CRITERIA FOR A MODEL FOR THE INTEGRATION OF ENVIRONMENTAL EDUCATION INTO THE SCHOOL CURRICULUM OF THE NORTHERN PROVINCE

by

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SUMMARY

The teaching and learning of Environmental Education as an integrated approach to education and training aims at a holistic modality. This requires a commitment by stakeholders to support formal and informal Environmental Education implementation.

By means of descriptive qualitative and quantitative methods, I investigated local, national and global, past and present Environmental Education practices with a view to recommend criteria for a model for the integration of Environmental Education into the school curriculum of the Northern Province.

The findings revealed that various countries have attempted to address the position and status of Environmental Education in the school curriculum. The one subject approach and a cross-curriculum approach emerge consistently as the options adopted. Neither of the two approaches are cited as completely successful. The integrated nature of Environmental Education issues are countered by country systemic constraints, for example the political climate, among other things. Other impediments to implementing Environmental Education are policy makers' lack of knowledge and negative attitudes, lack of resources, curriculum design deficiencies, inadequate pre-service and in-service teacher training and misconceptions about Environmental Education. The history, principles and the peculiarities of Environmental Education, the lessons learnt from other countries and the empirical investigation in the Northern Province give indicators that form the basis of the model recommended by this research.

In view of the findings the recommendation is made that Environmental Education be integrated into the school curriculum of the Northern Province for General Education and Training and Further Education and Training for all school grades using a project approach, a discipline-specific thematic approach and as a discipline.

KEY WORDS

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CHAPTER 1

OVERVIEW AND RATIONALE

1.1   INTRODUCTION AND BACKGROUND

Environmental Education (hereafter referred to as EE) is a relatively young, dynamic and complex field of study and interpretation (Palmer 1998:ix). The urgent need for the introduction of EE into the school curriculum is linked to the rise in the level of environmental awareness as seen in the twentieth century. This observation is validated by conferences, declarations, treaties and reports submitted by commissions during the last three decades. All efforts aim at achieving an acceptable level of environmental conservation and sustainable development.

Bornman (1997a:1), Palmer (1998), Taylor (1999) and Wals (1994) list the Nevada conference of 1970 (IUCN 1970), Recommendation 96 of the Stockholm Conference in 1972, the Belgrade Charter of 1975, the Tbilisi Declaration in 1977, the World Conservation Strategy (1980), the Brundtland Report (1987) and the Earth Summit, Agenda 21 (1992) as some of the landmark events of the last three decades of the twentieth century that contributed towards environmental conservation. The events listed were supported by earlier formations of organisations such as the United Nations Educational and Scientific and Cultural Organisation (UNESCO) in 1945, the International Union for the Conservation of Nature and Natural Resources (IUCN) in 1948, the Organisation for Economic Co-operation and Development (OECD) in 1948 and the World Wide Fund for Nature (WWF) in 1961 (Bornman 1997a:2).

Leopold (in Bornman 1997a:2) also believed that education for the people had a critical role to play in changing the relationship between people and their environment. This gave impetus to governments and agencies to allocate resources to aid the implementation of programmes advocating EE.

As governments began to implement programmes on EE, it became necessary to clarify people's understanding of EE (Bornman 1997a). The clarification of the

understanding of EE had an impact on the status of EE as a field of study in formal and informal education. A subject inclusive approach became common. Subjects oriented towards the natural sciences (Biology, geography, agricultural sciences and chemistry) were accepted as "homes" for EE (Bornman 1997b). The inclination towards the natural sciences was in itself exclusive in approach as it did not include all subjects or aspects of learning and teaching. Thus it denied teachers of other subjects and fields of studies an opportunity to interact with EE.

In addition Wals (1994:15) states that there is a supposition that:

•   EE as educational reform and not EE as an instrument should be implemented to modify behaviour in a predetermined direction;
•   education as a process should lead to autonomous thinking;
•   an environmental crisis is a crisis rooted in the inequitable distribution of resources and the uninhibited strife for economic bias.

The Tbilisi Conference (UNESCO 1977; see Annexure C) assisted by stressing in its declaration the need to integrate EE into the school curriculum. The stance to integrate was befitting to the nature of EE. The debate on the integration of EE into the school curriculum was sealed by the Earth Summit (1992). Agenda 21 of the Earth Summit promoted the inclusion of EE in the teaching and learning of development education and social education at all levels of schooling and after schooling, thereby promoting lifelong learning. Bornman (1997a) states that Agenda 21 complemented and fulfilled earlier approaches but cautions that EE programmes have to stay focussed by being relevant, issue-based, action oriented and value driven.

South Africa, like other countries, responded to the call to include EE in its education and training. The Curriculum 2005 policy claims to have fully integrated EE. Concerns remain around the interim curriculum that will be in practice until the year 2004 and the readiness of teachers to implement Curriculum 2005. Introducing EE into a school curriculum is a challenge to the dominant conception, organisation and

transmission of knowledge (Esland in Palmer 1998:96). Teachers find it difficult to choose an approach to teaching and learning. Robottom (1982, 1983) supports this view. He notes the discrepancy in EE knowledge acquisition *vis a vis* action oriented goals of contemporary rhetoric of EE.

Stevenson (1987) also notes the discord and contradictions between EE and schooling. Contradictions noted emanate from the statement that EE:

> *focuses on improving quality of life of all humankind on our planet by finding ways to ensure that no nation should grow and develop at the expense of other individuals, and thus has the revolutionary purpose of transforming values that underlie our decision making, from the present ones which aid and abet environmental and human degradation to those which support a sustainable planet in which all people live in human dignity* (Tanner in Palmer 1998:95-96).

Apart from the need to integrate EE into school curricula in general, little research has been done in the context of rural schools particularly those located in former homelands. Their plight is often overlooked by advocates of change in South African education (Graham-Brown 1991:214). This statement coupled with the paucity of literature on EE curriculum innovations justifies the choice of the Northern Province as an area of focus. The paucity of literature in EE research in South Africa is highlighted by Hart (1990:1) when he states:

> *There are excellent examples of research that has explored the interface between expressions of human will and various facets of the natural and man made environment. However, there is as yet no critical mass of core literature in the field ... Against this background, it is fair to suggest that environmental research is underdeveloped in the social sciences and humanities in general. A great deal of work remains to be done with reference to, inter alia, teacher training,*

developing curricula and finding appropriate vehicles for productive
interchange of environmental understanding among different groups.

1.1.1   The Northern Province

1.1.1.1   The location

The context of the study is the Northern Province (hereafter referred to as NP). The NP is one of nine provinces in the Republic of South Africa. South Africa is bordered by Botswana, Namibia, Zimbabwe, Mozambique, Lesotho and Swaziland. Its total area is 1 219 090 km^2. Figures 1 and 2 are maps of South Africa showing the location of the NP in the Republic of South Africa and the demarcation of administrative regions of the Department of Education.
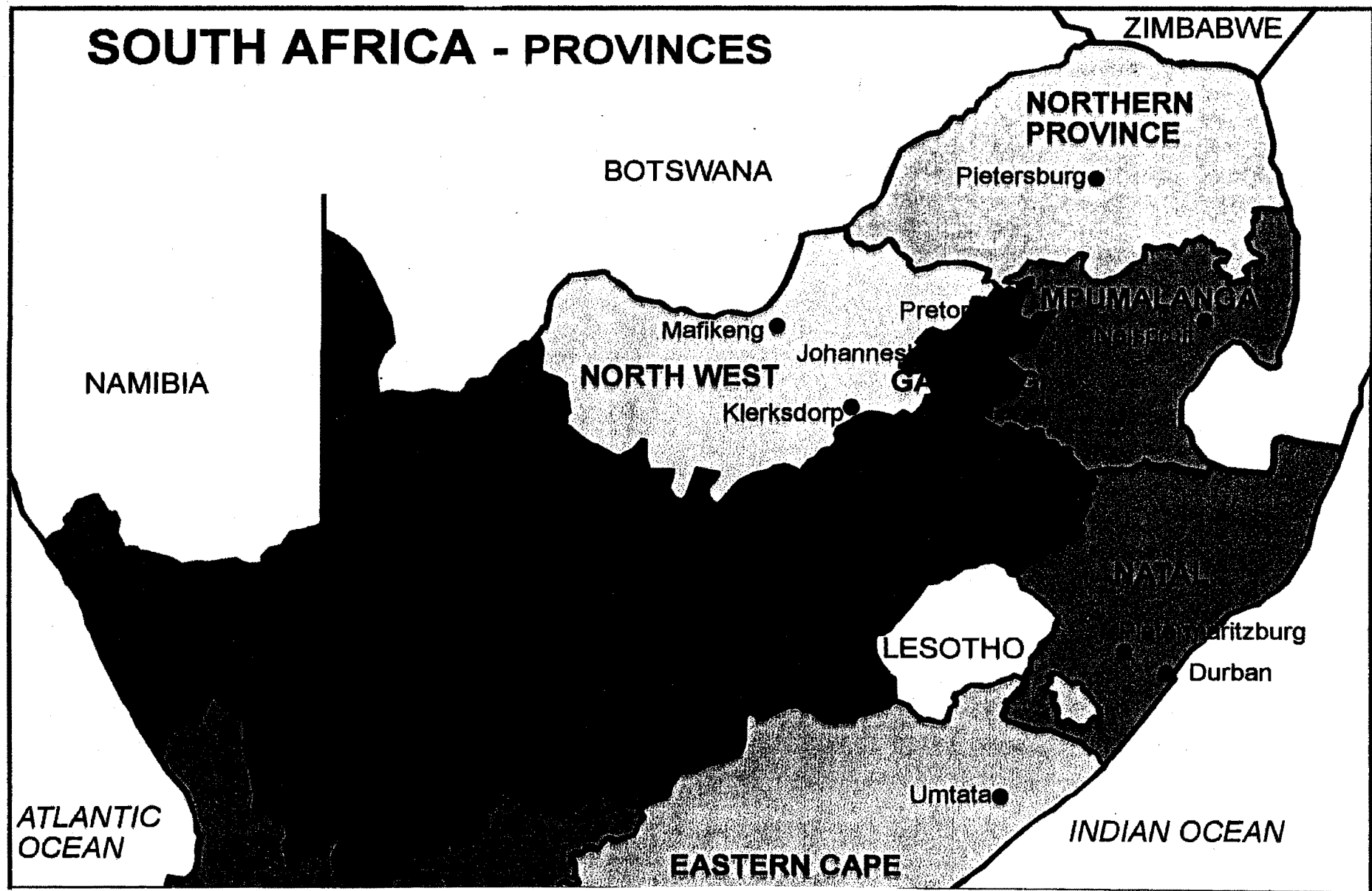
Figure 1: Map showing the location of the Northern Province in South Africa

NORTHERN PROVINCE
DEPT. OF EDUCATION, ARTS, CULTURE & SPORTS

ZIMBABWE

BOTSWANA

MESSINA

R3

SOUTPANSBERG

DZANANI

LOUIS TRICHARDT

SOUTPANSBERG

THOHOYANDOU

MOCAM-
BIQUE

MALAMULELE

TLANGANANI

GIYANI
NORTH

BOLETLAMA

R5

MOKERONG1

GIYANI

WENA

GIYANI
SOUTH

ELLISRAS

MOKERONG

R2

TZANEEN

POLOKWANE

DUIWENG

RETAVI

R1

MOKERONG

PIETERSBURG

PHALABORWA

WATERBERG

THABAMOOPA

R4

POTGIETERSRUS

MOKERONG

SEKHUKHUNELAND

NAPHUNO

THABAZIMBI

BENNINGTON

R6

NEBO

NYLSTROOM

NMALA

WARMBATHS

7

LEGEND

TOURISM/RECREATIONAL AREAS	DENSE RURAL SETTLEMENTS	DISPERSED RURAL SETTLEMENTS	ENVIRONMENTALLY SENSITIVE AREAS	COMMERCIAL AGRICULTURE (PROFITABLE)	COMMERCIAL AGRICULTURE (THREATENED)	POTENTIAL GROWTH	INDUSTRIAL DECLINE	IMPORTANT ROAD/ RAIL LINKAGES	SECONDARY SCHOOLS

Figure 2: Map showing the demarcation of administrative regions of the Department of Education

1.1.1.2   Economic activity

Before 1994, the NP region was inclusive of three homelands, that is, the self-governing Venda homeland, the Gazankulu homeland and the Lebowa homeland. The homeland structures lacked systems for viable economic activity. Most of the people of the province make a living from farming and depend on migrant remittances or cheap labour force for agriculture (Graham-Brown 1991). Some of the communities are comprised of people who were forcibly removed to areas from other areas of economic activity.

The Human Development Index (HDI) of the province stands at 0.4 (Taylor 1997:5). Considering that the HDI is measured on an ascending order of 1 - 9, 0.4 is very low. Average income per capita stood at R2 112 (Taylor 1997:5) per month a number of years ago.

The rural nature of the province should be seen as an opportunity for economic development. Rural development is an indispensable prerequisite for the maintenance of a minimum basic living standard for the province (Loubser & Lim 1999:51). People residing in the province should be seen as untapped human potential for empowerment. The development of this potential may be done by means of EE which is one of the reasons why EE should be integrated into the school curriculum.

1.1.1.3   Social structures

About 54 percent of the South African population live in urban areas. Urbanisation levels vary from province to province. The NP has a population of 5.2 million people. Of its population, 11 percent reside in an urban environment compared to about 88 percent in the Western Cape and 97 percent in Gauteng (Department of Education 1999:5). One can conclude that the low level of urbanisation in the NP implies that there may not be good education facilities, services and infrastructure as these are mostly situated in urban areas.

Other significant attributes of the NP are that its population is 12.1 percent of the total South African population (Department of Education 1999:6), and it has an educational attainment level of 36.9 percent for the total population (Department of Education 1999:7). The literacy level stands at 61.1 percent (Taylor 1997:5) Unemployment stands at 47 percent (Taylor 1997:126). The poverty rate is about 77 percent (Taylor 1997:121). Teacher pupil ratio (1993) is 1:35 against the 1:32 nationally (Taylor 1997:126). Non-attendance of school by school going learners is about 8.6 percent compared to 9.6 percent nationally (Taylor 1997:126). It is against this background that EE needs to be integrated into the curriculum of schools in the NP.

1.1.1.4 Life values and patterns

EE can address many issues in the NP by integrating these into its curricula. For example, most communities of the NP face core obstacles like illiteracy, some poor customs and traditions, dependency, apathy and poverty (Swanepoel in Loubser & Lim 1999:52-53). These obstacles are typical of rural communities in developing societies. Dependency patterns arise from a lack of self-sufficiency. The benefit for EE programmes in a rural setting is that communities still value interpersonal communication (Loubser & Lim 1999), which can be of use when addressing the abovementioned issues.

Societal issues such as lack of parental support, unmet learner needs, involvement in the migrant labour system, teenage pregnancies and drop-out are prevalent (Graham-Brown 1991:217). Poverty is drawn along a racial, non-urban bias. Most households are headed by women and are likely to be very poor. Male absenteeism contributes to sustained destruction of family life and social patterns in the home (Taylor 1997). Women struggle for survival in under-resourced, under-serviced areas. Cheap domestic and farm labour are usually the only options. Life expectancy (Taylor 1997:125) is about 62.7 years and the infant mortality rate is high (57%).

1.1.2 The Department of Education of the NP

1.1.2.1   *Organisational and management structures*

The NP Department of Education was established in 1995. Its provincial office is in the city of Pietersburg. The department is administered through seven regional offices located in Thohoyandou, Giyani, Thulamahashe, Tzaneen, Lebowakgomo for two regions, and Nylstroom (see figure 2). Regional directors manage the regions. Regions are divided into 31 districts. A region can have between two and six districts with appointed managers. Districts are the focal point of delivery and support for schools including support for curriculum development.

1.1.2.2   *Resourcing*

The integration of EE into the school curricula is influenced by resourcing. The resourcing in the NP is as follows: teachers employed in public schools are funded by the State. The per capita expenditure in primary education is R2 042 (Department of Education 1999). Observation and informal interviews carried out by the researcher, indicate that problems that schools experience include:

- lack of access for all learners;
- poor quality of teaching; and
- subjects offered vary from community to community.

Science subjects in particular are not always included in schools' curricula. Many of these schools are community schools in a poor physical condition, characterised by overcrowding. Buildings were paid for by communities and in few instances by the former (pre-1994) national, homelands, and self-governing states' governments.

Libraries, learner bursaries, subsidised transport for learners and science laboratories are a rarity for the poor (see table 1). Teachers in most instances teach

from textbooks and are unfamiliar with the syllabus of the subject they teach (Graham-Brown 1991).

Table 1 School Register of Needs: NP with a total number of 4 170 schools (adapted from Bot 1997:1-14)

NEED	NUMBER WITH	NUMBER WITHOUT	AWAITING VERIFICATION
Telephone	1 285	2 866	19
Laboratory	1 442	2 728	
Condition of school buildings*	1 386	3 705	79
Library facilities	205	3 920	
Water supply	2 055	2 029	86
Electricity supply	884	3 255	31
Toilet** facilities	3 657	370	133

* Number with means: suitable for learning and teaching, number without means: needs major or minor repairs

** The types of toilet included are flush system to main sewer, flush system to septic tank, ventilated improved pit, and pit latrine

1.1.2.3   Learning and teaching

Taylor (in Graham-Brown 1991:161) states that "the Department of Education and Training exerted a strong indirect influence on the other African [homeland] departments of education". They were established by the Department of Education

and Training (DET) or one of its predecessors before being granted "independence". Not only were the structures and systems of these departments inherited from Pretoria, but the genealogy of their staffing policies were derived from the same origin (Taylor 1989). The DET also played a leading role in the drawing up of syllabi and their work programmes, the setting and marking of examinations and the approval of textbooks and other materials (Graham-Brown 1991).

1.1.2.4   Internal and external factors that impact on the province

Internal and external factors impact on the NP and also influence the integration of EE in that province. For example, the African National Congress (ANC) as the ruling political party, influences the budget allocation for social services like education. The NP's social setting is also influenced by other internal and external environmental issues. Under resourcing means that few communities have access to basics like clean running water. For instance only 50 percent of the schools have access to a water supply. Other pertinent issues are highlighted by Seaman (1999:60-61) as follows:

- The Bill of Rights is understood by few so that some communities in the NP are still subjected to exploitation, racism and harassment. Teenage pregnancy, gender based violence and bad labour practices are still pertinent issues for consideration to include in curricula.

- It is doubtful if communities understand their critical roles in issues such as environmental impact assessment and handling of donor funds in guiding development.

- People in the province are generally excluded from the market economy since the hub of the South African economy lies in Gauteng.

- Development issues are not yet considered as an ally of conservation especially in rural development and poverty alleviation.

- There is a complex relationship between poverty and environmental issues in the NP. The poor draw from the natural environment for a livelihood. On the other hand, industry pollutes the environment. Raw materials are also removed from the province for beneficiation elsewhere.

- The non-recognition of indigenous forms of knowledge is another issue.
- There is a lack of societal equity.
- Finally, there is the non-implementation and lack of monitoring of policies and structures that will address economic, legal and educational issues and will lead to general good governance as well as effective literacy programmes.

On a positive note, amidst the external and internal influences, the NP is free of civil conflict. Women, girls, men and boys of the NP have equal access to educational opportunities at all levels through subjects on offer although the culture and quality of learning and teaching may differ. This creates a positive environment in which to integrate EE into the curriculum.

1.2 GENERAL STATEMENT OF THE PROBLEM

After investigating EE curriculum policy and practices at local, national and global levels, what should criteria for a model for the integration of EE into the school curriculum of the Northern Province look like?

1.3 AIMS OF THE RESEARCH

This research aims to:
propose criteria for a model for the integration of EE into school curricula of the NP on the basis of policies and practices regarding EE provincially, nationally and globally.

1.4 DEFINITION OF CONCEPTS

1.4.1 Curriculum

A curriculum is the planned experiences provided through instruction. It is continuously modified as the aims and goals of education are revised, as learner

populations change, as social issues are debated and as societies change (Ornstein & Levine 1993:521). According to Lovatt and Smith (1993:20) a curriculum is a product, a process, an intention, a reality, a normative and a descriptive document.

In my view a curriculum comprises the intended outcomes of learning programmes as influenced by numerous external forces.

1.4.2 Curriculum development

Curriculum development involves assessing the needs and capabilities of learners as well as selecting or creating instructional materials and activities (Ornstein & Levine 1993:529).

1.4.3 A curriculum model

A model is a miniature representation to summarise data and phenomena (Zais 1976:91). Models aid in theory building and graphic representations of theory.

A curriculum model may be:

- administrative in nature, following a top down approach: such an approach may use sanctions and penalties for enforcement;
- grassroots driven, indicating that it is teacher initiated. Such a curriculum improves with an improvement in professional competence;
- demonstrative, that is one group designs, another tests and validates;
- arena based, that is school, class and region driven; and
- rational in approach if it assumes that all persons are logical and rational human beings.

1.4.4 Environmental Education (EE)

EE is about the environment, people and other living things within life support systems and processes (Keogh 1994). It embraces regional, local and global

diversity, peace, democracy, political, social, economic development, and conservation of the manmade and the physical environment. EE is education about, through and for the environment (Bornman 1997b:2).

1.4.5 Integration

Integration is a device to organise content (McNeil 1996:438). It transcends conceptual blinders by relating intuition and intellect, as problems and ideas become the conscious focus. It is an interrelated, interdisciplinary approach geared to solving social problems (Lorber & Pierce 1990:5).

Integration calls for change in schools, which may be in the form of goals and purpose of learning outcomes or tasks, that is the involvement of parents in classroom work and structures (McNeil 1996:270).

1.4.6 Learning support material

Learning support material comprises texts, resources and equipment to aid learning and teaching. Learning support material may be electronic (transparency series, slide or sound presentations, filmstrips, video, videotapes, computer software) print based (notes, documents, textbooks, reading schemes, newspapers, reference books, magazines) or physical (Taylor & Vinjevold 1999:163). Ornstein and Levine (1993) further state that of the learning support materials, the textbook has a major dominating influence on the curriculum. The textbook is used frequently as an instruction medium at all levels of learning.

1.5 OVERVIEW OF THE RESEARCH DESIGN AND METHOD

The nature of EE requires the development of criteria or guidelines to inform its vertical and horizontal integration into the school curriculum (Bornman 1997). Development of the guidelines requires continuous research. McMillan and Schumacher (1997:6) report that "research provides valid information and knowledge about how to make decisions". Bornman (1997b:5-6) argues that research in EE

needs a re-conceptualisation. Research in EE belongs to a post-modern perspective that accommodates diversity of approaches and interpretation because EE is interdisciplinary and holistic.

1.5.1   Method

This study is quantitative and qualitative in approach. The methods used include: questionnaires, photographs and document analysis. This will be explained in more detail in chapter five.

1.5.2   Objectives

There are a number of objectives for the empirical study. These are stated in chapter five, section 5.2.

1.5.3   Ethical measures

Permission to conduct the research was given by the Northern Province Department of Education (see Annexure A).

The research design will endeavour to (Borg & Gall 1989:84-92):

- protect the rights of the participants;
- put the subjects at minimal risk;
- inform participants of all aspects of the research that might influence the participant's willingness to participate and answer any queries;
- respect the individual's freedom to decline to participate;
- eliminate any physical or mental discomfort from research procedures;
- provide the participant with information on data collected;
- keep the information on participants confidential;
- allow subjects to furnish information anonymously if they so wish; and

- refrain from bringing in any negative effects outside the realm of the study itself.

1.5.4 Validity and reliability

Validity and reliability are measures for consideration in research design. Denzin (1989:96) states that "a reliable observation is not biased by idiosyncrasies of the researcher, the research instrument, the subject or constraints of time and space". A reliable research instrument should yield acceptable observations if made by any similarly situated observer. Similar or nearly similar behaviours will be recorded by a research instrument administered by any observer. Reliability is assured by the second administration of the research instrument (Best & Kahn 1993:245). The first responses are compared to the second. Reliability can also be determined by split halves methods.

A valid design is theoretically directed (Denzin 1989:96). The design is grounded in actual behaviours of observed individuals. The more a similar behaviour is observed the more valid the design. A valid design should (Best & Kahn 1993:240):

- ask the right questions
- be phrased in the least ambiguous way;
- sample significant aspects of the investigation; and
- define terms clearly to all respondents.

Validity and reliability of the research design will be explained in section 5.4.1

1.6 DIVISION OF CHAPTERS

This thesis has seven chapters.

Chapter one gives an overview and background of the problem. The context of the study is described and explained. The problem statement forming the basis of the

research as well as the aims of the research is presented. Some concepts are explained and the research design and methodology are introduced briefly.

Chapter two elaborates two concepts that were explained briefly in chapter one, namely *EE* and *curriculum development*. This lays a theoretical basis for the integration of EE into the school curriculum of the NP.

Chapter three covers the history and the development of EE policies and practices at local, regional and national level from a South African perspective and the role of the private sector. Relevance for this study is indicated.

Chapter four gives a situational analysis of EE policy and practices from other countries around the world. Relevance for this study is indicated.

Chapter five presents a detailed explanation of the research design.

Chapter six gives the research results of the study. Issues raised in chapters two to four are revisited. An analysis of the results is undertaken.

Chapter seven presents the conclusions emanating from the study. The conclusions drawn are used to provide recommendations for criteria for a model for the integration of EE into the school curriculum of the NP. The literature study and empirical investigation presented earlier in chapters two to six inform the recommendations. Post research questions are posed as an indicator that the research journey is never complete.

CHAPTER 2

ENVIRONMENTAL EDUCATION AND CURRICULUM DEVELOPMENT:
A THEORETICAL BASIS

2.1   INTRODUCTION

In the previous chapter, an overview of and rationale for the study were given. This chapter will explain EE as a field of study. Attention will also be paid to ways and means of curriculum design, development and practice. The concepts of EE as well as curriculum design and development were explained briefly in chapter 1 (section 1.4). In this chapter the concepts are explained further because they are important concepts for the development of criteria for a model for the integration of EE into the school curriculum of the NP.

2.2   WHAT IS ENVIRONMENTAL EDUCATION?

To integrate EE into curricula, one should first of all know what EE is. In chapter one it was stated that EE is a subject, an area of learning, or an approach to education related to sustainable development, interdependence, biodiversity and living sensitively on earth. EE is crucial for improving people's capacity to address education and developmental issues.

Presented here in chronological order is an understanding of EE by different authors over a period of time since Disinger (1983) stated that it was a problem to define EE:

- Degenaar (1988:45) describes EE as that part of the general education programme (curriculum) which provides those special learning experiences which enable pupils to acquire appropriate knowledge, understanding and learning skills so that they will become aware of and understand the complex nature of the natural biophysical environment. This knowledge and understanding will help them to be environmentally literate and become responsible citizens.

- EE seeks to develop the necessary knowledge, understanding, values, skills and commitment allowing people to be proactive in securing a healthy and properly functioning environment that is sustainable and which will be good for future generations. This is true for people's local, regional and global environments (Environmental Education Policy Initiative 1995:ii).

- Robottom (1996:44) states that EE is grounded in critical and innovative thinking. It promotes the transformation and reconstruction of society in place and time. EE is not neutral, it is value based. Individuals and communities should participate in EE.

- Bornman (1997a:57) writes that EE entails educational reform. This implies changes in curriculum design of the school system, the school policy, the curriculum, classroom activities, teacher education and the role of the community - in fact it entails reform of the whole approach to education.

- Van Rooyen (1998:118) declares that EE focuses "not only on these dimensions" as cited by other authors "but also on the complicated set of links between these different dimensions of the environment". He emphasises "cause and effect relationships rather than the reductionist analytical techniques of some other related subject". EE, he says is not a subject but rather forms part of many different learning areas.

- Knamiller, Ramsey et al and Ramsey (in Doige 1999:192) describe EE as an issue based approach that aims to identify EE related social issues or problems and search for and gather information about such issues from the local environment, media and the library. Information is then organised, analysed and synthesised in order to try to solve the problem. Such an issue based approach includes questions such as: who are the relevant stakeholders? What are their views and beliefs? Do they identify with the facts around the issues? What is each stakeholder's social, political and economic background? What are the legal implications of the relevant environmental issue? The determination of effective ways of resolving the issue should be a collective decision based on value judgements about the cost, the risks and the benefits of the proposed solution. The best alternative

should be chosen to inform the appropriate action to be taken (Doige 1999:192).

- Sukumar (1999:649-656) sees EE as the cornerstone of long term control of the environment. EE considers strategies for preventing environmental problems. It aims at enabling people to solve environmental problems and encourage sound and sustainable development. The inclusion of EE in schools should enhance an understanding of environmental principles and concepts and promote the development of positive attitudes towards environmental management.

- Bandiera and Vincentini (1999:713-718) describe EE as introducing learners to a form of environmental knowledge that is often required when discussing social aspects of development. Such knowledge of EE is necessary in order to explore possible solutions to problems of our times like the energy crisis (for example, should we opt for nuclear plants?), pollution problems (for example, should industrial production be reduced?) as well as poverty and famine in developing countries (for example, is agricultural bio-engineering the solution?).

In summary: From the above descriptions it appears that EE should encourage in learners an environmentally responsible way of life. It entails a change in learning and teaching for a sustainable future. EE should lead to an environmentally responsible lifestyle or culture. For such a culture to be entrenched, it has to be built on an epistemological base (Mehrtens 1999:84). This implies a knowledge base of how nature works and how human behaviour can destroy or protect nature.

The descriptions above support the definition of EE as given in chapter one (section 1.4).

2.3   CURRICULUM DEVELOPMENT

Models of curriculum development and implementation vary. It is assumed that no particular model can in itself be an anathema to curriculum challenges (Lovatt & Smith 1995).

EE has its own particular structure and requires a distinct methodology and approach. This is supported by earlier descriptions in this chapter (see section 2.2). The question to be answered is: "What is most useful or important for these learners to know about EE, and the most effective way in which they can learn it?" (Lovatt & Smith 1995). In answer to the questions raised by Lovatt and Smith (1995), curriculum development for EE should be related to people's history and culture and provide a basis for critical analysis and independent thinking. EE curricula should empower learners. In accordance with Outcomes-Based Education (OBE), the eventual outcome of a curriculum should be skills development, making learners full participants in civic and political life.

A curriculum is one of four interacting systems namely: teaching (the work or profession of a teacher), learning, instruction (the act of teaching) and a curriculum (Lovatt & Smith 1995). A curriculum follows a non-static cycle while education systems conduct periodic situation analysis and the results inform the four interacting systems. The discussion on curriculum development is initiated by looking at models of curriculum development. This is appropriate as the ultimate aim of this study is to recommend criteria for a model the integration of EE into the school curriculum of the NP.

2.3.1 Models of curriculum development

Curriculum modelling as a process of making recommendations requires sequencing or identifying steps or phases that lead to a possible model. A number of models will be considered to facilitate the development of criteria for the most appropriate model for the integration of EE into curricula of the NP.

2.3.1.1 The objective model

Tyler (in Lovatt & Smith 1995:107-108) maintains that curricular research ought to examine the issues of learners and their backgrounds, the present and the future

society and knowledge of major disciplines to arrive at a curricular product specification. The approach is linear. It assumes that it is possible to pre-specify objectives in specific outcomes terms, and that there is a direct relationship between the objective specification and learning activity decision making. This approach is similar to OBE opted for by the South African Department of National Education in 1997. The OBE model is being used to transform the interim curriculum and the development of Curriculum 2005 (C2005) policy. The objective model is presented in figure 3.

The objective model

specify objectives → select learning experiences

→ organise learning experiences → implement

learning experiences → evaluation
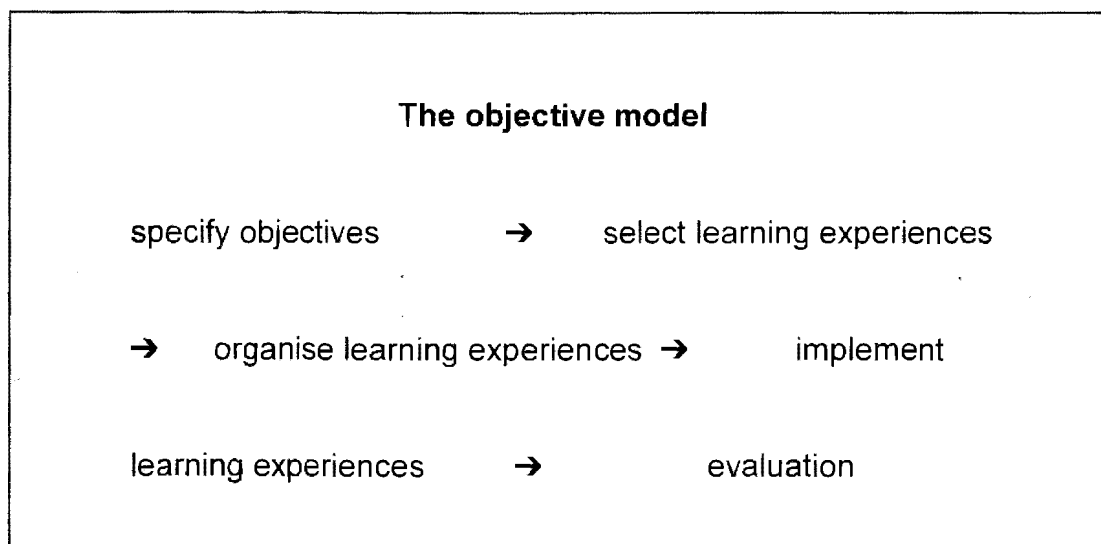
Figure 3 The objective model (Lovatt & Smith 1995:107-108)

2.3.1.2   *The rational model*

Toba and Wheeler (in Lovatt & Smith 1995:108-110) regard curriculum development as a rational and orderly process. This is in itself a limitation because the reality of learning and teaching may not always be rational. Toba (in Lovatt & Smith 1995:108-110) suggested that the rational model be inclusive of learner diagnoses prior to specifying the objectives. The rational model is circular in approach. Figure 4 presents the rational model.

The rational model

learner diagnoses ➜ specify aims and objectives

↓

select learning experiences

↓

↑   select content

↓

organise content and experiences

↓

back to step one ⬅ evaluate
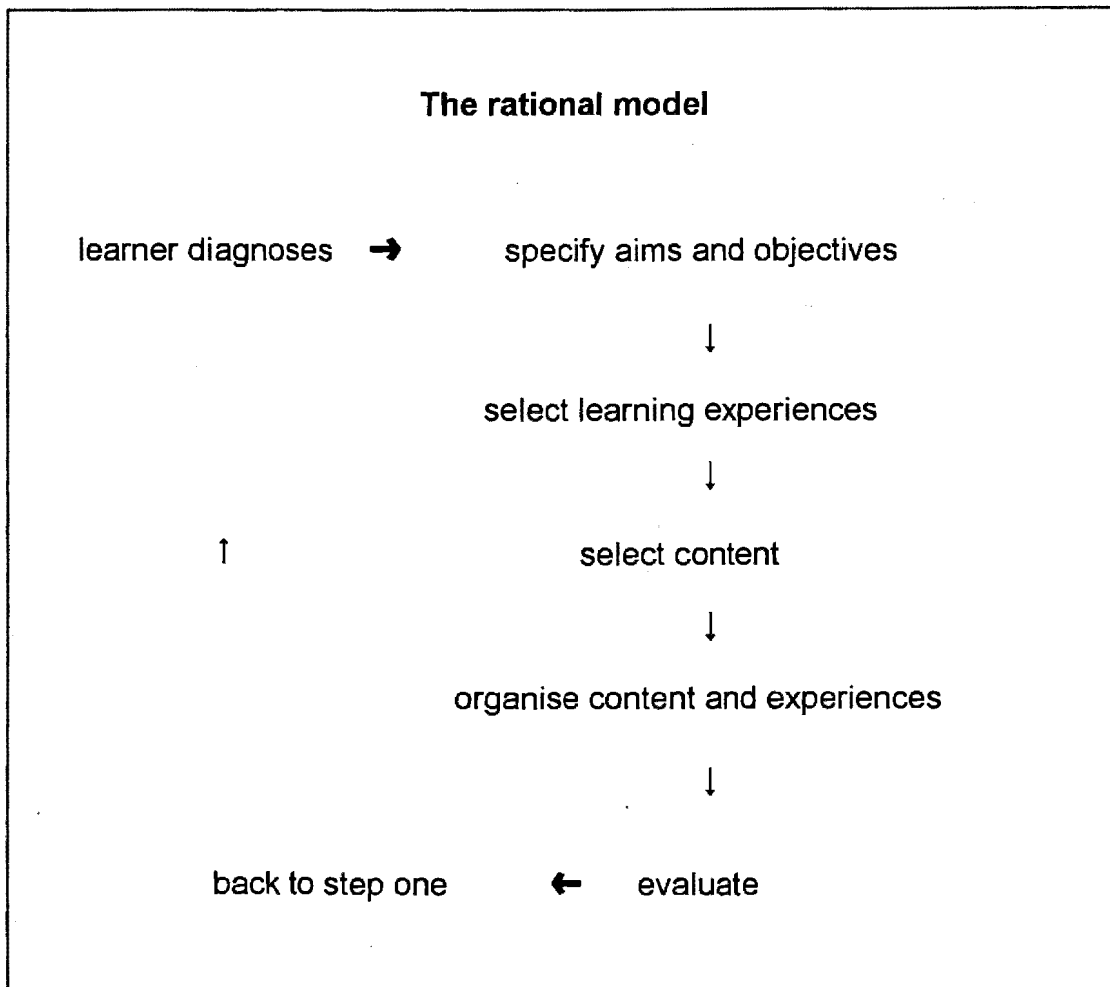
Figure 4 The rational model (adapted from Lovatt & Smith 1995)

2.3.1.3 *MacDonald's model*

MacDonald's model (Zais 1976:94-95) describes the nature of teaching, learning, instruction and curriculum, and explains the interrelatedness of the four aspects.
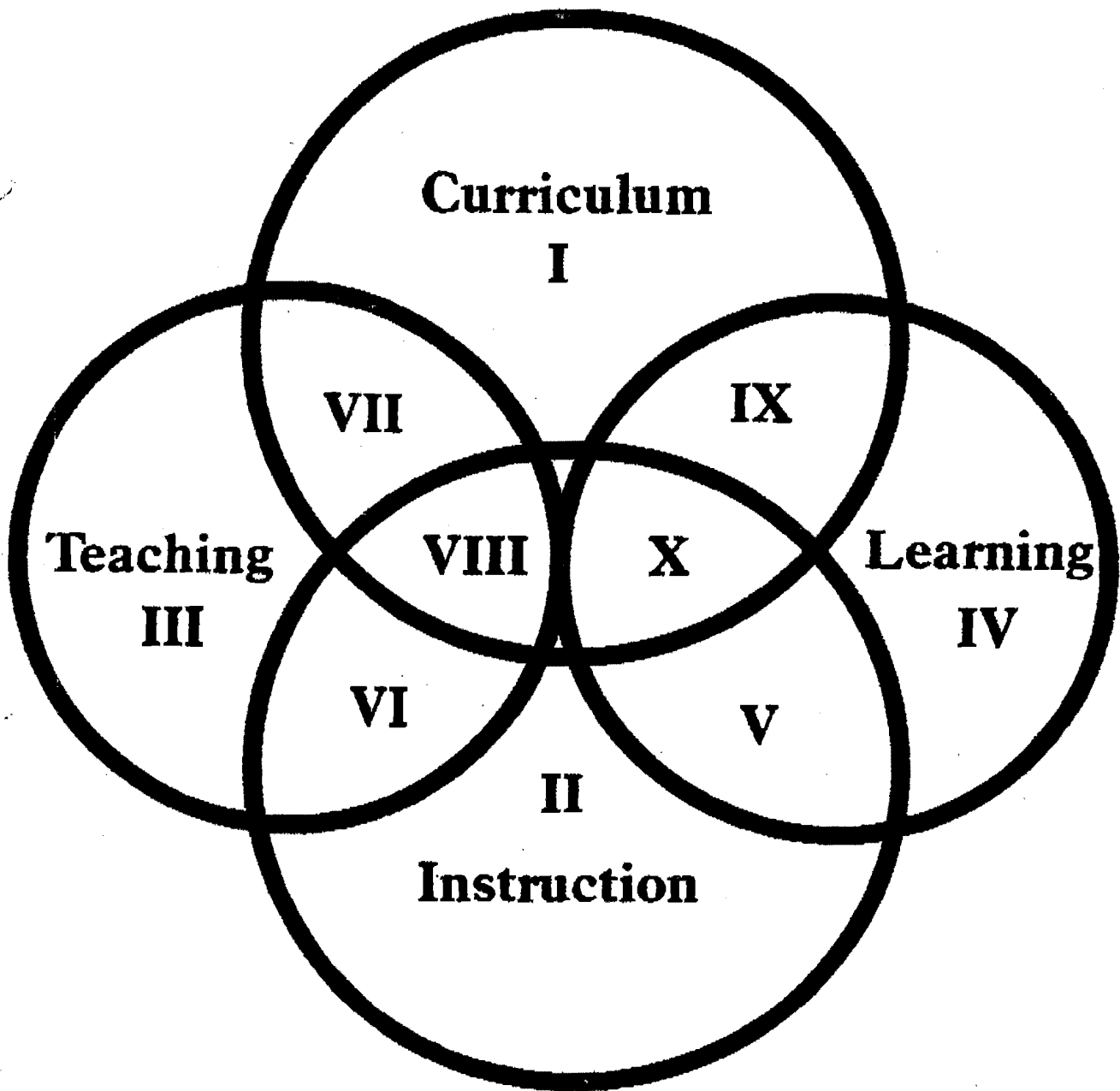
Figure 5   The nature of teaching, learning, instruction and curriculum (MacDonald 1965 in Zais 1976:95)

MacDonald's model is explained as follows:

"Point of congruence" (the point where I - X merge): where curriculum goals are operative in the instructional setting through effective teaching as evidenced by a change in learner behaviour;

I-IV: The whole of the curriculum or learning programme, subject instruction, teaching strategies and the process of learning;

V: Concomitant learning space, where instruction and learning happen together;

VI: Teacher modification of own behaviour or teaching strategy in response to feedback of the instructional situation;

VII: In-service experiences of teachers;

VIII: Supervision experiences of teachers; and

IX-XT: Teacher-pupil planning experiences to address issues related to the scope and nature of curriculum interactions. (The issues may not have been explained adequately in the curriculum instruction domain).

2.3.1.4   *The procedural model*

Stenhouse (in Lovatt & Smith 1995:118-120) criticises the objective and rational curriculum models because he maintains they may distort knowledge. He maintains the two models are useful for general curriculum development but may not hold when curricula are to be implemented, as translation and interpretation of meaning and curriculum intentions are often dependent on the teacher's own circumstances.

The procedural approach expects:

- respect for the peculiarities of a subject's knowledge base implicit to it;
- the teacher as a resource capable of participating in curriculum planning at macro-, meso- and micro-levels;
- developing learner enquiry skills;
- the teacher to understand the broad goals of the subject;
- the subject methodology to be accepted as a step in planning;

- that the teacher was trained in the subject instruction; and

- the teacher is initiated and inducted when beginning to practise.

The procedural method means considering the issues raised above prior to using the objective and the rational models of curriculum development.

2.3.1.5 Johnson's model

Johnson (in Zais 1976:95-96) explains "a curriculum as the output of a curriculum development system".

LEARNING
OUTCOMES

↑

SELECTION CRITERIA

	CURRICULUM	CURRICULUM	
➡	DEVELOPMENT ➡	STRUCTURED ➡	INSTRUCTIONAL
	SYSTEM	INTENDED	SYSTEM
STRUCTURING CRITERIA		LEARNING	
		OUTCOMES	

↑   ↑   ↑

SOURCE AVAILABLE   INSTRUCTIONAL

TEACHABLE CULTURAL ➡ CONTENT

CONTENT   TEACHING
BEHAVIOUR
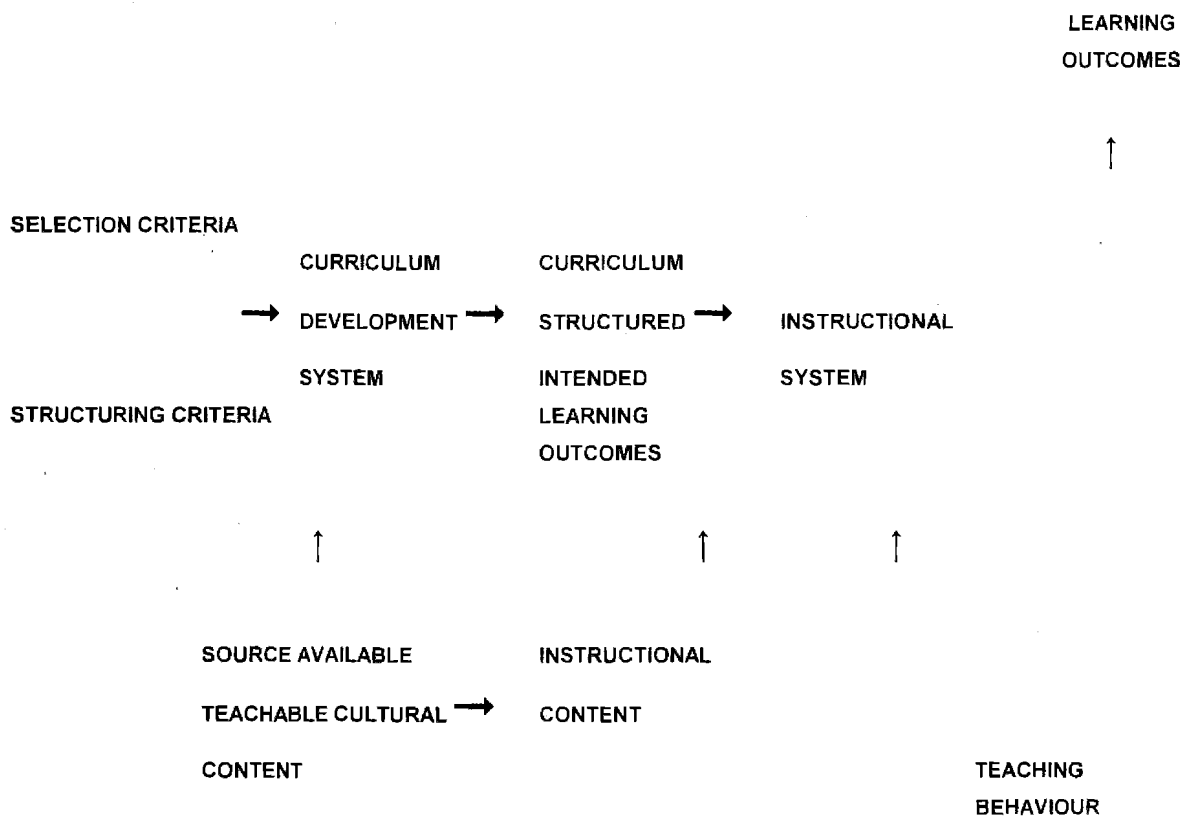
Figure 6 *Johnson's model* (Johnson in Zais 1976:95-96)

Johnson's model starts with selection criteria. This could be consideration of an age cohort or a school grade. The subject content to be taught will be dependent on the curriculum development system in place. The defined curriculum structure spells out intended learning outcomes. Outcomes of teaching and learning or learner achievement is measured against teacher behaviour.

2.3.1.6   The eclectic model

Zais (1976:96-97) presents the eclectic model that sees a curriculum as "a formless entity and an integrated unity". It is formless because the aims, goals, content, learning activities and evaluation remain dynamic in relation to each other depending on the context. On the other hand, it is an integrated unit because the aims, content, learning activities and evaluation are interdependent. This model assumes that the philosophical assumptions and the foundations of a curriculum are dependent on a subject's epistemology, as well as on the society and culture in which the curriculum must be implemented, the individual learner and on learning theories (Zais 1976:96-97).

The eclectic model has significantly contributed to the nature of the curriculum and the forces that determine its content and organisation. Processes of curriculum development remain controlled by forces and events of history and a knowledge of the existing curriculum (Zais 1976:96-97).

2.3.1.7   Summary

The models presented are of relevance to EE. The explanations of each will assist in the final recommendations. Johnson's model in particular has merit as it indicates the plan to guide instruction as well as the dynamics of curriculum design and implementation. It offers more than MacDonald's but lacks the complex relationship between teaching, learning, instruction and curriculum.

In summary the models presented indicate that a feasible school EE curricular model should include considerations such as the following:

- Which information, concepts, skills, activities, norms and values, feelings, and beliefs are relevant to EE?
- Which learning tasks and resources in this context are most effective in assisting the learners to obtain appropriate EE outcomes?

- What is the most appropriate way to sequence learning tasks, organise and interrelate such tasks, structure the tasks and provide instructions to complete the tasks effectively?

- How will the teacher know when the learners have acquired the stipulated knowledge, skills and attitudes?

2.3.2 Approaches to curriculum development

There are various approaches to curriculum development in support of the models discussed earlier. Lovatt and Smith (1995) as well as Ornstein and Hunkins (1993:3-8) present these approaches. Approaches to be explained are related to curriculum grounding features discussed later in this chapter. Approaches and modalities are about decisions made by curriculum development agencies. Approaches decided upon should be in line with curriculum grounding features, which are yardsticks to evaluate a curriculum in practice.

2.3.2.1 Behavioural approach

A behavioural approach to curriculum development considers efficiency and the economic implications. Objectives or intended outcomes are defined and linked to time. This is machinist in approach, in that learners' needs are not put first. The teacher is left to translate and implement objectives (Lovatt & Smith 1995:118-120). Returns on investment, that is financial resources, are paramount.

2.3.2.2 Managerial approach

In the managerial approach the school is regarded as a social system (Ornstein & Hunkins 1993:3-8). Within this social system learners, teachers, curriculum specialists and administrators interact. Curriculum development puts plans, learning programmes, teaching schedules, allocation of teaching space, resource and equipment utilisation and personnel management in place (Ornstein & Hunkins 1993). The managerial approach is rational and follows logical steps. There is a focus on

supervisory, administrative, organisational and implementation aspects. It is systems based. It encourages techniques of networking, planning and goal setting by curriculum practitioners.

2.3.2.3   Systems approach

A systems approach looks at curriculum development as an engineering system (Ornstein & Hunkins 1993:3-8). Parts of the total system are defined. The interrelatedness and influence over each other are examined. Planning, programming and budgeting systems are mapped. Administration systems for learner counselling, curriculum instruction and evaluation are defined. Long term objectives are infused with short term objectives. Incidental planning is acceptable to refine the curriculum in practice.

2.3.2.4   Academic approach

Academic approaches are traditional in the sense that they are conservative, encyclopaedic in knowledge content and synoptic. Intellectual knowledge is emphasised. Curriculum development considers the historical, philosophical and social aspects of a subject (Ornstein & Hunkins 1993:3-8).

2.3.2.5   Humanistic approach

The humanistic approach considers personal, social aspects and socio-psychological dynamics of classrooms and schools (Ornstein & Hunkins 1993:3-8). The approach is based on progressive philosophy which emphasises child centred life experiences, elementary classes' life experiences, field trips, social enterprise, homework, cooperative learning and learner centredness (Ornstein & Hunkins 1993:3-8). Teachers are not encouraged to be competitive.

2.3.2.6   *Reconceptualists*

Larger ideological and moral issues influence curriculum development centredness (Ornstein & Hunkins 1993:3-8). Schools are seen as an extension of society. Reconceptualists are subjective, political and ideologically influenced.

2.3.2.7   *Summary*

Having considered the epistemological nature of a subject, curriculum developers should use an integration of the mentioned approaches, because each approach has strengths and weaknesses. No single approach can adequately inform an EE curriculum because of EE's holistic nature. Ideological and moral issues are as important as the assessment of how efficient a system is because a curriculum is planned for a school which is a social institution. Learner needs, definition of learning strategies and setting up of systems of administrative or curriculum support are all essential. It is important for people to identify with a curriculum. Ownership of a curriculum by the people will influence implementation success. Therefore a collaborative and participatory approach is a prerequisite to EE curriculum development.

2.4   CURRICULUM DESIGN

Curriculum design is a conceptualisation and arrangement of the major components of a curriculum. This includes content, instructional methods, materials and learner experiences or activities (Ornstein & Hunkins 1993:16). A basic reference of planning and developing a curriculum is given by a design. Processes of curriculum design have central problems of scope, sequence, continuity and integration. Curriculum design manifests itself vertically (sequence and continuity) and horizontally (scope and integration).

A curriculum *sequence* fosters cumulative and continuous learning. It creates a vertical relationship among curricular areas. Learners' stages of thinking and

development are considered (Ornstein & Hunkins 1993:239). Sequencing considers the substantive structure or logic of content in line with individual learner and group interests (Ornstein & Hunkins 1993:239). Sequencing of subject content is related to:

- learning (how individuals learn);
- inquiry (nature of processes used by learners learning syntactical structure of subject); and
- utilisation (using knowledge in the world related to identifying inter-relationships of concepts).

Continuity is vertical curriculum manipulation. This implies consideration of a curriculum across school grades (Ornstein & Hunkins 1993:240). Components of a curriculum are repeated per grade in a recurring and continuous manner creating opportunities for skills development. It is assumed that the level of complexity increases with vertical movement. Subject knowledge, skills, values and attitudes continually increase in depth and breadth of knowledge over a length of the curriculum.

Integration links types of knowledge and experiences at a particular grade or within a school curriculum plan (see section 1.4). It unifies different areas of knowledge and gives the in-depth meaning of subject matter (Ornstein & Hunkins 1993:238). Integration occurs within the learner. Curriculum planners should organise opportunities for learning in a way to facilitate integration. Learners may then integrate what they are learning through various educational experiences. Curriculum integration deals with ideas that transcend fields of study and move to broader organisation of knowledge (Ornstein & Hunkins 1993:238).

Curriculum design maps a course of study (Ornstein & Hunkins 1993:237). Designing an EE curriculum or a curriculum of another subject or learning area that integrates EE requires comprehension of the rationale for teaching EE in the context of the goals of a particular school and/or a particular education district or area. It is

assumed that learning objectives and the focus of the subject should stress EE theory as well as learner and societal needs. Content, skills, attitudes and values must be clearly set out. Learning programmes decided upon should be such that the specified curricular outcomes can be met. Key thinking processes are addressed, learner abilities are considered and learner interest stimulated. The implementation should also be feasible in terms of school instructional time and available resources. Curriculum advisors should be consulted to assist with planning.

In addition, a curriculum design can be subject centred or experience centred. A new design can be correlated to other existing designs. Curriculum design is guided by centres of interest or focus. It could be a design for a core curriculum or a unit. It could also be learner centred or problem centred or a combination of both (Stratemeyer et al in Zais 1976:396).

The following curriculum design approaches set out by Stratemeyer et al (1957) were expressed more than forty years ago but can still be studied for applicability. These approaches propose that curricula can be:

- subject or discipline centred - disciplines and broad fields are used in the design;
- learner centred - activity based, classroom oriented, humanistic in approach;
- problem centred - living, personal, social, youth and core approach.

2.4.1 Subject centred design

Zais (1976:401-405) describes a subject based curriculum design as content based and it calls for verbal teaching. All learners are constants in that they are regarded as a homogeneous group. Integration across disciplines is compromised. Subject designs may be detached from real world concerns or learner needs, experiences and interests. It is an inefficient curriculum arrangement for EE because it may lead to passive learning.

A discipline or subject based design organises content and the criteria for a body of knowledge is set (Zais 1976:401-405). The design is marked by isomorphic features or grouping along a homogeneous group of people, for instance, historians or biologists. Isomorphic grouping practices may be discriminatory as they exclude others with an intention of preserving subject intellectual integrity. A fragmented curriculum (a curriculum that solely focuses on a particular discipline) is no vehicle for integration and may have no relationship with real life. Moreover, knowledge is compartmentalised and it may not consider learner interest and experience (Zais 1976:401-405).

2.4.2 Learner centred design

Learner centred designs are rooted in the idea that:

> *People learn what they experience. Only that learning which is related to active purposes and is rooted in experience translates itself into behaviour changes. Children learn best those things that are attached to solving actual problems, and help them in meeting real needs or that connect with some active interest. Learning in its lone sense is an active transaction* (Taba in Zais 1976:408-410).

A learner centred curriculum design aims at meeting the needs and interests of the learner. It tries to cater for individual development and is therefore not extensively pre-planned (Zais1976:401-405). Learners are encouraged to adopt problem-solving approaches and processes. The demerits of a learner centred approach is that it may not cater for the needs of educative efficacy. It lacks an inherent, definitive, horizontal structure. This creates problems of continuity.

Ornstein and Hunkins (1993:93) describe a learner centred curriculum as a curriculum that creates opportunities for:

- learners to talk about themselves;

- a choice of learning activities;

- each learner to be assisted to learn as much as possible about his or her values, attitudes, purposes, skills, interests and abilities;

- learners to say what they think and encourages them to reflect on their beliefs and values;

- learner interpretations of their in-class and out-of-class experiences which may be analysed in consultation with them;

- class activities to be organised around individual and group study problems important to the individual learner;

- learners to be assisted to state their purposes and share with other learners the information available about their present status;

- limitations in time, materials and resources of the situations to be clarified to learners;

- learners to be encouraged to plan their activities, collect and share materials; and

- record keeping of learner performance to be used as a way of helping the individual student to organise his or her learning.

2.4.3 Problem centred design

Problem centred designs are rooted in humanistic psychology which views individual learners as naturally good (Zais 1976:413). The assumption that all learners are good leads to learning activities which are preplanned. Activities are about life problems and emphasise subject content whilst developing learners.

A summary of the abovementioned designs is presented in table 2.

Table 2 **Overview of major curriculum designs**

(Ornstein & Hunkins 1993:262)

DESIGN	CURRICULAR EMPHASIS	UNDERLYING PHILOSOPHY	SOURCE	SPOKESPERSON
SUBJECT CENTRED				
Subject design	Separate subjects	Essentialism Perennialism	Science, knowledge	Harris, Hutchinson
Discipline design	Scholarly disciplines (mathematics, biology, psychology and so on)	Essentialism Perennialism	Knowledge science	Bruner, Phenix Schwab, Taba
Broadfields design	Interdisciplinary subjects and scholarly disciplines	Essentialism Progressivism	Knowledge society	Broudy, Dewey
Correlation design	Separate subjects disciplines linked while keeping identities of each	Progressivism Essentialism	Knowledge	Alberty & Alberty
Process design	Procedural knowledge of various disciplines genetic ways of information processing and thinking	Progressivism	Psychology	Adams, Beyer, Dewey, Papert
LEARNER CENTRED				
Child-centred design	Child's interests and needs	Progressivism	Child	Dewey, Kilpatric Parker
Experience-centred design	Experience and interests of child	Progressivism	Child	Rugg & Shumaker
Radical design	Experiences and interests of child	Reconstructionism	Child society	Freire, Habermans Holt, Illich
Humanistic design	Experiences, interests and the needs of the person	Reconstructionism Existentialism	Psychology child society	Combs, Fantini Maslow, Rogers

PROCESS/ PROBLEM CENTRED				
Life situation design	Life (social) problems	Reconstructionism	Society	Spencer, Stretemeyer Forkner & McKim
Core design	Social problems	Progressivism Reconstructivism	Child Society	Alberty & Alberty
Social design	Focus on society and its problems	Reconstructionism	Society, eternal truths	Apple, Brameld Counts, Rugg Shane

In summary: Real life subject instruction is based on more than one particular design category. The designs which have been discussed have merits and demerits. It is realistic for curriculum designers to use an integrated approach because curriculum designs should strive for balance by giving appropriate weight to each given aspect of learning. This may be difficult due to administrative pressures, like budget allocation and availability of staff as well as subjectivity of the curriculum designers. For EE curriculum development, learner centred and subject centred designs should be balanced with societal needs as well as with special education. Communities and schools as educational forces can increase the probability of attaining a balance by influencing and participating in curriculum design processes. This is also applicable for the integration of EE into the school curricula of the NP.

2.5 CURRICULUM PRACTICE

In table 3 Lovatt and Smith (1995:9-10) show how the history of defining a curriculum practice has developed over the years.

Table 3   **The chronology of defining a curriculum practice** (adapted from Lovatt & Smith 1995:9-10)

1936 -	A permanent study of grammar, rhetoric, logic, mathematics from the greatest books of the Western world.
1957 -	A sequence of potential experiences set up in a school to discipline children and young people in group thinking and acting.
1957 -	All of the learning of students which is planned and directed by the school.
1962 -	Consisting of knowledge from the disciplines.
1965 -	A curriculum produces plans; instruction puts plans into action.
1970 -	All experiences of a learner under the guidance of a school.
1970 -	The curriculum is all planned learning outcomes or desired consequences of the instruction of which the school is responsible.
1973 -	The curriculum is a vital complex movement of people and things in a free wheeling setting.
1975 -	A curriculum is an educational experience; the educational journey.
1982 -	Curriculum is the planned learning experiences of students for which the school is responsible.
1988 -	On one hand a curriculum is an intention. It comprises of progressively modifiable plans of areas of learning and growth for an individual or a group of learners focussed upon an educational centre, incorporating a set of objectives, a set of learning experiences and suggestions for their organisation and techniques for evaluation of learning outcomes. On the other hand, a curriculum as reality is what actually happens to the person or persons arising from a complex network of interactions between people responding to a diverse array of influences: explicit, implicit, human and physical.

From the above table one can see that over the years the definition of *curriculum practice* changed from a narrow, rigid definition in time to a more flexible, dynamic framework that acknowledges that curriculum design is merely an intention, subject to the interpretation by the intended audience. This gradual change is because the perception of what a curriculum should entail is bound by historic "zeitgeist".

A curriculum practice or implementation is a process. This is in line with the current educational practices and principles that emphasise life-long learning not confined

to a school setting. Earlier definitions before the 1970's confined curriculum practice to the school setting and not to the subject content. Later definitions in the 1980's have a broader, extended view that focuses on learning objectives or outcomes and learning experiences. Objectives and outcomes set the norms and standards (expectations) of an education system. Outcomes may not always acknowledge that the realities of complex social interactions located outside the school have a meaningful influence on the actual implementation of the curriculum.

Observations indicate that interactions and influences in-school and out-of-school, negate, confirm or actualise the intended outcomes of a curriculum practice. What eventually happens at a micro level (in the classroom), may depend more on the teacher and the learners than on the declared curriculum policy. Declaration of curriculum intentions alone is narrow. What should and what actually happens may be different. Planners plan but teachers translate the intentions and implement. There may be a gap between the education ideal and the actual outcomes achieved.

Some of the definitions of a curriculum practice emphasise the process whilst others emphasise the products, where the school syllabus is the product and learning and teaching are a process. The gap is not a quantifiable entity. However, there is a degree of essential connectedness between the ideal (the planned curriculum) and the actual (the implementation process). Implementation depends on the level of curriculum planning at classroom level.

In summary: From the descriptions and earlier discussions in this chapter on models of curriculum development, approaches to curriculum development, curriculum design and curriculum implementation, one can assume that learning and teaching experiences define a curriculum in practice. A curriculum should therefore:

- have a perspective of intention;
- have a perspective of reality and actuality (address what happens when a curriculum is contextualised); and

- be a product of the process of learning and teaching, that is the policy documents, expected human relations, learning outcomes and the learning and teaching processes.

2.6   THE SCHOOL CURRICULUM FOR ENVIRONMENTAL EDUCATION

2.6.1   Characteristics of a school curriculum for Environmental Education

The school curriculum for EE has to consider what environmentally related knowledge is most useful to learners. EE is value based, (see section 2.2). Thus the organisation of a curriculum around those human activities that impact on nature will not only bring about an integration of knowledge but will ensure that the curriculum is of value to learners in their everyday lives (Taba in Zais 1976).

The school curriculum is usually spelt out in national policy statements. These must be translated into actual practice. However the actual intentions of the curriculum are not always met (see section 2.5).

A viable school curriculum for EE should have features of self-sufficiency, validity, interest, utility, learnability and feasibility (Ornstein & Hunkins 1993:281-282). These features give meaning to an EE curriculum by supporting its aims, objectives and content base. Can EE as a school subject rise to the expectations of these features?

Ornstein and Hunkins (1993:281-282) explain the abovementioned curriculum features as follows:

- *Self-sufficiency* of an EE curriculum is economical education provisioning. Learners are helped to attain learning outcomes in an economical manner. Teaching efforts and provision of resources are economical and match learner efforts. Learners are given opportunities to crystallise their identities. Humanists, radicals and reconceptualists agree with the above significance, namely the crystallisation of learner efforts. EE content's significance is in its

contribution to the development of particular learning abilities, skills, processes and attitude formation.

- An EE curriculum's *validity* depends on the authenticity of the EE content selected. Content selection should be verified at the planning stage and be checked for relevance at regular intervals.

- Learner *interest* in EE should be maintained by using learner centred designs as a key criterion in curriculum planning. Knowledge should be meaningful to the learner's everyday life.

- EE content *utility* in everyday life is important. Curriculum content utility is improved by a problem-centred approach that focuses on everyday life problems.

- Learning and teaching depend on the *learnability* of the EE curriculum. Optimal placement of EE concepts per school grade, appropriate organisation and sequencing of content is critical. In EE, learnability should also address social issues and convergent learning styles. The notion of one right answer only in problem solving should be discouraged.

- A *feasible* EE approach will address issues such as planning content in terms of time allowed, resources available, current staff, existing legislation, budget allocation and school calendar days. Other critical issues are social and environmental in the context of schools' settings as well as the economics and politics of a country.

Other excerpts from literature (Bandiera & Vincentini 1999; Tarasova 1999; Dale Tunnicliffe & Reiss 1999a) also deal with the school curriculum. They write in relevance to EE and other issues that validate what is taught or what should be taught in schools. For example, Bandiera and Vincentini (1999:713-718) point out that learners reveal curriculum gaps when requested to produce their knowledge of the environment. The gaps are that:

- there is a gap between knowledge about technology and knowledge about the environmental risks connected with it. Often this is not explicitly declared if market needs dictate the schooling agenda;

- EE knowledge obtained in schools may be irrelevant to the needs of the learners;

- the EE school curriculum may not develop questioning attitudes and inquiring minds. The EE school curriculum may only provide information (perhaps even an excess of information) without providing for hands-on experiences such as laboratory experiments and field trips; and

- the scientific knowledge and the pseudo-scientific knowledge forms that have their roots in the popular traditions may not be compatible with real learner needs, rather the knowledge is in need of aesthetic, ethical and psychological considerations.

Tarasova (1999:661-664) believes that education and curriculum development for EE should be:

- knowledge based and generate more knowledge about environmental issues;
- life-long;
- inclusive of what happens beyond classroom walls, that is relevant to real life
- diverse in content;
- ethical and interdisciplinary;
- promoting problem solving approaches;
- eventually impacting on economic development;
- embracing natural environmental systems;
- of interest to all where possible;
- community based, and involve families;
- open to partnerships; and
- enabling development of learner personal responsibility.

Tarasova's (1999:661-664) list of issues to be included in an EE curriculum development process support the view that development should be open to professionals and interest groups from all related relevant areas. Areas such as population studies, education, economics, religion, social sciences and human rights, among others, are important. Such collaboration and consultation allow for

interdisciplinary thinking and benefit. The setting of EE outcomes and subsequent standards will then be an informed choice.

Tarasova (1999) as well as Bandiera and Vincentini's (1999) views are in tandem with curriculum validating issues as raised by Ornstein and Hunkins (1993) earlier in this section. Moreover, Tarasova (1999), Bandiera and Vincentini (1999) as well as Ornstein and Hunkins (1993)'s are comparable to Dale Tunnicliffe and Reiss' (1999a:696-702) statement that children's awareness of the environment is enhanced if they can identify organisms around them, that is, plants and animals. Their learning is also improved if they can locate the habitat of an organism through the recognition of its structural form or features. Regarding their knowledge of nature, it appeared that most children learn the "things" they know at home. Dale Tunnicliffe and Reiss (1999a:696-702) believe that schools should provide excursions, for example to places like the zoo. Pre- and primary school learners see the trip to the zoo as a social event and it is important for the guide to talk about the animals, their taxonomy and attributes. Involvement of the sense of touch is a key to learning in the early stages of development. The more meaningful, concrete and tangible a point or an issue for learning, the better the rate of success.

The next table gives a possible curriculum model framework for EE in schools:

Table 4   A possible EE curriculum model (adapted from Engleson and Yockers 1994)

GRADE	ENVIRONMENTAL TOPIC	GOALS
R	• different environments, environment we live in	• perceptual awareness • environmental ethics • minimal environmental knowledge
1	• energy, increase in use then and now	• perceptual awareness • environmental ethics • minimal environmental knowledge
2	• recycling, waste disposal	• perceptual awareness • environmental ethics • minimal environmental knowledge

3	• farmland preservation, rural communities	• perceptual awareness • environmental ethics • minimal environmental knowledge
4	• living in the Northern Province	• environmental ethics • environmental knowledge • minimal citizen action skills
5	• energy sources, industrial revolution	• environmental ethics • environmental knowledge • minimal citizen action skills
6	• rainforest destruction	• environmental ethics • environmental knowledge • minimal citizen action skills
7	• water quality	• environmental ethics • environmental knowledge • citizen action skills • minimal citizen action experience
8	• soils and Southern African history	• environmental ethics • environmental knowledge • citizen action skills • minimal citizen action experience
9	• investigating environmental issues	• environmental ethics • environmental knowledge • citizen action skills • minimal citizen action experience
10	• people, environmental relationships	• citizen action experience • minimal emphasis on all other goals
11	• pesticides	• citizen action experience • minimal emphasis on all other goals
12	• ecological or economic impacts of human events	• citizen action experience • minimal emphasis on all other goals
enrich-ment for grades 9 - 12	• land, nature • energy use in the twenty first century • environmental protection • impact of acid deposition • national parks	all of the above

The possible curriculum framework should be supported by an EE teaching and learning premise that supports education about, for and through the environment.

2.6.2 Education about, for and through the environment

2.6.2.1 Education ABOUT the environment

Goswami (1999:252) and Fien (1993:14,38-39) write on education *about* the environment. It is empirical and about knowledge of natural systems, processes, ecological, economic and political factors that influence or interfere with decisions about how people use the environment. Knowledge about natural and social systems is needed to resolve local, national and global environmental issues and managing the environment in a responsible way.

2.6.2.2 Education FOR the environment

Education *for* the environment is ethical. It should offer teachers the theory and practice with which to make a genuine contribution to environmental well being (Huckle 1983a:100). Learning and teaching have to acknowledge the links between environmental, moral and political education (Huckle 1983:100; Fien 1993:14, 38-39). Education for the environment is about learners in active resolution of environmental questions, issues and problems of:

- social organisation; such as individual, family, class, race, bureaucracy;
- aesthetics;
- culture and ideology; such as cultural needs, ideology, moral code;
- freedom, justice and responsibility;
- economic systems, production, for example nature, land, land use;
- distribution and redistribution, for instance wealth, waste and poverty;
- power and decision making, including participation.

Education *for* the environment is difficult. It is not neutral (Fien 1997:14). Like any classroom action it is linked to external economics, politics and social order. It fosters social and ecologically sustainable ways of organising people and environment relationships through education. The intention is to prepare people and learners for life as members of the biosphere.

2.6.2.3   *Education THROUGH the environment*

Education *through* the environment (Fien 1993:15) offers learners experiences in the environment as a medium for education. Experiential learning is emphasised. It is learner centred in approach and adds to reality, relevance, appreciation and concern for the environment.

Experiential learning develop learners' skills and maybe even teachers' skills of data gathering, observation, sketching, photography, using scientific instruments, social skills of co-operation, interviewing and group responsibility (Fien 1993:15).

2.6.3 Learning strategies

An EE curriculum should consider strategies that require the use of learner centred strategies. This is supported by Lorber and Pierce (1990:81-87). It is proposed that strategies such as brainstorming, panel discussions, socio-drama, field trips, small group activities, out of class assignments and nature tables should become a common feature of EE teaching and learning.

Brainstorming can be used to generate creative ideas. Its success depends on pace, duration and frequency of application. It helps learners to build a rationale for an issue.

Panel discussions comprising of six or fewer learners allow groups of learners to delve into an EE area of interest and then act as a source of information to the rest of the class. A moderator will introduce the topic and summarise the discussions. It is important to maintain an equal basis of participation.

Socio-drama gives learners an opportunity to dramatise social problems. The affective domain is developed. It should be emphasised as role playing, no own feeling and no rehearsing.

Field trips and experiences provide first hand knowledge of environmental issues. There is direct use of the local environment, be it cultural or natural (Gamble 1988:26). Field trips create room for the blending of a number of skills into a whole. Cultural experiences are shared. Trips should be related to an on-going unit of study. It is important for objectives or outcomes to be outlined. There is a spectrum of scapes which may be used in field studies to provide a framework for observation (Gamble 1988:26), for example, the landscape, farmscape, waterscape and treescape. Scapes vary in proximity and scale, for example, the school grounds, a garden, the local park, a walk through the village, industries and mines are all possible environments for learning and teaching. Field trips require expenditure, first aid and insurance. Field trips should also be followed by proper follow-up activities in the classroom setting.

Small group activities are of value. They increase learners' social interaction and maximise social development. Efficient use of limited materials and resources is possible. Complex tasks can be divided into less complex assignments. Peer to peer tutoring happens. Learner productivity is enhanced. Out of class instructional packages are possible with small group activities.

Out of class assignments complement small group activities. They can be in the form of homework assignments. Learners are given opportunities to acquire new information by reading or watching a television program. Assignments provide practice in particular skills. Creativity is enhanced and schooling is made more interesting and relevant. All learners should be given guiding questions and worksheets if necessary. Quality products should be expected.

Nature tables (Curror 1988) are useful for primary classrooms in developing environmental awareness. A nature table should have a thematic approach, for example colours, transport or seasons. It need not be elaborate. Natural objects should be on display.

Proposed learning strategies are intended for use by teachers when incorporating EE into all learning areas. Experiences of learners from outside school are important. Social action and future willingness to act (Fien 1993:73) are critical in integrating EE into the sequence of a learning programme or teaching unit. The National Environment Management Authority (1996:13) emphasises that recommended learning and teaching strategies should emphasise dialogue, encounter and reflection.

Wals (1994:9) states that the integration of EE into issues of learning and teaching requires political will and community support. He further mentions that:

- there is a need to decentralise, and have school based development of an EE curriculum guided by the uniqueness of each individual school situation;
- schools should institutionalise time for teachers, this will give teachers an opportunity to reflect and share ideas on EE learning programme design;
- schools should form partnerships with universities, research institutions, non-governmental organisations (NGOs) and community resource centres for guidance; and
- schools should be given the "space" and "breathing room" by the Ministry of Education to determine own specific EE context goals.

In summing up: Regarding a school curriculum for EE one can conclude that it has to contend with problems of construction of learning activities. Decisions have to be made on who determines the nature of the school curriculum design. It should be noted that the construction of the school curriculum is an on-going process in line with the concept of curriculum development as has been explained (see sections 2.3.1 and 2.3.2). Teachers should carry on the process of constructing the school curriculum while they implement it.

2.7   CURRICULUM PLANNING AND CHANGE

EE curriculum change is intended to review curriculum plans. EE curriculum planning is subject to legal constraints and administrative structures. The implementation of an EE curriculum's success is dependent on teacher attitude and capacity, learner interest, principles of sequencing, learning activities, the nature of the activities themselves and the constraints of time and resources (McNeil 1996:142).

McLaughlin (in McNeil 1996:247) explains curriculum change in terms of the following issues:

*   The nature and the pace of change at the local level is a product of local factors beyond the control of higher level policy makers. Local choice on turning EE policy into practice is more important than programme design, technology, funding and government regulation.
*   Policy cannot mandate what EE matters, local events and attitude of administrators should be if teachers are to change.
*   Classrooms share common features but differ in fundamental ways: variability and not uniformity is to be expected and viewed as desirable.

EE curriculum change is a journey (Fullan 1993:21). According to Fullan (1993:21-22) individualism and collectivism should have equal power in the journey for change, neither centralisation nor decentralisation works. It is the connection with the wider environment which is critical for success (Fullan 1993:21-22). Fullan (1993:45) further states that curriculum change is complex because of its pedagogical substance, that is figuring out effective approaches for teaching and assessing learning under conditions of diversity and politics of reform.

Once EE curriculum change principles have been understood, practice may follow. It is notable that expected change can be catalysed by introducing external EE consultants in support of the process of change. Change will follow the expected route if prevailing social change is in line with the proposed curriculum change.

Change should be beneficial to the interests of EE stakeholders. This is supported by Fullan (1993:60-61) when stating that getting clear on the focus of change, making change systemic and organisational and managing the ongoing change process should be followed by deploying state restructuring grant funds to spur the change.

Lieberman and McLaughlin (in McNeil 1996:250) write about developmentalism, participation and support. Developmentalism as a catalyst for EE curriculum change requires the provision of different kinds of help at different levels of implementing this change. Teachers should participate in decision making through the EE curriculum planning process and the implementation of change. EE curriculum change requires visible tangible material and human support for a period of three to five years. Support is dependent on political will and commitment.

Curriculum planning and change are issues that have been an essential part of South African education for the past six years. Further changes should only be implemented if absolutely necessary. People, civil society, institutions and learners are overwhelmed or are nearing a threshold level of tolerance to more change. However, the introduction of EE is one such necessary change (see section 1.2) and it calls for the following:

- Systemic realignment of learning and teaching activities;
- A political commitment and support to make learning and teaching more holistic; and
- A commitment for an equitable mobilisation of resources.

Introducing EE in the NP will not be easy. There are the urban and resourced, the peri-urban and moderately or marginally resourced, the rural and under resourced, and the deep rural or farm schools that are in settings of abject poverty with very limited resources. The intended model for the integration of EE into the school curriculum must cater for all these diverse classroom settings.

2.8   CONCLUSION

In conclusion, this chapter gives an understanding of EE as:

* learning how to care for the earth, other people and ourselves;

* learning to understand the inter-connectedness and yet distinctiveness of the earth, other people and ourselves;

* learning to understand concepts *about* the environment;

* developing sensitivities *through* the environment;

* promoting effective learning *in* and *about* the environment; and

* fostering values that enable us and learners to act *for* the environment.

Furthermore, curriculum work is about construction, development and implementation. Construction is about decision making and determining the nature of design. Development is about carrying on with construction. Implementation puts the curriculum into effect. These activities are neither discrete nor sequential. EE curriculum practice demands concurrent handling of EE curriculum construction, development and implementation.

EE curriculum development is a multilevel process. This means it is a process conceptualised at macro, meso and micro level of an education system. The ultimate determinant of an EE curriculum's intended outcomes takes place at the micro level: the teacher's domain. It is important to note that the *tendency to prescribe the content on a central level* (Boland & Letschert 1995:157) is noble, and that there is a need for "a definition of a core curriculum that gives the authority a possibility of control" but that the teacher is a critical factor in EE curriculum implementation. Teachers need to be informed about the expectations of curricula innovations. They should not feel that they have lost their involvement and ownership of the EE curriculum development processes.

Criteria for the model should clearly ascertain the peculiarities and the critical essence of EE as an area of knowledge. Should the model only focus on learning EE

by learners as individuals or in a group process? An attempt will be made to try and identify carefully the possible alternatives, considering the consequences of choosing a particular approach and making the choices explicit.

The next chapter will examine the history of the development of EE and the implications for EE curriculum development in the NP.

CHAPTER 3

THE HISTORY, POLICIES AND PRACTICES OF ENVIRONMENTAL EDUCATION

3.1   INTRODUCTION

In the previous chapter a theoretical basis for EE and curriculum development was given. This chapter intends to provide an explanation of the following issues that influence the integration of EE into the school curriculum:

- the history of EE;
- sustainable development and EE;
- theory and practice of EE;
- EE policy and practice in South Africa; and
- the role of the private sector in EE in South Africa.

The history of EE will elucidate the aims, objectives and guidelines of EE over the years. This information is important for the development of criteria for a model for the integration of EE into the school curriculum of the NP. An understanding of the history of EE and related concepts such as *sustainable development* will inform the recommendations to be made in the last chapter.

3.2   THE HISTORY OF ENVIRONMENTAL EDUCATION

The presentation starts at a regional level, that is, Southern Africa, The discussion then moves to an international level and then back to a national level.

3.2.1   The Southern African perspective

Any curriculum that integrates EE, should consider culture and tradition. Traditional Southern African communities had strict codes of conduct which determined how much and when people could draw from the natural environment. For example, wood

gathering and stock piling was a seasonal practice (Chenje & Johnson 1994:39). Policy making and the drawing of guidelines and enforcement were the responsibility of the *kgotla* (Batswana), *lugiko* (Sukuma in Tanzania) and *lipitso* (Basotho). The *kgotla/lugiko/lipitso* is a structure of a gathering of men in a community, headed by the traditional ruler of the community. Enforcement of rules and guidelines was aided by myths and taboos that scared the people into compliance. In this way the environment was preserved by controlling human behaviour (Chenje & Johnson 1994:39).

An example of such control was the desire to restrict the behaviour of people who were allowed to enter the so-called sacred places. Such sacred places were often ecologically valuable and rich in species diversity (Chenje & Johnson 1994). No loud talking or shouting was allowed as it was believed this would scare the animals or cause the people to disappear from the face of the earth. People were therefore scared to enter these places and thereby made the *kgotla/pitso or lugiko* achieve its goal of conserving that area for the spirits (Chenje & Johnson 1994). The rules were passed on orally from one generation to the next.

Some cultural practices regarding EE still prevail in several communities, especially in rural areas and need to be considered in the integration of EE into curricula. Informal interviews indicate that many traditional elders hold the view that current practices as advanced by technological developments, for example, electrification is non-holistic, and view formal education and training as having disrupted the traditional culture. In their view modern practices are often consumption oriented when they use raw materials from the environment without putting anything back. Thus traditional practices are often contradictory to the legislative policy making of the country as presented in the ensuing discussion.

South Africa established a Council for the Environment in 1982 (Botha & Huntley 1991:330-333). Establishment of the Council was preceded by a non-governmental initiative in 1981, namely the Wildlife Society of Southern Africa (WSSA) which attempted to develop a National Environmental Conservation Policy. Policy was

influenced by the World Wide Fund for Nature (WWF), the International Union for the Conservation of Nature and Natural Resources (IUCN), and the World Conservation Strategy (WCS) global initiatives. The global initiatives set broad goals, principles, approaches and actions pertaining to environmental issues.

Global initiatives probably influenced the drawing up of policy documents. Topics such as EE, solid waste management, noise control, open space planning and integrated environmental management were researched. The promulgation of the Environmental Conservation Act of 1982 set the scene for South Africa (Botha & Huntley 1991:330-333). The Council for the Environment drew heavily on the World Conservation Strategy to arrest and perhaps even reverse the then resource utilisation and environmental deterioration (Botha & Huntley 1991:332).

Principles of equitable distribution and access to resources, integration of planning, conservation and development were highlighted (Botha & Huntley 1991:330-333). At this point it was important to retain options for future use, that is, focussing on causes as well as symptoms of environmental degradation. Development of environmental knowledge and a predictive capacity for future application were emphasised. Education and active participation by the public in environmental matters needed the political will, social and economic stability which were a problem in the eighties due to apartheid policies of the South African government.

On a positive note, South Africa and its people have had opportunities to participate in relevant international events like the Rio conference of 1992. The 1994 political empowerment marked the beginning of the road to a sustainable society (Ferreira in Filho & Tahir 1998). Socio-political, economic and biophysical aspects came to the fore, as embodied in Ferreira's (in Filho & Tahir 1998) statement that most South Africans are environmentally illiterate through no fault of their own.

The effectiveness of participation by communities in curriculum development for EE will be addressed in this thesis. It is important to have an EE curriculum that considers the needs and the priorities of all (disadvantaged and privileged) communities.

3.2.2 Global perspective

Current EE curricula or EE policies have been influenced by several events. Some of the events are:

- Disinger (in Palmer 1998:5) claims that the term EE was first used in Paris in 1948 by a Thomas Pritchard at an IUCN meeting. Wheeler (in Palmer 1998:5) writes that the term first appeared in 1947 in a book by Paul and Percival Goodman entitled *"Communitas"*.

- The adoption of a working definition of EE by the 1948 IUCN meeting: such a definition was adopted as "the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings". This definition was again used at an IUCN conference of 1970 (Bornman 1997b:58). The EE definition included practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality.

- The sixties represented the beginning of the environmental awareness era. Holistic views like the preservation of the environment were widely advocated, for example Rachel Carson's (1962) novel influenced governments to ban the use of pesticides like DDT. The use of DDT is also banned in South Africa. Problems around soil and water conservation and wildlife became prevalent. Southern Africa also raised concerns around these problems (Chenje & Johnson 1994).

- Rachel Carson's (1962) novel, *Silent Spring* highlighted issues around the residual nature of pesticides and their dangers. The danger arises if pesticides are used without following and/or tracking their influence on the natural systems other than the intended target (Chenje & Johnson 1994).

- Environmental awareness of the sixties culminated in the Stockholm Conference on the Human Environment in 1972 that emphasised sustainable development (Chenje & Johnson 1994:39). This conference

called for the need to integrate development consciously with sustainability at a local level, or when considering eco-development projects.

• An international EE programme launched the Belgrade Charter in 1975. The Charter gave a global framework for EE, which read as follows (UNESCO 1975):

⇒ fostering awareness and concern for economic, social, political and ecological interdependence in urban and rural areas;

⇒ providing a person with opportunities to acquire knowledge, skills and values to protect and improve the environment; and

⇒ creating new patterns of behaviour of individuals, groups and society as a whole towards the environment.

• A 1977 intergovernmental conference on EE was hosted by UNESCO at Tbilisi, Georgia (UNESCO 1977). Of the member states, 66 attended. A set of EE objectives were adopted (see Annexure C).

• The World Conservation Strategy launched a document stressing sustainable development (Bornman 1997a:59). The chapter on EE emphasised that "the long term task of EE (is) to foster or reinforce attitudes and behaviour compatible with a new ethic". This linked poverty to development and environment.

• During the eighties there were not many new ideas regarding environmental policies. Some scholars of Environmental Policy and Practice refer to the Eighties as the "lost decade" globally (Chenje & Johnson 1994:39). For Africa the eighties were a turning point in development and thinking (Chenje & Johnson 1994:39). Drought, famine and large scale starvation, especially in the Horn of Africa, called for new environmental ethics for Sub-Saharan Africa (Chenje & Johnson 1994:39).

• The 1987 Brundtland Report (World Commission on Environment and Development) focussed on sustainable development and qualitative development, socio-economic policy on resource mobilisation and mainstreaming of environmental concerns. The world learnt two "words

(sustainable development)" from the commission, referred to as "Our common feature: sustainable development" (O'Keem 1990:24).

- Observation indicates that the road travelled by the 1990's policies and frameworks, were probably guided by sustainable development principles. During this time priorities of countries and their people differed. Developing countries were concerned about poverty, shelter, warmth, access to water and land and its resources. Poor nations argued that it was the ills of modern trading rules that jeopardised their long harmonious existence with the physical environment. The Earth summit in 1992 took a more prominent stance: that EE and development should be integrated into curricula of formal and non-formal education (Bornman 1997b:59).

The events listed touch on EE and sustainable development. The next section explains the link between EE and sustainable development more clearly and also indicates relevance for the integration of EE into curricula.

3.3   SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL EDUCATION

From the global history of EE it is clear that the issue of sustainability is fundamental to EE curriculum development. It is one of the cornerstones of Agenda 21 (Bartelmus 1994:79) and was also the key focus of the Stockholm conference of 1972.

Fien (1997:8) explains sustainable development as:

> *a process that requires that the use of environments and resources by one group of people does not jeopardise the environments and well being of people in other parts of the world or destroy the capacities of future generations, to satisfy their future generations to satisfy their responsible needs and wants.*

Similarly, according to Heyn, Luthgoe and Myers (in Barker 1999) issues that are relevant to sustainable development and therefore to EE curricula are:

- the difference between availability of resources and their consumption;
- harmful economic activities;
- economic growth for super luxuries:
- an increase in population growth creating pressure on the local resource base; and
- indigenous people and their lifestyles.

Palmer (1998:30) explains that EE curricula focussing on sustainable development or sustainability aims to "help people understand the interdependence of life on Earth, the effects of actions and decisions relating to resource use, and factors which foster or impede sustainable development". Education for sustainable development should develop people's environmental awareness, values and attitudes. It should enable them to be involved effectively in sustainable development.

The World Commission on Environment and Development (WCED), chaired by the Norwegian Prime Minister, Gro Harlem Brundtland, defined "*sustainable*" in the report, *Our Common Future* published in 1987 (Chenje & Johnson 1994:xx) as:

> ... *a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.*

Chenje and Johnson (1994:xx) as well as Stawinski (1999:634) write about sustainable development as "a development that meets the needs of the present without compromising the ability of future generations to meet their own needs". According to Stawinski (1999:634), the idea of sustainable development should be included in EE curricula at all school levels because:

- human beings are a part of nature and their existence depends on the ability to draw sustenance from a finite natural world;

- economic activity must account for the environment costs of production; and

- maintaining a liveable global environment depends on development that humans can establish.

Tarasova (1999:661-664) writes about "educating for sustainability". He points out that people have a commitment to the environment and need knowledge of how nature works to make sustainable decisions. He contends that "educating for sustainability" will build the intellectual capacity of learners. The capacity will carry people towards the fulfilment of our highest aspirations and allow for prosperity, a socially equitable and a healthy life for the present and future generations.

Zharikov, Osiko and Sarkisov (1999:755-757) support Tarasova's above mentioned contention by emphasising the tendencies of development and the role of science and technology in creating sustainable development. They assume that sustainability is linked to society's level of competencies in science and technology.

EE can therefore address sustainable development by including the following issues in the curriculum design (Bartelmus 1994):

- ways of ensuring that acceptable standards of living or human needs are upheld and raised where necessary;

- means to address the depletion limits of natural resources;

- setting acceptable standards of pollution and contamination;

- emphasising ecological limits of the carrying capacity of bio-reproductive systems for sustaining human population;

- accepting standards of equity in the distribution of income, wealth and access to natural resources;

- emphasising cost benefit analysis of the environment, like the monetary value of maintaining and harvesting plantations;

- investigating social, political and cultural gains from environmental investments, determining the returns that are gained from projects designed to be environmentally sensitive, for example, establishing a hydroelectric power station; and

- determining environmentally viable demographic targets.

Sustainable development is "development that expands choice, reduces poverty, enhances equity and promotes participation. It protects and restores the environment" (Barker 1999:52). With reference to the Maori (the indigenous people of New Zealand), Barker (1999:52) adds that if learning is done in an indigenous language the students' poverty of thinking is reduced, equity is enhanced and students have an opportunity to participate, raise complex issues and contribute to the traditional knowledge base. The relevance of Barker's (1999:52) statement to EE is that most of the discourse in EE is done in the English language. Barker's argument is interesting as it raises another dimension of sustainable development: what happens to the quality of development if learning is done in an indigenous language? This has relevance for the integration of EE into the school curricula of the NP, as the province has about six indigenous languages.

In addition to calling for countries to co-operate for sustainable development, there is a need for inter-sectorial and inter-disciplinary collaboration. For example, the World Health Organisation's (WHO) goals state that to achieve anything, departments of housing, transport, industry and medicine, amongst others have to collaborate on development projects (O'Keem 1990:24). The collaboration has to acknowledge that political, social and economic conditions differ from country to country, thus consideration for sustainable development is an imperative (Fafunwa & Aisiku 1982:260). All these parties may be consulted in the design of EE curricula.

Agenda 21 deals with formal and non-formal education that aims at an understanding of environmental quality, sustainability and social equity. The aims of EE cannot be divorced from the concept of sustainable development. EE should aim at a process of change in the relationship between social, economic and natural systems and

processes. Equity between the present and future, countries and continents, races and classes and gender and ages will materialise if development and educational programmes remain sustainable.

It is important for curriculum planning and pedagogy to help integrate social justice and ecological sustainability (Fien 1997:8). The implications of sustainable development in EE education and training curricula call for a new categorical imperative that requires trans-border governmental agreements or co-operation between countries (O'Keem 1990:24; Hughes 1998:20).

3.4 THEORY AND PRACTICE OF EE

Theory helps persons, researchers and practitioners analyse and synthesise data, organise concepts and principles and suggest new ideas and relations (Ornstein & Hunkins 1993:19). An effective test of a theory is its ability to guide practice. EE practices are dependent upon its theory. Those who are expected to work with EE theory will shape and formulate its curriculum in one way or another whilst dealing with its practice. Such people may be curriculum administrators, supervisors, teachers, curriculum developers, learning support material writers, learning area committee members, accrediting agencies and non-governmental organisations. It is therefore important to provide an understandable EE theory.

Vallance (in Ornstein & Hunkins 1993:20) states that:

> *much ado (is) made about the split between theory and practice in the dialogues and concerns about professional curriculum workers - the crux of the matter is to provide practical answers to very practical questions having to do with design, development, implementation and evaluation of curricula.*

The statement by Vallance challenges EE theory to make practice feasible by ensuring that the practicalities of EE are made clear. Teachers and other EE

practitioners should be able to relate theory to practice based on a sound EE knowledge base, insight and understanding as well as other relevant EE skills. Curriculum developers and practitioners should identify and agree on major EE constructs, concepts and questions for discussion. Existing EE theories have to be analysed in terms of validity, evidence, accuracy, underlying assumptions, logic of argument, coherence, values and biases (Ornstein & Hunkins 1993:20).

Other issues for consideration in EE theory and practice for curriculum development are that (Ornstein & Hunkins 1993):

- theory should be considered in context of the real world of schools;
- theory must be plausible, applicable and realistic in terms of practice;
- theory should be empirically tested;
- theory should be evaluated in a school setting over a period of three years prior to making generalisations; and
- theory should be modified from paper to practice, abstract to concrete.

The assumption is that when theory moves into practice as curricula are implemented it is important to include relevant people (internal and external stakeholders) and resources to make it work. Theory should address the needs of the people, not mould people to theory. If theory accommodates the needs of the people, it may be less difficult to move from an idea to action or practice.

Translating EE theory into practice with the implementation of EE curricula requires a selection of strategies and rules that are relevant and applicable to the context chosen, in this case the NP (Ornstein & Hunkins 1993:22). Goals and priorities of schools and the needs of learners and teachers should be taken into account. The fact that the theoretician and the practitioner may have different agendas about the implementation of a EE curriculum is critical when translating theory into practice.

For schools to be able to translate EE theory into practice, it is important that they become effective. Taylor and Vinjevold (1999:17-18) describe effective schools as

schools that receive a low level of external support. They have the maximum threshold capacity to initiate and manage their own reform. This supports the suggestions by Wals (1994 see section 2.6).

Taylor and Vinjevold (1999:17-18) further explain effective schools as schools that have had exposure to new ideas and practices, they have collaborated with other schools and have partnerships with external consortia. The tenets of effectiveness are features that have a bearing on the integration of EE into the school curricula of the NP. To integrate EE effectively into school curricula the schools in the NP need to be empowered to be effective.

The value of the teacher as a resource and an agent of change in communities and classrooms is a merit for continuity and translation of EE theory into practice. Curriculum supervisors should assist in facilitating, supporting, co-ordinating and communicating the mission of turning theory into practice. Teachers are critical in turning curriculum theory into practice. Having presented the parameters of theory and practice, the South African theory and practice landscape is presented.

3.5 ENVIRONMENTAL EDUCATION THEORY, POLICY AND PRACTICE IN SOUTH AFRICA

Taylor (1999:665-672) reviewed EE in South Africa in terms of the past, present and future. His review describes EE issues for Southern Africa with a special emphasis on the Province of KwaZulu Natal. He gives the year 1952 as the first time when organised EE was offered by Ian Garland, a school teacher (Pringle in Taylor 1999:665). Ian Garland took a group of school boys on an outdoor camping experience which included nature studies (Taylor 1999:665).

Subsequent activities wherein EE developed further with implications for the development of a model for EE integration into the curriculum are the following:

- Eshowe College, a teacher training college endorsed a teacher trainee programme in nature conservation which included weekend field excursions to natural areas in 1969. This programme revealed the need for field centres (Taylor 1999:665-666).

- EE had its origins confirmed in the early seventies. Prior to this period it was more conservation education. It concentrated on natural resources and basic ecology (Ferreira 1998:88). "Veld" schools, mostly in the former Transvaal, offered outdoor education.

- The first International EE conference was held in Treverton, Mooi River in 1982 (Palmer 1998). The conference was instrumental in the formation of the Environmental Education Association of Southern Africa (EEASA) (Palmer 1998). EEASA has spearheaded a number of EE projects and initiatives in Southern Africa, for example the Environmental Education Curriculum Initiative (EECI). EECI contributed to the development of Curriculum 2005 (Taylor 1999:665-666). Non-governmental organisations like WSSA and the Wilderness Leadership School were also involved in EE.

- Water pollution and droughts became severe in 1991. People such as Rob O'Donoghue (KwaZulu Natal Nature Conservation Service) developed low cost water monitoring materials in collaboration with the Umgeni River Project run by the Wildlife Society of Southern Africa (WSSA). The Umgeni River Project was established by WSSA in 1978. The materials are very well used by schools. According to a 1999 estimation (Taylor 1999), up to 2500 kits are sold annually. The water monitoring kit has a compelling ACTION acronym (see figure 7) (Taylor 1999:665-666):

A - ask about local indigenous knowledge

C - check catchment conservation, river quality and health risks

T - test water life and water quality

I - inform others to get support and encourage local action

O - outline a catchment conservation plan

N - network with other local and global "GREEN"[1] groups

Figure 7   The ACTION framework (Taylor 1999:666)

- Non-governmental organisations contributed to the development of teaching materials for EE.

- Contributions were made in Bophuthatswana, a former self-governing state, where EE was incorporated into the curriculum as part of teacher training programmes (Ferreira 1998).

- An EE workshop was held at Dikhololo, in Brits (North West Province) where the focus was on EE for formal education in 1993 (Ferreira 1998).

- The White Paper on Education and Training was accepted. This 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 system.*

- A document on *Norms and Standards for Teacher Education* which has important implications for the integration of EE into curricula was compiled by the Committee on Teacher Education Policy (COTEP) (COTEP 1996). It stated that:

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1 "GREEN" Global Rivers Environmental Education Network, School of Natural Resources, University of Michigan, 430 East University, Ann Arbor, U.S.A.

teacher education should enable the prospective teacher to develop skills such as a sense of environmental responsibility in students, teacher education programmes should ensure that the teacher is able to ... identify areas of knowledge, for example, language and EE which can contribute to a cross curricular integrated approach to learning, within the framework of their subjects and as a cross curricular study (COTEP).

In addition to the activities described above, the Department of Environmental Affairs and the Environmental Education Association of Southern Africa (EEASA) established a participatory curriculum policy initiative, Environmental Education Policy Initiative (EEPI) in 1992. EEPI's focus was inclusion of EE in the then new educational policy. EEPI gave birth to Environmental Education Curriculum Initiative (EECI). EEPI embarked on a three year consultative process. It was inclusive of government and non-governmental organisation, University departments as well as organisations involved in the "struggle" (Environmental Education Policy Initiative 1995:i-ii). EEPI presented its report in 1995. The report was acknowledged by the Heads of Education Committee (HEDCOM).

EECI was established in 1996 as a state-civil society partnership body. It has contributed and complemented the National Curriculum review process. The achievements stated below were reported in 1999 by the national co-ordinator, Mrs Tshidi Magonare, located in the Department of Environmental Affairs and Tourism. EECI has succeeded in:

- establishing a national task team involving key role players (government departments and non-governmental organisations) concerned with EE curriculum issues;
- encouraging active involvement of the provincial departments of education, such as participating in EEASA;
- establishing an environmental standards generating initiative (discussed later in this section);

- contributing significantly to educational policy, for the development of Curriculum 2005 so that the concept "environment" became an organiser for learning and teaching in the foundation, intermediate and senior phase for general education and training;

- establishing national working groups on learning programme development, curriculum research, materials development, teacher education and standards generation;

- creating a national database of EECI members and EE supporters; and

- continuing to develop and publicise a range of support materials for EE curriculum development, for example an EE Catalogue: *Supporting Outcomes Based Education and Training (OBET)*.

EECI took a decision to participate in the standards generating process (Department of Environmental Affairs and Tourism 1999). The South African Qualifications Authority (SAQA) has proposed 12 fields under National Standards Bodies (NSBs). The fields are organisers and not fields of learning or competence. Some are knowledge oriented while others are training oriented. The development of unit standards is in tandem with Curriculum 2005, which is explained in the next section.

3.6 CURRICULUM 2005

Curriculum 2005 (hereafter referred to as C2005) was announced by the then Minister of Education, Professor S.M.E Bengu in February 1997 (Department of Education 1997a). The Department of Education had started a curriculum review process in August 1995. C2005 intended to shift from content based learning and teaching to a curriculum based on outcomes. It intended to integrate education and training to reduce the gap between academic and applied knowledge, theory and practice, knowledge and skills (Department of Education 1997a, see Annexures E-H).

It can be stated that C2005 may offer better EE learning and teaching opportunities as compared to the interim syllabi for the following reason. The interim syllabi offers

EE under the topic *Ecology* in grade 10. Learners are expected to make their own observations of specimens and experiments, learn how to handle and use apparatus correctly, and observe organisms in their natural environment. Geography makes attempts to deal with the environment. Such once off curricular presentations of EE in a grade with no sequential follow-up is not sufficient.

The Department of Education has recognised the need for EE in the curriculum (Department of Education 1997a). It declared as a priority the intention to develop a national feasible EE policy through a participatory approach (Environmental Education Policy Initiative 1995:26). The policy is expected to state that EE should not be prescriptive. EE should allow for options relevant to local environment, issues, resources and contexts (Environmental Education Policy Initiative 1995:2).

Various policy options were considered (Environmental Education Policy Initiative 1995). Options were:

(i)   EE as a local, problem solving curriculum action;

(ii)   EE as an integrated approach, namely as an environmental perspective within separate subjects;

(iii)   EE as a separate subject, and

(iv)   EE as a component within a subject.

A choice was made in 1996 to integrate EE into various learning areas. The concept of a phase organiser as a design feature of C2005 meant that EE would be one of the phase organisers (see Annexure H).

Environment is applicable across all learning programmes for the Foundation, Intermediate and Senior Phases of the General Education and Training Band of C2005 (Department of Education 1997a; 1997b; 1997c). C2005 was implemented in grade one in 1998. Up to date grades two, three, four, seven and eight have changed to OBE, a methodology chosen for the implementation of C2005. It is

expected that by 2005 the curriculum transformation will be complete. The frameworks of C2005 are presented in Annexures D to H.

As part of the implementation of C2005 an evaluation was conducted in the NP by Khumalo, Papo, Mabitla & Jansen (1999). The grade one teachers of the NP who were interviewed stated that they believe that OBE, the methodology for implementing C2005 is an appropriate approach (Khumalo et al 1999:41). OBE aims at participatory and active learning. Learners work in groups and share information and experiences. The learner based approach may be a supportive setting to *Environment* as a phase organiser. Teachers raised other concerns that may hamper OBE: there is a shortage and lack of the necessary learning resources, continuing professional teacher development programmes are inadequate and the classroom support is insufficient (Khumalo et al 1999:41).

3.7   THE PROVINCES

Provinces are committed to the implementation of C2005 and therefore support EE initiatives and environment as a Phase Organiser.   Environmental Education Curriculum Initiative (EECI 1997) captures some of the provincial commitments.

3.7.1 Eastern Cape

The Eastern Cape has representatives on the national curriculum committees. The representative advocates the inclusion of EE across the curriculum (Environmental Education Curriculum Initiative 1997).

3.7.2 Free State

The Free State is represented in the EECI learning programme working group. An EE working group is active. The Free State intends to establish about 60 localised learning centres which will be manned by EE representatives (Environmental Education Curriculum Initiative 1997).

3.7.3 Gauteng

Each provincial learning area committee has an EE representative. The Gauteng Education Department works closely with Delta Park EE Centre. The Department has contributed financially to staff development. Gauteng has a HEDCOM approved Danish government EE Teacher Education Project which will contribute to EE curriculum development. Gauteng also has an environmental project called the National Environmental Awareness Council. Soweto teachers, learners and youths are the stakeholders (Environmental Education Curriculum Initiative 1997).

3.7.4 KwaZulu Natal

KwaZulu Natal has conservation services and non-governmental organisations that are supporting schools. A resource pack is available to guide schools in processes of developing their EE policies. The following indicates guidelines given to schools to integrate EE and develop policy (Taylor 1999:672) as illustrated in figure 8.

Schools are encouraged to develop an EE school policy. They take the school calendar and indicate days of significance to EE for the year. The policy takes into consideration the curriculum, school grounds, community knowledge and available learning resources. Schools are encouraged to plan for fieldwork, action projects and the establishment of EE clubs as part of standing learning activities.

SCHOOL CALENDAR
year of special days

CURRICULUM
the sum of all formal and
informal teaching and learning
activities and experiences

FIELDWORK
hands-on series
local eco-systems

SCHOOL GROUNDS
hands-on: schoolyard life

COMMUNITY KNOWLEDGE

RESOURCE USE
water audit

ACTION PROJECTS
how to guide
action series

ENVIRO-INFORMATION
Enviro-fact

COMPETITIONS
ENVIRO '98

CLUBS
"EnviroKids"
"Clubs Pack"

ADVENTURE & CULTURAL
Various excursion venues

CONTACT: Jim Taylor
Wildlife and Environment Society
Box 394 Howick 3290
Tel: 0332 303931

Figure 8 **Tools for active outcomes based learning in support of education: getting organised, Environment as a Phase Organiser, school environmental policy and management action plan, SEP-MAP** (Taylor 1999)

The EE Curriculum Forum (EECF) has met to discuss the NQF developments and the development of an OBE curriculum. The position of EE in the new curriculum was considered. Each learning area committee has been requested to co-opt EECF members (Environmental Education Curriculum Initiative 1997).

3.7.5 Mpumalanga

A HEDCOM approved Danish government supported EE Teacher Education Project for this Province and Gauteng will contribute to EE curriculum development (Environmental Education Curriculum Initiative 1997). Mpumalanga has a directorate for EE in their Department of Environmental Affairs. It is active in teacher materials development. Schools receive free Enviro-Club start-up booklets. DEAT and DoE will collaborate to discuss ways in which EE can be included in the provincial curriculum development process. Eco-Link, a non-governmental organisation, is active in Mpumalanga (Environmental Education Curriculum Initiative 1997).

3.7.6 Northern Cape

The Northern Cape has established regional learning area committees. EE is included as a cross curricular concern. Workshops and information planning sessions are held (Environmental Education Curriculum Initiative 1997).

3.7.7 Northern Province

In 1996 I (in my capacity as Chief Education Specialist, Curriculum Development, NP, DoE) received an account of EE activities from one Frederick Matjokana who was then attached to the Giyani Science Centre. The report is of relevance because it gives the history of past EE practices in the NP. This will be important when it comes to recommending a model for the integration of EE into the school curriculum of the NP. The report further gives contextual information which is important because

EE as a field of study places importance on context. The report included the following:

- In response to the announcement by the National Ministry regarding the integration of EE into the formal curriculum (White Paper on Education and Training 1995), the Biology Department at Giyani Science Centre, took action in incorporating EE into its curriculum.

- Our in-service programmes for the former Gazankulu department included handouts of materials to help teachers in their lesson procedures. Within the same package were environmental support materials on how biology benefited from natural resources.

- On March 25, 1995 I organised with Schoemansdal Environmental Centre for a workshop. Schools involved were Sukani, Giyani, Risinga, Ndalama, Vurhonga and Hlalala, all from the Giyani area. The course was for a duration of three days over a weekend. Each school sent at least one biology teacher.

- Activities included topics such as food chains, hiking, foot trails and a visit to a museum.

- Many similar excursions and EE activities were conducted in 1995 at different times. About 45 schools had participated up to the end of 1995.

- I participated in Global Agenda 21 for Global Sustainable development. The questionnaire was sent to me by Dr. Erasmus, Director for Curriculum Development, through Mr. A.G. Chuma, In-service Training Department.

The NP is serviced by the Schoemansdal Environmental Education Centre in Louis Trichardt. The Department of Education, Northern Province funds the centre.

Programmes on offer are:

- Leadership development:
  leader identification through practical courses

leadership development

problem solving

communication

leadership and relationship

- EE:

water ecology - life in water

birds - identification and role in the ecosystem

spiders - identification and role in the ecosystem

snakes - talk about their role in the ecosystem

environmental games

- Adventure activities:

camping

hiking

volleyball

upsailing

rafting and swimming

tug-of-war

- Attitudinal skills to be developed are:

a greater love for the creation of our fauna flora;

a better understanding of their fellow citizens;

a better relationship with their parents;

better problem solving skills; and

a spirit of adventure.

Teaching and learning strategies or techniques used are:

- active learning;
- critical thinking, reasoning, reflection and action;

- real-life situations;

- learner centered education,

- group work and teamwork in problem solving;

- programmes which are adapted to suit the needs of the learners/students;

- responsibility which is with learners/students, self-discipline and self-activity; and

- in support of C2005.

Brochures, advertising flyers and application forms are sent out to institutions annually. Schools can then apply to visit the centre. The centre offers unspoilt surroundings.

3.7.8 North West

North West had a representative on the EECI. It has a designated EE co-ordinator, the only province which has one. Provincial OBE workshops are held (Environmental Education Curriculum Initiative 1997).

3.7.9 Western Cape

The Western Cape Education Department (WCED) is committed to the realisation of Agenda 21: A Global Plan for sustainable development. The declaration of the commitment to Agenda 21 and an action plan were publicised in a brochure form in 1999 (Western Cape Education Department 1999). The detail on the WCED is necessary as it appears to be the only province that has made more progress towards EE issues. The brochure gives a period for the development of the Curriculum Policy and its aims are stated as follows.

The policy aims to:

- create an awareness of government policies regarding EE;

- provide a platform for various education stakeholders to reach consensus on key concepts and models for understanding issues concerning the environment; and

- provide a guideline document for educators to provide education for sustainable development.

The development of the policy will be in consultation and collaboration with:

- learners, educators, parents, institutions inclusive of Early Childhood Development (ECD) and Education for Learners with Special Needs (ELSEN);

- communities, community-based organisations, non-governmental organisations including traditional healers, educationists, women and the unemployed with an interest in EE; and

- the public and private sector.

The collaborators are encouraged to share the brochure, discuss the contents of the brochure, find out, attend workshops, listen, articulate their views, participate in discussions, give comments and inform the department on how they like to be involved. The key stages in the development of the WCED EE curriculum policy are:

PHASE ONE	
STAGE ONE August 1999	• identification of key role players • formulation of consultative strategies for successful engagement of role players
STAGE TWO September 1999	• drafting the policy framework • planning awareness and consultative workshops
STAGE THREE October - November 1999	• awareness and consultative workshops in all nine areas of WCED
STAGE FOUR December 1999	• development of the first draft policy document
STAGE FIVE January 2000	• distribution of the first draft WCED EE curriculum policy document for public comment

PHASE TWO
• development of the final draft document and the subsequent implementation

Figure 9   **Developing an EE curriculum policy** (Western Cape Education Department 1999)

3.8   THE ROLE OF THE PRIVATE SECTOR IN ENVIRONMENTAL EDUCATION IN SOUTH AFRICA: IMPLICATIONS FOR CURRICULUM DEVELOPMENT

This section explores the role of the private sector in EE in South Africa. The intention is to establish the benefits for learners, schools and their communities if they form partnerships with the private sector. Moreover, the possibility of co-operation between the private sector and schools regarding the integration of EE into curricula, will be explored.

Ledgerwood, Street and Therivel (1993:xiii,162-189) write that the market place has embarked on a new kind of social change. There is a revival of social activism. It is coupled with an increasing level of concern for the environment. It is not the angry protests of the sixties, but a focus on values, what consumers want and a sense of producing environmentally sensitive products (Ledgerwood et al 1993). This has implications for the kind of values educators want to develop in learners by means of the curricula.

Smuts and Hobbs (1991:334-346) state that business co-operations alter the environment by improvement and destruction. The scale and the complexity of improvement and destruction are increasing with time. Biodiversity is reduced in an effort to achieve short term economic goals. It is therefore important to promote and protect biodiversity as an investment and environmental insurance. It is an imperative for everyone to be environmentally literate, and therefore to integrate EE into school curricula.

Smuts and Hobbs (1991:342) further state that the following socio-political and socio-economic issues are of importance:

- improving educational opportunities and incentives for historically dis-advantaged people and institutions;

- investing in EE programmes to increase the rate of environmental literacy;

- assisting employees to improve their physical home environments and their workplace;

- breaking the cycle of poverty by supporting sustainable rural, peri-urban and urban development programmes;

- institutionalising workplace health policies;

- decentralising of funds, political power and personnel to local authorities or government;

- being informed about local, regional and international developments in environmental matters;

- collaborating with relevant stakeholders in initiatives about the use of natural resources; and

- sharing material and technological skills with environmental stakeholders.

In the light of the introduction of EE into the school curriculum, one can assume that it is expected that the private sector's contribution can be enhanced if EE is emphasised formally and informally. Next are some of the contributions by the private sector to formal and informal education. The contributions add value to raising environmental awareness and give an indicator of environmental social investment by the private sector. This is relevant to EE in schools because the model to be proposed in this study will require co-operative interaction between business and schools. The co-operation is needed because observation indicates that most schools in the NP are under funded, hence the need for social investment by the private sector.

3.8.1 Gold Fields Foundation

Gold Fields Foundation co-funds a chair in EE at Rhodes University (Rhodes University 1998). On offer are EE graduate courses, publications, professional services, specialised curriculum and course development and materials development.

3.8.2 Mazda

Mazda made a commitment of R5 million to the Wildlife Fund for a period of five years starting in 1990. It co-funds a chair in EE at Rhodes University (Rhodes University 1998). On offer are EE graduate courses, publications, professional services, specialised curriculum and course development and materials development. Other Mazda EE related projects are the Lapalala Wilderness School in the NP and the Wildlife Environmental Society in Umgeni Valley, KwaZulu Natal. The project exposes learners to conservation issues. The Frog Atlas Project by the University of Cape Town and the University of the North involves a partnership.

More than a hundred environmental projects come through for consideration. Proposals received are for education, conservation, research and general issues. An open mechanism is created for institutions and NGO agencies to apply for financial support. Mazda does not declare the rate of funding.

3.8.3 Murray and Roberts

Murray and Roberts co-funds a chair in EE at Rhodes University (Rhodes University 1998). On offer are EE graduate courses, publications, professional services, specialised curriculum and course development and materials development.

3.8.4 Nedbank

The Nedbank group has pledged R7 million for the years 2000 - 2004 in collaboration with the Mail and Guardian newspaper (Mail & Guardian 1999) and the World Wide Fund (WWF). The collaboration sponsors annual Green Trust awards. The award celebrated its tenth anniversary in 2000.

The Green Trust recognises and awards individuals, communities, companies and organisations committed to making environmental concerns their business. Awards to deserving entries are made on 02 June, World Environmental Day. Focus categories are:

- water awareness
- schools' projects
- urban renewal
- natural resources
- investing in the environment: individual
- investing in the environment: corporate
- community projects

The awards are of monetary value.

3.8.5 Pick and Pay

Pick and Pay launched an Enviro Facts Project using recycled paper (Earthyear 1999:8-9). Environmental facts sheets are distributed throughout Pick and Pay stores. Facts sheets cover topics such as:

- water
- global issues
- trees

- marine environment
- pollution
- waste
- greenhouse effect and
- drug, child and woman abuse.

Reprints of about six million copies have been distributed to schools, universities, technikons and non-governmental organisations.

Environmental issues form an integral part of the company's on-going education and training programmes for employees. Staff at all levels attend workshops that highlight Pick and Pay's commitment to uplifting communities, reducing waste generated and recycling.

Other environmental projects have been part of the Green Trust Annual Awards since 1997, participating in the water week, World Environmental Day, Arbour and Marine days.

3.8.6 SASOL

SASOL has a social responsibility programme (Earthyear 1999:14). It is committed to improving local community structures enabling EE programmes. Sites expansion and location are not clearly put. The company has made a R3 million grant to the University of the Witwatersrand for the establishment of the SASOL Chair in Environmental Engineering and the SASOL centre for Environmental Management.

3.8.7 Summary

The contribution to EE policy and practice by the private sector is of varying magnitude. The commitment varies from superficial or to serious internal and external environment commitment. This is a missing link between the Department of

Education and business except for the continuing contribution to previously advantaged institutions such as Rhodes University. It appears that historically white institutions like Rhodes enjoy a lofty funding position. A more equitable approach is needed to address the capacity of historically black institutions to be involved in EE.

Unfortunately, economists and ecologists or environmentalists are often antagonists, (Mehrtens 1999:84-85). Business may regard EE or environmental concerns as problems. Mehrtens (1999:84-85) states that:

> *Constant growth is essential for a healthy economy; We must consume to keep the economy growing: A business that cares about the environment is at a competitive disadvantage; Society should pick up the tab for the social costs of production, for example pollution; The earth is a gigantic toolshed - which we can ransack for the necessary raw materials to power our plants and furnish our factories.*

EE requires that respect and integrity of ecosystems should be promoted. Business and economics should align with ecological principles. Business should attempt to absorb the social costs of pollution and other environmental issues. Investing in EE and the integration of EE into school curricula are a start.

3.9   CONCLUSION

Policy and practice on EE warrant that careful attention be paid to agents that drive its drafting and the eventual promulgation of Acts. People tend to have similar aspirations, they want policies and practices that will help them meet their aspirations in life. An education and training policy has to consolidate a capacity building approach to human resource development that maintains a healthy physical environment.

The criteria I to be recommended for the integration of EE into the school curriculum of the NP should therefore pay careful attention to the agents that will drive the

implementation process. This chapter has highlighted roles played by government and non-governmental organisations. It is assumed that the criteria for the model to be recommended will depend on the willingness of government to consider it and the support of the non-governmental organisations to support schools in implementing EE.

The NP may be on the losing end since most of the companies' headquarters are located outside the province. If EE policy and practice is to be seriously funded by business then more is expected: the collaboration and linkages have to be adjusted and be more equitable. Business should be taken to task by civil society to balance the scales between profit and community building. This will favour EE in South Africa. EE will benefit if legal compliance which may go above minimal compliance is set and potential environmental liability which impinges on the company's financial liability is set (Ledgerwood et al 1993:xiii).

The expected partnerships between schools and the private sector should directly benefit learners, schools and their communities. Indirectly the private sector should benefit from an improved public image. Thus, the role of business is important in EE curricular practice as it pays social dividends.

This chapter has shown that government, the private sector and civil society structures contribute to EE curriculum policy development and practice. The next chapter deals with EE approaches from selected countries.

CHAPTER 4

ENVIRONMENTAL EDUCATION CURRICULUM DEVELOPMENT
IN SELECTED COUNTRIES

4.1 INTRODUCTION

In the previous chapter the history, policies and practices of EE were described and the relevance for the integration of EE into curricula, indicated. This chapter describes what underpins, informs and drives EE curriculum development and implementation in other countries around the world. This information can help with the development of criteria for a model for the integration of EE into the curricula of schools in the NP because curriculum innovation experiences of other countries should be an indicator of success stories to be considered and examples that may be followed.

4.2 ENVIRONMENTAL EDUCATION CURRICULA IN OTHER COUNTRIES

4.2.1 Australia

Australia has developed national statements and curriculum profiles in recent years. A national statement gives a curriculum framework. The arts, English, health and physical education, languages other than English, mathematics, science, technology and studies of society and environment (SOSE) are the learning areas covered (Robbotom 1996:44). The SOSE learning area is identifiable with EE.

The SOSE places emphasis on:

*   time
*   continuity and change
*   place and space
*   culture

- resources and natural and social systems (Australian Education Commission, in Robottom 1996:45). The five strands are supported by a process strand of investigation, communication and participation.

Two research projects carried out by the Faculty of Education, Deakin University, contributed to an understanding of the Australian EE policy and practice. The projects were titled:

- Contestation over National and "Community" Interests in the Development of Environmental Education (Robottom 1996:45) and
- Environmental Education across Australia (Robottom 1996:45)

The project on the "Contestation over National and Community Interests in the Development of Environmental Education" focussed on the tension between the attempt by government to centralise curriculum development and historically school based EE activities. The study revealed that there are (Robottom 1996:46):

- a number of role players in the development of the EE curriculum, that is the teacher, the community and non-governmental curriculum development agencies;
- conflicts over policy direction in EE: in the 70's the Ministry recommended that schools take the initiative to develop programmes whereas SOSE national standards centralise decision making;
- to some extent lessons to learn from the United Kingdom that centralisation of EE might have a marginalising effect;
- critical research topics such as EE curriculum development and continuing professional development of teachers;
- calls for a socio-political approach in EE research.

The project on "Environmental Education across Australia" looked at the relationship between EE policies and practices in schools, agencies (non-governmental

organisations) and field study centres involved in EE. A distance education programme was developed.

Other issues relating to EE learning and teaching in Australia are (Palmer 1998:170-171; Schulze 1998; Duffy & Duffy 1994):

- It is teacher based and school based.
- Teaching is investigative in approach.
- There is adherence to national curricular statements.
- The curriculum is centralised, strongly contextual and community based.
- An attempt to address philosophical and empirical questions has been made.
- Environmental issues are addressed on the basis of what is, and what ought to be.
- There is collaboration with other non-governmental agencies that are committed to environmentalism.
- An EE curriculum is co-joined with social education, hence promoting a social agenda.
- There is a presence of an association for EE formed in 1980 with a membership of about 500 individuals.

The lessons from Australia for the integration of EE into the school curriculum of the NP are that: It is important to develop and pronounce a National Curriculum Statement that gives a framework for curriculum development. Furthermore, it is of value to follow a participatory and collaborative process in the development of EE curricula. The process of EE curriculum development should consider the advantages and disadvantages of centralisation of decision making. This implies that criteria for the integration of EE into the school curriculum of the NP should define the EE curriculum framework through the involvement of stakeholders and also strike a balance between centralisation and decentralisation of decision making.

4.2.2 Botswana

The Botswana government appointed an Education Commission in 1994 to review its education system. The report of the education review by the appointed commission made the following recommendations (The revised national policy on Education 1994). That:

- clear national goals for EE be defined;
- an action plan for implementation be drawn;
- EE be incorporated into all key school subjects;
- an EE Education Development officer be appointed;
- an EE curriculum panel be institutionalised with all other subjects represented; and
- in-service teacher training for citizen participation be recognised.

The NP should learn from the Botswana experience that political and administrative decisions should be followed by a commitment to allocation of resources. In this case the decision to "incorporate EE into all key school subjects" was followed by the appointment of EE staff and an emphasis on continuing professional development of teachers.

4.2.3 Canada

Since the late 1960's, Canada recognised the importance of public education (Palmer 1998:173-175). EE was preceded by nature study, natural history, conservation education and outdoor education. There was federal and provincial co-operation though education is a provincial mandate (Palmer 1998:173-175).

EE is embedded in the science curriculum documents. Environment related school activities are integrated into existing subjects. Learning support material is available. Topics covered include: water resources, sustainable living, forestry and environmental citizenship. Learning programmes challenge schools to become

"green'. Schools engage in activities such as restoring grounds, parks and wetlands, recycling, fund-raising for whales, local zoos and forests, planting trees and writing to elected officials about local issues. Values of caring, responsibility and respect are inculcated (Palmer 1998:173-175). Canadian higher education has faculty members whose main research interest is EE.

The Canadian EE curriculum development process has certain similarities to the South African situation. Canadian provinces have a mandate to provide education, as in the case of South Africa. From Canada's example the NP should consider that it is beneficial to maintain links and co-operate with the National Department of Education in matters pertaining to the integration of EE into the school curricula. EE themes to be taught should be defined and learning support material should be made available to learners and teachers.

4.2.4 Ecuador

Palmer (1998:184) states that Ecuador has an EE policy in support of sustainable regional development. The Provincial Council of the Pichincha Province of Ecuador (a regional government) asked Corporacon OIKOS (a non-governmental organisation) to develop an Environmental Communication and Education Plan (ECEP). Broad components guided the development. The components were environmental communication, environmental education, agro-industrial production and municipalities' institutional building.

Informal sectors chose strategies that were campaign based. The campaign focused on:

- social diffusors: local people were engaged to pass on information to others;
- targeting the general public;
- a mass communication campaign;
- applying new environmental norms and regulations;

- launching complementary local environmental management programmes by municipalities and local development agencies;

- community dialogues, consensus, negotiations around characterisation and interpretation of environmental problems; and

- day-to-day practices to prevent pollution, protect the environment and to conserve natural resources and wildlife.

Formal education in Ecuador focuses on developing and strengthening EE technical infrastructure in the schooling system, including curriculum development, teacher training and the production of educational materials. Formal education is intent on putting schools in contact with communities to work out solutions to environmental needs (Palmer 1998:184). Palmer (1998:184) concludes that problems facing Ecuador are lack of institutional support, monitoring and evaluation.

Informal and formal EE education offer learning programmes that support sustainable regional development. The same can be said for the NP: any EE curricular content should address the broader regional social development agenda. There should be emphasis on the principle of integrated development planning that brings together social partners such as the municipality and the NP Department of Education. Issues such as *mass communication campaigns* to advocate a positive environmental ethos and support schools in the integration of EE into curricula should be considered the model to be recommended.

4.2.5 Greece

Palmer (1998:188) indicates that EE was initiated in 1980 with the training of 30 teachers by the Council of Europe (Palmer 1998:188). Presently EE is project based and holistic in approach. The Ministry of Education is supportive.

Various problems are experienced in Greece. For example, the curriculum development is extremely centralised and the supply of textbooks is limited so that schools are provided with one textbook per teacher per subject. Sources of

information are limited. Time-tabling is interdisciplinary though EE teaching is on a voluntary basis. An experimental Environmental Education Centre was opened by the Ministry. There are attempts to establish a network of Regional Training Centres. Teachers are encouraged to participate when free. Minor remuneration is offered. Higher education has included EE in university courses. Non-governmental organisations contribute to community projects and networks of teachers.

For consideration by the NP, Greece presents possibilities of continentally and cross country supported EE learning projects. It should be noted that the experience of Greece does not favour centralisation of curriculum development. The problem of inadequate learning support for schools is also evident. In addition the issue of the importance of EE centres is highlighted. In this regard the establishment of a network of EE centres within the NP would benefit schools.

4.2.6   Kenya

The aims of EE in Kenya (African Social Change and Environmental Studies Programme 1993 & 1997:v) are to:

- increase the learners' awareness of the components of the environment and how they interact to modify surroundings;
- encourage the learners to be more aware and sensitive to their surroundings;
- assist the learners in developing skills that enable them to learn from the environment so as to solve environmental problems;
- encourage the learners to develop personal concern for the quality of the environment;
- help the learners to appreciate and enjoy the environment; and
- encourage the learners to develop positive attitudes towards the use and care for the environment.

Learners are taught EE themes to be aware of the processes and consequences of their activities on the environment and their quality of life. Resource material for

learners and teachers was developed through the Project on Education Resources in Primary Schools in East Africa (African Social Change and Environmental Studies Programme 1997:I). Tanzania and Uganda are using similar resource material.

Similar to Greece, Kenya spells out the value of cross country collaboration and sharing of resources which the NP could consider. Once more the Kenyan experience shows the NP the need to spell out required EE knowledge, skills, values and attitudes.

4.2.7 Malawi

Chilambo (1999:91-95) writes about Malawi as a country with a population of about 12 million people (year 2000 estimation). The population growth rate is 3.2 percent. There is pressure on arable land, therefore the government has attempted to address EE issues. However, the process is impeded by the high illiteracy rate. Malawi has an Environmental Action Plan which was launched in June 1994, an Environmental Management Act of 1996 and a Forestry Act of 1996. The Acts' intentions are assisted by efforts such as:

- non-governmental projects to enhance EE and natural resource conservation;

- formal education which presents EE as integrated into the geography and biology curriculum: the critique thereof is that fieldwork and course work are too broad;

- donor funds from the Rockefeller Foundation which sponsored 25 secondary schools through the African Forum for Children's Literacy in Science and Technology.

Malawi has a multi-sectoral approach to EE. Other observations about Malawi indicate that the teachers' inadequacy to teach EE impacts negatively on how learners interact with the environment (Chilambo 1999:95). Chilambo (1999) recommends that in-service teacher training for EE be institutionalised, more schools

be included in EE projects and that the Ministry of Education should provide more learning support material.

Accordingly, the NP should consider a *multi-sectoral approach* to the learning and teaching of EE. Benefits of a such an approach is that NGO's, international donors and government can plan together to combat problems of teacher incompetence and the allocation of learning support material.

4.2.8   The Netherlands

The Netherlands' education system is undergoing changes. The changes are propelled by a 30 percent drop-out rate in tertiary education (Kroft & Sinkeldam 1999:605-614). Students in tertiary education are found not to have adequate skills in planning, creativity, communication and investigation among others (Kroft & Sinkeldam 1999:605-614). Two key studies or review curriculum processes were embarked upon in 1996/1997 and 1998/1999. The two studies are discussed next as presented by Kroft and Sinkeldam (1999:605-614).

A curriculum review pilot project was carried out in a network of schools in 1996 to 1997 (Pieters, Brone & Kolker 1998). Administration of examinations was part of the review. The study aimed to test expected skills that would support integration of curricular topics across subject areas. EE topics were found to be more relevant integrators or lending themselves better to integration.

The Netherlands school curriculum forming the last two years of general education was the focus as an extension of the 1996/1997 study in 1998-1999. Learners were requested to choose one of the four profiles or streams of learning to prepare portfolios (Kroft & Sinkeldam 1999:605-614) including:

- learners had to choose between culture and society, economics and society, environment and health, as well as environment and technology as streams of learning;

- the first domains of attainment targets for the four profiles were defined as language, computation, communication, information, problem solving, research and technical domains; and

- assessment of a learner's portfolio took the form of a practical assignment, which could be a written report, article, oral report, demonstration, poster presentation, or audio-visual presentation (Kroft & Sinkeldam 1999:607).

A practical assignment would carry a weight of 40 percent of the overall mark. The written pencil and paper test would account for the remaining 60 percent. This applies to the last but one year of schooling. The last year of general education's assessment of learner profile is not mark-linked but promotes a full research cycle in the form of a scientific research, social research, an investigation of literature and a technical or creative design (Kroft & Sinkeldam 1999:607).

The nature of the integration around EE topics covers examples like an assignment on urbanisation. This integrates geography and history as well as ecological recovery which integrates biology and chemistry (Kroft & Sinkeldam 1999:610).

Data from the two Netherlands studies are indicators of possible methodologies that can be followed in integrating EE across the school curriculum in the NP. The studies also give advice to schools on how to assess an integrated approach.

In the Netherlands EE learning is through practical, institutionalised and assessable projects. The model for the integration of EE into the school curriculum of the NP should ensure that EE learning and teaching is not extra-curricular. EE learning programmes should contribute to learner assessment and promotion from one school grade to another. EE assessment should also be formative and summative.

4.2.9 Norway

The Norwegian plan for promoting an international perspective in primary and lower secondary education states that environmental awareness is one of the needs of society (Barr 1994:56). The needs are spelt out as (Barr 1994:56-59):

- greater knowledge and awareness of ecology and the consequences of, for example, environmental pollution (Barr 1994:56);

- a citizen of the world should know about management of resources, pollution and global impoverishment which must be addressed and resolved in co-operation with others who may be different from one and would therefore react differently to the problems (Barr 1994:58); and

- the syllabus of grades seven to nine has as one of its goals to help learners to "gain insight into society and the natural environment and to understand our duty to manage our environment responsibly" (Barr 1994:59).

Norwegian schools use the project approach (Palmer 1998:159). EE is implemented as a multi-disciplinary issue. Integration acknowledges professional and psychological barriers of mono-disciplinary trained teachers. These teachers find it difficult to function in an inter-disciplinary, co-operative learning environment.

EE projects approved by the Norwegian system aim at (Palmer 1998:161):

- selecting, developing and implementing interdisciplinary local environments;

- working out proposals for the integration of informal mono-disciplinary curricula;

- preparing a set of educational material for each project and appropriate teacher courses; and

- raising public awareness about such changes in the education system as a whole and in EE in particular and the impact of changes.

The outcomes of approved projects have been (Palmer 1998):

- the realisation of links among various forms of subject knowledge;

- holding successful regional seminars;

- publication of materials;

- enhanced dissemination of acquired collective experiences of EE;

- publication of a methodological newsletter; and

• INSET for EE leadership for head teachers, regional boards and the Ministry.

Norwegian schools use EE learning and teaching to contribute to the broader social agenda, an issue for consideration by the NP. EE learning themes are similar to those of other countries such as Canada and Ecuador. Lessons for the NP are that there are limits to over-emphasising an interdisciplinary approach and that teachers find it difficult to cope. Issues such as well-developed learning support material, EE dialogue in the form of seminars, conferences and public awareness cannot be over-emphasised if the integration of EE into the school curriculum is to succeed.

4.2.10 Poland

Stawinski (1999:634) writes that the Polish EE school curriculum aims at teaching and learning about the principles or foundations of sustainable use of natural resources. The focus and main areas of study are on local, regional and global EE issues. Basic human needs are acknowledged in the light of finding ways of meeting the needs whilst respecting the foundations of sustainable development. The school curriculum further aims at developing the following attitudes in learners:

• taking individual responsibility for one's impact on the environment;

• adopting a pro-ecological lifestyle, which includes self discipline in consumption;

• a pro-active stance to prevent ecological problems and finding solutions where problems exist;

• living in harmony with nature; and

• prioritising nature and environmental conservation.

Polish EE research indicates a need to increase the knowledge of EE among teachers. Stawinski (1999:637) suggests that organising seminars and conferences can serve that need. Teachers should be encouraged to take part in ecological research. Research results should be shared by publication in the media, the local press, magazines, radio and television. New didactic methods are needed in EE.

Learners and adults can have an impact on local and regional decision making in EE.

The Polish EE school curriculum is premised by sustainable development and therefore has an ecological bias. Human needs are considered within a participatory framework. These issues are important for designing a model for integrating EE into the school curriculum of the NP. The use of the media (be it electronic or print), should be considered in an EE advocacy campaign.

4.2.11 Scotland

> The knowledge and skills to understand and interpret the environment ...should go further by encouraging and providing opportunities for developing informed attitudes ...related to the need to care for the environment in its immediate, local and global contexts and to the desirability of taking an informed position on topical and important issues (SOED in Palmer 1998:154).

The Scottish Consultative Council on the Curriculum (SCCC) cites EE as one of the issues to be considered in Values in Education for Scotland (Barr 1994:164). A Social Responsibility statement states that *respecting and caring for the environment* enables learners to work towards the humanistic and international dimensions in education.

Environmental studies is given 25 percent of the time allocation in primary schools (age cohort five to 14). Primary school curricula include science, technology, social subjects, health education and information technology (Palmer 1998:154). The knowledge and understanding dimensions are emphasised. Acquisition of inquiry based skills and learning about, for and through the environment are promoted.

Secondary schools allocate 10 percent of learning time to social and environmental studies. The schools have 20 percent notional time which can be used at their discretion.

Learning and teaching is based on the action competence model (Palmer 1998:157). Knowledge, commitment, vision and action experiences guide learning. EE is not another curriculum element for which to find space but a way of learning and teaching. Reality and imagery of social and natural issues are the focus. Issue-based constructs are implementable as key elements in a cross curricular way. Schools use a holistic approach towards learning and teaching.

EE learning in Scotland is *about, in and through the environment* in primary schools. Lessons for the NP from the Scottish experience are once more the emphasis on humanistic values in the teaching of EE and the time allocation on the school time table.

4.2.12 The People's Republic of China

Palmer (1998:179) writes about The People's Republic of China as having professional and general EE in higher education. Professional EE is followed by individuals intending to work in the environmental field on graduation. General EE is taken by students who will enter various fields of basic education.

The Chinese Association of Environmental Science held an EE conference in 1979. It recommended EE for primary and secondary education. The recommendation was followed by a pilot study in 1979, and a conference for teachers in 1985. EE was arranged as an elective course or an extra-curricular course from 1991 by the State Education Commission. By 1993 EE material was added to teaching materials at the stage of compulsory education.

EE has become a regular discipline in basic education. It is integrated into Chinese, mathematics, social studies, geography and science education. Areas of knowledge

covered are: air, water, soil, noise pollution, plants, animals, food chains and ecological balance. Secondary education covers systemic environmental knowledge, awareness, values, attitudes and investigating problems. EE is an elective. Both secondary and primary education offer extra-curricular activities such as hiking, mountain climbing, observing and experiencing. Problem solving, experimenting, field studies and simulated or role playing approaches are used.

The People's Republic of China has moved from having EE as an extra-curricular course to having it integrated into subjects of basic education. In addition, EE can also be offered as an elective. Similarly, the NP could offer extra-curricular activities to support in-school teaching of EE.

4.2.13 Uganda

The concept of EE was not common to Uganda prior to 1977 (National Environment Management Authority 1996:5). Mobilisation of the community has led to education *about* and *from* the environment and less *for* the environment.

The topic *Environment* is mentioned in the Uganda Primary Teachers Colleges Syllabus. Aims of teaching are to enable students to:

- consolidate previous science learning by applying knowledge from all science fields to the study of the environment;
- understand the environment and the interactions therein;
- realise the need for improving the quality of the environment through sustainable development; and
- show competence in teaching EE in primary classrooms.

Selected curriculum content is:

- Introduction to the environment, the physical and social environment.
- Different interactions in the environment.

- Important natural cycles.
- Teaching about the environment.

Pre-primary education has objectives to (National Environment Management Authority 1996:5):

- help ... the child to develop right attitudes towards the environment, and
- develop ... the child's consciousness for safety within the environment.

Primary education has environmental concerns integrated into the curriculum. Science and social sciences use more of an integrated approach. Teacher competence has to be strengthened (National Environment Management Authority 1996:5). Secondary education has items of minimal environmental importance in subjects such as geography, agriculture, chemistry, physics and biology.

References to pre-, primary and secondary education is for prior 1996. An EE strategy was developed by the National Environmental Management Authority (NEMA). Newly defined objectives are more in line with the Tbilisi conceptual framework. More emphasis is put on methodologies (National Environment Management Authority 1996:12) that encourage:

- adventurous exploration and enjoyable involvement;
- extensive interdisciplinary participation;
- decision-making based on practical problems - and living with the consequences of the decisions made;
- future relevancy unfettered by conventional wisdom;
- improving performance, through applying knowledge, considering values, perceptions and decision options and responding to feedback; and
- setting verbalisation and social skills alongside numeracy and literacy.

Uganda emphasises the learning and teaching of EE from pre-primary, to primary and secondary education in line with the Tbilisi conceptual framework (Ministry of

Education 1997). A model for the integration of EE into the school curriculum of the NP should review the Ugandan aims and methodologies of teaching EE.

4.2.14 United Kingdom

The United Kingdom has a history of EE related activities dating back to the eighteenth century. Around 1902 to 1940 associations of rural studies gave rise to Environmental Studies (Palmer 1998:4). An EE conference was held at Keele University, Staffordshire. The conference brought together educationists and conservationists. A Council for Environmental Education (CEE) was established in 1968. Terms of reference given where the development of EE theory and practice, promoting the concept and monitoring progress and assessing effectiveness.

A statement of aims of the National Association for Environmental Education was drawn in 1976 and revised in 1982 and 1992 (Palmer 1998:12). The statement set out learning targets or performance objectives for all school age groups. Targets for ages five to12, that is primary and middle schools were as presented in the table below (Palmer 1998:12).

Table 5 EE learning targets for primary and middle schools in the United Kingdom with special reference to science and geography (Palmer 1998:12).

TOPIC	LEARNING TARGETS
Area and location	• local and national environments using local and world maps
Atmosphere and cosmos	• simple climatic factors • atmosphere in the life of plants and animals • major climatic and vegetative patterns of the world
Landforms, soils and minerals	• soil, landforms in Britain and the world
Plants and animals	• own environment • interdependence • conservation, food species • create and preserve conditions under ecologically balanced ecosystems which can evolve in this local environment
Energy	• recognise manifestations of energy in various forms • control of energy by man • know that energy arrives from the sun • know the origin of fossil fuels
Water	• necessity of water • importance as a natural resource • water cycle
People	• varieties and similarities among people • how people live and use their different environments • rural depopulation as a world-wide phenomenon • population growth and its relations to the quality of life
Social organisation	• individual and group responsibility • environmental experience to gain discipline • recognition to agencies working with problems • recognise international co-operation as a means of solving world environmental problems
Economics	• food, clothing and shelter needs to available resources in various societies • recognise organisation of resources into farming, forestry, fishing, mining, manufacturing, servicing, transportation and communication
Aesthetics, ethics, literacy and numeracy	• environmental experience to acquire basic skills • building a basic vocabulary of environmental terms • use of visual arts and music to describe and interpret various environments • appreciation of art and design factors in the built environment
Built environment	• recognition of different buildings and functional areas in the locality, residential, shopping, work places, leisure provision • know the main local services, police, fire brigade, hospital

The National Curriculum has been revised. A report was published in 1995 for implementation in 1996. EE is subsumed in the science and geography instructional offerings. Subjects such as English, mathematics, science design and technology, information technology, history, geography, modern foreign language, art, music and physical education are offered. A study of the report reveal that some of the key outcomes address EE curricular issues. The table below presents the broader curricular framework and subject topics that create opportunities for the study of EE issues:

Table 6 Broader curriculum framework with special reference to science and geography (Department of Education 1995)

KEY STAGE	AGE COHORT	SCIENCE	GEOGRAPHY
1	5 - 7	• experimental and investigative science	• environmental quality • riverine studies
2	7 - 11	• life processes and living things	• weather, settlement, • environmental change
3	11 - 14	• materials and their properties	• ecosystems
4	14 - 16	• physical processes	• development • environmental issues

The curriculum is structured to continue to develop knowledge and skills in key subject areas; motivate all learners and ensure high expectations; develop a range of talents and raise standards (Dearing 1993:44).

Valuable lessons can be learnt from the United Kingdom due to its "long history of EE related activities". EE learning targets for primary and middle schools and the broader curriculum framework with special reference to science and geography are valuable in benchmarking a possible EE framework for the NP.

4.3 CONCLUSION

Numerous countries have made attempts to accommodate EE in their curricula. However there are still vast differences in scope and depth of EE programmes offered. Various models are used. They vary from adopting a general approach, a project approach, an extra-curricular approach to integration into all or selected disciplines. The various approaches are relevant to the research problem: what should a model for the integration of EE into the school curriculum of the NP look like? The recommended model will consider EE curricular policy and practice in the aforementioned countries.

The next chapter is a presentation of a detailed explanation of the research design for this study.

CHAPTER 5

RESEARCH DESIGN

5.1 INTRODUCTION

In chapters two to four a review of relevant literature with regard to EE curriculum policies and practices was presented and discussed. This chapter gives the research design to investigate a case study of the NP in view of the literature review. The aim of this is to develop criteria for a model for the integration of EE into the school curriculum of the NP. A model cannot be proposed in a void - context is important. The approach will be qualitative as well as quantitative.

5.2 SPECIFIC RESEARCH OBJECTIVES

As indicated in chapter one the general research problem is:

What should criteria for a model for the integration of EE into the school curriculum of the NP look like? (See section 1.2)

Following the statement of the research problem there is an expectation to state relevant hypotheses. Hypotheses are formal affirmative statements predicting a single research outcome and giving tentative explanations of relationships between variables (Best & Kahn 1993:11). This study is descriptive in approach, therefore in some instances only objectives are listed. In other instances the objectives are followed by the stating of hypotheses (Best & Kahn 1993:66). This is supported by Borg and Gall (1989:67) who also state that listing objectives and not hypotheses is more preferable in descriptive studies.

Thus the following are the five specific research objectives which were identified during the literature review and which will direct the research design. The aim of the research is to develop criteria for a model for the integration of EE into the school curriculum of the NP.

5.2.1   Research objective 1

To define the personal profiles of the curriculum practitioners of the NP.

The description of the personal profiles is supported by the stating of specific research problems and hypotheses where applicable.

The personal profiles will be described in terms of:

- category (teachers, college lecturers, curriculum advisors, curriculum developers and curriculum managers);
- age;
- sex;
- language preference;
- qualifications; and
- experience.

The definition of the personal profiles of the curriculum practitioners of the NP is important since it is the practitioners who are involved in the development and implementation of EE into curricula. Their understanding of the diverse theories and competencies that EE develops will be influenced by their experience, language abilities and qualifications.

Following are the research problems, null-hypothesis and research hypothesis per age, sex, language preference, qualifications and experience.

- **Age**

Research problem 1

Is there a significant difference between the number of curriculum practitioners of diverse ages in urban, peri-urban, rural schools and the head office of the department?

Null-hypothesis 1

Ho_1: There is no significant difference between the number of curriculum practitioners of diverse ages in urban, peri-urban, rural schools and the head office of the department.

Research hypothesis 1

H1: There is a significant difference between the number of curriculum practitioners of diverse ages in urban, peri-urban, rural schools and the head office of the department.

- **Sex**

Research problem 2

Is there a significant difference between the number of male and female curriculum practitioners in urban, peri-urban, rural schools and the head office of the department?

Null-hypothesis 2

Ho_2: There is no significant difference between the number of male and female curriculum practitioners in urban, peri-urban, rural schools and the head office of the department.

Research hypothesis 2

H2: There is a significant difference between the number of male and female curriculum practitioners in urban, peri-urban, rural schools and the head office of the department.

- **Language preference**

Research problem 3

Is there a significant difference between the number of curriculum practitioners of diverse language preference found in urban, peri-urban, rural schools and the head office of the department?

Null-hypothesis 3

Ho_3: There is no significant difference between the number of curriculum practitioners of diverse language preference in urban, peri-urban, rural schools and the head office of the department.

Research hypothesis 3

H3: There is a significant difference between the number of curriculum practitioners of diverse language preference in urban, peri-urban, rural schools and the head office of the department.

- **Qualifications**

Research problem 4

Is there a significant difference between the number of curriculum practitioners of diverse qualifications in urban, peri-urban, rural schools and the head office of the department?

Null-hypothesis 4

Ho_4: There is no significant difference between the number of curriculum practitioners of diverse qualifications in urban, peri-urban, rural schools and the head office of the department.

Research hypothesis 4

H4: There is a significant difference between the number of curriculum practitioners of diverse qualifications in urban, peri-urban, rural schools and the head office of the department.

• **Experience**

Research problem 5

Is there a significant difference between the number of curriculum practitioners of diverse years of experience in urban, peri-urban, rural schools and the head office of the department?

Null-hypothesis 5

Ho_5: There is no significant difference between the number of curriculum practitioners of diverse years of experience in urban, peri-urban, rural schools and the head office of the department.

Research hypothesis 5

H5: There is a significant difference between the number of curriculum practitioners of diverse experience in urban, peri-urban, rural schools and the head office of the department.

5.2.2 Research objective 2

To describe the institutional setting, institutional capacity, curriculum practices and provisioning patterns of the NP.

The description of the setting is supported by the stating of the research problems and the hypotheses, in some instances.

The setting will be described in terms of:

- residential area (urban, peri-urban, rural) illustrated by means of photographs;
- laboratory or science room facilities;
- number of learners per grade or class;
- types of field excursions undertaken by schools;
- the number of learners provided with learning support material;
- the number of teachers provided with syllabi and other curriculum policy documents;
- the number of teachers receiving curriculum support; and
- the number of schools that have an EE school policy.

The description of the institutional setting, institutional capacity, curriculum practices and provisioning patterns of the NP is necessary because the feasibility of integrating EE into school curricula depends on the variables listed above.

Following are the research problems, null hypotheses and research hypotheses for the number of schools with a laboratory or science room facilities; number of learners per grade or class; types of field excursions undertaken by schools; the number of learners provided with learning support material; the number of teachers provided with syllabi and other curriculum policy documents; the number of teachers receiving curriculum support; and the number of schools that have an EE school policy.

- **Laboratory or science room facilities**

Research problem 6

Is there a significant difference between the number of schools with a laboratory or science room in urban, peri-urban and rural settings?

Null-hypothesis 6

Ho_6: There is no significant difference between the number of schools with a laboratory or science room in urban, peri-urban and rural settings.

Research hypothesis 6

H6: There is a significant difference between the number of schools with a laboratory or science room in urban, peri-urban and rural settings.

- **Number of learners per grade or class**

Research problem 7

Is there a significant difference between the number of learners per class in urban, peri-urban and rural schools?

Null-hypothesis 7

Ho_7: There is no significant difference between the number of learners per class in urban, peri-urban and rural schools.

Research hypothesis 7

H7: There is a significant difference between the number of learners per class in urban, peri-urban and rural schools.

- **Number of times per year that schools go on field excursions**

Research problem 8

Is there a significant difference between the number of times per year that schools go on field excursions in urban, peri-urban and rural schools?

Null-hypothesis 8

Ho_8: There is no significant difference between the number of times per year that schools go on field excursions in urban, peri-urban and rural schools.

Research hypothesis 8

H8: There is a significant difference between the number of times per year that schools go on field excursions in urban, peri-urban and rural schools.

- **The number of learners provided with learning support material**

Research problem 9

Is there a significant difference between the number of respondents provided with learning support material in urban, peri-urban and rural schools?

Null-hypothesis 9

Ho_9: There is no significant difference between the number of respondents provided with learning support material in urban, peri-urban and rural schools.

Research hypothesis 9

H9: There is a significant difference between the number of respondents provided with learning support material in urban, peri-urban and rural schools.

- **The number of teachers provided with syllabi and other curriculum policy documents**

Research problem 10

Is there a significant difference between the number of teachers provided with syllabi and other curriculum policy documents in urban, peri-urban and rural schools?

Null-hypothesis 10

Ho_{10}: There is no significant difference between the number of teachers provided with syllabi and other curriculum policy documents in urban, peri-urban and rural schools.

Research hypothesis 10

H10: There is a significant difference between the number of teachers provided with syllabi and other curriculum policy documents in urban, peri-urban and rural schools.

- **The number of teachers receiving curriculum support**

Research problem 11

Is there a significant difference between the number of teachers receiving curriculum support in urban, peri-urban and rural schools?

Null-hypothesis 11

Ho_{11}: There is no significant difference between the number of teachers receiving curriculum support in urban, peri-urban and rural schools.

Research hypothesis 11

H11: There is a significant difference between the number of teachers receiving curriculum support in urban, peri-urban and rural schools.

- **The number of schools that have an EE school policy**

Research problem 12

Is there a significant difference between the number of respondents that have an EE school policy in urban, peri-urban and rural schools?

Null-hypothesis 12

Ho_{12}: There is no significant difference between the number of respondents that have an EE school policy in urban, peri-urban and rural schools.

Research hypothesis 12

H12: There is a significant difference between the number of respondents that have an EE school policy in urban, peri-urban and rural schools.

In addition a number of open-ended questions related to curricula (resources, interim syllabi and policy documents) were asked.

5.2.3   Research objective 3

To document the EE knowledge, skills and attitudes and other related issues of curriculum practitioners of the NP.

This was done by means of the following eight questions:

(1)   What is your understanding of EE?

(2)   Have you heard/read about the Rio Summit. If yes, what is your understanding of commitments made by the South African government?

(3)   If you think EE should be taught in schools, can you give reasons?

(4)   How do you think EE should be taught in primary or secondary school education?

(5)   What is your understanding of C2005 and OBE?

(6)   Environment is a phase organiser in C2005. What does this mean to you?

(7)   Which knowledge, skills, values and attitudes should an EE curriculum impart to learners?

(8)   If you were given a chance to redesign the curriculum, how would you integrate EE into the school curriculum?

5.2.4   Research objective 4

To seek guiding principles to curriculum development partnerships between institutions of learning, their communities and other agencies like non-governmental organisations.

This was done by means of the following five questions:

(1)   What role should the Department of Environmental Affairs, Nature Reserves, Science Centres and Environmental Centres play in the teaching of EE in the school curriculum?

(2)   What role should provincial universities and colleges play in supporting the teaching and learning of EE?

(3)   What role would you like to see communities where colleges are located, play in the EE school curriculum?

(4)   How can communities benefit from schools that teach and practise EE?

(5)   Any other comments you have on the integration of EE into the school curriculum of the Northern Province?

5.2.5   Research objective 5

To look for recurrent EE related events in media release statements with a view of providing incidents or categories of focus.

This was done by analysing 14 articles on environment, education and development which appeared in diverse newspapers during the research period.

5.3 RESEARCH DESIGN

Borg and Gall (1989:324) refer to a research design as "a process of creating and empirical testing to support or refute a knowledge claim". Bogdan and Biklen (1992:58) define a research design as a product of the planning stage providing the parameters, the tools and the general guide on how to proceed.

Apart from a quantitative approach (testing hypotheses), this study will also use a descriptive, naturalistic, inquiry approach. According to Patton (1990:195) as well as Lincoln and Guba (1985), in naturalistic inquiry design the researcher joins the subjects' world but remains detached. The inquiry is open-ended and phenome-nological in approach. It seeks to discover "what is the structure and essence of experience of a phenomenon for the subjects" (Patton 1990:69). The inquiry is open-ended because it does not "presuppose which dimension of feeling or thought will be salient for the subject" (Patton 1990:296).

A naturalistic inquiry design also makes it possible to collect qualitative and quantitative data (Patton 1990:189). Qualitative data (Best & Kahn 1993:183-187) uses non-quantifiable relationships existing between variables like the level of EE curriculum support and its impact on curriculum practice for explanations. Quantitative data (Best & Kahn 1993:208) are numerical in nature. Observations of situations and materials is described in a numerical format. The respondents are described per defined category, for example as teachers or curriculum advisors.

In this study there will be qualitative and quantitative (using descriptive statistics) data collected because the study is descriptive in nature.

5.4 RESEARCH METHODS

The following issues will be addressed:

- measures to ensure validity and reliability;

- data collection; and
- data analysis.

5.4.1 Measures to ensure validity and reliability

Validity and reliability as concepts were explained briefly in chapter one (see section 1.5.3). Content validity was ensured by making sure that all the relevant and appropriate questions for designing a model for the integration of EE into the curriculum of the schools in the NP were asked. This was done, amongst others, by asking the opinions of curriculum practitioners.

Validity was also ensured by triangulation of methods. More than one method was used namely: questionnaires including open-ended questions, photographs and document analysis (articles). Moreover, validity and reliability were ensured by the fact that the researcher is knowledgeable and experienced in EE and spent a reasonable amount of time in the research field.

5.4.2 Data Collection

5.4.2.1 Sample

A sample is a small proportion of the population (Best & Kahn 1993:17). A population is defined as a group of individuals who have one or more characteristics in common (Best & Kahn 1993:17). For this study the population refers to the curriculum practitioners in the NP Department of Education.

The education social unit as a whole will be examined, in this case the school and its support structures. The school is selected because it is an institution set up by the community through work and effort to afford the child an opportunity to constitute his/her world (Kruger 1992:57). The school as a unit or a section of the community is used to explore the feasibility of transforming the curriculum because schools and teachers are often called upon to help assuage society's problems (Fien 1997:5). The Brundtland Report of the World Commission on Environment (Fien 1997:7) also

states that teachers have an important role to play. Thus teachers can be seen as social change agents.

The sample for this study is therefore a non-probability sample (Best & Kahn 1993:17). Subjects who were available and willing were used, which means it was a convenience sample (McMillan & Schumacher 1997:169). The respondents are employees of the Department of Education from three areas namely, Tzaneen, Pietersburg and Rebone in the NP of South Africa. The respondents worked at schools, curriculum units and colleges.

5.4.2.2   Methods

More than one method (the questionnaire, photographs and document analysis) will be employed in this study.

(a)   Questionnaires

A questionnaire will be used as the main tool to collect data on the research objectives (see section 5.2). Both closed and open ended questions were used in the design of the questionnaire (see annexure B).

Such a questionnaire gives participants an opportunity for free responses so that desired factual information is collected (Best & Kahn 1993:229). Two hundred questionnaires were mailed to primary schools, secondary schools, a college of education and the provincial directorates of curriculum development and curriculum support services.

(b)   Photographs

School grounds were observed and documented photographically. The state of the physical environment of the learning site or school or institutional grounds was captured in pictures. The photographs tell a story on whether policy necessarily

translates into practice. Photographs are useful as they can be aligned with qualitative research. They provide striking descriptive data used in understanding the subject of study. They are not the answer but a research tool for arriving at an answer (Best & Kahn 1993). These photographs may present useful information to be considered in the design of a model for the integration of EE into the school curriculum because the physical state of a school environment may influence the culture of learning and teaching.

(c) **Document analysis of media release statements**

Key EE issues were looked for in media release statements. Recurrent events and activities were noted with a view of providing incidents or categories of focus, to allow for seeing the diversity of situations under review and the dimensions of the categories (Glaser 1978). This too may present the researcher with important information for designing a model for the integration of EE into the school curriculum, since a curriculum should be relevant to local issues.

(d) **Procedures**

The NP Department of Education granted permission for conducting the research in any of its institutions (see annexure A). The researcher engaged a research assistant to administer the questionnaire in Tzaneen and Rebone. The researcher administered the questionnaire in the Pietersburg cluster.

A pilot study was conducted with college lecturers of Tivumbeni College of Education in Tzaneen to identify problems related to the questionnaire. No problems were recorded.

5.4.3 Data processing

The data collected is qualitative and quantitative. Data from quantitative variables will be processed through the use of descriptive and non-parametric statistics (Borg & Gall 1989:819).

▲

According to Patton (in Best & Kahn 1993):

> *Interpretation involves explaining the findings, answering 'why'*
> *questions, attaching significance to particular results and putting*
> *patterns into an analytic framework. The discipline and rigor of*
> *qualitative analysis depend on presenting solid descriptive data ....*
> *in such a way that others reading the results can understand and*
> *draw their own interpretation.*

5.4.3.1   *Quantitative analysis*

Descriptive statistics in the form of frequencies and percentages will be employed. Data will be counted or classified. The data will be taken as distribution free and there will be no stringent assumption of normally distributed populations (Best & Kahn 1993:275). Non-parametric statistics is chosen because it makes inferences without assumptions about the nature of data distribution (Best & Kahn 1993:357). This study will further employ the chi-square formula to test hypotheses (Siegel & Castellan 1988:111; Zar 1996:457).

The analysis yields a normative description in line with non-parametric statistics as explained earlier. Borg and Gall (1989:419) refer to this normative description as a "marginal tabulation". Marginal tabulations report on single questionnaire variables in the form of percentage after calculating the number of occurences or incidences (frequencies). For example, the tabulation might state that 50 percent of the curriculum practitioners in the NP are not in favour of integrating EE into the school curriculum. Marginal tabulations provide important leads in identifying needed emphases and changes in school curricula issues (Borg & Gall 1989:419), and are therefore important in the design of a model for the integration of EE into the curriculum of the NP.

5.4.3.2 Qualitative analysis

The qualitative analysis shall be done by means of words. The responses of the respondents shall be "assembled, subclustered in semiotic segments" (Miles & Huberman 1994:5-7). A detailed description of events is given. The description of events will include direct quotations capturing the respondents' personal perspectives and experiences. Content analysis puts patterns into an analytic framework (Patton 1990:376), through data reduction (Miles & Huberman 1994:10). Data reduction is reorganising data into comprehensive units.

Patton (1990:381) and Robinson (1991) further describe qualitative content analysis as a process of identifying, coding and categorising primary patterns in the data collected. Sherman and Webb (1990:85,137) explain content analysis as an intention to gain insight from data collected by means of identifying domains of a phenomenon to identify categories. Qualitative data analysis is informed by context sensitivity. The content analysis will be done on the respondents' answers to the open-ended questions, the photographs and the media release statements.

5.5 CONCLUSION

This chapter stated the five specific research objectives and the 12 hypotheses. A descriptive, naturalistic research design is used. Research methods were discussed in detail.

The next chapter presents the results and a discussion of the results. These results will be studied to determine what criteria for a model for the integration of EE into the school curricula of the NP should look like.

CHAPTER 6

RESULTS AND DISCUSSION OF RESULTS

6.1 INTRODUCTION

In the previous chapter, five research objectives were stated. Moreover, the research design was explained. This design is aimed to gather information to determine criteria for a model for the integration of EE into the school curriculum of the NP. This chapter will proffer research results from the empirical research. Of the 200 questionnaires that were given to institutions 50 percent were returned and analysed to reveal the following results regarding the five research objectives.

6.2 PRESENTATION OF RESULTS OF EACH RESEARCH OBJECTIVE

6.2.1 Research objective 1

To define the personal profiles of the curriculum practitioners of the NP.

This will be done with regard to categories of curriculum practitioner, age, sex, language preferences, qualifications and years of experience. The results appear in tables 7 to 17.

- **Categories of curriculum practitioners**

Table 7 gives the categories of curriculum practitioners that responded to the questionnaire, as follows:

Table 7   **Categories of curriculum practitioners**

CURRICULUM PRACTITIONER	f	%
Teachers	82	77
College lecturers	06	6
Curriculum advisors	02	2
School principals	03	3
Curriculum developers	11	10
Educational managers/directors	02	2
n =	106	100

According to table 7 most of the respondents (77%) curriculum practitioners are teachers and 10 percent are curriculum developers.

•   **Age**

Table 8 gives the age groups of the curriculum practitioners that responded to the questionnaire in various areas, as follows:

Table 8   **Age groups of respondents in various areas**

AGE GROUPS (f)				
Location	< 30	30-40	40-50	50 - +60	n
Urban	9	17	12	8	46
Peri-urban	5	11	2	0	18
Rural	7	15	6	1	29
Head office	0	2	8	3	13
n =	21	45	28	12	106
%	20%	43%	26%	11%	100%

The analysis of the age groups of curriculum practitioners is as follows:

Null-hypothesis 1

Ho1: There is no significant difference between the number of curriculum practitioners of diverse ages in urban, peri-urban, rural schools and the head office of the department.

To test the hypothesis, a χ^2 - value was calculated. The results appear in table 9.

Table 9   Chi-square and significance of difference between the number of respondents of diverse age groups in different locations

N	df	χ^2	Significance
106	9	27.33	$p < 0.01$

According to table 9, the null-hypothesis is rejected. This means that there is a significant difference between the number of curriculum practitioners of diverse ages in urban, peri-urban, rural schools and the head office of the department.

According to table 8, 43 percent of the respondents are between the ages of 30 and 40. There is a comparable spread of 20 percent for respondents less than 30 years of age and 26 percent of respondents who are 40 to 50 years. Collectively 63 percent (40 years and younger) were educated in the seventies and trained as teachers in the eighties at a time when South Africa was going through a tumultuous time politically. Teacher training was then conducted under different education departments. These respondents were educated when EE was being defined globally.

Of importance is also the consideration that most of the respondents still have more than twenty years of teaching time prior to retirement. They represent a good

investment for retraining and continuing professional development in line with any curricular changes to be implemented, for example for integrating EE into curricula.

• **Sex**

Table 10 indicates the sex of the respondents in various areas, as follows:

Table 10   Sex of respondents

SEX (f)			
LOCATION	MALE	FEMALE	n
Urban	10	36	46
Peri-urban	9	9	18
Rural	17	12	29
Head office	5	8	13
n =	41 (39%)	65 (61%)	106 (100%)

The null-hypothesis that was stated was the following:

Null-hypothesis 2

Ho2: There is no significant difference between the number of male and female curriculum practitioners in urban, peri-urban, rural schools and the head office of the department.

To test the hypothesis, a χ^2 - value was calculated. The result appear in table 11.

Table 11   Chi-square and significance of difference between the number males and females in different locations

N	df	χ^2	Significance
106	3	6.73	$p > 0.01$

The null-hypothesis is accepted. This means that there is no significant difference between the number of male and female respondents in different locations.

Although there are not significantly more females in the diverse locations, 61 percent of the respondents were female. This means that females are well presented to address gender equity issues in curriculum development and gender related, environmental issues such as employment practices in the teaching profession.

• **Language preference**

Table 12 gives the language preferences of curriculum practitioners who responded to the questionnaire in various areas, as follows:

Table 12   Language preference of respondents

Location	Afrikaans	English	Sepedi	Setswana	siNdebele	Tshivhenda	Xitsonga	n
				LANGUAGE				
Urban	29	18	2	1	1	1	0	52
Peri-urban	1	11	1	0	0	0	7	20
Rural	0	15	5	0	1	1	11	33
Head office	2	10	7	0	0	0	0	19
n =	32 (26%)	54 (43%)	15 (12%)	1 (1%)	2 (1.6%)	1 (1.6%)	18 (14.5%)	144 (100%)

Null-hypothesis 3 stated: There is no significant difference between the number of curriculum practitioners of diverse language preference in urban, peri-urban, rural schools and the head office of the department.

To test the hypothesis, a χ^2 - value was calculated. The result appear in table 13.

Table 13   Chi-square and significance of difference between the number of respondents of diverse language preferences in different locations

N	df	χ^2	Significance
124	18	75.91	$p < 0.01$

Table 13 indicates that $p < 0.01$, thus the null-hypothesis is rejected on the 1%-level of significance. This means that there is a significant difference between the number of curriculum practitioners of diverse language preference from various locations.

Respondents also had preference for more than one language. Table 12 shows that the majority (43%) of the respondents prefer English as a language of communication. This questions the status of the other ten official languages and the feasibility of a language policy promoting multilingualism when EE is integrated into the curriculum. Language of choice has a bearing on the language of teaching and the development of learning support material. These preferences are important when EE is integrated into the curricula of the NP.

• **Qualifications**

In the next table (table 14) the qualifications of the respondents are indicated.

Table 14   Qualifications of curriculum practitioners

QUALIFICATION* (f)						
Location	tdo	d&td	do	pgd	sd	n
Urban	30	13	1	1	1	46
Peri-urban	10	7	1	2	0	20
Rural	20	9	0	4	0	33
Head office	1	12	0	10	2	25
n =	61 (49%)	41 (33%)	2 (1.6%)	17 (14%)	3 (2%)	124(100%)

(* Teaching diploma only: tdo,   Degree and teaching diploma: d&td .

Degree only: do, Post graduate degree: pgd,   Senior degree (masters): sd).

(** respondents fell into more than one category of qualification)

The following null-hypothesis was tested:

Null-hypothesis 4

There is no significant difference between the number of curriculum practitioners of diverse qualifications in urban, peri-urban, rural schools and the head office of the department.

To test the hypothesis, a χ^2 - value was calculated. The result appears in table 15.

Table 15   Chi-square and significance of difference between the number of respondents of diverse qualifications in different locations

N	df	χ^2	Significance
124	12	48.78	p < 0.01

According to table 15 p < 0.01, thus the null-hypothesis is rejected. This means there is a significant difference between the number of curriculum practitioners of diverse qualifications in different locations. Table 14 indicates that those practitioners in urban areas are better qualified.

The qualifications of curriculum practitioners may influence their ability to integrate EE into the school curriculum. According to table 14, 49 percent of respondents have a two year, three year or four year teaching diploma. Variations in years of professional training are traceable to the inconsistencies of the apartheid policy of teacher training. White students had an opportunity to obtain a four year diploma. Black students could study for a three year diploma only, starting in the late seventies. The duration of teacher training influences the quality of graduating teachers.

Table 14 also shows that 33 percent of the practitioners are university trained. Thus in-service teacher training initiatives would probably be required, especially for poorly trained teachers in rural areas.

• **Years of experience**

Table 16 gives the curriculum practitioners' years of experience in the education department, as follows:

Table 16   Respondents' years of experience in the Department of Education

NUMBER OF YEARS (f)						
Location	<5	5-10	10-15	15-20	>20	n
Urban	11	11	5	7	12	46
Peri-urban	3	5	5	3	2	18
Rural	3	11	9	4	2	29
Head office	0	1	2	5	5	13
n =	17 (16%)	28 (26%)	21 (20%)	19 (18%)	21 (20%)	106(100%)

Null-hypothesis 5 that was stated reads as follows:

Ho5: There is no significant difference between the number of curriculum practitioners with diverse years of experience in urban, peri-urban, rural schools and the head office of the department.

To test the hypothesis, a x^2 - value was calculated. The result appears in table 17.

Table 17   Chi-square and significance of difference between the number of respondents with diverse years of experience in different locations

N	df	x^2	Significance
106	12	22.26	$p < 0.05$

Table 17 indicates that $p < 0.05$, thus the null-hypothesis is rejected on the 5%-level of significance. There is a significant difference in the number of respondents with diverse experience in the different locations. Urban teachers are most experienced (see table 16).

In addition, according to table 16, 26 percent of the respondents have between five and 10 years of teaching experience. The significance of experience should become clear later when exploring the question of EE knowledge, skills, values and attitudes.

Moreover, experience could have a bearing on one's ability to comprehend and adapt to change. It may be that those teachers with most experience are also those that are more set in their ways and may find it most difficult to adapt to change. On the other hand, younger, more inexperienced teachers are less set in their ways and may change more easily.

6.2.2 Research objective 2

To describe the institutional or school setting, institutional capacity, curriculum practices and provisioning patterns of the NP.

The above mentioned objective will be discussed in terms of institutional or school setting or residential area; the number of schools/institutions with a laboratory or science room; the average number of learners per grade or class; the number of times a year that schools go on field excursions; types of field excursion undertaken by schools; the number of learners provided with textbooks and or other learning support material; the number of teachers who have copies of the interim syllabi or the appropriate curriculum policy documents; the number of schools that receive curriculum support; and the number of institutions that have an EE policy.

The results appear in tables 18 to 33 as well as in photographs one to seven. In addition, a number of open-ended questions were also asked (as indicated). The questions focussed on the problems and possible solutions for obtaining resources, interim syllabi or curriculum policy documents.

The residential areas of the respondents appear in table 18.

Photograph 1: School A (a primary school in an urban setting)

Photographs 2 and 3: School B (a primary school in a rural setting)

Photographs 4 and 5: School C (a secondary school in a rural setting)

Photographs 6 and 7: School D (a secondary school in a peri-urban setting)

Photographic documentation of the school setting reveals the gap between urban and rural contexts. Rural settings indicate abject poverty and an environment not conducive to a positive culture of learning and teaching as well as learning about EE through the environment. School grounds are bare and neglected. The non-plastered structures next to the schools are the teachers' cottages, with no running water or sanitation. Their size limits the teachers' comfort and well being. Urban schools are structurally better off. School grounds are maintained but there is no indication of harnessing the natural environmental features. The grounds are man-made and clinical. Settings of schools do not create an environment for learning *through* the environment.

• Schools with laboratories or science rooms

Table 19 gives the number of schools/institutions with a laboratory or a science room, as follows:

Table 19 Number of schools/institutions with a laboratory or a science room

RESPONSE (f)			
Location	**Yes**	**No**	**n**
Urban	44	2	46
Peri-urban	19	5	24
Rural	6	23	29
n =	69 (70%)	30 (30%)	99 (100%)

Null-hypothesis 6 stated

Ho6: There is no significant difference between the number of schools with a laboratory or science room in urban, peri-urban or rural settings.

To test the hypothesis, a χ^2 - value was calculated. The results appear in table 20.

Table 20   Chi-square and significance of difference between the number of institutions with laboratories and science rooms in different locations

N	df	χ^2	Significance
99	2	44.56	$p < 0.01$

According to table 20 the null-hypothesis is rejected. Thus there is a significant difference between the number of schools with a laboratory or a science room in diverse locations.

According to table 19, 70 percent of the institutions had facilities such as a laboratory or a science room. Most of these (44%) are in urban areas. A laboratory or science room is important for the integration of EE into the school curriculum to enable learners to do practical work when learning about the environment. Moreover, it should be noted that the schools in rural areas are mainly without a laboratory or a science room. This confirms the findings of the School Register of Needs (Bot 1997:14; see section 1.1.2.4). This register states that only about 34 percent of the schools in the NP have a laboratory. This could be an obstacle for the integration of EE into curricula in rural areas in the NP.

• **Learners**

Table 21 gives the average number of learners per grade/class as follows:

Table 21   The average number of learners per grade/class

AVERAGE NUMBER (f)						
Location	30-40	41-50	51-60	61-70	>70	n
Urban	9	17	15	3	0	44
Peri-urban	0	2	14	2	0	18
Rural	0	3	7	8	8	26
n =	9	22	36	13	8	88
%	10	25	41	15	9	100

Null-hypothesis 7 states the following:

Ho7: There is no significant difference between the number of learners per class in urban, peri-urban and rural schools.

A chi-square value was calculated to test the null-hypothesis. The results are in table 22.

Table 22   Chi-square and significance of difference between the number of learners in schools in different locations

N	df	χ^2	Significance
88	8	55.056	$p < 0.01$

Table 22 indicates that the null-hypothesis is rejected on the 1%-level of significance. Thus there is a significant difference in the number of learners in classes in diverse locations.

Class sizes vary from 30 to over 60 learners per teacher (see table 21). National norms for learner teacher pupil ratios are 1:40 for primary schools and 1:30 for secondary education. Provinces have the prerogative to align the ratio in

consultation with stakeholders. More than 20 percent of respondents have classes of more than 60 learners, which is a source of concern and a violation of statutory learner and teacher rights. It questions the nature of pedagogical activities and practices in such classes. Collectively, 65 percent of respondents face classes with more than 50 learners; a teacher learner ratio higher than the national norm. These teachers would find it more difficult to incorporate EE into the school curriculum within the context of learner centred OBE and C2005. This is especially true of rural areas (see table 21).

• **Excursions**

Tables 23 and 24 demonstrate how teachers use the environment in their education.

Table 23   Number of times a year that schools go on field excursions

NUMBER OF EXCURSIONS (f)							
Location	Once	Twice	Often	Never	Depends on need	Not sure	n
Urban	8	15	8	6	1	2	40
Peri-urban	12	0	1	6	0	0	19
Rural	9	5	2	10	1	0	27
n =	29	20	11	22	2	2	86
%	34	23	13	26	2	2	100

Table 24   Type of field excursions undertaken by schools

RESPONSE	f	%
1. Environmental centre	8	8
2. Veld school	3	3
3. Fieldwork around town	5	5
4. Fieldwork outside the province (Gauteng, Mpumalanga and KwaZulu Natal)	17	18
5. Science Education Centre or Science Fair or Expo	6	6
6. Museums	10	10
7. Animal farms, birds or snake park, zoo	11	11
8. Tea farm	1	1
9. Factories	4	5
10. Water purification plants	1	1
11. Public service offices	2	2
12. Game reserves	3	3
13. Airports	2	2
14. Educational outings	11	11
15. Environmental studies	6	6
16. Subject specific outings (biology, geography, history and science)	7	7
n =	97	100

Null-hypothesis 8 states:

Ho8: There is no significant difference between the number of times per year that schools go on field excursions in urban, peri-urban and rural schools.

To test the hypothesis, a χ^2 - value was calculated. The results appear in table 25.

Table 25   **Chi-square and significance of difference between the number of school excursions in different locations**

N	df	χ^2	Significance
86	4	19.59	$p < 0.05$

The null-hypothesis is rejected on the 5%-level of significance. This means there is a significant difference between the number of excursions by schools in diverse locations.

According to table 23, responses to how many times a year the learners went on field excursions ranged from never (26%) or not sure (2%), to once per year (34%), twice per year (23%), often (13%), to depending on need (2%). Generally it appeared that schools strove to have out of class learning experiences at least once a year.

According to table 24, there was no consistency in the type of field excursions undertaken. Of the excursions, 18 percent were trips outside the NP, usually to Mpumalanga, Gauteng and KwaZulu Natal. It is not clear whether the three provinces were chosen on environmental merit or whether the choice was driven by a need to get away from the NP. Places such as environmental centres, veld schools, museums, animal farms, the zoos, factories, game reserves and airports were visited by schools.

However, tables 23 and 24 indicate that the majority of teachers take learners on excursions once or twice per year, outside the NP. Learners in urban areas most often get the opportunity to go on these trips. This implies that urban teachers can more easily use trips to help to integrate EE into curricula (see table 23).

- **Learning support material**

Table 26 gives the number of learners provided with textbooks and/or other learning support material in different areas, as follows:

Table 26   Number of learners provided with textbooks and/or other learning support material

RESPONSE (f)				
Location	Yes	No	Some	n
Urban	38	7	1	46
Peri-urban	6	10	3	19
Rural	5	19	4	28
n =	49	36	8	93
%	53	38.7	8.6	100

Null-hypothesis 9 states:

Ho9: There is no significant difference between the number of respondents provided with learning support material in urban, peri-urban and rural schools.

To test the hypothesis, a χ^2 - value was calculated. The results appear in table 27.

Table 27   Chi-square and significance of difference between the number of respondents with learning support material in different locations

N	df	χ^2	Significance
93	4	36.38	$p < 0.01$

According to table 27, the null-hypothesis is rejected on the 1%-level of significance. Therefore there is a significant difference in the number of learners from different locations, who have learning support material.

Of the learners, 53 percent have access to learning support material whilst 39 percent do not (see table 26). Provision was also significantly in favour of urban schools. Learning support material is a critical vehicle for learning and teaching.

Lack of learning resources could raise a range of deficiencies in curriculum practice with regard to the integration of EE.

As a follow-up, the following open-ended question was posed to respondents:

> If learners do not have textbooks and resource material, what do you think is the problem and what solution do you propose?

The lack of textbooks and resource material was attributed to problems such as lack of financial support, poor planning and lack of proper co-ordination by the Department of Education and schools. Textbook and learning support material suppliers contracted by the department were blamed for breaching book distribution supply contracts. The government is seen as failing to fulfil its promises and commitment of free education whilst at the same time not stopping "political point scoring" according to some of the respondents. "Mismanagement, corruption, surplus keeping by schools, high learner enrolments" and failure to institutionalise textbooks retrieval mechanisms also contribute to the problem of insufficient, non-satisfactory access of learning support materials in the classroom according to the respondents.

To further quote one of the respondents: "The government is yet to fulfil its promises". It was suggested that the government should "create job opportunities" for parents. If parents were financially empowered, they would assist the department in purchasing learning support material for their school-going children. Government should further reconsider and prioritise its departmental budget allocations. In addition, government should ensure that guidelines for learning support material delivery are adhered to, especially if there is a change in curriculum policy.

Respondents also suggested that schools continuing to have problems with supply of learning support material should consider "fund raising, copying worksheets, raising school fees, allowing teachers to develop learning support material" and "..consider holding back learners' end of term reports until textbooks were returned to schools".

Moreover the department was urged to consider "subject meetings, improving facilitation, co-ordination, communication and giving the schools the responsibility to manage their own financial allocation" as some of the systemic solutions. According to respondents, it would also help if allocation of resources were reviewed to ensure that schools have "similar resources and material".

• **Syllabi and policy documents**

The numbers of teachers with copies of interim syllabi or appropriate curriculum policy documents are indicated in table 28.

Table 28 **Number of teachers who have copies of the interim syllabi or the appropriate curriculum policy documents**

RESPONSE (f)				
Location	Yes	No	Do not know	n
Urban	39	4	1	44
Peri-urban	7	11	0	18
Rural	1	25	3	29
n =	47	40	4	91
%	52	44	4	100

Null-hypothesis 10 states that:

Ho10: There is no significant difference between the number of teachers provided with syllabi and other curriculum policy documents in urban, peri-urban and rural schools.

To test the hypothesis, a χ^2 - value was calculated. The results appear in table 29.

Table 29 Chi-square and significance of difference between the number of teachers with syllabi and policy documents in different locations

N	df	χ^2	Significance
91	4	51.075	$p < 0.01$

Table 29 shows that the null-hypothesis is rejected. Thus there is a significant difference between the number of teachers with appropriate documents in diverse locations.

Table 28 shows that only 52 percent of the respondents had appropriate curriculum policy documents to guide the integration of EE into learning and teaching. If practitioners do not have access to curriculum policy guideline documents, how, what and when do they teach? If this issue is linked to lack of access to learning support material, it is evident that the needs of learners and the teachers are compromised. However, the urban teachers have significantly greater access to appropriate documents and rural teachers have least access.

The responses in table 28 was followed by an open-ended question:

If teachers do not have copies of the interim syllabi or the appropriate curriculum policy documents, what do you think is the problem and what solution do you propose?

According to respondents, the numbers of teachers who had copies of the interim syllabi or the appropriate curriculum policy documents varied because of problems such as ".. lack of contact between departmental education planners and educators". It is the view of the respondents that educators were not informed which were the relevant curriculum policy documents and where to get a copy. Apparently school principals were "not communicating" nor "co-ordinating activities" with their circuit offices. Sometimes the circuit offices themselves did not have curriculum policy documents and therefore failed to hold workshops to familiarise teachers and

curriculum advisors with policy requirements. As such, curriculum advisors fail schools by not visiting them to offer classroom support. Schools were also blamed for "losing" copies of curriculum policy documents. The "ever changing" leadership in the education system was also cited as one of the problems.

As possible solutions, the respondents recommended the following: "The department needed to research what happened in schools and consider exempting syllabi printing from stringent Tender Board rules and procedures". Respondents felt that the department "should deliver", that is meet its mandate. Better "administrative control, appointment of qualified personnel with job descriptions", 'improved co-ordination and communication" were solutions to be considered. Moreover, schools should "demand" syllabi from education authorities. Teachers should be involved in planning, work together and communicate more with their circuit or district offices.

- **Curriculum support**

The next table indicates the number of respondents that receive curriculum support.

Table 30   Number of respondents that receive curriculum support

RESPONSE (f)				
Location	Yes	No	Not sure	n
Urban	13	17	5	35
Peri-urban	2	16	0	18
Rural	3	26	0	29
n =	18	59	5	82
%	22	72	6	100

Null-hypothesis 11 reads as follows:

Ho11: There is no significant difference between the number of teachers receiving curriculum support in urban, peri-urban and rural schools.

This null-hypothesis was tested by means of chi-square technique. Results appear in table 31.

Table 31   Chi-square and significance of difference between the number of teachers with curriculum support in different locations

N	df	χ^2	Significance
82	4	18.8	$p < 0.01$

Table 31 shows that the null-hypothesis is rejected on the 1%-level of significance. There is a significant difference between teachers from urban, peri-urban and rural areas regarding the curriculum support they receive. Teachers from urban areas receive significantly more support (see table 30). However, according to table 30, only 22 percent of the respondents received curriculum support at their schools. The percentage is low when compared to 72 percent of respondents who do not receive curriculum support. Curriculum support is an important feature of a functional education system. If respondents are not receiving curriculum support, it implies that the expected integration of EE is compromised.

The responses in table 30 was followed by an open-ended question:

If you receive curriculum support, how and by whom?

Respondents indicated that curriculum advisors, school principals, other teachers through schools cluster meetings, private agencies and teacher unions offered curriculum support. Workshops were indicated as the means of offering curriculum support.

Table 30 indicates that curriculum support to schools and in-service teacher training (INSET) for teachers is inadequate. INSET is integral for continually ensuring that teachers execute their responsibilities professionally. Continuing professional development should form a continuum with pre-service teacher training (PRESET). Issues of curriculum support create gaps in education provisioning if neglected and systemic quality assurance is compromised. Norms and standards should also be drawn. This is essential for teachers to learn how to integrate EE into curricula.

• **EE policy**

In the next table the respondents indicated who had an EE policy at their institutions.

Table 32   Number of respondents who have an EE policy at their institution

RESPONSE (f)				
Location	Yes	No	Do not know	n
Urban	7	18	4	29
Peri-urban	0	18	0	18
Rural	1	25	0	26
n =	8	61	4	73
%	11	84	5	100

Null-hypothesis 12 states:

There is no significant difference between the number of respondents that have an EE school policy in urban, peri-urban and rural schools.

This null-hypothesis was tested by means of chi-square technique. Results appear in table 33.

Table 33   Chi-square and significance of difference between the number of teachers with EE policy in different locations

N	df	χ^2	Significance
73	4	16.8	$p < 0.05$

Table 33 indicates the following: The null-hypothesis is rejected on the 5 percent - level of significance. This means there is a significant difference in the number of teachers of different locations with an EE policy, in favour of teachers in urban schools (see table 32).

However, only 11 percent of the respondents had an EE school policy. Schools may not have a policy because EE is not a mainstream subject in the interim curriculum. It is, however, a Phase Organiser for C2005. Lack of an EE policy has serious implications for the integration of EE into curricula of NP.

In addition to the aforementioned, the following question was asked:

If you have an EE policy, how was it developed and by whom?

Respondents indicated that school principals, heads of departments and other teachers had developed the schools' EE policy. The EE policy is embedded in OBE and is left to individual teachers to interpret.

6.2.3   Research objective 3

To document the conceptual understanding of EE knowledge, skills, values and attitudes and other related issues of curriculum practitioners of the NP.

Eight open-ended questions were asked to determine the EE knowledge, skills, values, attitudes and other related issues of curriculum practitioners of the NP. The results are as follows:

(1)   What is your understanding of EE?

The respondents' understanding of EE included the following: EE teaches and educates learners about the natural environment and manmade environments. EE ensures that learners take care, experience, respect, protect and preserve the environment. Awareness, valuing one's heritage and wise use of resources are promoted. One respondent stated "EE emphasises the integratedness and interconnectedness of natural, social, and cultural systems" .

Thirteen percent (n = 106) of the respondents have an understanding of EE as related to "knowledge, skills and education for survival in their environment as well as for protecting the environment, nature, plants and animals". The knowledge expected from EE is to enable learners to "look after and care for the environment".

Twenty one percent (n = 106) of the respondents understand EE as "teaching about the surroundings, as well as the cultural, social, natural and manmade environments". EE is also linked to "preservation, respect for, protection of and wise use of resources for future generations". At a personal level, EE is related to life skills, the ability to evaluate good or bad, improvement of the environment by recycling and the awareness of keeping the environment clean, according to the respondents.

(2)   Have you heard/read about the Rio Summit? If yes, what is your understanding of commitments made by the South African government?

Sixty six percent (n = 106) of the respondents have not heard of the Rio Summit of 1992. Those who have (about 3 percent, n = 106) are unsure of what it entails. They are unable to give an indication of their understanding of commitments made by the South African government. To quote one of the respondents: "South Africa will co-operate in important matters such as water management, animal management and pollution." Uncertainty and ambiguity by respondents on the Rio Summit of 1992

could be an indicator of how little environmental social marketing was done before and after the summit in this country. Lack of general knowledge such as this, has negative implications for the integration of EE into curricula of the NP.

(3)   Why do you think EE should be taught in schools?

One of the respondents gave the following response:

> *We are all one... whatever befalls the earth befalls sons of the*
> *earth... this we know, the earth does not belong to man, man belongs*
> *to the earth.*

Others responded that EE should be taught in schools to develop skills such as "critical thinking", "observation", "classification", "discovery", "interpretation", "prediction", "communication", "recording and problem solving". Other responses indicated the development of skills, as well as knowledge and insight. For example, according to some of the respondents:

> *EE teaches and educates learners about the natural world, it enables*
> *them to discover and research the environment thereby improving*
> *their knowledge and understanding of the environment.*

Some respondents focussed more narrowly on "nature conservation", "saving our heritage", "appreciation of fauna and flora", "preservation of natural resources and their management" and "development" as keys to the learning and teaching of EE. Some respondents felt that if learners understand environmental issues such as "ecosystem balance" they will "appreciate the need to protect and monitor environmental development and the need to live a better life in relationship with the environment".

Finally some responses indicated the feeling that EE should be taught in schools because EE can contribute to the national agenda of economic development since

the environment forms the basis from which life emanates. Seeing that education of learners is a critical national agenda, schools are the rightful institutions for the primary teaching of EE integrated into the school curricula. The integration of EE into the school curricula will assist teachers and schools to counter man's interaction with the environment, according to respondents.

(4)   How do you think EE should be taught in primary or secondary school education?

When the above mentioned question was asked, suggestions made included that EE should be "practically oriented and instil positive discipline and reinforce the culture of learning and teaching". Parents should be involved. Specified allocated time should be set aside for EE, that is, its subject status should be elevated. EE should be "integrated into geography, social sciences, biology, agriculture, general science and life orientation". Other views were that EE should have a scope covering all phases of learning from grade R to tertiary level. INSET initiatives should be more visible and resources should be allocated.

Several learning and teaching strategies were suggested. These included EE:

*   as out-of-class learning experiences, that is, field work;
*   as practicals;
*   as outcomes-based learning;
*   as a subject with its own syllabi and examinations;
*   integrated into art and culture;
*   as co-operative learning;
*   integrated into all learning areas; and
*   as a project approach, for example like poster making, gardening, tree planting and investigations.

Others stressed that the approach to the learning and teaching of EE should be global and holistic. This implies that it should consider that learners live "in a world with wide issues" that may be physical, social and economic in nature.

(5) **What is your understanding of Curriculum 2005 and Outcomes -Based-Education (OBE)?**

"Curriculum 2005 and OBE are outcomes driven and learner centred". This view was expressed by 21 percent of the respondents. For example, the outcomes based nature of C2005 was explained as learning products or results driven. It integrated education and training and is therefore theme-based, theory-based, experiential and practical in approach. In addition it was stated that teaching is not an end in itself. Teaching should recognise prior learning whilst ensuring holistic learner development that leads to lifelong learning.

Others stated that the development of skills, values and attitudes is encouraged. Learning is through discovery and group work. It is experiential and practical. Equity and lifelong learning are promoted.

Some respondents cited C2005 and OBE as "a nightmare", "too much rigmarole", and "new names to old ways of doing things". They doubted the success of implementing C2005 because whilst it was a good idea, the learner-teacher ratios in class remained an impediment.

The implication for the integration of EE into curricula is that there has to be enhanced advocacy, improved PRESET and INSET.

(6) **Environment is a phase organiser in Curriculum 2005. What does this mean to you?**

Responses to the above question were as follows: Environment as a phase organiser means that it is a point of departure in learning and teaching and it should

not be overlooked. It is fundamental to C2005. It cuts across all eight learning areas (see Annexures F and H). It is "inextricably and inexorably" linked to education and training as a whole, according to some of the respondents.

Environment should facilitate planning, organisation of learning as well as teaching and assessment. It should be addressed in all learning themes. It ensures that "personal development", "responsible citizenship", "learner awareness and understanding of the environment" are enhanced, to quote some of the respondents.

The development of learning support material cannot overlook the environmental context of learning. The writing of material should be organised around the topic environment to integrate subjects to be taught to ensure the holistic personal development of learners. Environment should give context to "planning, designing and organising as well as assessment" of learning experiences. It should be considered in materials development. However, some respondents did not know what a "phase organiser" is. It could be that advocacy for C2005 has still not reached all teachers since it was started in 1998.

This implies that even though some teachers understand the meaning of Environment as a Phase Organiser, there are systemic issues to be addressed like curriculum planning and materials development.

(7) *What knowledge, skills, values and attitudes should an EE curriculum impart to learners?*

A summary of the responses to the above question is given in table 34:

Table 34   Expected EE knowledge, skills, values and attitudes

ITEM	EXPECTATION IN RESPONDENTS' WORDS
Knowledge	• how the environment works • interrelationships between man, society and environment • understanding physical factors • management and development of natural resources • socio-economic development and conservation • understanding the relationship between science and culture • health education, HIV and AIDS
Skills	• comprehension, modelling, • creative and critical thinking • spatial and chronological perception • technical and social skills • problem solving, analytic thinking • mapping • writing, listening and reading • visual literacy • data organisation • reasoning, putting theory into practice • sorting and ordering information
Values and attitudes	• appreciation, responsibility, pride, devotion, respect and positive attitude towards the environment • wise use of the environment for the benefit of all living organisms • ubuntu, life skills • responsible citizenship and national loyalty • promote environmental social justice • self-sufficiency and tolerance • compromise, sacrifice, empathy • national loyalty • co-operation

The implication for the integration of EE into the curricula is that the EE curriculum design should sequentially incorporate the expected and appropriate knowledge, skills, values and attitudes. However, these should be compared to formal requirements so that training can provide the necessary knowledge and skills if these are lacking.

(8) *If you were given a chance to redesign the curriculum, how would you integrate EE into the school curriculum?*

Responses included that the curriculum should be "more practical" in design. EE could be integrated into the curriculum using a "thematic approach". Subjects such as "geography, social studies, biology, general science, agricultural science, guidance would be used as homes for the integration of EE".

Some respondents felt that the culture of learning and teaching needed to be restored prior to considering curriculum redesign. In their view "teacher morale and discipline were low in schools". In addition, more parent, teacher co-operation and in-service training were needed. Other respondents felt that it was "sufficient" to have environment as a phase organiser, that is there was "no need to redesign" the curriculum.

Other respondents stated that "resource allocation", and " time allocation" for EE (at least a period per week) should be a consideration. On the other hand it was suggested that "EE should be part of learning across the education system", that is General Education and Training (GET), Further Education and Training (FET) and Higher Education and Training (HET) bands of the National Qualifications Framework (NQF) should accommodate EE in curriculum design. Hence the need to allocate resources, be it financial or time on the institutional time table.

6.2.4 Research objective 4

To seek guiding principles to curriculum development partnerships between institutions of learning, their communities and other agencies like non-governmental organisations.

Five questions were asked, (as indicated in section 5.2.4). The results are as follows:

(1) *What role should the Department of Environmental Affairs, Nature Reserves, Science Centres, Environmental Centres play in the teaching of EE in the school curriculum?*

About 25 percent (n=106) of the respondents indicated that the Department of Environmental Affairs, Nature Reserves, Science Centres and Environmental Centres "should be more involved and play a more active role" in the teaching of EE. As stakeholders they could act as "resource centres" that "supply relevant information" and also assist schools in "learning materials development and support". For example, one stated: "resources like video tapes can be developed for borrowing by schools".

Respondents cited financial constraints as an impediment to out-of-class learning and teaching experiences. In this regard a respondent declared that "... the institutions referred to above should offer reduced rates for services to schools".

The respondents also felt that "the stakeholders should participate in national initiatives to develop an EE curriculum" and EE policy related matters. Schools would benefit if they were offered structured curriculum support. Examples of responses include that these could be done by "inviting or visiting schools through reach-out programmes". "Debates", "seminars" and "discussions on EE" should be held regularly, where possible on a quarterly basis. Events such as expos and school art competitions would raise learner EE awareness.

It was also felt that EE learning and teaching would be enhanced if learners were offered "scholarships and guidance" to pursue "EE career opportunities". Advocacy campaigns and social marketing, lobbying of international bodies, and community education were areas of forming partnerships with schools.

The next question focussed on the role of higher education in support of schools.

(2) **What role should provincial universities and colleges play in supporting schools in the teaching and learning of EE?**

One respondent stated:

> *Communication between provincial universities and colleges is important, in this way correlation will be achieved in setting EE as a common goal for the eventual education of learners throughout their school and university career.*

Other respondents declared that colleges and universities should carry and provide "up to date research results to schools" to enable them to develop relevant EE learning programmes. "Knowledge, resources and skills sharing" should be a feature of the relationship between schools and colleges or universities. In addition universities and colleges may provide EE materials "lending services" to schools.

Some respondents stated that "teacher training, be it pre-service teacher training or in-service teacher training, is a key area of service provision by colleges and universities". Community education and networking should also be done because schools are part of communities.

Curriculum development in schools will benefit if partnerships are formed with colleges and universities to continually develop EE as a subject by keeping the design simple and practical. The partnership will succeed if universities and colleges

include EE in their curriculum frameworks. Respondents stated that the "partnerships should include curriculum support to schools and materials development".

About 30 percent (n=106) of the respondents emphasised that activities such as "school competitions", "expo projects", "formation of study groups", "university students visiting schools", "workshops for teachers" and "the use of university laboratories and experimental farms" should be the basis of collaboration. This would allow universities, colleges and schools collectively to become EE agents of change.

The next question related to the role of communities in the development of EE school curricula.

(3)   What role would you like to see communities where colleges are located, play in the EE school curriculum?

Communities can play "a supportive role in the development" of EE school curricula. This support can be by "participation" in curriculum development and providing "financial aid". Furthermore communities should be agents of change by active participation. About 40 percent (n=106) of the respondents cited "community co-operative involvement" as important. Respondents stated communities could "assist in setting EE curriculum standards" through their School Governing Body membership, NGO's, the people's education and sharing their knowledge of indigenous technology and cultural teachings.

Issues such as "exemplary or good morals in environmental appreciation", "campaigns for the environment", "cleaning the environment", "respect and care for the environment", "saving water", "planting trees", "keeping the school yard clean" are rooted in the community. If communities understand "that individuals have a right to a healthy environment, they will thus educate their children on the importance of the environment".

School EE curricula will further be influenced by a community's ability to manage environmental projects such as "peace gardens", "set aside land for parks", "celebrate cultural days", "recycle waste" and "plant trees".

The question that was asked next aimed to determine how communities could benefit from EE curricula in schools.

(4) How can communities benefit from schools that teach and practise EE?

Respondents stated that communities would benefit from an introduction of EE into schools as "learners carry their knowledge, skills, values and attitudes back to communities". The knowledge, skills, values and attitudes are "the ability to solve problems, preservation and development of natural resources, protection of endangered species, respect for the environment and the ability to manage conservation projects". These were cited as important by respondents.

Respondents further stated that: "building a better, safe and clean environment and entrepreneurial benefits from recycling and tourism" are of interest to schools and their communities. Funds could be raised through tourism opportunities.

The final question that was asked of respondents was if they had any comments to add regarding the integration of EE into school curricula.

(5) Any other comments you have on the integration of EE into the school curriculum of the Northern Province?

Respondents raised issues that were systemic in nature such as "curriculum development", "curriculum design", "teacher development" and "provision of resources".

It was suggested that education and "advocacy campaigns" that encourage institutional collaborative stakeholder and individual support to schools should be

emphasised. Establishment of EE centres, inclusion of HIV/AIDS and sex education were considered as important.

In terms of curriculum development and design it was made clear by respondents that more "curriculum research and planning" that involve curriculum practitioners like teachers was of relevance to the integration of EE into the school curriculum. EE curriculum design should "develop languages", "involve stakeholders" and "give learners advanced EE knowledge". In the end this would promote a common goal around the teaching and learning of EE. EE learning programmes should be "learner centred", "technology based" and use "computer based assisted learning strategies".

Teacher development was raised again by respondents to reiterate that it should be "inclusive of EE programmes" whether it was PRESET or INSET. The "provision of resources" such as funding for school field excursions, purchasing of audio visual equipment, provision of learning support material and appropriate curriculum policy documents were cited as critical to meaningful curricular interventions and innovations. Respondents also felt that learner-teacher ratios warranted the attention of education authorities: these ought to be reduced to create a better environment for the learning and teaching of EE.

The last research objective was to take a closer look at media release statements and how these may influence the integration of EE into curricula of the NP.

6.2.5 Research objective 5

To look for recurrent EE related events in media release statements with a view of providing incidents or categories of focus for curricula.

Some media articles presented were collected from 1995 to 2000. The intention of including media "images" was to reflect on issues raised, namely messages on environmental matters, education and development. It is acknowledged that the images reach the literate part of our communities. It is also acknowledged that these

are only some examples and that, in fact, everything that is presented in the media focus on the natural, social, economic or political environments. This is in line with EE curriculum design considerations.

Media images on environment, education and development are presented in Annexure L. The article topics which focussed on both the social and the natural environment are:

Article 1:	Region faces deforestation by the year 2030
Article 2:	Outrage at soil scientist's view
Article 3:	A river dammed and destroyed
Article 4:	Government 'pit latrine' policy under fire
Article 5:	Local focus on fynbos for World Environment Day
Article 6:	Watershed in war on pollution
Articles 7 and 8:	Annan echoes call to save seas; 50 free environment teaching aid sets on offer
Article 9:	Teachers are not the only educators
Article 10:	Good ... and bad news for SA's environment
Articles 11 and 12:	Greenpeace tactics stir controversy; Green schools project launch
Article 13:	Green groups demand clean air as a constitutional right
Article 14:	Iscor warns about water

Table 35 gives a reflection of the mainly natural environmental issues raised by the media articles from 1995 - 2000.

Table 35   Media images on the natural environment, education and development

ARTICLE NUMBER	YEAR OF PUBLICATION	ENVIRONMENTAL ISSUES RAISED
01.	1995	Deforestation, energy needs
02.	1995	Species extinction, conservation, development, tourism
03.	1995	Environmental degradation, industrialisation river management, pollution, waste management, effluence, agriculture, mining
04.	1996	Provision of basic services like running water, sanitation, energy to households
05.	1997	Social marketing for environment education, role of business and partnerships, provision of learning support material
06.	1997	Water resources, pollution by mining, waste management, economic development
07.	1998	Save our oceans, marine environment, resource harvesting, waste management, sewage
08.	1998	Partnerships, provision of learning support material (posters and puzzles for schools)
09.	1998	Curriculum policy change, partnerships in education, provision of learning support material, what defines a curriculum, the role of the teacher
10.	1999	Species conservation, water resource management pollution, waste management, marine resources mining, land and environment
11.	2000	Species conservation, citizen action or environmental activism, development
12.	2000	Launch of the National Environmental Education Programme
13.	2000	Citizen action Pollution Energy use
14.	2000	Pollution of water resources

The implications for the integration of EE into school curricula in the NP are as follows:

The issues raised by the media are of local, national and global importance. They are indicative of issues for consideration when developing policy and designing a

curriculum for EE. The need for constructive partnerships between government, civil society and business is critical for dealing with these media images. The role of NGO's like Green Peace and the World Wide Fund for nature (WWF) is more effective in driving citizen action or being gatekeepers to ensure sustainable education, economics and development. Media images affect the learners, schools and their communities.

6.3   CONCLUSION

The results proffered have given a contextual profile of the empirical study. A contextual profile is explained as a detailed picture of emerging issues (Janse van Rensburg 1998:62). The responses from the open-ended questions gave a profile of how curriculum practitioners see the social construction role of EE and the need to institutionalise EE. The views of the respondents are in line with the observations of Robottom (1996:44), Le Grange and Reddy (1997:18) and Schreuder, Le Grange & Reddy (1999:128).

In conclusion, the research results highlighted issues such as:

- The status of EE as an approach or discipline;
- The value of partnerships and co-operation by government;
- Civil societies and NGO's in education provisioning;
- Learning support development and availability;
- Teacher training: who does it and when?;
- Funding and resource provisioning;
- Administrative capacities of the department and its schools;
- Participatory approaches to curriculum development;
- Curriculum support for schools;
- Curriculum policy development and practice;
- Mapping a possible curriculum for EE including out-of-class learning experiences;
- Media images - do policy makers listen?;

- Language development and EE policy;
- Classroom learner-teacher ratio;
- Consideration of other pressing issues like HIV/AIDS.

The issues raised in this chapter are in line with the findings from the literature study in chapters two to four. The empirical investigation together with the literature study should guide the outcome of this study. Findings of this study call for a modification of the previously accepted EE curriculum ideas. The quantitative and the qualitative research data are of important consideration in recommending criteria for a model for the integration of EE into the school curriculum of the NP in the next chapter.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

The aim of this study was to develop criteria for a model for the integration of EE into the school curriculum of the NP. Following the aim of this study a theoretical basis for EE and curriculum development was given in chapter two. Chapters three and four gave the history and the development of EE at local, national and international level as well as the contribution of South African business to EE. In addition, an analysis of EE policies and practices in other countries around the world was presented and the relevance for EE curriculum development indicated. Following the research design described in chapter five, chapter six gave the research results and a discussion of these results. In this chapter conclusions and recommendations emanating from the literature review and the empirical research are given. Limitations of the study are also highlighted.

As indicated in chapter one (see section 1.2) and chapter five (see section 5.2), the general research problem is:

> *What should criteria for a model for the integration of EE into the school curriculum of the NP look like?*

Following the statement of the general research problem the research objectives were stated as:

(1)   to define the personal profiles of the curriculum practitioners of the NP;

(2)   to describe the institutional or school setting, institutional capacity, curriculum practices and provisioning patterns of the NP;

(3)   to document the conceptual understanding of EE knowledge, skills, values and attitudes and other related issues of curriculum practitioners of the NP;

(4)   to seek guiding principles to curriculum development partnerships between institutions of learning, their communities and other agencies relevant to EE like NGO's;

(5)   to look for recurrent EE related events in media release statements with a view of providing incidents or categories of focus for an EE curriculum.

The five stated objectives that guided this study used both quantitative and qualitative approaches.

The conclusions and recommendations provided in this chapter are further informed by Armstrong who states that curriculum innovation brings about a change in the teacher's personal day (in Ornstein & Hunkins 1993:310). The recommendations on the integration of EE into the school curricula of the NP will also influence the role of the teacher in the classroom.

A model for the integration of EE into the school curriculum should be relevant, issue based, action oriented and value driven.

The model recommended should further consider (Ornstein & Hunkins 1993:298-299):

•   educating individuals about the worth of introducing EE into learning programmes;

•   that curriculum practitioners and other stakeholders should be clear about the purpose, the nature, and the benefits of the integration of EE into the school curricula of the NP

•   expected behavioural change in terms of EE learning and teaching premises;

•   the world of the teacher which may resist curriculum innovation;

•   that presence of new knowledge is not sufficient for curriculum innovation;

•   the required leadership, communication, release of human potential, problem solving and evaluation;

- that there may be tension, co-operation, conflict and cohesion in an attempt to innovate a curriculum; and
- the influence of external forces.

7.2 CONCLUSIONS

7.2.1 Conclusions from the literature study

The following conclusions from the literature study will be considered in the design of a model for the integration of EE into the curricula of the NP.

7.2.1.1 The history, policies and practices of EE

The aims, objectives and guidelines of EE were made clearer by the Tbilisi declaration of 1977 (see Annexure C).

Locally, that is in Southern Africa, traditional societies had strict codes of conduct. Observation of the codes generally meant sustainable living and environmental benefit (see section 3.2.1). Colonialism, apartheid and modernisation changed peoples' way of life. This affected the environment negatively. The previous apartheid regime in South Africa made attempts to address environmental issues by establishing a Council for the Environment in 1982. Principles of equitable distribution of resources and access promoted by the Environmental Conservation Act of 1982 were negated by the very nature of apartheid which emphasised separate development.

Several environmental landmark events as stated in chapters one and three contributed greatly to the global development of an environmental approach to education and development. Mentioned events promote learning and teaching for a sustainable life on the planet Earth. It is clear that governments periodically bind themselves to international declarations and conventions on the environment but

home based realities and priorities or lack of priorities dictate otherwise when policies are matched to funding and implementing practices.

OBE was implemented in the nine provinces of the Republic of South Africa from 1998. It was to be practised through C2005 in which environment is a phase organiser for the development of learning programmes and learning activities. This enables the integration of EE into curricula. Provincial capacity to implement a new curriculum varies. Capacities to integrate EE and provide supportive extracurricular activities vary. Provinces like Mpumalanga and Gauteng benefit from donor assistance with EE projects. Other provinces do not. The NP has only one EE Centre officially supported by the provincial Department of Education.

Business is a strategic partner in EE (see section 3.8). However, rural provinces like the NP are at the losing end as most corporate giants' headquarters are located in the affluent provinces like Gauteng and the Western Cape. Thus business in the NP has not made a major contribution towards the integration of EE into curricula.

7.2.1.2   EE curriculum development in other countries

Country by country studies or reflections were done to build a profile of the status of EE as a national concern or priority. Relevant issues regarding the integration of EE into curricula that were raised when countries' EE curricular frameworks were compared are:

- National statements and/or curriculum profiles or frameworks need to be developed;
- For the integration of EE, collaboration with NGO's and other stakeholders is important;
- The issue of centralisation or decentralisation of curriculum planning regarding EE need to be resolved;
- EE curriculum development is an ongoing process;
- Continuing professional teacher development in EE is important;

- A socio-political approach to EE research in curriculum development is critical;

- School based EE learning and teaching as well as informal EE are important;

- EE should also be considered as a social development agenda;

- A national action plan for EE integration into curricula is crucial;

- EE development officers and curriculum panels are necessary to facilitate the integration of EE into curricula;

- Learning support material development and availability to schools for the integration of EE into curricula are essential;

- EE centres play an important role as resources for teachers when they integrate EE into curricula;

- Donor funding for EE projects is crucial; and

- Advocacy for EE in the form of seminars, professional associations and newsletters facilitates the integration of EE into curricula.

Infusion, inclusion or integration of EE into the school curriculum differs from country to country (see section 4.2). Approaches chosen are:

- integration of EE across all learning areas - Botswana
- project approach - Norway
- interdisciplinary teaching - The Netherlands and Greece
- integration of EE into selected subjects - The Netherlands, Australia, Canada, The People's Republic of China, The United Kingdom
- teaching environmental studies - Scotland
- teaching social and environmental studies - Scotland
- general approach, no clear subject area of focus - Poland
- teach EE as a discipline - Uganda, Malawi

Subjects that are commonly chosen for the integration or interdisciplinary approaches are geography, languages, mathematics, biology, social studies, history, chemistry and physics .

Of the abovementioned, the following may be the most viable in the NP:

- integrating EE into selected school subjects or learning areas in lower school grades of schooling using a thematic approach (as in The Netherlands, Australia, Canada, The People's Republic of China and the United Kingdom, see sections 4.2.1, 4.2.3, 4.2.8, 4.2.12 and 4.2.14);

- teaching EE as a discipline in higher school grades in the form of unit standards (as in Uganda and Malawi, see sections 4.2.7 and 4.2.13); and

- implementing a project approach (as in Norway, see section 4.2.9).

Country studies further revealed that legal constraints and administrative structures can aid or hamper curriculum planning, development and change.

7.2.1.3 EE and curriculum development

The integration of EE into curricula is hampered by competing needs of other subjects in curricula. Its progress is also hampered by the lack of visible political will and allocation of resources.

Section 2.2 indicates that constructs of EE from literature that need to be understood by teachers and integrated into curricula, include that EE is:

- about learning knowledge, skills, values and attitudes for a healthy and sustainable environment;

- about learners being empowered and thereby becoming critical thinkers;

- concerned with transformation and reconstruction of communities at a local, national and global level;

- a way of life, a culture;

- being proactive, and reactive when necessary; and

- participation and collaboration for sustainable education and development.

Curriculum development for EE can be done by concurrently using various models such as the objective, rational, procedural, MacDonald's and Johnson's models to achieve defined outcomes (see section 2.3.1). Critical to the tenets of curriculum development models is negotiation of meaning by learners and teachers.

Approaches to curriculum development of EE can be behavioural, managerial, systems, academic, humanistic or reconceptualist based (see section 2.3.2). All approaches can be integrated in line with the schooling context and learner needs. The key to an acceptable approach is one that opens access to EE learning for all. An EE curriculum should be designed within the district or schools' context, learners' stages of development, choice of holistic inclusion or selective inclusion.

An EE curriculum design can be learner centred and project or problem centred (see section 2.4). Once a curriculum is designed it is used by a heterogenous group of people. In the case of the NP the schools are mainly in a rural setting. Design defines an intention explained as outcomes, learning strategies, a framework and assessment. The EE curriculum is subject to interpretation by users, who may or may not implement it successfully.

In view of the issues raised around curriculum development, an EE curriculum should include the aspects as listed in table 36.

Table 36   An EE curriculum framework/model

KEY STAGE	SCHOOL GRADE	THEMES
1	R - 3	own environment taking care of the environment human needs and the needs of other living organisms relationships between living organisms
2	4 - 6	settlements, built environment interdependence ecosystems
3	7 - 9	interdependence ecosystems social organisation environmental change development and environmental issues environmental economics
4	10 -12	environmental laws, ethics, auditing ecosystems land forms, soils and minerals conservation human impact on the environment

7.2.2 Conclusions from the empirical investigation

The empirical investigation in the NP with regard to the five research objectives revealed critical issues to be considered when designing a model for the integration of EE into school curricula.

The conclusions from the empirical investigation are given with regard to each of the five research objectives.

Research objective 1

To define the personal profiles of the curriculum practitioners of the NP.

Categories of curriculum practitioners that responded are teachers, college lecturers, curriculum advisors, curriculum developers and managers. Each category of curriculum practitioners plays different but complementary roles in curriculum implementation.

Personal profiles of categories of curriculum practitioners were further determined with regard to their age, sex, language preference, qualifications and years of experience as they are found in urban, peri-urban, rural and the head office contexts of the NP. The following conclusions were made:

- There are significant differences in the number of curriculum practitioners in urban, peri-urban and rural schools and the head office of the NP regarding age, language preference, qualifications and experience. Collectively 63 percent of the respondents are less than forty years old. Their views matter as they still have about twenty years of teaching to offer. Language preference differences emanate from the demographic pattern of the province. Indigenous languages are prevalent in peri-urban and rural areas. There is a bias of better qualified and more experienced teachers in urban schools. This implies that EE may be integrated more easily in urban areas. Rural areas may not have more INSET to facilitate the integration of EE into curricula (see section 6.2.1 and section 6.2.2)

- There is no significant difference in the number of male and female curriculum practitioners in different locations. This infers employment equity which is positive for the integration of EE since EE also addresses social issues such as gender issues (see section 6.2.1).

Research objective 2

To describe the institutional or school setting, institutional capacity, curriculum practices and provisioning patterns of the NP.

- Photographic documentation of schools in an urban, peri-urban and rural settings reveals disparities in the infrastructure (see section 6.2.2). Poverty as well as bare and neglected school grounds in rural areas will influence integration of EE negatively because there is a lack of resources to help integration. Schools in urban and peri-urban areas also do not foster natural environments that facilitate the integration of EE into currricula.

- There is a significant difference in the number of schools with a school laboratory or science room. The majority of the schools in rural areas are without this facility. The lack of such facilities influences the success of the integration of EE into the school curriculum. It implies that rural schools are at a disadvantage (see section 6.2.2).

- There is a significant difference in the number of learners per classroom in diverse locations (see section 6.2.2). Urban schools have a class average of mainly between 30 and 50 learners, whilst rural schools have class averages of 40 to 70 learners. Disparities in learner teacher ratio should be addressed by the provincial department. If not addressed, teachers in rural and peri-urban schools will have difficulty to integrate EE into the school curriculum because bigger classes impact negatively on the time that the teacher has available to address individual learner needs and the management of classroom activities.

- There is a significant difference (on the 5%-level of significance) between the number of times per year that schools go on field excursions. Urban schools go more often. Most schools, however, be it in an urban or rural setting, attempt to have one out-of-class experience per year (see section 6.2.2).

- There is a significant difference in the number of learners in different locations provided with textbooks and other learning support material (see

section 6.2.2). Access to learning support material is skewed in favour of learners in urban schools. Rural schools are at a disadvantage. This has a negative influence on learning and teaching in rural areas and thus on the integration of EE into curricula. The significant lack of access was blamed on the Department of Education and the government. Respondents suggested that resources allocation be equitable for all learners in the province.

- There is a significant difference in the number of teachers in different locations provided with syllabi and other curriculum policy documents (see section 6.2.2). Of the teachers in rural schools, about 3 percent have appropriate policy documents as compared to 88 percent of teachers in urban schools. Once more the communication and co-ordination mechanisms of the Department of Education are cited as a negative effect. It was concluded that schools exercise their Constitutional rights and "demand" syllabi and other related documents from the provincial department of education. If provision of the necessary policy documents is done arbitrarily as it appears to be the case, then the practice should be amended if the integration of EE into curricula of the NP is to succeed.

- There is a significant difference between the numbers of teachers from different locations receiving curriculum support. The level of support is low generally: it peaks at 37 percent in urban schools whilst rural teachers get by with a 10 percent level of support. This is not adequate for integrating EE into curricula.

- There is no significant difference between the number of schools/institutions in urban, peri-urban and rural areas provided with an EE policy. The overall percentage of schools with an EE policy is 11 percent. Schools that had an EE policy indicated that the staff themselves had developed the policy. There is no evidence of assistance by the district nor the provincial department.

Research objective 3

To document the conceptual understanding of EE knowledge, skills, values and attitudes and other related issues of curriculum practitioners of the NP.

Responses to the eight open-ended questions (see section 6.2.3) lead to the following conclusions:

- EE educates learners about the cultural, social, natural and manmade systems and is linked to care and wise use of resources.
- EE social marketing is low.
- EE should be taught to develop knowledge, skills, values and attitudes of learners.
- The teaching of EE should be through the environment, and be outcomes driven. The status of EE as a school should be "elevated". EE should be taught as a "full" subject or integrated into all learning areas.
- C2005 and OBE was a "nightmare" for some teachers. It was acknowledged that C2005 developed skills and knowledge and integrates education and training.
- Environment as a phase organiser in C2005 means it is a point of departure for learning and teaching, curriculum planning and the development of learning support material.
- An EE curriculum should impart knowledge on the management and the development of the natural and manmade environments. Learners should acquire skills such as critical thinking, technical and social skills. Values and attitudes such as responsible citizenship should be developed.
- An EE curriculum should be thematic and practical in design and approach and EE should be taught and institutionalised in all bands of the NQF.

Research objective 4

To seek guiding principles to curriculum development partnerships between institutions of learning, their communities and other agencies like non-governmental organisations.

Conclusions from the open-ended questions are as follows:

- The Department of Environmental Affairs and Tourism, nature reserves, science centres as well as EE centres should collaborate and co-operate with schools in the learning and teaching of EE.

- Provincial colleges and universities should function as resources for the teaching of EE through PRESET, INSET, community education programmes, in-school curriculum support and as change agents.

- Communities should play a role in EE through curriculum development and offering financial assistance and community based environmental projects.

- Schools that teach and practise EE should benefit communities, through the transmission of EE skills, knowledge, values and attitudes by learners to their communities.

- Systemic issues such as curriculum development, teacher development, establishment of EE centres, curriculum research and planning, language development, learner-teacher ratio, provision of resources should be attended to in the integration of EE into the school curriculum.

Research objective 5

To look for recurrent EE related events in media release statements with a view of providing incidents or categories of focus for EE curricula.

Media release statements focussed on local, national and global issues related to natural, social, economic and political environments. The statements should influence curricular decisions because curricula should be relevant to the everyday lives of learners.

7.2.3   Conclusions from the literature study and the empirical investigation

Conclusions from the literature study and the empirical investigation raise issues for consideration by the NP Department of Education, its leadership, curriculum administrators and managers, curriculum developers, curriculum advisors, teachers, the school community and other stakeholders.

The issues that need to be addressed for the integration of EE into curricula of the NP are:

- the importance of defining and structuring an EE learning and teaching premise (see chapter two);
- the supportive role the provincial Department of Education needs to play;
- the design of an EE curriculum framework (see section 7.2.1.3);
- EE as supported by an ecological theory (see section 3.3);
- the training of teachers regarding learning and teaching strategies for EE (see section 2.6);
- educating policy makers and teachers to ensure that schools/institutions have an EE policy (see section 6.2.2);
- EE teacher training (see sections 6.2.1 and 6.2.2);
- the role of EE centres as resources for the integration of EE into curricula (see section 6.2.2);
- the provision of learning and support material to facilitate the integration of EE into curricula (see section 6.2.2);
- EE leadership and management to support the integration of EE into curricula (see section 6.2.2);
- the role of curriculum advisors in providing curriculum support to schools (see section 6.2.2);
- partnerships and co-operation with relevant stakeholders (see sections 3.8 and 6.2.4).

7.3 RECOMMENDATIONS

It is recommended that the issues raised in the conclusions from the literature study and the empirical investigation be addressed as part of the criteria for a model to be recommended for the integration of EE into the curricula of the NP.

7.3.1 Criteria for a model for the integration of EE into the school curriculum

The following recommendations are proposed:

Recommendation 1

It is proposed that EE be integrated into the General Education and Training and Further Education and Training Bands (see Annexure D). School curricula can use a project approach, a theme within a discipline approach or function as a discipline.

Recommendation 2

Learning areas such as mathematical literacy, mathematics, mathematical sciences (MLMMS), economics and management sciences (EMS) and technology (TECH) should use an environmental project approach to teaching and learning.

Recommendation 3

Learning areas such as Human and Social Sciences (HSS) and natural sciences (NS) should integrate EE into the curriculum design using a thematic approach. Teaching time should be allocated for environmental topics.

Recommendation 4

Recommendations 2 and 3 are made in reference to the General Education and Training band, that is grades R to nine.

Recommendation 5

EE should be taught as a discipline in the Further Education and Training band in the form of unit standards on environmental topics as part of the curriculum.

Moreover, of the current C2005 eight learning areas (see Annexure G), only five have specific outcomes which address EE. Language Literacy and Communication has seven specific outcomes, arts and culture has seven specific outcomes, life

orientation has eight specific outcomes. None of the three learning area specific outcomes addresses EE directly. If the intention is implied then it is covert. This makes it difficult for a teacher at the micro level of curriculum development to pick up the curricular intentions. Thus teacher training for EE integration is crucial. The remaining five learning areas have some specific outcomes that are clear in addressing EE.

Recommendations made present forms of competition, collaboration, divergence and convergence with the current C2005 policy as follows:

Recommendations made present an alternative curriculum design choice which competes for attention with C2005. The NP has an opportunity to reconsider if the premise of integrating EE into all learning areas of GET and FET is the best possible curriculum design model. C2005 policy decision is more behavioural, managerial/ systems based and reconceptualist in approach (see section 2.3.2). Decisions around C2005 have not fully met the requirements of academic and humanistic needs since C2005 does not take into account the personal and social aspects of the classrooms in the NP.

Collaboration and convergence of C2005 and the recommendations made in this study are that they both ascribe to a learner-centred approach that supports learning and teaching that is activity based and takes into consideration life-long learning.

Forms of divergence between the recommendations of this study and C2005 are that C2005 determines outcomes and does not give schools grade specific scope, sequence and continuity aspects of the curriculum design (see section 2.4). The integration of EE through environment as a phase organiser is left to the teacher to interpret. The teacher may or may not have the capacity to design a learning programme. If one therefore considers that a curriculum design manifests itself vertically and horizontally, then the C2005 design does not fully address the needs of the learner, the teacher and schools.

Criteria for the integration of EE into the school curriculum of the NP following recommendations one to five should be done in consideration of the following guidelines:

Guideline 1: The scope of EE

The scope of EE should be guided by the Tbilisi Declaration (see Annexure C).

Guideline 2: Learning and teaching premise

The planning as well as the teaching and learning of EE should be participatory and collaborative in approach. EE requires the use of learner centred strategies. It is proposed that strategies such as brainstorming, panel discussions, socio-drama, field trips, small group activities, out of class assignments and nature tables should become a common feature of EE teaching and learning (see section 2.6.3).

Learning and teaching EE should include matters that inculcate national values. Outcomes driven learner centred approaches, and discovery learning should be used. In general, learning has to be structured whilst it promotes on-the-spot thinking and clear oral expressions by learners. Learning and teaching will benefit if the following approaches are used interchangeably or when relevant. Approaches suggested are guided, reflective, inquiry and explorative learning (Lorber & Pierce 1990:77-79).

Guided or *directed* learning uses a series of a set of questions leading to the discovery of some principle, formula or relationship. The practice allows learners to think deductively or inductively by following step-by-step thinking.

Learning should be *reflective*. Learners should be assisted in developing analytical skills, alternative explanations, finding solutions to selected problems and classifying ideas into major categories.

The *scientific method* and *inquiry* learning are applicable to most learning situations. Learners should be given opportunities to identify a problem, formulate a hypothesis, gather, evaluate and categorise available data, reach some conclusion, accept or reject the hypothesis on the basis of evidence acquired and take some appropriate action. In a case for EE, learners can write letters to relevant parties. Inquiry learning is not a one period event. Hours or days can be required to conclude an issue.

The *explorative discovery* approach enhances the affective domain. It is relevant to controversial environmental issues. It should be used without fear or censure in conjunction with a resource person who may be the teacher or a field specialist. The quality of learner responses should be an indicator of the effectiveness of discussions.

Guideline 3: The role of the provincial office of the Department of Education of the NP

The Provincial office of the Department of Education, referred to as Head Office by the public, has a responsibility to steer intervention programmes. It is responsible for mobilisation of resources, guiding curriculum planning and development, monitoring implementation of programmes and provision of technical support. The listed responsibilities are applicable to the integration of EE into the school curriculum. If the role of the provincial office is not pronounced, then the integration of EE into the school curriculum will be jeopardised.

Guideline 4: An EE curriculum framework

The learning programmes for EE for General Education and Training and the unit standards for Further Education and Training should have a curriculum framework or plan. The framework should give learning and teaching plans, expected learning experiences, outcomes and assessment strategies. All experiences in an EE educational programme should state the objectives or outcomes and content.

An EE curricular framework should consider issues of education about, for or in the environment (see section 2.6.2) at all times and be matched to the critical outcomes as in C2005 (see Annexure E).

Guideline 5: EE as supported by an ecological theory

Decades ago, Emery (1981:15) and Gough (1987:63) stated that EE implementation should be supported by an ecological theory. The integration of EE into the school curriculum will still benefit from the following suggestions of Emery and Gough:

- Consider and use information that is present in our personal, social and physical environment through learning processes within our environment;
- Promote interrelationships between learners and the environment rather than imparting knowledge in traditional teacher learner hierarchical relationships;
- Promote reality centred projects, not textbooks or standardised procedures;
- Use cooperative learning rather than competition;
- Learn together and from each other;
- Learn in community settings and less in classrooms; and
- Discover universals in particular learner environments and perception of invariants rather than transmission of knowledge and abstraction of generic concepts.

Guideline 6: Ensuring that schools or institutions have an EE policy

Schools have a responsibility to be responsive to environmental issues and their management within their communal setting. They should be encouraged to develop a policy, (see Annexure I) for guidelines. Schools should establish an EE forum per learning programme of the curriculum framework. The forum should be representative of internal and external stakeholders.

Guideline 7: Teacher training

Teacher training should develop EE knowledge, skills, values and attitudes. The EE knowledge base and the conceptual understanding should be broadened to enable teachers to teach beyond the specified outcomes.

Engleson and Yockers (1994:151) and Myburgh (1994:7) emphasise the importance of teacher knowledge of EE and the ability to recognise those parts of the syllabi or learning programmes that lend themselves to environmental content. EE was not emphasised enough in PRESET and INSET in the past. There is a dire need for teacher re-orientation and training.

Teachers need knowledge of the natural, social and political environments including:

- natural resources
- interactions of living and non-living elements
- the concept of energy and its various transformations in physical and biological systems
- local, national and global interactions among people and the natural and built environments
- affective methods to examine values and attitudes inherent in environmental problems
- how to incorporate an environmental approach in learning
- involving communities in resolving environmental problems

Teacher training should be a joint responsibility of the department, the private sector, tertiary institutions and non governmental organisations. Options such as a cascade model, distance learning, provincial level of facilitators, regional teacher workshops and school clusters followed by site visits can be considered.

Guideline 8: EE centres

The NP should consider increasing the number of Environmental Centres. It is proposed that there be a minimum of four centres. Schoemansdal EE Centre (see chapter 3) is in the northern part of the NP. Three more centres should be established in the east, west and south of the province to minimise travel by learners and teachers to reach the centre. The establishment of three more centres should increase learner access and facilitate the integration of EE into the curriculum.

A network of four Environmental Education Centres (EECs) should also be used as points of long term field work projects such as environmental data collection as well as for researching issues such as grasslands and fresh water streams. Long runs of data will be a valuable resource for the NP. EECs should not be a stand alone facility. They also need to be coupled with other centres intended for continuing professional development of teachers. EECs can be multimedia education resource centres to facilitate collection and dispersal of materials to schools and communities.

The EECs should offer courses that match institutional, learner and teacher needs as half day, full day or residential courses. Centre's tutors and caretakers should be trained in first aid, field leadership, maintaining and improving the quality of our environment as well as individual and group participation activities. An EEC should have well resourced workrooms and field equipment. Schools should have opportunities to borrow EE resource material.

Guideline 9: Learning support material

Learning support material for EE should be low cost, multipurpose and multigrade where possible (Goswami 1999:245). The NP has about 1.9 million learners in school. If the NP was to spend at least R100.00 per learner per year, it would need at least R191 million per annum for learning support material (Report of the Review Committee on Curriculum 2005, 2000:143). Clearly this presents a problem.

Integrating EE would mean a rethinking of the utilisation of the limited financial pool and the design of learning support material.

O'Donoghue and Taylor (1988) as well as Tyson (1994:10) advocate that learning support material be developed through a participatory approach involving experts and teachers.

The NP can benefit from interagency research projects giving space to curriculum developers, curriculum support services, teachers, NGO's, local universities and members of the community working in groups to develop resource materials for EE. Schools need resource books and learner guides.

What teachers make of learning support material is critical to their use in the classroom and the integration of EE into the school curriculum of the NP.

Guideline 10: Leadership and management

Leaders can make a difference. The leadership and the management of the department and schools should apply generic principles of management that promote the presented model of integrating EE into the school curriculum. The principles for consideration are (Speicher in Ornstein & Hunkins 1993:320):

- moving the education development officers, education district managers, teachers, parents, learners and other stakeholders such as the teacher unions, NGO's and cognate government departments in the direction of integrating EE in and out of school programmes through non-coercive means;

- moving people in a direction that is genuinely in their long term interests;

- establishing a set of processes or strategies that aligns the needs and values of individuals and groups with the mission and goals of the department;

- developing a set of strategies that will move the school as an institution towards achieving its mission or goals;

- instilling co-operation and teamwork within the department and inter-departmentally, aimed at achieving shared goals;

- allowing for input and participation in decision making among participants, as opposed to directing and dictating;

- motivating a group of key people who are committed to the mission and goals of the organisation;.

- being consistent and practising what is preached;

- delivering what is promised and promising only what is feasible and within one's authority to follow through; and

- creating and maintaining professional work conditions, attractive work environments, challenging work opportunities and opportunity for career development.

Guideline 11: Learners, teachers and managers' willingness to sacrifice self-interest to promote EE policy

Learners, teachers and managers have to be willing to sacrifice self-interest to promote EE. Sacrifices will be enriched by the willingness to become change agents (Lovatt & Smith 1995:210). They have to be willing to demonstrate empathy, credibility, as well as be hardworking and active. Empathy for EE will build their ability to promote EE policies. Credibility means being continually informed about EE.

Teachers and curriculum managers as pedagogical agents are expected to assume the roles of (Lovatt and Smith 1995:211):

- solution givers, that is, generating strategic programmes and resources;

- resource linkers, who encourage business, NGO's and universities to work together for EE;

- catalysts, that is, motivating for EE; and

- process helpers, that is, showing the willingness to facilitate EE learning and teaching.

Guideline 12: Curriculum support: the role of curriculum advisors in schools

Curriculum support and the role of curriculum advisors can be enhanced by:

* taking the responsibility to assist the schools in developing their educational outcomes in line with EE goals;

* involving teachers in planning the EE curriculum at a micro-level;

* developing staff capacity and offering continuous classroom support;

* preparing EE guides per grades;

* helping to organise, select and order instructional materials and media;

* providing multicultural language training;

* serving as a resource agent; and

* helping teachers implement an EE curriculum and encourage curriculum innovation (see Annexure K).

Guideline 13: Districts as delivery foci

Districts should spearhead curriculum implementation in collaboration with other stakeholders. District managers have a responsibility to carry state mandates and legislation. They should encourage formation of professional associations or EE reference groups. District actions should address local needs and parental and community concerns. Presentation of evaluation reports on school programmes and curricula is an expected output of a district. Districts can develop curriculum plans (see Annexure J).

Districts should develop a checklist known to all stakeholders, (Engleson & Yockers 1994:153-155). Checklists should be used to verify compliance with philosophy and policy, a curriculum plan, instructional program, learning environments (in-and-out of class activities), staff preparation, budget utilisation, assessment and evaluation for EE.

Districts have a responsibility to build supportive school environments. School practices should present a continuum of action from pro-active to the reactive, non-violent, non-discriminatory languages practices defined, modelled and reinforced (Environmental Education Curriculum Guide P-12 1991:10).

Guideline 14: The role of the teacher

The Committee on Teacher Education Policy (COTEP) (1999:50-51) spells out the six roles of the teacher as:

- mediator of learning
- leader, administrator and manager
- scholar, researcher and life-long learner
- community, citizenship and pastoral role
- subject specialist
- a phase (foundation, intermediate or senior) or context (rural, occupational practice, professional service, management) specialist.

The six roles of the teacher are supportive of the context of EE. What is disturbing about the roles is the discrete absence of the teacher as an assessor of learning, unless it is to be expected that every teacher is by general assumption an assessor. In addition to the six roles, a teacher should have an understanding of the interrelatedness of the various disciplines or learning areas.

Guideline 15: Possible career paths for learners

The introduction of EE into the school curricula should benefit learners in career planning and further be considered by school career guidance programmes. Learners will want to know why they should study EE. Integrating EE into the school curriculum will benefit learners as there are possible career paths which they can follow. Learners should be informed that they can become (Enabling Environmental Education Processes in Teacher Education 2000:11):

- teachers and teacher educators of EE
- EE material writers for education, training and development sectors
- training officers in government, NGO's, conservation organisations, eco-tourism industry and business
- specialists in environmental management training
- environmental impact assessors
- oonservationists
- environmental law practitioners
- sustainable agriculturists

Guideline 16: Partnerships, integration and co-operation between stakeholders

EE projects should include NGO's and any voluntary bodies. Teacher training, curriculum reform and development of learning support materials shall benefit from the involvement of external stakeholders like NGO's.

The Departments of Education, Environmental Affairs and Tourism, NGO's, communities and other stakeholders or environmental education service providers will add value to the process if they integrate their services and commit to co-operation.

Stakeholders can benefit by exchanging information on EE practices and experiences. Learning support material and other resources can be co-developed and shared using the participatory approach. (See Annexure K). Collaborative efforts will benefit research actions and the need to find solutions together.

7.3.2 The organisational framework and co-ordinating structure

Figure 10 gives the structural framework of the organisation and co-ordination of the proposed model.

NATIONAL DEPARTMENT OF EDUCATION POLICY FRAMEWORK

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PROVINCIAL DEPARTMENT OF EDUCATION **PROVINCIAL EE CURRICULUM NORMS AND STANDARDS**

↑↓

DISTRICT

PROGRAMME AREAS
- MATERIALS DEVELOPMENT
- RESOURCE PROVISION
- TEACHER TRAINING
- ADMINISTRATIVE PLANNING   **DISTRICT EE**   **REGIONAL**
- CURRICULUM DEVELOPMENT   **COMMITTEE**   **EE CENTRE**
- RESEARCH
- CURRICULUM REVIEW
- EVALUATION AND REPORTING
- ASSESSMENT

SCHOOLS EE FORUM

↑↓

COLLABORATE WITH: **TERTIARY INSTITUTIONS** **OTHER GOVERNMENT DEPARTMENTS** **NGO's** **BUSINESS** **COMMUNITIES**

Figure 10 The organisational framework and co-ordinating structure of the proposed model

The framework of the organisation and co-ordination of the proposed model hinges on co-operation between the National and Provincial Departments of Education. Within the NP the district office is expected to be the key driver of the integration of EE into the school curriculum and continuing school support.

A suggestion is made by the model framework that at district level there should be an EE programme in place for materials development, resource provision, teacher training and development, research and curriculum development. It is further suggested that the schools should have their own EE forums for research, curriculum planning, curriculum review, learner evaluation or assessment and reporting. The district and its schools should have access to a regional EE centre to emphasise education for, about and through the environment.

The model is enhanced by the expectation that the NP, its districts and schools shall collaborate with tertiary institutions, other government departments, NGO's, the private sector and own communities in support of the implementation of EE into the school curriculum.

The framework should be guided by principles of the process approach, education for sustainability, partnerships, decentralised functioning, collaboration, participatory learning and communal benefit.

7.4   LIMITATIONS OF THE STUDY

This study is descriptive in nature. It therefore had the following limitations (Best & Kahn 1993:128):

*   Respondents were not randomly chosen and are therefore not representative of all role-players in the NP;
*   Causative factors to an issue are often multiple rather than single.

- The dynamic nature of curriculum development as dictated by social and political needs means that all new developments are not included in the research project.

7.5   CONCLUSION

Since the times are dynamic, we need to realise that the curriculum is never completed; it is ongoing. We never arrive at the perfect curriculum for the times. History is added to each day (Ornstein and Hunkins 1993:401).

In conclusion it is worth noting that the suggested model criteria is not a rigid prescription for EE integration into the school curricula. The recommendations are intended to add value to the cause of education *for, through* and *about* the environment. Teachers' continuing professional development cannot be overemphasised. Curriculum managers and practitioners should be vigilant in their efforts to monitor any form of curriculum innovation. The success of any curriculum hinges on defining a working partnership between the school, parents and other stakeholders like the private sector and NGO's.

Post research issues for consideration are further exploration of:

- teacher training with emphasis on the expected role of higher education and training and will the extent to which EE features in the PRESET-INSET;
- a critical EE pedagogy paradigm: do teachers really want to know?;
- the urban and rural divide in EE curriculum policy development and practice;
- partnerships in EE: what is the role of "big" business?

As the integration of EE into the school curriculum is considered, it is expected that EE will focus, among other things, on issues of health, poverty and population

growth, economic growth, soil degradation, food production, water supply, biological diversity and environmental quality, but that it will be dynamic to stay relevant.

The increase in technical efficiency and economic minimalism will require that the school curricula keep pace with changes. One can further say that extinction of millions of acres of life preserving rain forests will go on and all manner of species, including man shall be endangered.

Recommendations of this study are in line with the need to review social and ecological relations between people and nature. The success of the integration of EE into the school curriculum might depend on issues of moving away from the "dominant social paradigm" of the twentieth century's industrial society and replacing it with a "new environmental paradigm" (Stevenson 1987:73). It is important that human needs and economic growth should have high regard for nature. EE learning outcomes should put a premium on respect for natural and social limits to growth. Empathy with other species, people, communities, countries and future generations should inform the choices we make in designing EE curricula. The intellectual tasks of critical appraisal of environmental and political situations should integrate "the new environmental paradigm" with the "socially critical orientation" (Stevenson 1987:73).

Integration of EE into the school curriculum should influence curriculum practice such that schools of the future should be about individualised learning rather than teaching. Learners should, by means of the school curricula, develop lateral, creative and intuitive ways of thinking and problem solving, and act as collaborative partners in the learning process (Lovatt & Smith 1995:240). Teachers should facilitate learning rather than merely acting as subject experts. Co-operation between learners, teachers, communities and other stakeholders is important.

Challenges for all EE curriculum practitioners include continuing to generate learning programmes that fit or suit schools and serve the needs of the learner and society. EE learning and teaching should develop communal unity and cohesion among the multicultural societies of the NP and South Africa. EE curricula should emphasise

inherent unity and integration of knowledge of life and being, and most of all, education for sustainability.

Recommendations made recognised grassroots problems peculiar to the NP and the national education and training policy. They are therefore manageable and feasible. If there is a political will to implement the model for the integration of EE into the school curriculum of the NP, this study adds value to transformation. In addition, the recommendations are technically sound and guided by local, national and global curriculum development norms and standards. If the recommendations made will improve learner achievement, then this study would have contributed to the culture of learning and teaching in the NP.

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PERMISSION TO CONDUCT RESEARCH

NORTHERN PROVINCE
EDUCATION, ARTS, CULTURE & SPORTS

Enq: N.M Nghatsane

Ms M P Rampedi
P.O. Box 11134
BENDOR
0699
PIETERSBURG

Dear sir/madam

REQUEST TO CONDUCT RESEARCH IN OUR SCHOOLS AND GOVERNMENT
INSTITUTIONS: _M P Rampedi_

Your request to conduct research in _Integration, Environmental Education into the School Curriculum_ with the Northern Province educational institution and educators is hereby granted.

You will be expected to keep the Regional Directors informed of research taking place in their schools and for that reason we attach a list of regional directors.

We will appreciate if we could be supplied with the findings of your research , this will help to improve teaching in our schools.

We hope you will find this arrangement helpful.

[signature]
Superintendent General

Date : 1999/06/21

THE QUESTIONNAIRE

'A MODEL FOR THE INTEGRATION OF ENVIRONMENTAL EDUCATION INTO THE SCHOOL CURRICULUM OF THE NORTHERN PROVINCE'

RATIONALE

The questionnaire is intended to elicit your responses on:

- your general knowledge and attitude towards Environmental Education [EE];

- your views on the past and present EE practices within the school curriculum of the Northern Province [NP]; and

- your views towards the future position of EE in the school curriculum

QUESTIONNAIRE NUMBER _____

Request:

Please write where space is given

Please tick appropriate box

PART A

1.   **SURNAME, INITIALS AND TITLE** (it is acceptable if you do not wish to reveal your name):

_____

2.   **AGE GROUP** (please tick)

under 20   ☐

20 - 30   ☐

30 - 40   ☐

40 - 50   ☐

50 - 60   ☐

over 60   ☐

3.   **SEX**

Male   ☐

Female   ☐

4.   **LANGUAGE PREFERENCE**

Sepedi   ☐

Tshivhenda   ☐

Xitsonga   ☐

Setswana   ☐

English   ☐

Afrikaans ☐

siNdebele ☐

Other: ☐   Specify: _____

5.   PROFESSIONAL TEACHER OR OTHER QUALIFICATION

NAME OF QUALIFICATION	YEAR OBTAINED	INSTITUTION

6.   YEARS OF EXPERIENCE IN THE EDUCATION DEPARTMENT

Less than 5 ☐

5 - 10 ☐

10 - 15 ☐

15 - 20 ☐

More than 20 ☐

7.   POSITION

Teacher/lecturer ☐

Curriculum advisor ☐

School/college principal ☐

Education specialist ☐

Environmental officer ☐

Educational manager/director ☐

Other: ☐ Specify: _____

PART B

1. NAME OF INSTITUTION/OFFICE OF EMPLOYMENT

_____

2. YOUR INSTITUTION'S ADDRESS

_____

_____

CODE _____

TEL. NO. _____ FAX _____

3. TYPE OF RESIDENTIAL AREA WHERE YOUR INSTITUTION/OFFICE IS LOCATED

Urban ☐

Peri-urban ☐

Rural ☐

Farm ☐

4. DOES YOUR SCHOOL OR COLLEGE HAVE A LABORATORY OR A SCIENCE ROOM?

Yes ☐

No ☐

5. WHAT IS THE AVERAGE NUMBER OF LEARNERS PER GRADE/CLASS?

_____

_____

6. HOW MANY TIMES A YEAR DO YOUR LEARNERS GO ON FIELD EXCURSIONS? WHERE DO THEY GO?

_____

_____

7. WHAT TYPE OF FIELD EXCURSIONS ARE UNDERTAKEN?

_____

_____

8. DO ALL YOUR LEARNERS HAVE TEXTBOOKS AND/OR OTHER LEARNING AND SUPPORT MATERIAL?

_____

_____

9. IF LEARNERS DO NOT HAVE TEXTBOOKS AND RESOURCE MATERIAL, WHAT DO YOU THINK IS THE PROBLEM AND WHAT SOLUTION DO YOU PROPOSE?

_____

_____

10. DO ALL TEACHERS IN YOUR SCHOOL/IN THE DEPARTMENT HAVE COPIES OF THE INTERIM SYLLABI OR THE APPROPRIATE CURRICULUM POLICY DOCUMENTS?

_____

_____

11. IF TEACHERS DO NOT HAVE COPIES OF THE INTERIM SYLLABI OR THE APPROPRIATE CURRICULUM POLICY DOCUMENTS, WHAT DO YOU THINK IS THE PROBLEM AND WHAT SOLUTION DO YOU PROPOSE?

_____

_____

12. DO SCHOOLS RECEIVE CURRICULUM SUPPORT, e.g. INSET IN THE TEACHING AND LEARNING OF EE? IF YES, HOW AND BY WHOM?

_____

_____

13. DOES THE DEPARTMENT/SCHOOL HAVE AN ENVIRONMENTAL EDUCATION POLICY? IF YES, HOW WAS IT DEVELOPED AND BY WHOM?

_____

_____

PART C

1.   WHAT IS YOUR UNDERSTANDING OF ENVIRONMENTAL EDUCATION [EE]?

_____

_____

2.   HAVE YOU HEARD/READ ABOUT THE RIO SUMMIT? IF YES, WHAT IS YOUR UNDERSTANDING OF COMMITMENTS MADE BY THE SOUTH AFRICAN GOVERNMENT?

_____

_____

3.   WHY DO YOU THINK OR WHY SHOULD ENVIRONMENTAL EDUCATION BE TAUGHT IN SCHOOLS?

_____

_____

4.   HOW DO YOU THINK SHOULD EE BE TAUGHT IN PRIMARY OR SECONDARY SCHOOL EDUCATION?

_____

_____

5.   WHAT IS YOUR UNDERSTANDING OF CURRICULUM 2005 AND OUTCOMES-BASED EDUCATION?

_____

_____

6.   ENVIRONMENT IS A PHASE ORGANISER IN CURRICULUM 2005. WHAT DOES THIS MEAN TO YOU?

_____

_____

7.   WHAT KNOWLEDGE, SKILLS, VALUES AND ATTITUDES SHOULD AN EE CURRICULUM IMPART TO LEARNERS?

_____

_____

8.   IF YOU WERE GIVEN A CHANCE TO REDESIGN THE CURRICULUM, HOW WOULD YOU INTEGRATE EE INTO THE SCHOOL CURRICULUM?

_____

_____

9.   WHAT ROLE SHOULD THE DEPARTMENT OF ENVIRONMENTAL AFFAIRS, NATURE RESERVES, SCIENCE CENTRES AND ENVIRONMENTAL CENTRES PLAY IN THE TEACHING OF EE IN THE SCHOOL CURRICULUM?

_____

_____

10.   WHAT ROLE SHOULD PROVINCIAL UNIVERSITIES AND COLLEGES PLAY IN SUPPORTING SCHOOLS IN THE TEACHING AND LEARNING OF EE?

_____

_____

11. WHAT ROLE WOULD YOU LIKE TO SEE COMMUNITIES WHERE SCHOOLS/COLLEGES ARE LOCATED, PLAY IN THE EE SCHOOL CURRICULUM?

_____

_____

12. HOW CAN COMMUNITIES BENEFIT FROM SCHOOLS THAT TEACH AND PRACTISE EE ?

_____

_____

13. ANY OTHER COMMENTS YOU HAVE ON THE INTEGRATION OF EE INTO THE SCHOOL CURRICULUM OF THE NORTHERN PROVINCE?

_____

_____

THANK YOU VERY MUCH FOR COMPLETING THE QUESTIONNAIRE!

THE TBILISI DECLARATION

(Engleson & Yockers 1994:157-158)

'The world's first intergovernmental conference on environmental education was organised by the United Nations Education, Scientific and Cultural Organization (UNESCO) in cooperation with the U.N. Environment Programme (UNEP) and was convened in Tbilisi, Georgia (USSR) from October 14-26, 1977.

Delegates from 66 member states and observers from two nonmember states participated. Representatives and observers from eight U.N. agencies and programmes also participated. Three other intergovernmental organizations and 20 international non-governmental organizations also were represented. In all, 265 delegates and 65 representatives and observers took part in the conference.

The Tbilisi Declaration was adopted by acclamation at the close of the intergovernmental conference. The declaration noted the unanimous accord in the important role of environmental education in the preservation and improvement of the world's environment, as well as in the sound and balanced development of the world's communities.

The Tbilisi Declaration constitutes the framework, principles and guidelines for EE at local, national, regional and international levels for all ages in formal and non-formal education.

The Conference recommended the following:

CRITERIA

a)   Ethical, social, cultural and economic dimensions should play a part a part in determining the lines of approach and instruments in making better use of natural resources to satisfy human needs.

b)   EE is the result of the re-orientation and dovetailing of different disciplines and educational experiences which facilitate and integrate perception of the problems of the environment. Knowledge of EE enables rational actions to meet social needs.

c)   EE aims 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 the management of the quality of the environment.

d)   EE further aims to show the interdependence of the economics, politics, and ecology of the modern world. Decisions and actions by different countries can have international repercussions. EE helps to inculcate a sense of responsibility and solidarity among people to guarantee environmental conservation.

e)   Paying attention to the complex relations between socio-economic development and developing the environment.

f)   EE should provide knowledge, and a wide range of practical skills required in applying effective solutions to environmental problems.

g)   EE should bring a closer link between educational processes and real life, building its activities around the environmental problems. It should focus on interdisciplinary analysis and a comprehensive approach.

h)   EE should cater for all ages and all groups of the human population, the young and adults, particular social groups, scientists, and technicians.

i)   Public and private facilities available to societies should be effectively utilised for the formal and non-formal education.

j)   EE actions must be linked with legislation, policies, measures of control and the decisions which governments may adopt in relation to the human environment.

GOALS

The goals of EE should be to:

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

OBJECTIVES

The categories of EE objectives are:

Awareness - to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.

Knowledge - to help social groups and individuals gain a variety of experiences in, and acquire a basic understanding of, the environment and its associated problems.

Attitudes - to help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.

Skills - to help social groups and individuals acquire the skills for identifying and solving environmental problems.

Participation - to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

GUIDING PRINCIPLES

EE should:

- consider environment in its totality, natural and built, technological and social (economic, political, cultural-historical, ethical and aesthetic);

- be a continuous lifelong process, beginning at the preschool level and continuing through all formal and non-formal stages;

- be interdisciplinary in approach and should draw on the specific content of each discipline in developing a holistic and balanced perspective;

- examine major environmental issues from local, national, regional, and international points of view so that students receive insight into environmental conditions in other geographical areas;

- focus on current and potential environmental situations while taking into account the historical perspective;

- promote the value and necessity of local, national, and international cooperation in the prevention and solution of environmental problems;

- explicitly consider environmental aspects in plans for development and growth;

- enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions in accepting their consequences;

- relate environmental sensitivity, knowledge, problem-solving skills, and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years;

- help learners discover the symptoms and real causes of environmental problems;

- emphasise the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills;

- utilise diverse learning environments and a broad array of educational approaches to teaching, learning about and from the environment with due stress on practical activities and first-hand experience.

THE NATIONAL QUALIFICATIONS FRAMEWORK (NQF)

(Department of Education 1997a:30)

School grades	NQF level	Band	Types of qualifications and certificates		Locations of learning for units and qualifications
			HIGHER EDUCATION AND TRAINING CERTIFICATES		
	8	HET	DOCTORATES FURTHER RESEARCH DEGREES		TERTIARY/RESEARCH/ PROFESSIONAL INSTITUTIONS
	7	HET	HIGHER DEGREES, DIPLOMAS, CERTIFICATES		TERTIARY/RESEARCH/ PROFESSIONAL INSTITUTIONS
	6	HET	FIRST DEGREES, DIPLOMAS, CERTIFICATES		UNIVERSITIES/TECHNIKONS/ COLLEGES/PROFESSIONAL INSTITUTIONS/PRIVATE/ WORKPLACE
	5	HET	DIPLOMAS, OCCUPATIONAL CERTIFICATES		UNIVERSITIES/TECHNIKONS/C OLLEGES/PROFESSIONAL INSTITUTIONS/PRIVATE/ WORKPLACE
			FURTHER EDUCATION AND TRAINING CERTIFICATES		
12	4	FET	TRAINING CERTIFICATES, MIX OF UNITS		PUBLIC, STATE & PRIVATE SCHOOLS TECHNICAL, COMMUNITY, POLICE, NURSING & PRIVATE COLLEGES LABOUR MARKET SCHEMES INDUSTRY TRAINING BOARDS, WORKPLACE
11	3	FET	TRAINING CERTIFICATES, MIX OF UNITS		
10	2	FET	TRAINING CERTIFICATES, MIX OF UNITS		
			GENERAL EDUCATION AND TRAINING CERTIFICATES		
9 8 7 6 5 4 3 2 1 R	1	GET	SENIOR PHASE INTERMEDIATE PHASE FOUNDATION PHASE PRESCHOOL	ABET 4 ABET 3 ABET 2 ABET 1	PUBLIC, STATE & PRIVATE SCHOOLS PRIVATE COLLEGES LABOUR MARKET SCHEMES INDUSTRY TRAINING BOARDS, WORKPLACE

CRITICAL OUTCOMES

(Department of Education, 1997b,c and d)

The South African Qualifications Authority has adopted seven Critical Outcomes. The Critical Outcomes are broad, generic cross-curricula and underpinned by the Constitution. These outcomes ensure that learners gain skills, knowledge and attitudes that allow them to contribute to their learning success. Seven Critical Outcomes supported by an additional five are adopted.

The Critical Outcomes are:

Learners will:

a)   identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made

b)   work effectively with others as members of a team, group, organisation, community

c)   organise and manage themselves and their activities responsibly and effectively

d)   collect, analyse, organise and critically evaluate information

e)   communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation

f)   use science and technology effectively and critically, showing responsibility towards the environment and health of others

g)   demonstrate an understanding of the world as a related systems by recognising that problem-solving contexts do not exist in isolation

The seven Critical Outcomes are supported by five other outcomes. Personal, social and economic development of the learner are enhanced by an awareness of:

a)   reflecting on and exploring a variety of strategies to learn more effectively

b)   participating as a responsible citizen in the life of local, national and global communities

c)   being culturally and aesthetically sensitive across a range of social contexts

d)   exploring education and career opportunities, and

e)   developing entrepreneurial opportunities.

THE EIGHT LEARNING AREAS

(Department of Education 1997a:14-15)

01. LANGUAGE, LITERACY AND COMMUNICATION

People interact with the world and each other through language. Communication enables people to understand each other freeing them of intolerance, prejudice and misunderstandings.

02. MATHEMATICS, MATHEMATICAL LITERACY AND MATHEMATICAL SCIENCES

This learning area encourages logical thinking, problem solving and teaches analytical skills, enabling critical decision making.

03. HUMAN AND SOCIAL SCIENCES

South Africa needs responsible citizens who are able to operate in a culturally diverse, democratic society. Learners will learn how to interact with each other and their natural environment.

04. NATURAL SCIENCES

Effective natural resource management is critical. Learners need to understand the universe both natural and built. Natural Sciences will equip learners with the ability to understand natural resources and to manage them wisely.

05. ARTS AND CULTURE

Through developing creativity and exploring the diverse cultures that exist, the spiritual, intellectual and emotional aspects of our personalities will be promoted.

06. ECONOMICS AND MANAGEMENT SCIENCES

Learners are encouraged to develop into economically informed and active citizens able to participate and lead the economic development.

07. LIFE ORIENTATION

Life skills are needed by learners to be able to cope with the rapidly changing world. Life Orientation includes the building of self-esteem, survival skills and a healthy life style.

08. TECHNOLOGY

The learning area promotes aspects of technology, that is, planning, design and manufacturing.

THE 66 SPECIFIC OUTCOMES

(Department of Education 1997b,c and d)

01.   LANGUAGE, LITERACY AND COMMUNICATION

Learners:

a)   make and negotiate meaning and understanding

b)   show critical awareness of language usage

c)   respond to the aesthetic, affective, cultural and social values in texts

d)   access, process and use information from a variety of sources and situations

e)   understand, know and apply language structures and conventions in context

f)   use language for learning

g)   use appropriate communication strategies for specific purposes and situations

02.   MATHEMATICS, MATHEMATICAL LITERACY AND MATHEMATICAL SCIENCES

Learners will be able to:

a)   Demonstrate understanding about ways of working with numbers

b)   Manipulate number patterns in different ways

c)   Demonstrate understanding of the historical development of mathematics in various social and cultural contexts

d)   Critically analyse how mathematical relationships are used in social, political and economic relations

e)   Measure with competence and confidence in a variety of contexts

f)   Use data from various contexts to make informed judgements

g)   Describe and represent experiences with shape, space, time and motion, using all variable senses

h)   Analyse natural forms, cultural products and processes as representations of shape, space and time

i)   Use mathematical language to communicate mathematical ideas, concepts, generalisations and thought processes

j)   Use various logical processes to formulate, test and justify conjectures

03.   HUMAN AND SOCIAL SCIENCES

Learners will be able to:

a)   Demonstrate a critical understanding of how South African society has changed and developed

b)   Demonstrate a critical understanding of patterns of social development

c)   Participate actively in promoting a just, democratic and equitable society

d)   Make sound judgements about the development, utilisation and management of resources

e)   Critically understand the role of technology in social development

f)   Demonstrate an understanding of interrelationships between society and the natural environment

g)   Address social and environmental issues in order to promote development and social justice

h)   Analyse forms and processes of organisations

i)   Use a range of skills and techniques in the Human and Social Sciences context

04.   NATURAL SCIENCES

Learners will be able to:

a)   Use process skills to investigate phenomena related to the Natural Sciences

b)   Demonstrate an understanding of concepts and principles and acquired knowledge in the Natural Sciences

d)   Apply scientific knowledge and skills to problems in innovative ways

e)   Demonstrate an understanding of how scientific knowledge and skills contribute to the management, development and utilisation of natural and other resources

f)   Use scientific knowledge and skills to support responsible decision making

g)   Demonstrate knowledge and understanding of the relationship between science and culture

h)   Demonstrate an understanding of the changing and contested nature of knowledge in the Natural Sciences

i)   Demonstrate knowledge and understanding of ethical issues, bias and inequities related to the Natural Sciences

j)   Demonstrate an understanding of the interaction between the Natural Sciences and socio-economic development

05.   ARTS AND CULTURE

Learners will be able to:

a)   Apply knowledge, techniques and skills to create and be critically involved in arts and culture processes and products

b)   Use the creative processes of arts and culture to develop and apply social and interactive skills

c)   Reflect on and engage critically with arts experience and work

d)   Demonstrate and understanding of the origins, functions and dynamic nature of culture

e)   Experience and analyse the use of multiple forms of communication and expression

f)   Use art skills and cultural expressions to make an economic contribution to self and society

g)   Demonstrate an ability to access creative arts and cultural processes to develop self esteem and promote healing

h)   Acknowledge, understand and promote historically marginalised arts and cultural forms and practices

06.   ECONOMICS AND MANAGEMENT SCIENCES

Learners will be able to:

a)   Engage in entrepreneurial activities

b)   Demonstrate personal roles in economic environment

c)   Demonstrate the principles of supply and demand and the practices of production

d)   Demonstrate managerial expertise and administrative proficiency

e)   Critically analyse economic and financial data to make decisions

f)   Evaluate different economic systems from various perspectives

g)   Demonstrate actions which advance sustained economic growth, reconstruction and development in South Africa

h)   Evaluate the interrelationships between economic and other environments

07.   LIFE ORIENTATION

Learners will be able to:

a)   Understand and accept themselves as unique and worthwhile human beings

b)   Use skills and display attitudes and values that improve relationships in family, group and community

c)   Respect the rights of people to hold personal beliefs and values

d)   Demonstrate value and respect for human rights as reflected in *Ubuntu* and other similar philosophies

e)   Practise acquired life and decision making skills

f)   Assess career and other opportunities and set goals that will enable them to make the best use of their potential talents

g)   Demonstrate the values and attitudes necessary for a healthy and balanced lifestyle.

h)   Evaluate and participate in activities that demonstrate effective human movement and development.

08.   TECHNOLOGY

Learners will be able to:

a)   Understand and apply the technological process to solve problems and satisfy needs and wants.

b)   Apply a range of technological knowledge and skills ethically and responsibly.

c)   Access, process and use data for technological purposes

d)   Select and evaluate products and systems.

e)   Demonstrate an understanding of how different societies create and adapt technological solutions to particular problems.

f)   Demonstrate an understanding of the impact of technology.

g)   Demonstrate an understanding of how technology might reflect different biases, and create responsible and ethical strategies to address them.

THE PHASE AND LEARNING PROGRAMME ORGANISERS

(Department of Education 1997b,c and d)

H1. PHASE ORGANISERS

PHASE	PHASE ORGANISERS
FOUNDATION PHASE	personal development health and safety environment society the learner as entrepreneur communication in our lives
INTERMEDIATE PHASE	the learner as communicator the learner as enquirer the learner as active, creative participant the learner in the environment the learner and personal development
SENIOR PHASE	communication culture and society environment economy and development personal development and empowerment

H2. LEARNING PROGRAMMES PER PHASE

PHASE	LEARNING PROGRAMMES	NUMBER
FOUNDATION PHASE	NUMERACY LIFE SKILLS LITERACY	03
INTERMEDIATE PHASE	LANGUAGE, LITERACY AND COMMUNICATION MATHEMATICAL LITERACY, MATHEMATICS AND MATHEMATICAL SCIENCES NATURAL SCIENCES AND TECHNOLOGY HUMAN, SOCIAL, ECONOMIC AND MANAGEMENT SCIENCES ARTS, CULTURE AND LIFE ORIENTATION	05
SENIOR PHASE	LANGUAGE, LITERACY AND COMMUNICATION MATHEMATICAL LITERACY, MATHEMATICS AND MATHEMATICAL SCIENCES NATURAL SCIENCES TECHNOLOGY HUMAN AND SOCIAL SCIENCES ECONOMIC AND MANAGEMENT SCIENCES ARTS AND CULTURE LIFE ORIENTATION	08

DEVELOPING A SCHOOL ENVIRONMENTAL EDUCATION POLICY

GUIDELINES (Environmental Education Policy Initiative 1995:28-29, WWF,1988)

PROCESS

The process of development is as important as the product, that is the policy document. Once the policy is implemented it is critical to periodically review it and continually monitor and evaluate the policy practice.

ROLE PLAYERS

Policy development should involve all the role players in the school community. Teachers, the School Governing Body, Management, Support staff like the grounds and administrative staff, Learner Representative Council, Special interest groups, and local authorities and business should be involved.

APPROACH

It is important for the role players to participate fully. The policy should be developed by them and not for them. The facilitator of the process should consult broadly and ensure that the development is a fully interactive process. External persons with Environmental expertise should be used as reference groups or resources.

ENVIRONMENTAL AUDITING

It will be useful for the school to start the process by conducting an audit of the school in terms of existing environmental practice. The findings of the audit can inform the process of policy development. The audit should include the role players.

CONTENTS OF THE POLICY DOCUMENT

A school's EE policy will be enhanced if the school grounds are considered as an educational resource. The school policy should have (WWF,**), the:

1.　Context
2.　Aim
3.　Objective
4.　Motivation
5.　Expected environmental experiences
6.　Fieldwork and study methods
7.　Streetwork or community work
8.　EE and classwork
9.　Anticipated outcomes, skills or capacities per grade or phase
10.　Monitoring and evaluation

TIME LINES

Development processes can be drawn out due to their interactive and consultative nature. The school should set a target of one year for development. Year two should be for implementation. It is wise to revisit the policy every three years.

RELATIONS, THE SCHOOL CURRICULUM AND THE EE POLICY

The core EE curriculum should follow guidelines as set out in the Curriculum 2005 framework. Environment as a Phase Organiser should be understood for what it means. Classes in Secondary Education still using the interim syllabi could form focus themes in subjects like Biology, Geography and Science.

Extracurricular activities endorsed by the school should be stated in the school policy. Environmental clubs, science clubs, school gardening committees are viable options for schools even in a rural setting.

IMPLEMENTATION

A teacher committed to EE, or earmarked for in-service teacher training or with a professional qualification in EE should be appointed to play the role of EE co-ordinator. Other staff members and role players should be allocated responsibilities to support the co-ordinator.

MONITORING AND EVALUATION

The EE co-ordinator should ensure continuous monitoring and evaluation of the policy.

ADOPTING THE POLICY

It will encourage learners, teachers and role players if the school policy is adopted at a high profile school gathering. The adoption day is a form of advocacy for the policy.

LINKAGES OUTSIDE THE SCHOOL

Schools are encouraged to form EE partnerships with other schools. Workshops can be jointly conducted by teachers to develop learning activities and annual plans.

A GUIDELINE TO PROCEDURES FOR DEVELOPING A DISTRICT

CURRICULUM PLAN

(Engleson & Yockers 1994:2-6)

The following are steps that Districts can consider in starting to implement EE.

1. Form a District Environmental Education Committee. All groups: administrators, curriculum advisors, teachers and other stakeholders should participate. A person who understands EE should lead the group.

2. The committee should be prepared for their role. Aims, objectives, guidelines and principles of EE should be explained.

3. Develop a district EE philosophy and policy.

4. Conduct a needs assessment, that is, determine existing district EE status. Issues such as teaching, reporting, learner testing and environmental issues should be looked at.

5. Use the provincial norms and standards for EE or a given curriculum framework to develop a contextualised EE curriculum. Implement the curriculum.

6. Establish district aims, that is, develop a district statement of aims and goals in line with the needs as identified needs and the district philosophy and policy.

7. Continue to develop a district curriculum framework. The framework should be in line with the Minister's policy, at this point in time, C2005. Assign curricular responsibilities.

8. Prepare teachers and curriculum advisors. It is important to discuss the implementation strategies with all stakeholders. Ensure that minimum levels of expertise that is the district EE philosophy, elements of curriculum framework and identification of content is clear to all.

9. Provide additional INSET on EE content and methodology. Certify teacher competencies as per level of responsibility, that is, Early Childhood Development, Intermediate Phase, Senior Phase or Further Education and Training. Link the training with existing legislation, for example the prescribed 80 hours allocated for INSET by the ELRC. The District Committee should verify teacher training.

10. Develop learning or instructional strategies. Teachers should in consultation with the district committee identify learning support material. Teachers should develop budget requests for presentation to the School Governing Body.

11. Develop and implement an evaluation plan. Monitoring should be continuous to inform programme development and the district committee's responsibility.

12. The District curriculum plan should be holistic, future oriented, issue oriented, universal, action oriented, interdisciplinary and experiential.

13. District Committees should link up with the Provincial Committee.

A PARTICIPATORY APPROACH TO CURRICULUM CONSTRUCTION
THROUGH INSTITUTIONAL BASED RESEARCH

(O'Donoghue & McNaught 1989:19).

EXTERNAL SUPPORT STRUCTURE

↑ ↓

Pool of environmental resource
materials and techniques

Resource development and
printing support services for
projects and teachers

↑ ↓

**TEACHER WORKING GROUPS DEVELOP, ADAPT AND SELECT CURRICULUM
MATERIALS THROUGH A PROCESS OF SCHOOL BASED ACTION RESEARCH**

↑ ↓

Reflection ➔

| CONTEXTUAL |
| school |
| CRITICAL |
| evaluation |
| DIALOGUE |
| discussion |

➔

Innovation
Current practice

↑

↓

| Classwork |
| Fieldwork |
| Action |

←

←

MEDIA ARTICLES

Article 1: Region faces deforestation by the year 2030.

16 Junie, 1995   Noordelike/Northern Review

Region faces deforestation by the year 2030

600 000 trees distributed since January

PIETERSBURG. — Approximately 40% of the total population in Southern Africa have access to electricity at this stage. The other 60% have to make use of other sources to provide in their energy needs.

As a result, more than 7,2 million cubic meters of firewood are used annually. This could lead to the total deforestation of the region by the year 2030.

To address this major problem, the Forestry Chief Directorate of the Department of Water Affairs and Forestry has embarked on a social forestry campaign country-wide, with the main thrust being community involvement in the planting of trees to meet the people's needs and to improve the environment. In the course of one such effort, 600 000 trees have been distributed since January 1995 through various projects in the Northern Transvaal. These projects include tree plantings at schools, mission stations, household plantings as well as introducing agroforestry practices.

The Department has distributed 500 000 young eucalypt trees and HL&H contributed 100 000 trees. Palmaryville nursery, established by the Forestry Department of the former Venda, prepared the young trees for distribution and planting.

In the process of distributing the trees, the assurance is received that they will be planted and tended to. The five competent extension foresters in the province are keeping an ardent eye on each project. If trees that have been obtained are not planted and tended to, reasons for this neglect have to be given.

The rural areas are often faced with the additional problem of a lack of water for sustaining any envisaged tree planting. To address this, the Department of Water Affairs and Forestry is considering the sinking of bore-holes at selected sites where a domestic water supply is also a problem.

The provision of trees as a source of energy and/or building materials, the provision of water for areas lacking this commodity, and the indirect benefit to protection of the indigenous vegetation are all positive contributions to the RDP. This will also have a tangible and lasting effect on the rural communities of the Northern Transvaal.

The Department uses every opportunity possible to maintain contact with, and offer advice to, each project leader. It is therefore the Department's pride to see that a visible impact is being made in these needy communities.

Article 2:   Outrage at soil scientist's view

'It's as radical as sterilising people'

Outrage at soil scientist's view

■ OWN CORRESPONDENT

Pretoria — Outraged conservationists have reacted vehemently to suggestions that certain species of wildlife should be allowed to become extinct as they serve no useful purpose.

Unisa soil scientist Dr Munro Munnik suggested in a recent interview with Farmer's Weekly that rhino, elephant, hippo and other species take up valuable grazing space.

"You must be realistic," he is quoted as saying. "I feel strongly if we do not curb population growth in Africa — and this seems highly unlikely — we can forget about conservation. We will have to give all our attention to ... producing food."

Most outspoken of the critics was award-winning wildlife film maker Fanie van der Merwe. He said: "It appears Dr Munnik has adopted a radical approach. I could be just as radical and say why don't we sterilise people?"

Clive Walker, co-founder of the Rhino and Elephant Foundation, was also scathing in decrying Munnik's views.

"If what he is reported as having said is true, I would compare it to destroying cathedrals to grow cabbages," he said.

"While I appreciate his views on the population explosion, it is wrong to stampede people into thinking game reserves and conservancies would be better utilised to grow potatoes."

Munnik would be well advised to remember that extinction is forever, warned International Fund for Animal Welfare South African spokesman David Barritt.

The Natal Parks Board, ini-

UNISA's Dr Munnik has been criticised for saying certain wildlife should be allowed to become extinct

tiators of Operation Rhino, which led to the re-establishment of a sustainable white rhino population in Southern Africa, dismissed Munnik's remarks as ill-informed opinion.

"It is widely accepted that tourism has the potential of pulling South Africa out of the financial doldrums and Satour informs us that 90% of foreign tourists come to South Africa for natural areas and wildlife.

"Rhino and elephant, apart

from having a vital role in nature, are very much part of the wildlife attraction. To consign them arbitrarily to extinction is to threaten the success of our eco-tourism incentives," executive director Dr George Hughes said.

Wildlife Society ecologist David Lindley was in agreement with Hughes' views and added he was surprised a soil scientist would come forward with an opinion such as Munnik's.

"There are very few game farms and reserves on what can be considered prime agricultural land in South Africa. If this land was turned over to agriculture it would cost plenty to produce crops and even then the cost would be far higher than that of game ranching."

North West Conservation's Steve Johnson said Munnik's

views, if correctly put, would do irreparable damage to the earth's biodiversity.

He added that in the province's 75 000ha Madikwe Game Reserve it had been forecast via modelling that cattle ranching would create an extra 80 jobs with about R500 000 a year in salaries. Against this, further boosting of nature-based tourism would create up to 1 200 jobs with salaries exceeding R7-million a year.

Last words from Worldwide Fund for Nature South Africa's director of conservation Dr Ian Macdonald: "The reality of Africa is that the diverse communities of wild herbivores that have evolved on the continent are often better able to exploit natural rangelands than introduced domestic livestock," he said.

Article 3: A river dammed and destroyed.

A river dammed and destroyed

To trace the course of the Olifants River is to trace a history of appalling environmental degradation, writes **Eddie Koch**

5. Arabi Dam – Laden with silt from overgrazed homeland areas

8. A trickle of effluent as it crosses into Mozambique.

6. Forests soak up fresh recharges on the escarpment

7. More pollution from copper mines

Commercial Agriculture depletes the river

3. Loskop Dam – SA's only "acid lake"

OLIFANTS: THE ANATOMY OF A RIVER

2. Duvha Power Station draws millions of litres a week from the Vaal because the Witbank's too polluted to cool its stacks.

Article 4: Government "pit latrine" policy under fire.

Government "pit latrine" policy under fire

Colleen Lowe Morna

Article 5: Local focus on fynbos for World Environment Day.

World Environment Day

Advertising feature

Local focus on fynbos for World Environment Day

Thursday June 5 1997 SOWETAN

The Star—Monday, August 11 1997

Watershed in war on pollution

Asmal gives 'list of horrors' perpetrated by the mining industry on our water resources and says that the costs to the country have been enormous

By Melanie-Ann Feris
Environmental Reporter

Inadequate legislation and administration relating to pollution control has allowed the country's mining industry to get away with unacceptable pollution of water resources, according to the Minister of Water Affairs and Forestry, Kadar Asmal.

Asmal was addressing a water management in mining conference held in Johannesburg.

The list of pollution horrors revealed by Asmal included mine dumps, described by chemical engineers as "arsenic factories" in the Mpumalanga area, and dumps left by a prospecting team from a large mining company which contained so much arsenic and cadmium that it killed all the aquatic life in a nearby dam.

On the eastern Witwatersrand, gold mine waste water, containing sulphuric acid, iron and manganese, was being pumped into the Klip and Elsberg rivers, adding between 60 and 150 tons of salt into the Vaal Barrage on a daily basis.

Another example highlighted was the discharge of polluted water from the Grootvlei mine on the East Rand into the Blesbokspruit, a Ramsar wetland, which turned the water orange and killed aquatic life.

Asmal said also that sulphuric acid leachate from coal mine dumps was resulting in groundwater pollution in various areas, while recent aerial photographs revealed leakage of radioactive material from slime dams into water resources on the West Rand.

Community will not carry can

"If we match this list of horrors with the predictions that, within the next 30 years, South Africa will have used up all its available water resources and will have joined that unenviable elite of water-stressed countries, the implications are extremely disturbing," he said.

He added that, although mining had been the backbone of the economy, had contributed enormously to the current economic development of the country and was a large source of employment, the costs had been enormous.

He said the Government had put in place the appropriate changes to make sure these costs were no longer borne by innocent individuals and communities, but by the perpetrators themselves.

The white paper on national water policy, adopted by the cabinet in April, underlines policy which will determine the future management of water resources.

World Environment Day

Annan echoes call to save seas

"THE theme for this year's World Environment Day – For Life on Earth: Save Our Seas – is an appeal to each and every one of us to protect and focus our attention on one of our planet's most valuable resources, the oceans," stated United Nations Secretary-General, Kofi Annan today on the occasion of 1998's World Environment Day.

"Oceans comprise more than 70 percent of the earth's surface. Nearly two-thirds of humanity – some 3,5 billion people – inhabit coastal areas and depend on coastal and marine environments for their livelihood.

"Twenty years from now, this population is expected to have reached seven billion.

"For far too long, we have regarded the oceans' resources as inexhaustible. We have viewed the oceans as a bottomless receptacle for unlimited waste.

"With changing land patterns due to the pressures of an ever-increasing population, with the development of industries, with the massive use of agro-chemicals, the oceans have reached the limits of their capacity to assimilate the waste generated by human activities.

"Our self-centred approach has damaged human health, ecosystems and economic productivity.

"Any approach to meaningful and effective protection of the marine environment must factor in the full complexity of modern life – from politics to technology, from science to the law.

"On this day – whether we live near the ocean or not – let us demonstrate our commitment to protecting the environment. Let us prevent any further damage to our one and only Earth.

"Let us make this mission a priority in our daily lives. Let us recognise that our lives depend upon it," concludes Annan.

Friday June 5 1998 Sowetan

Articles 7 and 8: Annan echoes call to save seas, 50 free environment teaching aids sets on offer.

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SUNDAY LETTERS

THE article "Please, Mr Mandela, may I have a book" and the editorial "Betraying South Africa's children, yet again" (February 22) pointed out that all is not well with the implementation of Curriculum 2005 at Grade 1 level for various reasons, none of which is insurmountable.

Keeping the public informed of this scheme of national and historical importance is constructive leadership on your part. You have demonstrated that Curriculum 2005 is not only the responsibility of the government, teachers, pupils and parents, but of every South African, including the media.

Let's hope measures to correct shortcomings will be undertaken as promised by Bheki Khumalo, the spokesman for the Minister of Education, Professor Sibusiso Bengu. — **Professor TUNTUFYE S MWAMWENDA, University of Transkei**

■ MINISTER Sibusiso Bengu and his advocates want us to believe that before the introduction of Curriculum 2005 there was no teaching or learning in South African schools, that all our teachers were untrained and that the existing curricula and textbooks are useless.

This type of outcomes-based education propaganda has supplied teachers with the best excuse since the struggle against apartheid to do nothing.

Bengu has succeeded in paralysing education, especially in the so-called disadvantaged schools, with teachers' excuses for the present crisis centring on a lack of outcomes-based education training and shortages of the required textbooks and booklets.

I have been involved in teaching and the training of teachers for 30 years. Teachers under the age of 50 who claim they are not trained to regard every learner as unique, or that they have never heard of learner-centred teaching, self-activity, group work, co-operative learning, continuous evaluation, the enhancement of creativity and criteria-referenced instruction ...id take out their old textbooks.

Teachers are not the only educators

To dedicated teachers: keep up the good work. You have been practising outcomes-based education without knowing it and you will make a success of it.

The "incomprehensible jargon" attributed by your paper to the Free State department of education ("Learners make and negotiate meaning and understanding") is outcome number one for the learning area of language, literacy and communication.

This means that little Lerato Radebe's Grade 1 teacher should teach him how to listen, speak, read and write — just as she was trained to do and has always done. The teaching of these basic skills does not require any additional training and/or new textbooks.

In Curriculum 2005, existing educational aims and lesson goals have been replaced by so-called critical and specific outcomes and assessment criteria, stated in jargon such as "Original meaning is created through personal texts" and "Discourse is sustained". This simply means the teacher should talk to and listen to little Lerato and allow him to practise listening, talking, reading and writing, starting with his home language.

To regard a curriculum as either outcomes-based or content-based is a contradiction in terms. According to Fraser, Loubser and Van Rooy in a textbook prescribed at various training institutions since 1993: "A curriculum is the interrelated totality of (1) aims; (2) learning-content; (3) teaching and learning activities, opportunities and experiences; and (4) evaluation procedures which guide and implement the didactic activities in a planned and justified

manner."

In 1902 John Dewey, the American educationist, warned that if we treat these factors in isolation or focus on one at the expense of the others, we end up with insurmountable antagonism, such as between the child and the curriculum or between individual nature and social cultures.

Dewey stressed how the curriculum should be harmonically integrated with the learner's nature and needed growth and with the goals and ideals of a democratic society. In this regard, not one of the integrated components of a curriculum can be made absolute to such an extent that a syllabus can be considered to be based on outcomes (evaluation), content (objectives), or on activities (process). To regard a curriculum as outcomes-based overemphasises evaluation and devaluates teaching to the level of coaching for the attainment of simplistic outcomes. — **Dr I M VERMEULEN, head of department: didactic sciences, Potchefstroomse Universiteit vir Christelik Hoër Onderwys (Vaal Triangle Campus), Vanderbijlpark**

Articles 11 and 12:   **Greenpeace tactics stir controversy, Green schools project launch.**

Greenpeace tactics stir controversy

By JOHN YELD

Daredevil activists from the international conservation organisation Greenpeace are risking their lives in the icy waters of the Southern Ocean trying to disrupt Japan's annual slaughter of minke whales within a whale sanctuary.

But local whale conservationist Nan Rice does not approve of Greenpeace's tactics against the Japanese whalers and is concerned they could backfire on the organisation as Japan lobbies to have it thrown out of its official observer role at the International Whaling Commission (IWC).

Greenpeace reported this week that two of its activists in an inflatable boat had been dragged halfway up the stern ramp of the Japanese whaling factory ship Nisshin-maru after they attached their craft to a tow line transferring a harpooned minke whale from a catcher ship.

The crew aboard the factory ship then used a long-handled knife – normally used for cutting the whales into sections – to cut the inflatable from the tow rope, sending it shooting back down the stern ramp.

The activists in the inflatable were not injured.

Then, as the Nisshin-maru sailed off at high speed to resume whaling, six of the activists – from Japan, the Netherlands, Australia, Argentina and Spain – jumped into the freezing water in front of vessel. The ship did not slow down or divert from its course, but none of the six were injured, Greenpeace said.

The Greenpeace team, working from the vessel MV Arctic Sunrise, has been tracking the Japanese whaling fleet since December 20 1999, and has successfully disrupted illegal whaling on at least eight occasions.

It is the group's most extensive action against Japanese whaling activities in the Southern Ocean whale sanctuary in a decade. The sanctuary was established in terms of an IWC resolution in 1994, with a vote of 23 in favour and just one against.

Research

Japan, the only country in the world that does not recognise the sanctuary, exploits a loophole in the commission's regulations that allows whales to be killed for genuine scientific research.

Greenpeace argues that Japan's whaling programme in the Southern Ocean sanctuary is in violation of the 1982 United Nations Convention on the Law of the Seas, which requires all states to co-operate with the IWC regarding whale protection.

It also says the annual hunt is part of Japan's strategy to overturn international agreements to protect whales.

"Japan, with the support of Norway, is actively lobbying to lift the current ban on the international trade in whale products at the next meeting of the Convention on the International Trade in Endangered Species, being held in Nairobi in April," said Greenpeace campaigner John Bowler, who is aboard the MV Arctic Sunrise.

"Japan has also embarked on a concerted effort to convince more than a dozen developing countries to become members of the IWC and vote with Japan to resume large-scale commercial whaling worldwide in exchange for foreign aid from the government of Japan."

Rice, of the Dolphin Action and Protection Group (incorporating Save the Whales), says Greenpeace should be "very careful".

An attempt last year by a "furious" Japan to expel Greenpeace from the IWC was defeated, but the organisation's current tactics could count against it in the future. "It's not that we approve at all what the Japanese are doing down there – we don't. Also, their research from these hunts is not contributing much to the overall knowledge about whales," says Rice.

"But there's a right forum for discussing these things (the IWC), and there are loopholes in the IWC's policies, and until these are closed, this kind of thing will carry on."

Saturday Star January 15 2000, p-8.

Green schools project launched

THE National Environmental Education Programme which includes a drive to create "green" schools, was unveiled by the Department of Education yesterday.

Dr Razeena Wagiet, Education Minister Kader Asmal's environmental adviser, said the "green schools" programme was broader than just planting trees – it was about creating a healthy school environment. Sapa

Sowetan Tuesday June 6 2000

By Russel Molefe
Environment Reporter

Good ... and bad news for SA's environment

AT FIRST glance it does not seem as if 1999 was a particularly good or bad year for the environment in South Africa. But a closer look shows it has been quite an extraordinary 12 months.

On the downside, the Tuli elephant saga sparked off a very high-profile public debate. The National Council of the Society for the Prevention of Cruelty to Animals laid charges of cruelty to animals.

The Brits Magistrate's Court subsequently dropped the charges against Africa Game Services owner Riccardo Ghiazza, who purchased the elephants from the Tuli Block in Botswana.

It appeared as if international animal rights groups merely played on the emotions of local animal lovers to promote their own agendas.

On the upside, commendable work was carried out at Government level this year. It passed important legislation aimed at protecting the environment.

The Government also passed legislation to protect people from environmental hazards and water resources, though not without criticism from some quarters.

A Coastal Management Green Paper and a report on the State of the Environment was released, which painted a gloomy picture of the country's environment, especially fresh water resources such as rivers and streams.

However, the National Environmental Management Act, the National Water Act and the Marine Living Resources Act indicated that the protection of water resources was being given much more attention.

South Africa is one of the 20 most water-scarce countries in the world, with more than eight million of its people relying on unreliable water resources because of pollution.

Most of the rivers of Gauteng, the country's economic heartland and most crowded province, are very polluted.

The Crocodile, Jukskei and Little Jukskei rivers, as well as the Braamfontein, Modderfontein and Sand spruits, have high levels of bacteria and raw sewage.

All these rivers and streams, including the Jukskei (which is reported to be the most polluted river in South Africa), flow through densely populated urban areas, including upmarket suburbs and squatter camps, posing a serious health risk to residents.

flow into Klip River.

Large corporations are also to blame for water pollution. For instance, oil-from-coal giant Sasol was blamed for allowing toxic waste from its Sasolburg plant to leak into Leeuspruit, which feeds the Vaal Dam.

Sasol repeatedly and vehemently denied the accusation, but became the subject of a landmark judgment, which was a victory for environmental conservation.

The Save the Vaal environmental group successfully challenged the company's authorisation to strip-mine the Rietspruit site on the banks of the Vaal River.

Sasol lodged an appeal but the Supreme Court of Appeal in Bloemfontein declared: "The Constitution included environmental rights as a fundamental of the year over the dumping of industrial waste and sewage into the sea around Durban.

The dumping is threatening the future survival of marine resources industries such as shellfish.

Still, on pollution, asbestos again caused an uproar this year, especially in Northern Cape, where many people are dying of asbestos-related diseases.

The victims are now claiming compensation from the British company, Cape plc, which mined asbestos in the area and wanted the case to be heard in Britain.

However, a London court rejected the application and the victims are now

Children play on the banks of the polluted Jukskei River near Alex. Reports state that there are about a thousand sewerage blocks and spills a month in the Johannesburg Eastern Metropolitan Substructure alone.
PHOTO: ANTONIO MUCHAVE

had an impact on the natural environment.

However, some of the land claims already settled, especially those within protected areas, helped to achieve plans to include disadvantaged communities in nature conservation management.

On wildlife conservation matters, the bovine tuberculosis (BTB) in buffaloes, lions and other species gave Kruger National Park authorities sleepless nights trying to control the disease that so far has no cure or vaccine.

This led to conservation bodies in other provinces being on the alert and monitoring the movements of wildlife to make sure they stay BTB-

managed by the South African National Parks. The bad news this year was that the future of the Vaalbos National Park in Northern Cape remained uncertain because of its apparent lack of financial viability.

But the process started by WWF-SA 11 years ago paid off when the newest park, the Namaqualand National Park in Northern Cape, was proclaimed. This was after WWF-SA bought 930 hectares of land near Kamieskroon with funds donated by Dr Anton Rupert.

Other good news for the local environmental fraternity was that two individuals received international awards.

Anne Mearns, a veteran campaigner for environmental education, was one of 23 people around the world selected for the United Nations Environment

Article 13: Green groups demand clean air as a constitutional right.

Green groups demand clean air as a constitutional right

Nirode Bramdaw

SEVERAL environmental organisations will today present six government departments with a charter demanding clean energy alternatives to fossil fuels, to coincide with Earth Day, observed globally last Saturday.

On the 30th anniversary of the event, local environmental watchdog bodies articulated the theme "clean energy is our constitutional right" in a charter that will be sent to the departments of health, trade and industry, environmental affairs and tourism, water and forestry, minerals and energy, and transport.

"Noting the serious health concerns of communities who have refineries in their neighbourhoods, and proposals to expand oil-refining capacity at these refineries, it is of utmost importance that government enforces cleaner production processes and implements im-

proved legislation as a matter of urgency," said groundWork director Bobby Peek.

Compared with first world norms, SA had a lack of enforceable standards and legislation on refinery operations, with its air pollution law dating back to 1965. "The ... excessively high pollution levels at our oil refineries quickly saturate the surrounding environment's pollution-carrying capacity, and thus are a serious impediment to further economic development in the area," Peek said.

He cited southern Durban (Engen, Shell, BP), Sasolburg (Natref) and Cape Town (Caltex) as cases in point. "The lack of clear, strategic action by our government against these polluting refineries is thus impeding economic progress," he said.

He said fossil fuels contributed to global warming, and clean alternatives like wind and sunlight should be explored.

The charter was signed by Wildlife and Environment Society of SA, Earthlife Africa, Group for Environmental Monitoring, Environmental Justice Networking Forum, Climate Change Action Network, Environmental Monitoring Group, South Durban Community Environmental Alliance, Wentworth Development Forum and groundWork.

The demands include:

☐ the introduction of legally binding air emission standards for refineries;

☐ development of air quality management systems in areas where refineries are located;

☐ putting in place financial incentives and sanctions to encourage the fossil fuel industry to improve its environmental performance;

☐ rejection of nuclear power, as a dirty energy source; and

☐ acceleration of the transition from the age of oil to a clean energy era.

Business Day, Tuesday 25 April 2000

Article 14:   Iscor warns about water.

Iscor warns about water

CONTAMINATED industrial water accidentally spilled from Iscor's Newcastle plant on Saturday and the company has warned that water in the Ngagane River should not be used for at least four days.

In a statement yesterday, the company said water up to 50km from the confluence of the Ngagane and Buffalo rivers should not be used either.

Iscor public relations manage Mr Tienie Visagie said the coke oven gas holder at the factory caught fire and the factory roof collapsed.

"The gas holder contained contaminated industrial water, most of which was contained. Unfortunately a limited amount spilled into the Ngagane River just before its confluence with the Buffalo River."

Visagie said the Department of Water Affairs and Forestry, the local government's protection services and other affected institutions had been notified and were satisfied with the necessary precautions.

The Chelmsford and Amcor dam sluices were opened to dilute the contaminated water.

"The water quality is continuously being monitored," he said. – *Sapa*