available at http://www.stw-tac.k12.ia.us/curric/index.html. [Accessed 22 February 2003].

DAWSON, E. P. (Ed). Undated. Academic standards for environmental education in Wisconsin. [Online]. Available at http://www.madison.k12.wi.us. [Accessed 01 March 2003].

Environmental Education: Creating an environment to educate about the environment. [Online]. Available at http://www.gdrc.org/uem/ee.html. [Accessed 31 January 2003].

GAVELEK, J. ET AL. 2000. Mapping the possibilities of integrated literacy instruction. [Online] .Available at http://www.readingonline.org/research/biondo/biondo.html. [Accessed 28 February 2003].

JACOB, H. H. (Ed). 1989. Interdisciplinary curriculum: Design and implementation. [Online]. Available at http://www.ascd.org/readingroom/books/jacos89book.html. [Accessed 28 February 2003].

JOYCE, C. & TAYLOR, R. 2001. Is it, or is it not, integration? Paper presented at the ANZFSSA Conference. [Online]. Available at http://tki.org.nz/e/r/socialscience/pedagogy/integration.php. [Accessed 01 March 2003].

LAKE, K. 1994. Integrated curriculum. Portland. School Improvement Research Series. [Online]. Available at http://www.nwrel.org/scpd/sirs/8/c016.html. [Accessed 28 February 2003].

LANKARD, B. A. 1994. Integration of academic and vocational education: myths and realities. Columbus. [Online]. Available at http://www.flstw.fsu.edu/integrate/myth.html. [Accessed 22 February 2003].

LOEPP, F. L. 1999. Models of curriculum integration. *Journal of Technology Studies,* 25(2). [Online]. Available at http://scholar.lib.vt.edu/journals.JTS/Summer-fall.1999/Loepp.html. [Accessed 28 February 2003].

MATHISON, S. & FREEMAN, M. 1998. The logic of interdisciplinary studies. [Online]. Available at http://cela.albany.edu/logic/main.html. [Accessed 28 February 2003].

MAURER, R. E. 1994. Designing interdisciplinary curriculum in middle, junior and high schools. Needham Heights, MA: Allyn and Bacon. [Online]. Available at http://www.statecenter.com/resource/state/ccpc/it/hndbk3.htm. [Accessed 28 February 2003].

NAAEE.2000.Guidelines for the initial preparation of environmental educators. USA. [Online]. Available at http://naaee.org/npeee/newee.php. [Accessed 31 January 2003].

SCHMIDT, B. J. ET AL. 1992. Integrating academic and vocation education: For secondary school principals. Berkeley, CA: Nation Center for Research in Vocational Eucation. [Online]. Available at http://www.statecenter.com/resource/state/ccpc.htm. [Accessed 28 February 2003].

TBILISI DECLARATION. 1977. [Online]. Available at http://www.gdrc.org/uem/ee/tbilisi.html. [Accessed 31 January 2003].

Theories and practices of curriculum integration. [Online]. Available at http://www.purduenc.edu/ed/Maletta/TheoriesIntegratedCurriculum.htm. [Accessed 01 March 2003].

VYMETAL-TAYLOR, J. 1997. The environmental education collection: A review of resources for educators. Vol. 1. USA. [Online]. Available at http://eelink.umich.edu/naaee.html. [Accessed 13 February 2003].

UNIVERSITY OF NORTH-WEST

PLANNING AND ADMINISTRATION

TO: DISTRICT MANAGERS
CIRCUIT MANAGERS
SITE MANAGERS
EDUCATORS

RESEARCH PROJECT: FIELD WORK

The Department of Educational Planning and Administration hereby request you to grant our ACE, B Ed (Hons) and M Ed postgraduate student(s) permission to conduct research in school(s)/ college(s) under your jurisdiction.

TOPIC: KEY ISSUES AND CHALLENGES IN INTEGRATING ENVIRONMENTAL EDUCATION INTO THE SCHOOL CURRICULUM: PRIMARY SCHOOL EDUCATORS' VIEWS IN MAFIKENG DISTRICT IN NORTH-WEST PROVINCE

Student Name KENEILWE LETSELELA

Thanking you in anticipation

Yours sincerely

T Moraare

Prof MW Legotlo
HOD: Educational Planning & Administration

28 July 2003

Dear Educator

My name is Keneilwe Letselela and I am currently doing my Master' Degree in Environmental Education at the University of North-west.

The purpose of this questionnaire is to obtain the perceptions and views of educators on "Integration of Environmental Education into the Outcomes-Based Education Curriculum" in Mafikeng District.

Your voluntary participation will provide useful information on this topic. Please note that this questionnaire is completely anonymous and all information that you give shall be kept completely confidential.

It will be greatly appreciated if the questionnaire will be completed by the 1st of August 2003.

Thank you very much for your participation.

Sincerely,

Keneilwe Letselela
University of North-West

LIBRARY

QUESTIONNAIRE

TOPIC:KEY ISSUES AND CHALLENGES IN INTEGRATING ENVIRONMENTAL EDUCATION (EE) INTO THE SCHOOL CURRICULUM: EDUCATORS' VIEWS.

In this study, integration refers to the incorporation of environmental issues into the total curriculum through any subject matter and all learning areas of the outcomes-based education curriculum.

SECTION A
BIOGRAPHICAL AND DEMOGRAPHIC INFORMATION

This section asks about your work experience and other demographic information. Kindly answer the following questions by crossing (X) the appropriate answer.

1. Gender

1.1	Male	
1.2	Female	

2. Designation of educator

2.1	Educator	
2.2	Principal	
2.3	Deputy Principal	
2.4	Head of Department	
2.5	Other (Specify)	

3. Age

3.1	25 and below	
3.2	26 – 30	
3.3	31 – 35	
3.4	36 – 40	

3.5	41 – 45	
3.6	46 – 50	
3.7	51 – 55	
3.8	56 and above	

4. Teaching experience in years

4.1	0 – 5	
4.2	6 – 10	
4.3	11 – 15	
4.4	16 – 20	
4.5	More than 20	

5. Highest qualification

5.1	Diploma in Education	
5.2	Postgraduate Diploma in Education	
5.3	Bachelors degree	
5.4	Honours degree	
5.5	Masters degree	
5.6	Other (Specify)	

6. Settlement type of your school

6.1	Rural	
6.2	Urban	

7. Main teaching subject area/responsibility (Please tick only one)

7.1	Arts and Culture	
7.2	Languages	
7.3	Economic and Management	
7.4	Mathematics	
7.5	Human & Social Sciences	

7.6	Technology	
7.7	Life Orientation	
7.8	Natural Sciences	

SECTION B

8. ENVIRONMENTAL EDUCATION ATTITUDES AND PRACTICES

Please rate the following on a scale from 1to 4 according to how much you agree or disagree with the following statements by making a cross (x) in the appropriate block. (Please cross only one block).

Key: 1=Strongly Disagree
2=Disagree
3=Agree
4=Strongly Agree

	SD	D	A	SA
8.1 Teachers should help learners develop values and feelings for the environment.	1	2	3	4
8.2 It is important to integrate environmental education into my subject or learning area.	1	2	3	4
8.3 Teachers should provide learners with opportunities to gain knowledge, skills, understanding and experience about environmental issues.	1	2	3	4
8.4 A goal of my teaching is to increase learners' level of environmental responsibility.	1	2	3	4
8.5 Environmental education should be considered a priority in our education system.	1	2	3	4
8.6 I am effective at integrating the study of environmental concepts and issues that are related to my discipline into my subject or learning area.	1	2	3	4
8.7 Pre-service teachers should be required to take an environmental education methods course.	1	2	3	4
8.8 The main reason I teach learners about the environment is because it is mandatory.	1	2	3	4

SECTION C

9. EDUCATORS' VIEWS ON INTEGRATION OF ENVIRONMENTAL EDUCATION INTO THE SCHOOL CURRICULUM

9.1 What do you understand by the concept "environmental education"?

9.2 What do you think are the reasons, why environmental education has been introduced in the school curriculum?

9.3 Do you think it is important to have environmental education integrated into all learning areas?

Yes	No

Explain:---

9.4 Do you think integration of environmental education into the curriculum is succeeding?

Yes	No

Explain:----------

9.5 What do you know about the integration approach?

9.6 What benefits do you think this approach will bring to the curriculum?

9.7 What do you think are the challenges facing educators in integrating environmental education into the school curriculum?

9.8 What do you think should be done to improve the situation?

SECTION D

10. CAPACITY BUILDING AND SUPPORT

10.1 In your opinion, is the department communicating adequately with schools in introducing this approach to educators?

Yes	No

Explain:---

10.2 Have you ever received any in-service training to help you integrate environmental education into the curriculum?

Yes	No

10.2.1 If yes, how did the training help you prepare for the integration? Explain

---

10.3 Would you like further training on the integration process?

Yes	No

Explain:----------

Thank you for taking the time to complete this questionnaire.

Please feel free to add any comment.
