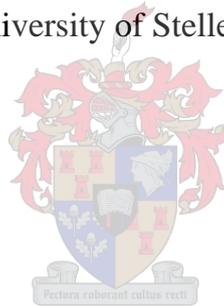


**IMPLEMENTING EDUCATION FOR SUSTAINABLE DEVELOPMENT:
THE ROLE OF GEOGRAPHY IN SOUTH AFRICAN SECONDARY
SCHOOLS**

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DECLARATION

By submitting this dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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ABSTRACT

During the Decade of Education for Sustainable Development (DESD) (2004-2015), better teaching and learning of environmental education and education for sustainable development (EE and ESD) in schools is one of the main responses to the worsening state of the global environment. Environmental concerns are integrated into the South African school curricula; in the General Education and Training (Grades R-9) (GET) and Further Education and Training (FET) phases through the principles that underpin the curricula such as social justice, a healthy environment, human rights and inclusivity. While a cross-curricula approach to teaching and learning is followed in the GET phase, environmental concerns are infused in each subject at FET level. Because geography deals with human-environment relationships and is interdisciplinary, it is considered to be one of the main vehicles for teaching EE and ESD.

To respond to the need for better teaching and learning of EE and ESD during the DESD, the main aim of this research project was to find out how EE and ESD are being implemented through the geography curriculum in South African secondary schools at FET level. The investigation sought answers to questions related to: opportunities for teaching EE and ESD in the geography National Curriculum Statement; the geography teachers' perspectives on EE and ESD; the extent to which the teachers incorporate the teaching of EE and ESD in the geography lessons; pedagogical approaches used by the geography teachers; and, the barriers to teaching environmental concerns through the geography curriculum.

A qualitative case study research design, underpinned by the interpretive research paradigm, was used. A sample of 10 senior geography teachers comprising 8 males and 2 females participated in the study. They were drawn from five Western Cape secondary schools selected through purposeful sampling in such a way that the sample of schools is representative of the socio-economic and socio-cultural context of the Western Cape as far as possible. Data were generated from biographic questionnaires and semi-structured interviews. Data were also generated from lesson observation and the analysis of documents such as the geography NCS, work schedules and lesson plans. The use of different research instruments ensured the triangulation of data sources in order to address issues of validity and reliability. The qualitative data were then analysed through thematic analysis.

The study found that the sustainable development theme is central to the curriculum. Additionally, strategies of implementing EE and ESD such as the enquiry approach, the issues-based approach and the need to impart critical thinking skills are suggested in the curriculum. The teacher participants experience conceptual barriers concerning the nature of EE and ESD and that of notion of integrated

geography promoted by the curriculum document. As a result, some of the teacher participants have difficulties in identifying EE and ESD themes in the curriculum document and incorporating them in the lessons.

Furthermore, the teacher participants have difficulties in distinguishing learner activities from learner-centred approaches underpinned by constructivist learning theories as observed by Janse van Rensburg & Lotz-Sisitka (2000) and in using the enquiry learning approach. Some teacher participants prefer using traditional teacher-centred approaches which enable them to finish syllabuses in time for examinations. The use of learner-centred approaches such as fieldwork is hindered by barriers such as shortage of resources, class time, large classes, deteriorating discipline, heavy workload and policy contradiction. This study revealed a gap between policy rhetoric and practice in the teacher participants' efforts to implement EE and ESD through the geography NCS.

Keywords

Environmental education, education for sustainable development, sustainable development, geography education, enquiry learning, issues-based approach, barriers to environmental education, curriculum implementation, secondary schools in South Africa

OPSOMMING

Beter omgewingsopvoeding-onderrig en -leer van volhoubare ontwikkeling (OO/OVO) in skole is een van die hoofresponse op die toenemende agteruitgang in die toestand van die wêreldomgewing in die Dekade van Opvoeding vir Volhoubare Ontwikkeling (DOVO) (2004-2015). OO/OVO is geïntegreer in die Suid-Afrikaanse skoolkurrikulum; in die Algemene Onderwys en Opleidingfase (Grade R tot 9) (AOO) en die Verdere Onderwys en Opleidingsfase (VOO) deur die beginsels wat die leerplan onderlê soos sosiale geregtigheid, 'n gesonde omgewing, menseregte en inklusiwiteit. Alhoewel 'n kruis-kurrikulêre benadering tot onderrig en leer in die AOO-fase gevolg word, word OO/OVO by elke vak op die VOO-vlak geïntegreer. Omdat geografie oor mens-omgewingverhoudings handel en interdisiplinêr is, word die vak as een van die hoofvoertuie vir die onderwys van OO/OVO beskou.

Om op die behoefte vir beter onderrig en leer van OO/OVO tydens die DOVO te reageer, is die hoofdoel van hierdie navorsingsprojek om vas te stel hoe OO/OVO deur die geografiekurrikulum in Suid-Afrikaanse sekondêre skole op VOO-vlak geïmplimenteer word. Die ondersoek het antwoorde gesoek op vrae wat verband hou met: geleenthede vir die onderrig van OO/OVO in die geografie Nasionale Kurrikulumverklaring (NKV); die perspektiewe van geografie-onderwysers oor OO/OVO; die mate waartoe onderwysers die onderrig van OO/OVO in geografie-lesse inkorporeer; die pedagogiese benaderings wat geografie-onderwysers gebruik; en die hindernisse ten opsigte van die onderrig van OO/OVO in die geografie-kurrikulum.

'n Kwalitatiewe gevallestudie-navorsingsontwerp, ondersteun deur die interpretatiewe navorsingsparadigma, is ingespan. 'n Steekproef van 10 senior geografie-onderwysers, bestaande uit agt mans en twee vroue is by die studie betrek. Hulle is uit vyf Wes-Kaapse sekondêre skole geselekteer deur middel van doelgerigte steekproefneming op so 'n wyse dat die monster van skole so ver moontlik die sosiaal-ekonomiese en sosiaal-kulturele kontekste van die Wes-Kaap weerspieël. Inligting is verkry uit biografiese vraelyste en semi-gestruktureerde onderhoude, asook deur waarneming van lesse en deur die ontleding van dokumente soos die NKV vir geografie, werkskedules en lesplanne. Die van verskillende navorsingsinstrumente is gebruik ter ondersteuning van die triangulasie van data ten einde geldigheids- en betroubaarheidskwessies aan te spreek. Die kwalitatiewe data is daarna aan tematiese ontleding onderwerp.

Die studie bevind dat volhoubare ontwikkeling 'n sentrale tema in die kurrikulum is. Daarbenewens word strategieë om OO/OVO te implementeer, soos die ondersoekleerbenadering, die kwessiegebaseerde benadering en die behoefte om kritiese denkvaardighede te ontwikkel, in die kurrikulum voorgestel. Die onderwyserdeelnemers ervaar konseptuele hindernisse met betrekking tot

die aard van OO/OVO en die nosie van geïntegreerde geografie wat die kurrikulumdokument bevorder. Gevolglik vind sommige onderwyserdeelnemers dit moeilik om OO/OVO in die leerplandokument te identifiseer en in hul lesse te inkorporeer.

Verder ondervind die onderwyserdeelnemers probleme om leerderaktiwiteite te onderskei van die leerdergesentreerde benaderings wat onderlê word deur konstruktivistiese leerteorieë soos deur Janse van Rensburg & Lotz-Sisitka (2000) waargeneem en om die ondersoekleerbenadering te gebruik. Sommige onderwyserdeelnemers verkies om tradisionele onderwysergesentreerde benaderings wat hulle in staat stel om kurrikula betyds vir eksamens af te handel. Die gebruik van leerdergesentreerde benaderings soos veldwerk word gestrem deur belemmeringe soos hulpbrontekorte, beperkte klastyd, groot klasse, verswakkende dissipline, hoë werklading en teenstrydighede in die beleid. Die studie het 'n gaping tussen beleidsretoriek en die praktyk in die onderwyserdeelnemers se pogings om OO/OVO te implementeer wat in die geografie NKV ingewerk is, uitgewys.

Sleutelwoorde

Omgewingsopvoeding; opvoeding vir volhoubare ontwikkeling; volhoubare ontwikkeling; geografie-opvoeding; ondersoekleer; kwessiesgebaseerde benadering; hindernisse in omgewingsopvoeding; kurrikulumimplementering; sekondêre skole in Suid-Afrika.

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This work is dedicated to my late parents: my mother, Teresa “MaNcube Mazilankatha” and my father, Petros Mdumbeni Dube who have inspired me to realise my academic potential.

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ANC	African National Congress
ARIES	Australian Research Institute in Education for Sustainability
ASMT	Academic School Management Team
C2005	Curriculum 2005
CASS	Continuous Assessment
CAT	Computer Applications Technology
CHE	Committee of Heads of Education
DEAT	Department of Environmental Affairs and Tourism
DES	Department of Education and Science
DESD	Decade of Education for Sustainable Development
DET	Department of Education and Training
DFEE	Department for Education and Employment
DoE	Department of Education
DVDs	Digital Versatile Discs
EDET	Environment and Development Education Training Group
EE	Environmental Education
EEASA	Environmental Education Association of Southern Africa
EECI	Environmental Education Curriculum Initiative
EEFSD	Environmental Education for Sustainable Development
EEPI	Environmental Education Policy Initiative
EFS	Education for Sustainability
ESD	Education for Sustainable Development
ESMT	Extended School Management Team
FET	Further Education and Training
GEAR	Growth, Employment and Redistribution
GET	General Education and Training
GIS	Geographic Information Systems
HDE	Higher Diploma in Education
HIV	Human Immunodeficiency Virus
HOD	Head of Department
ICT	Information and Communication Technology
IGU	International Geographical Union
IGU-CGE	International Geographical Union - Commission on Geographical

	Education
INSET	In-service Education and Training
IUCN	International Union for Conservation of Nature
JMB	Joint Matriculation Board
LSTD	Lower Secondary Teaching Diploma
MoEC	Ministry of Education and Culture
NCS	National Curriculum Statement
NECC	National Education Co-ordination Committee
NEEP-GET	National Environmental Education Programme for the General Education and Training phase
NGO	Non Governmental Organisation
OAS	Organization of American States
OBE	Outcomes-Based Education
OECD	Organisation for Economic Co-operation and Development
PC	Personal Computer
PGCE	Postgraduate Certificate in Education
PSHE	Personal, Social and Health Education
RNCS	Revised National Curriculum Statement
RSA	Republic of South Africa
SADC-REEP	Southern African Development Community Regional Environmental Education Programme
SAGS	South African Geographical Society
SD	Sustainable Development
SDEP	Sustainable Development Education Panel
SMT	School Management Team
UK	United Kingdom
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United States of America
UVP	Umgeni Valley Project
WCED	World Commission on Environment and Development
WESSA	Wildlife Society of South Africa
WSSD	World Summit on Sustainable Development
WWF	World Wide Fund for Nature

CHAPTER 1: INTRODUCTION

Citing the GEO-3 report (South Africa 2006: 14), the Department of Environmental Affairs and Tourism (DEAT) paints a gloomy picture of the global environment. Food security is being threatened by land degradation. There is a high rate of biodiversity loss due to problems such as land conversion, climate change, pollution, invasion by exotic species and overexploitation of vegetation. A severe shortage of water is being experienced in some countries as a result of excessive water demand and climate variability. Disease epidemics continue to be a problem in countries with poor sanitation, where people consume untreated water. The quality of coastal and marine areas has sharply deteriorated as result of global warming, population growth, increased industrialization, urbanization and tourism in coastal areas. The use of fossil fuels has increased the concentration of carbon dioxide as well as sulphur and nitrogen compounds which contribute to global warming and acid precipitation. Rapid urbanization in less developed countries is characterized by increasing unemployment, poverty, escalating crime, high prevalence of HIV/AIDS and other health problems that result from inadequate waste collection. According the United Nations International Strategy for Disaster Reduction (UNISDR) (2004) cited in Dube (2008), the vulnerability of the population to disasters appears to have greatly increased globally in recent years.

1.1 BACKGROUND TO THE STUDY

During the Decade of Education for Sustainable Development (DESD) (2005-2014), different countries are advised to redouble their efforts to achieve the required education targets. One of the targets is improved education for sustainability¹ (EFS) which can be accomplished through better teaching of environmental education (EE) in schools so as to enhance the state of the environment. The geography subject is one of the main vehicles through which environmental education can be taught (Ballantyne, Oelofse & Winter 1999; Cowie 1997; Du Toit 1990; Fairhurst 1994; Hurry 1979, 1980; Marker 1984; Sadie 1999; Symmonds 1996). Through geography education, learners are likely to gain knowledge, skills, values, attitudes and behaviour that will enable them to protect the environment. This sentiment is echoed by Bory-Adams (2006: 2) in the statement: “it is through the application of learnt knowledge, skills, values and behaviours - all outcomes of quality education, that we can change the way we and others live to ensure a sustainable present and future.”

The first part of this chapter deals with the background to the study and focuses on the origin and definition of the terms environmental education (EE), sustainable development (SD), education for sustainable development (ESD) and the Decade of Education for Sustainable Development (DESD).

¹ The terms sustainability and sustainable development will be used interchangeably (see also Le Grange 2012b: 126).

The chapter will then focus on the debate on the extent to which environmental education and education for sustainable development are similar. The last part deals with the conceptual context, the problem statement, the research questions and the research design. The chapter ends with the definition of the terms, an outline of the dissertation chapters and a summary of this chapter.

1.1.1 Environmental Education

Gough (1997) points out that the term environmental education was first described by Stapp and his colleagues at the University of Michigan in the late 1960s. The definition of the term has changed over time from conservation education which, according to Stapp et al (1969), focused on basic resources and not, as is the current focus, on both the biophysical and the human environment. Stapp et al defined environmental education as a new educational approach

that effectively educates man regarding his relationship to the total environment...Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems and motivated to work towards their solution (Stapp et al 1969: 30-31).

Stapp et al's definition takes a narrow view of the environment, and more specifically focuses on the biophysical environment, as the definition refers more to conservation education (Stevenson 1987). The IUCN (1970) definition cited in Linke (1980: 26-27) regards environmental education as:

the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his bio-physical surroundings. Environmental education also entails practice in decision-making and self-formulating of a code of behaviour about issues concerning environmental quality.

The definition given above, unlike that of Stapp et al, acknowledges the interconnectedness of the four dimensions of the environment: biophysical, social, economic and political. These definitions will be explored further in Section 3.1.1.1. A number of authors have debated on the relationship between environmental education and sustainable development (sustainability) (Sauvé 1996).

1.1.2 Sustainable development

According to Sauv  (1996), some authors view sustainable development as the ultimate goal of environmental education and have coined the term *environmental education for sustainable development* (EEFSD). At the Rio Earth Summit, the perspective that emerged in *Agenda 21* was that sustainable development is the main goal of environmental education (UNCED 1992, Chapter 36). For others, sustainable development objectives should be added to those of environmental education. These authors have therefore formulated the term *environmental education and sustainable development* (EE & SD). Other authors argue that the use of environmental education and sustainable development is tautological because the term environmental education inherently includes education for sustainable development. This contestation is continued in Section 1.1.5. What is the origin of the term sustainable development and how has it been defined in the literature?

According to Van Zon (2006), cited by Le Grange (2008), the term sustainability was first used in the 18th century in German forest management practices. One of the first people to use the term in England was Barbara Ward² in the early 1970s (Barrow 1995; Satterthwaite 2006). The term was widely publicized in the World Conservation Strategy (IUCN, UNEP, WWF 1980). It was then popularized by the World Commission on Environment and Development (WCED) who published a definition in the Brundtland report (WCED 1987). According to Telfer & Sharpley (2008) this definition, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”, is the best known and lasting definition of sustainable development (WCED 1987: 48).

The term sustainable development is widely accepted despite the fact that there is no agreement on its meaning (Bonnett 2002; Cotton et al 2007; Jickling 1999; Le Grange 2012a; Le Grange 2012b; Sauv  1996; Steer & Wade-Gery 1993; Telfer & Sharpley 2008). Steer & Wade-Gery (1993) point out that by the early 1990s over 70 definitions of the term had been formulated. The number of definitions had more than quadrupled to 300 by the late 1990s (Jickling 1999). This means that the term has varied meanings. Jickling (1994: 232), cited in Cotton et al (2007), noted that just after the Rio Earth Summit, sustainable development “has become for many a vague slogan, a bold platitude, susceptible to manipulation and deception.” According to Chapman (2004) the term is technocentric, the essence of modernism, which is the root cause of environmental problems. He supports similar views from Fien &

² Barbara Ward (1914-1981) was a British economist and writer (<http://www.britannica.com/EBchecked/topic/1388551/Barbara-Ward-Baroness-Jackson>). According to Satterthwaite (2006), she is remembered as one of the great intellectuals and internationalists of the 20th century who was one of the first champions of sustainable development discourse. The *Rich Nations and the Poor Nations* (1962), *Only One Earth* (1972) written with Ren  Dubos and *The Home of Man* (1976) are some of her most popular books. She played a role in building the International Institute for Environment and Development (IIED).

Trainer (1993) and Huckle (1991) that sustainable development is unashamedly linked with economic growth, excessive extraction of resources from the environment and instrumentalism. Chapman (2004) argues that conceptions of sustainability based on technocentric values cannot provide long-term solutions to environmental problems. He concludes that the term “sustainability” is basically useful but urges academics engaged in the sustainability discourse to clarify the term and not to further obscure its meaning.

The conceptualization of sustainable development in the 1980s was accompanied by a parallel exploration of the role of education to promote it (Hopkins & McKeown 2002).

1.1.3 Education for Sustainable Development

According to Hopkins & McKeown (2002: 18), Education for Sustainable Development “is a combination of existing and yet to be identified guiding principles, knowledge, skills, perspectives, and values that are organized around sustainability concepts and issues.” Reid (2002) provides another definition of ESD compiled by the Sustainable Development Education Panel (SDEP 1999: 30) for policy makers:

Education for sustainable development is about the learning needed to maintain and improve our quality of life and the quality of life of generations to come. It is about equipping individuals, communities, groups, businesses and government to live and act sustainably; as well as giving them an understanding of the environmental, social and economic issues involved. It is about preparing for the world in which we will live in the next century, and making sure that we are not found wanting.

The first definition is exploratory and leaves the reader uncertain of what education for sustainable development is. The second definition takes an anthropocentric view of sustainability because it focuses on improving the quality of life. This could happen through increased economic growth which might take place at the expense of the quality of the environment. This anthropocentric view illustrates the criticism of the concept sustainable development discussed above in Section 1.1.2.

Hopkins & McKeown (2002), explain that ESD was not created by the educational institutions, but was initiated by international political and economic forums such as the United Nations, OECD and OAS. As a result, international educational bodies such as UNESCO, as well as certain educators saw this external conceptual development of ESD as problematic. At the Rio Earth Summit in 1992, organized by UNCED, the role of education in promoting sustainable development was recognised. Chapter 36 of *Agenda 21*, titled “Promoting education, public awareness and training” (Quarrie 1992), deals with the

need to promote sustainable development through education. In this chapter, governments are called upon to re-orient education towards sustainable development. According to UNCED (1992: para 36.3) cited in Gough (2006a):

Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues ... It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making.

Governments are also advised to integrate environmental and developmental issues into educational activities throughout school and adult education, including vocational training programmes. Furthermore, governments are called upon to ensure universal access to basic education and to reduce adult illiteracy. The training of workers is also emphasized, the goal being the promotion of environmentally literate³ workers who have the knowledge and skills to make decisions that protect the environment in the work place (Quarrie 1992).

The World Summit on Sustainable Development (WSSD) in Johannesburg 2002 endorsed education, learning and capacity building as important agents in change towards a sustainable future. Furthermore, the delegates recommended that the United Nations General Assembly should consider adopting a DESD (ARIES 2005).

1.1.4 The Decade of Education for Sustainable Development

In December 2002, the UN General Assembly declared the period between 2005 and 2014 as the Decade of Education for Sustainable Development, so as to increase the pace at which education is re-oriented towards sustainable development and to ensure that training and public awareness systems zero in on sustainability issues (ARIES 2005). UNESCO was given the mandate to lead the DESD. ESD is founded on respect for others (present and future generations) and for the planet, as well as for its resources. According to UNESCO (2009), the DESD should drastically change the traditional education practice and promote:

- interdisciplinary and holistic learning rather than subject-based learning;
- values-based learning;
- critical thinking rather than memorizing;

³ According to Roth (1992: 1) 'environmental literacy is essentially the capacity to perceive and interpret the relative health of the environmental systems and to take appropriate action to maintain, restore or improve the health of those systems. To be environmentally literate, a sound knowledge of the threats to our environment is essential.'

- multi-method approaches: word, art, drama, debate, etc;
- participatory decision-making; and,
- locally relevant information, rather than national.

The Decade's goals can be broken down into four key objectives:

- facilitating networking, and collaboration among stakeholders in ESD;
- fostering greater quality of teaching and learning of environmental topics;
- supporting countries in achieving their millennium development goals through ESD efforts; and
- providing countries with new opportunities and tools to reform education (derived from website http://portal.unesco.org/education/en/ev.php-URL_ID=23279&URL_DO=DO_TOPIC&URL_SECTION=201.html (UNESCO 2009).

McKeown & Hopkins (2003) note a difference in opinion on whether EE is becoming ESD or not, or whether they are completely separate. The next section deals with this debate.

1.1.5 Is EE the same as ESD or are they different?

According to McKeown & Hopkins (2003), the principles of EE in the Belgrade and Tbilisi documents focus more on the plight of the (biophysical) environment than that of the people. They also point out that the core of EE currently in most programmes and curricula is concern for the (biophysical) environment. When they examine *Agenda 21* produced at the Rio Earth Summit in 1992, they notice a shift in focus to environment and development issues. According to McKeown & Hopkins, the contents of *Agenda 21* gave birth to the concept of Education for Sustainable Development as noted in Section 1.1.3. They also observe that the focus of EE is changing and beginning to embrace the environment in its totality. ESD is concerned with three sectors: environment, society and economy. McKeown & Hopkins (2003) try to allay the fears of some educationists by reassuring them that ESD will not replace EE. As for which one is bigger, these authors regard it as depending on one's perspective: EE or ESD "is either one part of the picture or the entire picture." Furthermore, they claim that it is important that EE and ESD should remain separate so that they influence each other as they grow independently. UNESCO (2004; 2006) and other authors (Fien 2001) support McKeown & Hopkins (2003) that EE and ESD are not identical.

Citing UNESCO (2004: 7), Gough (2006a) states that the scope of environmental education has been broadened in education for sustainable development to:

‘...encompass social justice and the fight against poverty as key principles of development that is sustainable. The human and social aspects of sustainable development meant that solidarity, equity, partnership and cooperation were as crucial as scientific approaches to environmental protection.’

Furthermore, Gough (2006a: 2) argues that environmental education focuses on resolving environmental problems, while education for sustainable development includes environmental education which is contextualized within “socio-cultural factors and the socio-political issues of equity, poverty, democracy and quality of life as well as a development perspective on social change and evolving circumstances.” According to Fien (2001: 6) “education for sustainability is broader and, perhaps, more challenging than the concept of environmental education.” Despite the differences dealt with above, Gough (2006a) states that there are similarities between EE and ESD. First, they have the same goal – to inculcate in learners values and attitudes that promote sensitivity to the environment, a critical attitude towards unsustainable practices and motivation to change these practices. Second, pedagogical practices used in both EE and ESD are similar in that critical thinking, issues-based approaches, interdisciplinary and holistic learning, participation and locally relevant learning are recommended. However, Robottom (2007) has a contrasting view.

Robottom (2007: 90) regards the introduction of ESD as replacing EE. He observes:

In particular we are currently in the throes of a situation in which the environment-related work formerly known as ‘environmental education’ (EE) is being aggressively and extensively ‘re-badged’ as ‘education for sustainable development’ (ESD). There are strong attempts internationally to supplant the use of the term EE with the newer term ESD; most of these attempts are associated with the international United Nations Decade of Education for Sustainable Development.

Robottom (2007) questions whether changes in language from EE to ESD will be accompanied by qualitative changes in environment-related educational practice. If meaningful reform is not realized, then ESD may just become an empty slogan. Citing Popkewitz (1982: 20), he argues that the adoption of the term ESD in place of EE could just become “changeless reform (the adoption of a new and high impact name in the absence of any real change in practice).” Moreover, because ESD lies at the intersection of the competing needs of economic development, society and environmental education, Robottom (2007) thinks that economic interests are likely to dominate to the detriment of the (biophysical) environment. The focus now turns to the conceptual context.

1.2 CONCEPTUAL CONTEXT

This research project is first contextualized within geographical education research in South Africa and then within policy implementation research in general. A review of the literature reveals a number of focus areas of the geography discipline in South Africa.

1.2.1 Research on geography education

The literature reveals four focus areas in geography education research in South Africa. First, a number of authors have dealt with the role of geography as a vehicle for teaching environmental education (Ballantyne, Oelofse & Winter 1999; Beukes 1992; Cowie 1997; Du Toit 1990; Fairhurst 1994; Hurry 1980; Marker 1984; Nduna 1995; Sadie 1999; Symmonds 1996). Second, some of the authors have been concerned with changes in the nature of the geography discipline in South Africa (Ballantyne 1989; Fairhurst et al 2003; Ramutsindela 2002). Third, several authors (Ballantyne 1999; Beets & Le Grange 2005; 2008; Le Grange & Beets 2005; Nel & Binns 1999; Van Harmelen 1999; Ramutsindela 2001; Van der Merwe 1998), focus on the impact of Curriculum 2005 on geography education, while the fourth emphasis has been on the pedagogical aspects of the geography discipline (Adonis 1993; Arjun 1991; Ballantyne 1986; Golightly 2005; Mayet 1988; Moodley 1997; Mphaphuli 1993; Ngcamu 2000; Ngquba 1992; Rambunda 1994; Rambuda & Fraser 2004; Webster 1979).

There is, however, hardly any literature on the role of geography as a vehicle for the implementation of education for sustainable development in South Africa. A significant amount of literature from other countries indicates that great strides have been made in orienting geography towards education for sustainable development, for example in Britain and Australia (Corney 2006; Hicks 2002; Morgan 2000; Oulton et al 2004; Reid 2000; Smith 2005; Summers, Corney & Childs 2004; Tilbury 2008).

This research project has been motivated by the desire to promote the environmental education and education for sustainable development discourse from the perspective of geography education at secondary school level in the South African context. The research has been done against the background of the DESD (2005-2014).

The broader context of this research project is that of curriculum innovation and implementation, because it focuses on curriculum implementation taking place following the far reaching educational changes in post-apartheid South Africa.

1.2.2 Perspectives on curriculum innovation and implementation

According to Carless (1998), research on processes of curriculum implementation aims to provide answers to a number of questions. Curriculum developers need to know to what extent teachers put into practice the intended goals of the innovations. Additionally, it is necessary to determine the ways in which teachers adapt the innovation to fit their contexts. Lastly, it is important to learn about the strategies used by the teachers to implement curriculum innovations and how the pupils respond to the curriculum innovations. Armed with this information provided by curriculum implementation research, the stakeholders in the education sector can focus on addressing the implementation problems in order to provide better quality education.

It has been observed that curriculum reforms generally have a limited impact on the teachers' classroom practice and that there is often a pronounced gap between policy rhetoric and practice (Carless 1998; Fullan & Pomfret 1977; Kirkgoz 2008a; 2008b; Orafi & Borg 2009; Panday & Moorad 2003; Sikoyo 2007). Researchers have identified a number of factors that influence the implementation and up-take of curriculum innovations. After an extensive review of literature on implementation research, Fullan & Pomfret (1977) identified four categories of factors influencing the implementation of curriculum innovations. These include the following:

- characteristics of the innovation;
- strategies and tactics;
- characteristics of the adopting unit; and,
- characteristics of macro socio-political units.

The two main characteristics of an innovation that influence its implementation are its clarity and its degree of difficulty. An ambiguous and complicated curriculum innovation is not likely to be implemented as successfully as one that is clear and easy to understand. The strategies and tactics are the methods that can be used for the effective implementation of an innovation. According to Fullan & Pomfret (1977), the implementation of a curriculum innovation is likely to be more successful if there is in-service training, support with materials, interaction that provides feedback to the facilitators and participation in decision-making.

In the education sector, adopting units refer to teachers and the school context, while the fourth category, macro socio-political factors, refers to the "role of political agencies outside the adopting organization" (Fullan & Pomfret 1977: 386). In the South African context, the macro socio-political factors include local school governing bodies, community agencies and local government, the

provincial departments and the national Department of Basic Education. Another classification of the factors is provided by Fullan (2001).

According to Fullan (2001) cited in Roehrig, Kruse & Kern (2007: 885), implementation outcomes are influenced by three categories of factors: “characteristics of the change itself (the need and relevance of the change, clarity and complexity of the change, and the quality and practicality of the program), local factors (characteristics of teachers, principals, and district administrators), and external factors (parents and community, technology, business, and corporate connections, government policy, and the wider teaching profession).” The factors can act as enablers to the implementation processes resulting in a significant up-take of the curriculum innovation. Alternatively, the factors dealt with above can act as barriers to the implementation of curriculum innovations, resulting in limited impact on classroom practice, as observed earlier. Fullan & Pomfret (1977) argue that centrally designed policies are often inadequately implemented because they do not address some of the crucial factors stated above, such as those related to teacher attributes.

Teachers play an important role in the implementation of curriculum innovations because they can act as change agents (Fullan 1993). According to Carless (1998), teachers’ attitudes, training, understanding of an innovation and extent of support, play an important role in the success of an innovation. The importance of the teacher’s role in the implementation of curriculum innovations has been illustrated through empirical research, for example Carless (1998), Kirkgoz (2008a; 2008b), Orafi & Borg (2009) in English language teaching and Roehrig, Kruse & Kern (2007) in Science education. These studies illustrate the crucial role that teachers play in the successful implementation of curriculum innovations. Kirkgoz (2008b) advises that teachers should be provided with appropriate training and support so as to enhance their capacity as well as to modify their beliefs and classroom practices.

Spillane, Reiser & Reimer (2002) have proposed the cognitive model of policy implementation, which involves the agents’ sense-making regarding new policy. This model attributes policy failure to the agents’ lack of understanding of the policy rather than the perceived lack of cooperation, acts of sabotage or resistance to change. I elaborate on Spillane, Reiser & Reimer’s (2002) model of policy implementation in Chapter 6 where I use it to discuss the results.

According to Sikoyo (2007), education systems in some African countries have recently undergone change as a result of the impact of globalisation forces. These changes have involved the introduction of new curricula, for example in South Africa, Botswana, Namibia, Uganda and Nigeria. Sikoyo (2007: 30) observes that these changes have mainly involved a shift towards more progressive learner-centred pedagogical approaches in an effort to discourage “teacher-centred didactic practices, associated with

teacher dominance and passive learners, rote learning and the stifling of critical and creative thinking.” In the following paragraphs I focus on education changes in South Africa, the context of my research.

At the inception of democracy rule in South Africa, there were fundamental changes in the education policy meant to redress the apartheid legacy of unequal access to resources, endemic poverty among some sections of the population and shortage of skills (Botha 2002; Cross, Mungadi & Rouhani 2002; Du Plessis 2005; Mosidi 1998; Reddy 2011; Steyn & Wilkinson 1998). At the centre of the education policy changes was the introduction of a new curriculum (Curriculum 2005), underpinned by outcomes-based education (OBE). The intention of the developers of the new curriculum was to encourage a pedagogical shift from content-based education delivered through teacher-centred, transmissive approaches to OBE to be taught through learner-centred approaches. Curriculum 2005 (C2005) was implemented using an integrated approach because the subjects were collapsed into eight Learning Areas at the General Education and Training (GET) band (Carl 1998; Mosidi 1998; South Africa 1995). The learners work towards the achievement of “curriculum-linked outcomes” called learning outcomes in the teaching and learning programmes (Le Grange & Beets 2005). All learning from school level to higher education is geared towards the achievement of critical outcomes. Critical outcomes are “generic and cross-curricular, and aim to develop in learners the knowledge and skills required to function meaningfully in a democratic country” (Le Grange & Beets 2005: 268).

According to Cross, Mungadi & Rouhani (2002), the new OBE curriculum resulted in policy tensions which precipitated widespread criticism (for details see Chisholm et al 2000; Christie 1999; Fakier & Waghid 2004; Jansen 1998; 1999a; 1999b; Jansen & Christie 1999; Kruss 1998; Meerkotter 1998; Morrow 1999; Le Grange & Reddy 1997; Waghid 2001; 2003). The criticism focused on: “(i) its origins and conceptual basis; (ii) its policy nature; (iii) its knowledge and pedagogical features; (iv) process issues such as the management of its formulation, adoption and implementation; (v) design issues; and, (vi) its position in the context of schooling” (Cross, Mungadi & Rouhani 2002: 180). The curriculum review committee (Chisholm et al 2000) identified a number of implementation problems and recommended a more streamlined curriculum as well as improved strategies of implementation. The Revised National Curriculum Statement (RNCS) was launched in 2002. According to Le Grange & Beets (2005), the findings of the curriculum review committee were supported through empirical research by other academics, for example Jansen (1999b) and Le Grange & Reddy (2000).

Despite the shortcomings and implementation problems of C2005, its advent after 1994 provided an opportunity and space for infusing environmental concerns. EE could be implemented holistically because of the integrated approach to education (Mosidi 1998; South Africa 1995) especially at primary and lower secondary school level – the GET band. Thus, the incorporation of environmental concerns into the Learning Areas and subjects in formal education in the South African context was one of the

most important innovations in the new curriculum. The processes that led to the incorporation of environmental concerns into formal schooling in South Africa will be elaborated on in Chapter 3. This research project is positioned in the implementation research field. It explores how EE and ESD as a curriculum innovation are being implemented through the geography curriculum at Further Education and Training (FET) level in South African secondary schools. The foregoing discussion on the factors influencing the implementation of curriculum innovations, especially the central role of teachers, is pertinent to this research. The research findings will explain how some of the factors, especially teacher attributes and contextual factors, have influenced the implementation of EE and ESD through the geography curriculum.

1.3 DESCRIPTION OF THE PROBLEM

It is now over five years since the DESD was declared by the United Nations (ARIES 2005; UNESCO 2004; 2006). It is necessary to find out whether South African education has been re-oriented towards sustainable development. This research will fulfil this need by establishing whether environmental concerns have been infused into the FET (Gr 10-12) geography National Curriculum Statement (NCS). The research will further determine whether the geography teachers actually teach environmental education and education for sustainability as stipulated in the NCS. The aim and objectives of the research are provided below. Ballantyne, Oelofse & Winter (1999) established that South African geography educators strongly support the teaching of environmental education through school geography and that they are more amenable to the idea of formal linkages between environmental education and geography education than their international counterparts.

In order to investigate the above problem, the main research question is posed:

How are EE and ESD being implemented through the secondary school geography curriculum?

This question is broken down into the following sub-questions to provide guidelines for the data collection phase of the research process:

- 1. What opportunities for teaching EE and ESD are there in the geography NCS?*
- 2. What are the geography teachers' perspectives on EE and ESD?*
- 3. How much EE and ESD are taught by the teachers in the geography subject?*
- 4. What methods of teaching dominate in geography instruction?*
- 5. Are there any barriers to teaching EE and ESD in geography and if so, how can they be overcome?*

The following section provides an outline of how the research was designed in order to address the above research questions. It includes a brief description of the main elements of the research design.

1.4 RESEARCH DESIGN

Durrheim (2006: 36) defines a research design as a “strategic framework, a plan that guides research activity to ensure that sound conclusions are reached.” The aim of a research design, according to Mouton & Marais (1990) cited by Durrheim (2006), is to “plan and structure a given research project in such a way that the eventual validity of the research findings is maximised.” Dealing with validity issues in the design ensures that credible findings are obtained. Durrheim (2006: 37) suggests four components that a researcher should consider in formulating a research design:

1. The purpose of the research;
2. The theoretical paradigm that underpins the research;
3. The research context; and,
4. The data collection and analysis techniques.

The four components of the research design are described in the following paragraphs.

As illustrated by the main research question (see Section 1.3), the aim is to find out how geography teachers in some South African secondary schools are implementing EE and ESD through the geography curriculum at FET (Gr 10-12) level. Therefore, this research is informed by the interpretive paradigm, which is elaborated upon in Section 4.1. Furthermore, the qualitative research approach is employed and a multiple case study design is followed, which highlights the influence of context on the findings.

The research was carried out in five secondary schools selected through purposeful sampling in the Western Cape province of South Africa. The following criteria were considered in selecting the sample of schools: first, the selected schools are all public high schools with FET and independent schools were excluded. Second, the sample schools are representative of the socio-cultural and socio-economic context of the Western Cape, and thirdly, the schools have geography in the school curriculum.

Two geography teachers from each of the five secondary schools participated in the research, making a sample total of 10 participants. A number of research instruments were used to collect data in the field. Data were generated from questionnaires given to the teacher participants and semi-structured interviews conducted with them. Data were also generated from lesson observation and the analysis of documents such as the geography National Curriculum Statement, work schedules and lesson plans.

The use of different research instruments ensured the triangulation of data sources in order to address issues of validity and reliability.

Field notes were written on lessons that were observed. The interviews were recorded and then transcribed verbatim. The qualitative data were then analysed through thematic analysis (Attride-Stirling 2001; Boyatzis 1998; Braun & Clarke 2006), which involved the initial coding process using ‘in vivo’ codes. The coding stage was followed by the classification of the codes into categories which were then classified into major themes. Tables of codes, categories and themes were compiled on Excel spreadsheets. The research findings were then presented as a thick description of the main themes including their sub-themes. The themes were illustrated with prolific quotations of the participants’ views extracted from the interview transcripts and other documents. Literature review was conducted throughout the study in order to provide both the conceptual framework for the study and to support the research findings.

1.5 DEFINITION OF TERMS

1.5.1 Implementation

According to Fullan & Pomfret (1977: 336), implementation refers to “the actual use of an innovation or what an innovation consists of in practice.” This research endeavours to determine how policy is being translated into practice with respect to environmental education and education for sustainable development. In the South African context, the curriculum innovation involved the infusion of environmental concerns in the school curricula at the GET and FET bands as part of the educational changes in the post-apartheid era (see also Section 1.2.2). I elaborate on environmental education in formal education in South Africa in chapter 3.

This research is based on the implementation of the geography National Curriculum Statement (NCS) for FET (General) (Department of Education 2003) which was phased into the schools in 2006. The geography NCS has since been replaced with a new curriculum document, the geography Curriculum and Assessment Policy Statement (CAPS) (Department of Basic Education 2011). The new geography curriculum (CAPS) has been implemented in schools with effect from 2012, starting with Grade 10 at FET level.

1.5.2 Use of the terms Environmental Education and Education for Sustainable Development (EE and ESD) in the study

The foregoing discussions in Sections 1.1.2 and 1.1.5 have shown that the concepts of sustainable development and education for sustainable development are highly contested. Additionally, there is no consensus among academics on the extent to which environmental education and education for sustainable development are similar. I have, therefore, decided to use EE and ESD as separate terms in the study. This, in my opinion, is a prudent approach in a field that is replete with diverse opinions and where it is not likely that there will be a consensus soon. It is, however, important for educationists not to lose sight of the similarities between EE and ESD. First, EE and ESD have the same goal – that of transformation towards more sustainable lifestyles (Gough 2006a; Kimaryo 2011). Secondly, they are both implemented through learner-centred, participatory pedagogical approaches that aim to inculcate critical thinking skills (Gough 2006a; UNESCO 2009) (see also Section 1.1.5).

1.5.3 Secondary school

Secondary school education in South Africa extends from Grade 8 to 12 (Province of the Western Cape 1997). According to the National Qualifications Framework (NQF) (Carl 1998), secondary school education includes two grades in the GET band (Grades 8-9) and three grades at FET level (Gr 10-12). This research project focuses on the implementation of EE and ESD through the geography curriculum in the FET band of the secondary school where geography is offered as a separate subject. At the lower level of the secondary school, Grades 8-9 (GET), geographical knowledge has been split and integrated into different learning areas. Human geography was incorporated into the Social Sciences learning area, whereas the physical geography component was integrated into the Natural Sciences learning area (Mosidi 1998).

1.6 DISSERTATION OUTLINE

Chapter 1 covers the introduction. It begins by highlighting the concerns with the ever-increasing environmental problems which need to be addressed through more effective teaching of issues affecting the environment. This is followed by a description of the background to the study in which the concepts environmental education, sustainable development and education for sustainable development are clarified. An outline of the context of this study follows, after which the problem statement, research questions and research design are described. The chapter ends with the definition of some key terms, the dissertation outline and a summary.

Chapter 2 reviews literature on geography, the vehicle for implementing EE and ESD. The first part of the chapter covers the definition and discussion on the core of geography, as well as major schools of thought in the discipline such as regionalism, logical positivism, behavioural geography, humanistic geography, Marxism, critical geography, post-modernism and environmentalism. This is followed by a discussion of the roots and routes of South African academic geography. Developments in school geography in both Britain and South Africa are then discussed with a particular focus on the impact of changing paradigms in academic geography, pedagogical approaches and the increasing need to tackle environmental issues in the teaching and learning of the subject. The chapter ends with an overview of the opportunities for implementing EE and ESD through the geography NCS in the post-apartheid era.

In chapter 3 literature on the environmental education and education for sustainable development field is reviewed. It begins with comments on the definition of environment and the origin and history of environmental education including the major milestones, followed by an outline of the development of EE in South Africa. Additionally, the chapter covers the implementation of EE in formal education in different contexts including South Africa. The chapter also highlights appropriate pedagogical approaches together with barriers that hinder the achievement of the goals of teaching EE and ESD. The chapter ends with an exploration of perspectives on the relationship between school geography and environmental education.

The methodology is outlined in chapter 4. The chapter begins with an outline of the interpretive paradigm that underpins the research. An explanation of the difference between interpretivist ontology and epistemology and other paradigms follows, after which a justification of the methodology for the study is provided. The chapter also illustrates the links between the interpretive paradigm, qualitative research and the case study approach employed in the research. A description of the sampling technique employed for selecting the schools is included, as well as the research instruments used in the study: semi-structured interviews, lesson observation, questionnaire and document analysis. The chapter ends with a brief explanation of the data analysis technique.

Chapter 5 provides a description of the results of the study. The first part of the chapter gives an outline of the profiles of the five sample schools and the 10 participant teachers. The results are organised into two major themes: opportunities, and challenges of implementing EE and ESD through the geography curriculum. Opportunities include an enabling policy framework, teachers' perspectives on the incorporation of environmental in the lessons and enabling pedagogical approaches. The challenges include the teachers' perspectives on EE, SD and ESD. This section also covers challenges with pedagogical approaches, school organization, inadequate resources, lack of awareness of EE and ESD strategies such as the need to inculcate critical thinking skills and the issues-based approach. The chapter ends with an outline of the role of curriculum advisers.

Chapter 6 deals with the interpretation and discussion of the data provided by the teacher participants using other authors as well as Spillane, Reiser & Reimer's (2002) cognitive model of the policy implementation process as a framework for discussing the findings. The chapter focuses on how the teacher participants make sense of EE and ESD and the recommended pedagogical approaches and strategies to implement the curriculum including the barriers that hinder them from using the strategies that are prescribed in the curriculum document. In Chapter 7, I conclude the report with the summary of the research project, conclusions and recommendations and end the chapter with some reflections on the research process.

1.7 SUMMARY

During the Decade of Education for Sustainable Development, better teaching and learning of EE and ESD in schools can help to address the worsening state of the environment. EE and ESD can be taught through the geography subject in order to impart knowledge, skills, attitudes and values required for more sustainable lifestyles.

From conservation education based on a narrow conception of the environment as consisting only of the biophysical component, EE is currently conceived of as being based on a broader view of the environment that consists of interconnected components of the biophysical and the human environment. Sustainable development began to be incorporated into the environmental education discourse in the 1980s. Education for sustainable development takes root after the Rio Earth Summit through its promotion in Agenda 21, Chapter 36 and the Decade of Education for Sustainable Development. There are multiple discourses on the links between environmental education, sustainable development and education for sustainable development. Furthermore, there are concerns that sustainable development conceived of as the promotion of economic development at the expense of the environment could increase the risks of environmental damage.

This study falls within both geography education research and curriculum implementation research. It aims to find out how EE and ESD are being implemented through the geography curriculum by answering questions on: opportunities for teaching EE and ESD through the geography curriculum; teachers' perspectives on EE and ESD; the extent to which EE and ESD are taught by the geography teachers in the lessons; pedagogical approaches used by the teachers; and, the barriers to the effective implementation of EE and ESD through the geography curriculum.

The research follows a qualitative and case study design underpinned by the interpretive research paradigm. A number of data collection instruments were used: semi-structured interviews, questionnaires, lesson observation and document analysis. The thematic analysis technique was used to

analyse the qualitative data. The next chapter examines the role of geography as a vehicle for implementing EE and ESD.

CHAPTER 2: A FOCUS ON THE VEHICLE FOR ESD: GEOGRAPHY

In the previous chapter, I introduced the report by emphasising the need to address the worsening condition of the global environment through better teaching and learning of EE and ESD during the DESD. I also pointed out that geography can play a leading role as a vehicle for implementing EE and ESD in South African secondary schools. Chapter 1 also deals with the problem statement, the research questions and research design. This research focuses on how EE and ESD are being implemented through the geography curriculum at FET level. This chapter reviews literature on the nature of the geography discipline and more particularly, school geography. The chapter also traces the contribution of geography in addressing environmental issues at both academic and school level.

2.1 TOWARDS A DEFINITION OF GEOGRAPHY

“Sociologists have society, biology living things, economists the economy and physicists matter and energy. But what is at the very core of geography? What are its key concepts?” (Holloway, Rice & Valentine 2003: xiv).

The definition of geography has evolved with changes in the discipline’s epistemology and scope (Meadows 2007). A number of definitions which were formulated at different stages in the history of geography are given in Table 2.1. Barnard (2001: 7) makes a number of observations in terms of these definitions. First, the focus of the definitions changes from the concrete to the abstract – from preoccupation with describing animate and inanimate objects on the earth’s surface to the formulation of concepts and theoretical constructs. Second, the definitions imply that geographers use different methodologies to research and study aspects of the discipline, as will be illustrated later in the discussion. Third, the definitions show that geographers do not agree on how the discipline should be defined.

Von Richthofen’s (1883) and Hartshorne’s (1959) definitions (see Table 2.1) focus on the description and explanation of the occurrence of concrete phenomena on the earth’s surface as noted by Barnard (2001) and Holt-Jensen (2009). Von Richthofen’s definition smacks of environmental determinism⁴ (see also Section 2.2.1) because it seems to emphasize causal relationships between the physical and the human environment (Biddle 1985). Hartshorne’s (1959) view of geography is that of an idiographic science concerned with describing unique features of the earth’s surface. Yeates’s (1968) definition embraces the logical positivist paradigm or quantitative revolution which had just taken place in the discipline during this period.

⁴ “The view that the natural environment plays the major role in determining the behaviour patterns of humans on the earth’s surface” (Haggett 2001: 783).

Table 2.1 Some definitions of geography

Von Richthofen (1883) “Geography ... (is) ‘the science of the earth’s surface and its causally related characteristics and phenomena” (Fisher, Campbell & Miller 1969: 91).

Hartshorne (1959: 21) “Geography ... (provides an) accurate, orderly and rational description and interpretation of the variable character of the earth(‘s) surface.”

Yeates (1968: 1) “Geography ... (is) a science involved in the rational development and verification of a body of theory which aims to explain and predict the location of phenomena on the earth’s surface.”

Dunford (1982: 85) “Geography is the study of spatial forms produced historically and specified by modes of production.”

Harvey (1984: 1) “Geographical knowledge records, analyses and stores information about the spatial distribution and organization of those conditions (both naturally occurring and humanly created) that provide the material basis for the reproduction of social life.”

Livingstone (1994) Geography is ... “an evolving tradition of inquiry – conversation woven around such themes as map, place, space, region, landscape, and the relations between nature and culture” (Times Higher Education Supplement, 11 March 1994).

Source: Barnard (2001: 7)

Yeates also views geography as a nomothetic (law-giving) science that develops and tests theories and models in order to establish geographical laws (Johnston & Sidaway 2004). Dunford (1982) appears to be an economic geographer influenced by Marxist ideas because of his interest in modes of production. According to Dear (1988: 268), Marxism is concerned with the “central significance of commodity production for profit as a principle of social organization.” Harvey’s (1984) definition views geography as a spatial science that encompasses the increased application of Geographical Information Systems (GIS) as a research tool in geography. Livingstone (1994) provides the most comprehensive definition as it includes the main themes studied in geography, as well as one of the most important tools, the map. The influence of the postmodernist discourse is evident in this definition as it regards geography as a conversation. Livingstone’s idea of a conversation seems to encourage dialogue between geographers who hold different perspectives on the nature of the discipline (Dear 1988) and who work in different sub-disciplines. What distinguishes geography from other disciplines?

A number of geographers have contributed to the discussions on the core of geography, which distinguishes it from other disciplines (Bonnett 2008; De Blij 1996; Gritzner 2002; Holloway, Rice & Valentine 2003; International Geographical Union 1992; Kates 1987; Matthew & Herbert 2004; Pattison 1964; Robinson 1976). According to Pattison (1964: 211), geography has four traditions

derived from Western thought: a spatial tradition, an area studies tradition, a man-land tradition and the earth-science tradition. The four traditions refer to place, space, environment and earth respectively (Kates 1987: 525). According to Holloway, Rice & Valentine (2003), all four traditions are evident in the practice of the discipline today.

Pattison (1964) explains that the spatial tradition deals with spatial analysis of phenomena where geographers are concerned with distance, form, direction and position. The location of things has been important to geographers since historical times. The desire to illustrate the location of phenomena has resulted in the production and use of maps in the discipline. Geometry and movement are essential features of the spatial tradition. Geometry refers to the position and layout of things, some of which move or are moved on the earth's surface. Early practitioners of the area studies tradition were Strabo⁵, Ptolemy⁶ and later Hartshorne (1959), who were not only concerned with the location of places but also the 'nature of places, their character and their differentiation' (Pattison 1964: 212). By "character" Hartshorne (1959) was referring to the features of the natural and human phenomena, their causal relationships and the interactions between the natural and human phenomena studied in specific areas or regions.

The man-land tradition emphasises the relationship or interaction between humans and the environment. This tradition appealed to teachers of the discipline, because according to Pattison (1964), the general view of the contribution of the discipline by members of the public was that it taught resource use and conservation. Early proponents of the man-land tradition were divided into those who belonged to the Environmental Determinism School and the Possibilism School (see Section 2.2.1). Adherents of the former school held the view that the environment predominantly influenced people's culture and direction of development, whereas the latter studied the extent to which people altered their environments (Haggett 2001; Herbert & Matthews 2004; Holt-Jensen 2009).

According to the International Geographical Union - Commission on Geographical Education (IGU-CGE) (1992), people engage in human activities that modify the environment. Some of the activities that they engage in are determined by the nature of the environment. There is thus a need for people to understand the human-environment interactions to enable the human impacts on the environment to be successfully managed. This understanding is likely to be improved by incorporating the study of environmental issues in geography education. The man-land or human-environment tradition is currently reflected in the study of human geography.

⁵ Strabo (64 BC-AD 20) was a geographer and historian who contributed to the development of the discipline during the classical geography period (600 BC – 1870 AD). He wrote 17 volumes of work called *Geographica* (Holt-Jensen 2009) in which he used a 'cultural approach, which entailed a literary synthesis of historical, ethnographic and environmental knowledge' (Dueck, Lindsay & Potthecary 2006).

⁶ Ptolemy (AD 90-168) wrote 12 volumes of work currently called *Ptolemy's Geography* (Holt-Jensen 2009). He is also well known for his contribution to cartography.

The earth-science tradition concerns the “study of the earth, the atmosphere surrounding the earth and the association between earth and sun” (Pattison 1964: 214). This tradition appeared in ancient Greece in Aristotle’s⁷ work and was later revived by Varenius.⁸ The earth-science tradition is currently called physical geography and includes such studies as geomorphology, climatology, biogeography and meteorology (Barnard 2001).

Pattison (1964) observed that definitions which have been given by some scholars referred to some elements of geography, but they were inadequate as they tended to alienate many professionals who had actively participated in the development of the discipline. He further criticized ‘monistic’⁹ definitions that ignore some of the traditions, while Kates (1987: 526) noted that “the insistence on collapsing the four traditions into a single monistic whole continues today.” This criticism implies that the definition of geography should show the main traditions noted above. The main gist of Pattison’s (1964) argument is that geography is a pluralistic discipline which reflects the four traditions discussed above (Goudie 1986; Kates 1987).

Robinson (1976) commends Pattison’s (1964) contribution towards establishing a definition of geography because the four traditions provide the central core and main themes of the subject. Twelve years after Pattison’s contribution, Robinson (1976) observes that the psychological concept of perception should be considered in the spatial tradition. According to him, the perception of spatial concepts by an ordinary member of the public differs from that of the trained eye of a geographer. Robinson (1976) also notes that Pattison did not include the time element, cartography and the map, which are central to the study of geography. Holloway, Rice & Valentine (2003) also endorse Pattison’s (1964) contribution but they identify three more organizing concepts in geography: system¹⁰, scale and time.

⁷ Aristotle (384 BC – 322 BC) was a Greek philosopher who contributed to geography’s earth science tradition (Pattison 1964).

⁸ Varenius (1622-1650) helped to develop the earth-science tradition in his work entitled *Geographia Generalis* (Pattison 1964)

⁹ Any theory, or system of thought or belief, that assumes a single ultimate principle, being, force, etc., rather than more than one (online Oxford English Dictionary 2009)

[http://dictionary.oed.com/cgi/entry/00314089?query_type=word&queryword=monistic+&first=1&max_to_show=10&single=1&sort_type=alp](http://dictionary.oed.com/cgi/entry/00314089?query_type=word&queryword=monistic+&first=1&max_to_show=10&single=1&sort_type=alpha)
ha

¹⁰ Haigh (1985: 192) stated that a system is a “wholeness that is created by the integration of its component parts. It is an entity containing a structured set of components whose structural and functional inter-relationships create an entirety which was not implied by those components in disaggregation. A system is a functioning organ within reality, conceived at a convenient scale and level of organisation. It is also a very personal construct. Systems have no absolute existence. They are abstractions from reality conceived by the observer for the purposes of conceptualization or investigation and at a level of complexity which permits study as a whole.” According to Harrison (2009: 251), a system may be closed, isolated or open. In a closed system matter or energy are not exchanged with the surroundings, whereas in an isolated system energy but not matter is exchanged with the surroundings. An open system exchanges matter and energy with its surroundings. The three main features of a system are structure, function and evolution. Additionally, the system may be described in terms of its complexity and organization.

The system can be used as an organizing concept in the study of either the human environment or physical environment (Haigh 1985; Harrison 2009; Katz 2009; Kennedy 2003; Nir 1987). The systems approach clarifies the functional interrelationships between the components within the subsystems in both the human and physical environment. Additionally, the systems approach provides a holistic perspective that promotes an understanding of how the operation of the human system affects the health of the physical environment systems and vice versa. The holistic perspective of the systems approach creates opportunities for incorporating environmental concerns into the teaching and learning of geography because it helps to improve the understanding of the causes of environmental impacts.

The concept of scale refers to the resolution at which a geographical enquiry can be conducted (Burt 2009). Furthermore, geographers have to resolve the question as to how far the findings of a study conducted at one spatial scale can apply to another bigger or smaller spatial scale. Scale can be conceived of as either a real thing or as an organizing framework for studying geographical phenomena. Human phenomena or social systems are often studied at either the local scale or the global scale or both (Herod 2009). Scale can also be used in the study of both the human and the physical environment with reference to time. In physical geography “time is a framework in which geomorphological events are often placed to infer cause-and-effect relationships” (Thornes 2009: 119). The temporal scale can also be used to study “human phenomena in the process of change” (Taylor 2009: 140).

The contribution of the International Charter on Geographical Education (IGU-CGE 1992) encapsulates the nature of geography. The IGU-CGE (1992) states that location and distribution, place, spatial interaction, region and people-environment relationships are some of the main concepts studied in geography. The IGU-CGE acknowledges all the themes identified by Pattison (1964) except the earth-science tradition. It appears that the International Charter on Geographical Education (IGU-CGE 1992) promotes an integrated approach in which specific environmental issues can be studied from the perspective of the human-nature interface. According to (IGU-CGE 1992: 5), geographers ask the following questions:

- Where is it?
- What is it like?
- Why is it there?
- How did it happen?
- What impacts does it have?
- How should it be managed for the mutual benefit of humanity and the natural environment?

These questions help to shed light on the nature of geography for the benefit of school geography curriculum planners and teachers in the classroom. Additionally, in the process of answering the last

two questions, curriculum planners and teachers can incorporate the teaching and learning of EE and ESD themes in geography education.

Finally, Matthews & Herbert (2004) explain that it is difficult to define geography because the complex subject straddles the physical and human aspects of the earth's surface. It thus has an interdisciplinary nature: overlapping between natural sciences, social sciences and humanities (Holloway, Rice & Valentine 2003; Clifford et al 2009; Purvis 2004). According to the Tbilisi principles (UNESCO 1978), environmental education should be implemented through an interdisciplinary approach (see section 3.1.2). Therefore, this makes geography an ideal vehicle for teaching EE and ESD in a subject-based curriculum. Since the time of the founders of geography as a discipline, Von Humbolt¹¹ and Ritter,¹² human geography has been studied through different lenses or schools of thought.

2.2 SCHOOLS OF GEOGRAPHICAL THOUGHT

The idea of paradigms (schools of thought) is related to distinct periods in the development of knowledge in human geography (Johnston & Sidaway 2004). The Kuhnian model posits that a discipline goes through periods of crisis or periodic changes when the main paradigms are challenged or even discarded. Geographers apply the original meaning of a paradigm, provided initially by Kuhn (1962), which is that it is “an exemplar, model, theoretical framework, political position, viewpoint and system of protocols and rules” (Pickles & Watts 1992: 301). The idea of paradigms provided an organizing framework for studying the history of the discipline.

According to Holt-Jensen (2009), the period before Darwin¹³ was the pre-paradigm phase. Prominent scholars of this time did not shed light on their methods whereas the paradigmic phase was characterized by distinct theoretical frameworks coupled with clear methodology. Additionally, during the pre-paradigm phase geographers pursued a deterministic explanatory framework (Holt-Jensen 2009).

Pickles & Watts (1992: 301) identify a number of perspectives in the history of the discipline: Darwinism and environmental determinism through possibilism, probabilism, areal differentiation, cultural ecology, landscape study, locational analysis, spatial science, systems analysis, humanism, Marxism, structuralism, social geography and post-modernism. A selection of some of the perspectives is highlighted in the following sections.

¹¹ Von Humbolt, Alexander (1769-1859), “German polymath, whose research expeditions contributed to the establishment of physical geography” (Holt-Jensen 2009).

¹² Ritter, Carl (1779-1859) “German geographer, first university professor in geography, in Berlin” (Holt-Jensen 2009).

¹³ Darwin, Charles (1809-1882), British natural scientist who wrote *Origin of the Species* (1859).

2.2.1 Early views on human-environment relationships

Geographers had different views on the relationship between people and the environment. There was a great debate on whether people were controlled by the environment or whether the environment was there for their wanton exploitation (Haggett 2001; Peet 1998). Extreme views arose in this debate – **environmental determinism** and **possibilism** (see Table 2.2). Charles Darwin's work on the *Origin of the Species* (1859) sowed the seeds of environmental determinism when he argued about the importance of competition and the survival of better adapted species in the environment (Haggett 2001; Peet 1998). The main proponents of environmental determinism were Frederick Ratzel, a German geographer and Ellen Churchill Semple, an American geographer (see physical determinism in Table 2.2). According to Ratzel, the distribution of the human population on the earth's surface could be attributed only to environmental factors (Haggett 2001).

Ratzel's view is echoed in one of Semple's writings, cited in Haggett (2001: 354):

Man is a product of the earth's surface. This means not merely that he is a child of the earth, dust of her dust, but that the earth has mothered him, fed him, set him tasks, directed his thoughts, confronted him with difficulties that have strengthened his body and sharpened his wits, given him his problems of navigation or irrigation, and at the same time whispered hints for their solution.

Griffith Taylor, another proponent of environmental determinism (see Table 2.2), argued that the environment in western Australia is more extreme than that in Europe and so it has a greater control over human activity (Haggett 2001; Johnston & Sidaway 2004). In other words, there is a limit to what humans can do to change the harsh environment. He refers to his view as stop and go determinism. This means that people's attempts to change a harsh environment are short-lived because nature will take over in the long run and determine the direction of people's endeavours (Johnston & Sidaway 2004). However, some academics such as, Alfred Hettner¹⁴ and Lucien Febvre¹⁵ saw the environment as providing opportunities rather than constraints – a view termed **possibilism** (see Table 2.2). The possibilists argued that people examine the range of possible activities that they can carry out in a particular environment and then select those that suit their cultural and technological capabilities (Johnston & Sidaway 2004).

Herbert & Matthews (2004: 6) point out that the debate about the relationship between humans and the environment was restricted to conceptual discussions which did not move to empirical verification.

¹⁴ Alfred Hettner (1859-1941) was a German geographer.

¹⁵ Lucien Febvre (1878-1956) was French historian and geographer (Barnard 2001).

Table 2.2 Main schools of geographic environmentalism

SCHOOL	BRIEF DESCRIPTION
Cognitive Behaviouralism	Holds the view that the impact of the environment on people is partly dependent on their perception (cognition) of the resources and barriers it poses.
Human ecology	Envisages reciprocal reactions between human and environment, like those of other plant and animal species. This view is associated with the Chicago geographer Harlan Barrows (1877-1960).
Physical determinism	Holds the view that the environment largely controls human development. It is associated with the German geographer Friedrich Ratzel (1844-1904) and his American disciple Ellen Churchill Semple (1863-1932).
Possibilism	Argues that the environment offers sets of possibilities, but the choice between them is determined by human beings. The French historian Lucien Febvre (1878-1956) was one of the strongest proponents of this view.
Scientific determinism	A variant of physical determinism in which the argument proceeds from statistical analysis of sets of data rather than individual case studies. Yale geographer Ellsworth Huntington (1876-1947) was the leader of this school of thought.
Stop and go determinism	Holds the view that people determine the rate but not the direction of an area's development (Griffith Taylor 1880-1963).

Source: Haggett (2001: 353)

Current views on the people-environment relationship will be dealt with later (see Section 2.3). Environmental determinism was often expressed in regional geography monographs where a causal explanation for human activities was sought in the physical environment.

2.2.2 Regionalism

According to Herbert & Matthews (2004), regionalism traditionally involved detailed descriptions of specific parts of the earth's surface. Paul Vidal de la Blache, the founder of modern French geography, developed regional geography in France (Holt-Jensen 2009). He severely criticized adherents of environmental determinism for separating the natural environment from the socio-cultural environment and then setting one against the other.

According to Paul Vidal de la Blache the relationship between people and the natural environment is

“so intimate that it is not possible to distinguish the influence of humanity on nature from that of nature on humanity...The area over which such an intimate relationship between human beings and nature has developed through the centuries constitutes a region. The study of regions...should be the geographer’s task” (Holt-Jensen 2009: 46).

In the United States of America, Hartshorne’s (1959) contribution on ‘areal differentiation’ emphasized the classification and subdivision of geographical space in a systematic way in the study of regional geography (Haggett 2001). The map was also central to the study of regions (Johnston & Sidaway 2004: 52). Hartshorne’s (1959) view of geography is that “the ultimate purpose of geography, the study of aerial differentiation of the world, is most clearly expressed in regional geography” and the practice of regional geography distinguishes geographers from other scientists (Johnston & Sidaway 2004: 51). The typical regional study followed the systematic approach - a sequence of themes relating to a particular region: physical features, climate, vegetation, agriculture, industries, population and other relevant information. However, EE and ESD cannot be taught effectively through the systematic approach because the physical and human geography topics are covered separately without showing the human-environment relationships (see also Section 2.6.5.5).

A number of academics became dissatisfied with the regional geography approach in the 1950s (Unwin 1992), and among these was Schaefer (1953), cited in Peet (1998:13), who delivered a paper criticizing Hartshorne’s views on the nature of geography at that time. Schaefer suggested that geography should adopt the logical positivist school of science and should provide explanations that require laws (Johnston & Sidaway 2004). Debates over philosophy and methods in geography resulted in a revolution against the regional geography paradigm and the logical positivist framework was adopted.

2.2.3 Logical positivism in geography

Between 1950 and 1965, the majority of geographers adopted logical positivism and quantitative techniques from other social sciences such as economics and sociology (Barnard 2001). Geography academics vigorously searched for standardised methodology based on mathematics and a body of theory on which they could base their hypotheses, analyses and predictions (Barnard 2001; Castree, Rogers & Sherman 2005; Harvey 1969). The empirical circle was followed in the research process. An academic who identified a problem through fieldwork, formulated a hypothesis which could be tested through the statistical manipulation of data collected from the field (Barnard 2001). During the quest for a body of theory for explanation and prediction, the discipline evolved into a spatial science as geographers adopted theories from economics and formulated others within the discipline (Barnard

2001). Haggett & Chorley (1969), Haggett, Cliff & Frey (1977) and Harvey (1969) contributed greatly to the development of geography as a spatial science.

However, a lot of criticism has been levelled against the logical positivist framework in geography (Castree, Rogers & Sherman 2005; Entrikin 1976; Johnston & Sidaway 2004; Unwin 1992). Entrikin (1976: 616) observes that the logical positivist framework was viewed as “overly objective, narrow, mechanistic and deterministic.” People were treated as “little more than dots on a map, statistics on a graph or numbers in an equation.” Human beings were dehumanized by the spatial science perspective (Barnard 2001). The logical positivist framework was also criticized on the grounds that it did not provide a sound philosophical underpinning to the discipline (Unwin 1992). Behavioural geography, unlike spatial science, acknowledges the importance of knowledge and perception of decision-makers in the location of enterprises (Holt-Jensen 2009).

2.2.4 Behavioural geography

According to Bunting & Guelke (1979) and Johnston & Sidaway (2004), behavioural geography developed as result of dissatisfaction with spatial science models that assumed that people were perfectly rational beings and that they inhabited an isotropic plain.¹⁶ Critics of spatial science called for an alternative approach in which empirical models could be based on actual human preferences and perceptions instead of unrealistic assumptions (Johnston & Sidaway 2004). Bunting & Guelke (1979) note that behavioural or perception studies in geography are based on a theoretical framework, called cognitive behaviourism (see Table 2.2). The latter, according to the Bunting & Guelke, assumes that human beings react to their environment as they perceive or interpret it through previous experiences and knowledge.

Logical positivism in geography has also been criticized for dismissing the importance of people’s values. Merrett (2000) states that with the adoption of this paradigm in geography, the discussion of values and social justice issues disappeared. Harvey (1973), cited in Merrett (2000: 212) argues that positivism in geography causes academics to produce research that maintains the status quo in that the research does not solve current social problems (see also Sections 2.2.6 and 3.1.1.2). Academics are called upon to conduct value-laden research on issues related to poverty, gender and the environment and to engage in praxis¹⁷ (Peet & Thrift 1989), cited in Merrett (2000). Merrett’s (2000) criticism of logical positivism in geography has implications for the incorporation of environmental concerns in

¹⁶ This was an “idealized segment of the earth’s surface, perfectly flat with an even spread of natural resources, the population uniformly distributed and transport available in all directions at equal cost” (Barnard 2001: 70).

¹⁷ Praxis “implies a connection between research, the transmittal of research findings through teaching, and the application of those ideas in society” (Merrett 2000: 212).

geography education. In order to promote the teaching and learning of positive attitudes and values for more sustainable lifestyles or to achieve transformation of lifestyles, critical theory in place of logical positivism in geography could be adopted because it is transformative and has an emancipatory interest (Fien 1993; Habermas 1978; Huckle 1997).

Concerned geographers proposed the humanistic perspective and radical geography. The humanistic perspective is an approach that studies human aspects such as meanings, values, goals and purposes (Johnston & Sidaway 2004), whereas radical geography seeks to transform the society that is riddled with economic inequalities resulting from capitalism. The next two sections deal with humanistic geography and radical geography.

2.2.5 Humanistic geography

Some geographers have adopted a number of humanistic perspectives mainly underpinned by the philosophies of existentialism¹⁸ and phenomenology¹⁹ (Buttimer 1976; Entrikin 1976; Relph 1981). Tuan (1976: 266) states that the aim of humanistic geography is to obtain a better understanding of human beings, their situation and the right picture of the human world. This, he continues, is achieved by studying people's relationship with nature, their geographical behaviour, their feelings and ideas regarding space and place. The nature of humanistic geography is summarized by Ley (1978: 50), cited in Smith (1981):

(He) identifies three building blocks of humanistic geography as anthropocentrism (the allocation of human consciousness to a significant position in theory); intersubjectivity (the inherently social nature of experience); and the concept of place. This view requires the acquisition of knowledge to be an experiential process; it demands that there are no essences or absolutes existing independently of the observer; and it implies therefore that the only authentic means of appreciating the world is through direct confrontation with it.

In humanistic geography, place is a small part of the earth's surface which is not well defined and people experience it in a particular way. The positive or negative feelings that a place arouses are studied by the humanistic geographer (Barnard 2001).

¹⁸ "Its central concern is with human existence in the world. Themes explored by existentialist philosophers include the relationships between individuals and systems, intentionality, being and absurdity, freedom and choice, and anxiety and dread. Much existentialist writing focuses on the way in which individuals are estranged from the world of externalized things, with the intention of reuniting them with their inherent creativity" Unwin (1992: 214).

¹⁹ It "involves the description of things as one experiences them. Experiences include seeing, hearing, and other sensory relations, but also believing, remembering, imagining, being excited, getting angry, judging and evaluating, and having physical relations, like lifting and pushing things" (Peet 1998: 37).

Tuan (1974) coined the term *Topophilia* to refer to love of place. From a phenomenological perspective, Tuan noted that people's sense of place is affected by age, gender, culture, religion and time. Humanistic geography also covers the theme of placelessness caused by globalization which imposes homogeneity over landscapes (Barnard 2001). A final note on humanistic geography from Entrikin (1976: 625) is on other common features: lack of a clearly defined methodology; the importance of non-empirical means of gaining knowledge such as intuition; and, the goal of ascertaining the structures or form of human experience.

Humanistic geography has, however, been criticized for its "irrelevance to present social and environmental problems" (Pocock 1983: 355). Brunn & Yanarella (1987) concur with this view: that the anthropocentrism²⁰ of humanistic geography could worsen the environmental problems because it promotes a technocentric human-environment relationship. This is characterized by a belief in modern science and technical solutions to environmental problems.

2.2.6 Radical geography, Marxism and structuralism

According to Unwin (1992), radical geography began in the late 1960s against the backdrop of widespread global political unrest. The armed struggle for freedom was taking place in many countries in the Third World, with civil rights protests by Afro-Americans in the United States, Britain and other western countries (Barnard 2001). Some geographers were concerned about wealth inequalities and social injustices created by the capitalist economic system. They were also dissatisfied with the technical support that the logical positivist perspective or empirical-analytic science provided to the capitalist economic system in maintaining the status quo (Peet 2000; Unwin 1992). Quaini (1982), cited in Unwin (1992), noted that the aim of radical geography was to revolutionize the geographical theory and practice. According to Blomley (2008: 285), "radical and critical geographies seek not only to interpret the world, but also to change it through the melding of theory and political action."

In the United States radical geography started with the launching of *Antipode*, a journal of radical geography, at Clark University in Worcester, Massachusetts. Early issues of the journal covered spatial problems such as poverty, minority rights and access to social services (Barnard 2001). Paradoxically, Harvey, whose earlier work *Explanation in geography* had contributed to the development of theory in spatial science, became one of the most passionate proponents of radical geography (Castree 2007; Merrett 2000). He published journal articles in *Antipode* in which he focused on ghetto formation,

²⁰ According to Shrivastava (1995: 126), anthropocentrism is "an ideology that asserts the separateness, uniqueness, primacy, and superiority of the human species. This concept legitimizes human welfare as the central purpose of societal institutions. Accordingly, nature is viewed as an expendable resource for furthering the interests of humans."

using the writings of Karl Marx²¹ as a theoretical framework (Unwin 1992). Unwin observes that Harvey's (1973) book, *Social justice and the city*, presented four themes: the nature of theory, the nature of space, the nature of social justice, and the nature of urbanism. Harvey argues that the Marxist theoretical framework used to explain the existence of ghettos offers a better explanation than the logical positivist framework. He thus injected Marxist theory into geography and radical geography eventually assumed the name Marxist geography (Barnard 2001).

Geographers borrowed dialectical materialism²² from Marxism and used it as a framework to pursue the discipline. According to Unwin (1992), Marx's ideas are evident in four main areas of geographical enquiry. First, the transition from feudalism to capitalism and the growth of industrial capital were studied in historical geography using Marx's ideas. Second, research has been done in the urban context to highlight the role of capitalism in creating social injustice. Third, the Marxist framework has been used to elucidate regional inequalities resulting from closure and relocation of industries. Fourth, Marxist ideas have been used to explain the issues related to underdevelopment in Third World countries.

Marxist geography was also influenced by structuralism. Structuralist philosophy posits that observable human phenomena can be explained by underlying structures which cannot be touched or measured (Unwin 1992). According to Marxist ideas, the underlying structures include political and economic institutions that sustain the social injustice. Unwin's view is that radical Marxist geography had a small effect on the discipline. Its emergence, however, gave rise to the feminist approach in geographical inquiry which interrogates gender inequality and the oppression of women. Marxist geography has been criticized for being reductionist in that all problems are attributed to economic causes only. The role of human agency is downplayed (Barnard 2001; Duncan & Ley 1982).

Additionally, Marxist geography was criticized for lacking a robust environmental theory to explain human-nature relationships during the 1970s (Castree 2002b; Wisner 1978). Nevertheless, some Marxist geographers disapprove of dominant modernist discourses on environmental management derived from Western science. Some of these geographers have tried to show that the class struggle is implicit in the reference to terms such as resources and wildlife conservation (Wisner 1978). Furthermore, Marxist geographers are increasingly addressing issues resulting from human-

²¹ Karl Marx (1818-1883) German philosopher and political scientist whose writings had a profound influence on radical geography though David Harvey (Holt-Jensen 2009).

²² Dialectical materialism is an approach that stresses material needs and opposites. It is an effective but complex instrument for analyzing change and also determines the researcher's attitude to research problems (Barnard 2001: 52).

environment relationships such as environmental (in)justice²³ (Meletis & Campbell 2009; Schroeder et al 2008; Walker & Bulkeley 2006).

According to Cutter (1995), the principle of environmental justice ensures first, that all residents are protected from environmental degradation. Second, the polluters of the environment are required to engage in measures that prevent the worsening of health impacts on the residents. Thirdly, the environmental justice principle provides instruments for assigning the responsibility of proof of contamination to polluters and not residents. Fourth, mechanisms are provided by which the residents can seek redress for the harm or injuries to their health that may result from the contamination of the environment. Additionally, Capek (1993), cited by Cutter (1995: 112), states that the residents are assured of “the right to information, the right to a hearing and the right to compensation.”

A number of geography scholars have conducted research on the distribution of amenities and polluted sites, including those containing toxic waste in relation to the location of residential areas occupied by racial and ethnic minorities in the US. Some of this research has uncovered environmental injustice issues resulting from institutionalized and environmental racism²⁴ (Bickerstaff & Agyeman 2009; Boone et al 2009; Holifield, Porter & Walker 2009). The concept of environmental (in)justice has been extended to studies in less developed countries as well. Some of the studies have exposed environmental racism perpetrated by transnational corporations involved in the export of toxic waste as well as the relocation of toxic industries from developed to less developed countries (Schroeder et al 2008; Walker 2009).

The environmental justice frame was introduced to South Africa from the US during the early 1990s (Cock 2004; Walker 2009). Grassroots activism against pollution had already started in Durban due to the presence of high levels of ground, air and water pollution which posed a health hazard to the residents living in the vicinity of the South Durban industrial area. Some of the country’s heavy industries, including two oil refineries, are located here. Non-whites had been forcibly moved to this area through the Group Areas Act during the 1950s and 1960s. The fight for environmental justice was thus intertwined with the struggle against apartheid injustices during the late 1980s and early 1990s (Walker 2009). As a result of these struggles, environmental rights were incorporated into the Bill of Rights in the new post-apartheid constitution (South Africa 1996a) so as to address the problem of environmental inequality that affected the majority of the Black population (Cock 2004; Walker 2009).

²³ Environmental justice is defined in the Dictionary of Human Geography (2009) as: “The right of everyone to enjoy and benefit from a safe and healthy environment, regardless of race, class, gender or ethnicity. More specifically, environmental justice is a social movement that takes social justice and environmental politics as fundamentally inseparable.”

²⁴ “Environmental racism includes differential exposure to harm and limiting of access to resources that are reliant on, or that reproduce forms of, racial differentiation” (Gregory et al 2009). (http://www.credoreference.com.ez.sun.ac.za/entry/bkhumgeo/environmental_racism)

The social and environmental justice principle has also been incorporated into the school curriculum in post-apartheid South Africa. It underpins the FET general curriculum (see section 3.3.3). Furthermore, Marxist geographers have introduced the political ecology²⁵ framework (see also Section 2.2.8) in the study of human-environment relationships. The Marxist urban political ecology framework has been used “for theorizing and analyzing capitalism and class as primary drivers of socio-environmental change” (Bryant 1997; 1998; Heynen 2003; Holifield, Porter & Walker 2009). Some of the issues that have been investigated using the political ecology framework relate to environmental (in)justice discussed earlier (Swyngedouw & Heynen 2003; Keil 2003). Radical geography gradually evolved into what is currently called critical geography (Castree 2000).

2.2.7 Critical geography

Castree (2000: 956) observes that critical geography “is an umbrella term for that plethora of antiracist, disabled, feminist, green, Marxist, postmodern, post-structural, postcolonial, and queer geographies which now constitute the large, dynamic, and broad-based disciplinary Left.” As a result, critical geography has a varied epistemology, ontology and methodology, and lacks a single identity (Hubbard *et al.* 2002). Critical geography, according to Blomley (2006), “is one variant of a rich and long-standing tradition of critical inquiry in social science.” Castree (2000) and Blomley (2007) note that in 30 years since the emergence of radical geography in the late 1960s, there has been a phenomenal expansion of critical geography. Unwin (1992) argues that Habermas’s (1974) critical theory should be central in the practice of critical geography in a number of ways. First, a critical approach to geography should reveal how facts are constructed through action-oriented research that seeks to bring about change. Second, practitioners of critical geography should take cognizance of the cognitive interest of critical geography. Thirdly, they should explore the importance of communication and language because these affect our view of reality. Fourth, emancipation through self-reflection is possible at three levels: individual experience, teaching and research.

The study of environmental issues can be more effectively done through critical geography because it is transformative and has an emancipatory interest. This is illustrated in the contribution of Marxist geography (see Sections 2.2.6 and 2.6.1) and postmodernist perspectives (see Section 2.2.8). Postmodernism in the discipline falls under the umbrella of critical geography as mentioned earlier. The next section deals with postmodernism.

²⁵ “At the heart of political ecology research is the notion that politics should be ‘put first’ in the attempt to understand how human-environment interaction may be linked to the spread of environmental degradation” (Bryant 1998: 80). Political ecology research is often linked to the investigation of environmental (in)justice issues.

2.2.8 Postmodernism

Postmodernism attacks modern-day philosophy (Barnard 2001; Curry 1991; Dear 1988; Gregory 1989; Morgan & Lambert 2005; Munck 2000; Rust 1991; Unwin 1992). It revolts against “modernist epistemology ... [which] searches for universal truths and meaning, usually through some kind of metadiscourse or metanarrative” (Dear 1988: 265). Furthermore, it challenges the authority of dominant discourses and questions the basis of their privileged status. Proponents of postmodernism disapprove of the dominance of some discourses over others. Postmodernism proposes a philosophy that is a “conversation” in which everyone is included. It is described by Barnard (2001: 62) as being “open, tolerant, pluralistic and liberating.”

Postmodernism has benefited from the realization by philosophers that language lies at the heart of all knowledge (Olsson 1991). The debates in which postmodernists engage mainly focus on how language is used to “maintain the hegemony of the privileged discourse” (Dear 1988: 266). One of the main study methods in postmodernism is deconstruction, in which certain inconsistencies, contradictions and omissions in the written text are exposed. Deconstruction shows us how to read text in such a way that we focus on what has been excluded (Dear 1988).

With regards to tackling environmental issues, geographers are “re-discovering and re-defining human environmental relations” through postmodernist perspectives (Cooke 1992: 132). According to Blaikie (1996), postmodernists question the modernist basis of environmental management policies on science. They reject the role of the so-called expert environmental scientists’ contribution to the policy making process. They also propose that multiple actors such as scientists and ordinary people or grassroots participation can play an important role in contributing solutions to environmental problems.

Furthermore, postmodernists interrogate the “privileged status of scientific knowledge” in favour of the empowerment of ordinary people (Blaikie 1996: 82). For example, the indigenous knowledge of local environments could be provided by local farmers, pastoralists and forest dwellers in less developed countries in order to address issues mentioned in *Agenda 21* related to land degradation, desertification and biodiversity loss (Blaikie 1996; Bryant 1998). This view has implications on designing the content of school geography. However, Blaikie (1996) criticizes some postmodernists for only engaging in deconstruction or criticism without providing alternative solutions. Furthermore, some of the suggested alternatives could eventually become the very same totalizing discourses or metanarratives which postmodernists so fervently criticise, for example the controversy between expert-led, science-based environmental policy versus the locally based solutions that empower ordinary people (Blaikie 1996).

Postmodernism has also contributed the idea of unequal power relations which can enhance the understanding of the causes of environmental problems, for example in less developed countries (Bryant 1997; 1998; Castree 2002a). Bryant (1997: 10) states that:

At the heart of a political ecology reading of the Third World's environmental problems is the idea that the relationship between actors (i.e. states, businesses, non-governmental organisations, farmers etc), and the links between actors and the physical environment, are conditioned by power relations. Those relations are highly unequal in so far as different actors bring to bear different power capabilities in struggles over access to environmental resources in the Third World. Power is thus for political ecologists a key concept in efforts to specify the topography of a politicised environment.

Bryant (1997) discusses the ways in which the unequal power relations are manifested. The powerful actors seek to control the environment of the other actors. Additionally, the unequal power relations are manifested in the condition of the physical environment. The weaker actors in turn, try to resist the impact of the powerful actors on their livelihoods. According to Bryant (1997), the powerful actors such as the state, private companies and wealthy individuals can deny local people access to resources, e.g. land, forests, water, minerals, etc., thus adversely affecting the peoples' livelihoods. These actors also wield the power to degrade the environment of the weaker actors through pollution which might adversely affect their health. Moreover, the powerful actors leave an imprint of infrastructure and pollution on the physical environment produced by the economic activities which they engage in. Bryant (1997) further observes that the weaker actors often resist through sabotaging the economic activities which they believe present a threat to their livelihoods.

The environmental movement can find space in Marxist, critical and postmodernist geographies as noted above. The next section reviews the literature on the involvement of geographers in environmentalism.

2.3 GEOGRAPHERS AND ENVIRONMENTALISM

According to Johnston, Gregory & Smith (1994: 167), environmentalism refers to a 'wide range of ideas and practices evincing a concern for nature-society or human-environment relations.' A more informative definition is provided by Mayhew & Penny (1992: 76) cited by Beaumont & Philo (2004). They define environmentalism as "a concern for the environment, and especially with the bond between [humanity] and the environment, not solely in terms of technology but also in ethical terms – we are reminded of the necessity of sharing and conservation. [Humans are] seen as having a responsibility for

[their] environment.”²⁶ Johnston, Gregory & Smith (1994) outline three perspectives of human-environment relationships: society living in harmony with nature (deep ecology or ecocentric view); humanity as determined by nature (environmental determinism) (see Section 2.2.1); and, humans as modifiers of nature (technocentric view) (see Section 2.2.5). They note that environmentalism is currently dominated by the latter perspective. Beaumont & Philo (2004) caution that rigid definitions of the term might fail to capture different perspectives on people’s relationships with the environment.

People became increasingly concerned with environmental problems since the late 1960s. This is illustrated by a number of events, mentioned below, which have occurred since that time (Beaumont & Philo 2004). The world was spurred into action by Rachel Carson’s (1962) book, *Silent Spring*, in which she highlighted the unintended impacts of pesticides on birds. In 1972 the Stockholm Conference on the Human Environment drew the world’s attention to the transboundary effects of industrial pollution. The term ‘sustainable development’ emerged and was popularized through the Brundtland report, *Our Common Future* (WCED 1987). Sustainable development aims to integrate economic and social development with environmental protection (Barrow 1995). The 1992 Rio Earth Summit, UNCED, brought together heads of government, non-governmental organizations and other stakeholders to discuss environmental problems and associated development issues (Barrow 1995). The Rio Earth Summit was followed by the Johannesburg World Conference on Sustainable Development in 2002. The significance of the above events is discussed in greater detail in Section 3.1.2.

At the inception of the environmentalism movement mainly led by scientists (see also Section 3.1.1), there was heated debate among academics on whether population increase caused environmental problems or whether environmental problems could be attributed to technological advancement that caused both the depletion of resources and increased pollution (O’Riordan 1976). The contribution of geographers to this debate during the early years of the environmental movement was negligible (Barnard 2001; Beaumont & Philo 2004; Castree 2004; Johnston, Gregory & Smith 1994; Kates 1987; Liverman 1999; Marsden 1997; O’Riordan 1976; Sauri-Pujol 1993; Stoddart 1987; Unwin 1992). After reviewing a number of journals such as *Perspectives on Environment*, Mikesell (1974), cited in Johnston & Sidaway (2004), concluded that geographical contributions to environmentalism were insignificant. He noted that geographers had not actively participated in debates on environmental, social and philosophical issues during the environmental campaign. Furthermore, Johnston & Sidaway (2004) analyzed the contents of recent geographical journals as well as O’Riordan’s (1976) and Goudie’s (1993) bibliographies and attested to the minimal contribution made by geographers towards tackling environmental issues. Castree (2002a) is also dissatisfied with the contribution of geographers towards influencing the development of environmental policy. He comments that “the discipline remains a marginal player in the shaping of environmental agendas.”

²⁶ Matthews & Herbert have changed some of the terms in the quotation in order to make them more gender sensitive.

However, Turner (2002) argues that this situation has been corrected in the United States where human-environment relationships now form a significant portion of the American geography discipline. According to Turner (2002: 53) cited in Bednarz (2006), American academic geography can be divided into “geography as a spatial-chorological approach and geography as the human-environment subject.” Turner proposes that an integrated approach could focus on the study of human-environment interactions with the spatial perspective as a method. This approach could provide opportunities to place the study of environmental problems at the centre of geographical enquiry. Additionally, this perspective has implications on tackling environmental issues through school geography curriculum (see section 2.6.2).

The low level of involvement of geographers in environmental issues at the inception of the environmentalism movement can be attributed to a number of factors (Unwin 1992). First, the restructuring that took place in institutions of higher learning resulted in the merging of departments and the creation of interdisciplinary research. Second, new disciplines such as environmental science and conservation emerged. They focus on the management of resources and the monitoring of environmental problems – subject areas that could be covered by geography. Third, the division of the discipline into physical geography underpinned by logical positivism and human geography, whose philosophical framework has shifted towards social sciences, has deterred geographers from moving environmental issues to the centre of geographical enquiry.

Stoddart (1987: 331) criticizes the nature of geography. He observes that it is diffuse and lacks a central focus, which should be the “earth’s diversity, its resources, man’s survival on the planet.” This implies that geography needs to play a greater role in addressing problems that result from human-environment interactions. Additionally Stoddart argues that there is need to unify the discipline (human and physical geography) to enable geographical problems or environmental issues to be identified, studied and alleviated or solved where possible. This view is supported by Kates (1987) and Guelke (1989). According to Kates (1987), greater involvement of geographers in environmental issues is imperative. He also criticises the dominance of spatial science in geography and argues that the discipline is more suited to playing a leading role in dealing with environmental issues because it offers a more integrated view than other disciplines. Similarly, Guelke (1989) urges geographers to re-emphasize “the central importance of the human-environment relationship as the foundation of the discipline” so as to address the lack of coherence in the geography discipline noted by Stoddart (1987).

Finally, those geographers who identify themselves as environmentalists such as Douglas (1986), Goudie (1986), Stoddart (1987) and Turner (2002), support a united discipline based on environmentalism and argue that human-environment relationships provide a basis for uniting physical and human geography (Beaumont & Philo 2004).

2.4 A DISINTEGRATING DISCIPLINE – NEED FOR UNITY

A number of academics lament the widening rift between physical and human geography (Archer & Dodson 1997; Barnard 2001; Cooke 1992; Douglas 1986; Goudie 1986; Mathews & Herbert 2004; Viles 2005). They argue that this will result in narrow sub-disciplines whose contribution to the study and solution of environmental problems could be reduced. Graham (1986) stresses the importance of uniting the two sub-disciplines because, according to him, the acceptance of geography as a coherent discipline depends on the unity between physical and human geography.

However, there have been marked changes in physical geography globally (Barnard 2001; Meadows 2007; Vogel 1992). The main feature of the changes is the emergence of integrated geography, which can be applied more effectively in solving environmental problems than the separate disciplines. This integration has been effected within the physical geography sub-disciplines such as geomorphology, climatology and biogeography as well as between physical geography and human geography (Blaikie 1985; Gregory, Gurnell & Petts 2002). The integrated geography is called environmental geography (Barnard 2001). However, Johnston (2003), cognizant of the epistemological dissonance not only between physical and human geography but also within human geography itself, is doubtful of the success of uniting the two sub-disciplines.

The focus now turns to South Africa in which this research project is based. I deal with the institutionalization of geography as well as developments in academic geography since the time of colonization of the country up to the current period.

2.5 SOUTH AFRICAN GEOGRAPHY

Changes in the South African geography discipline have closely followed developments in Anglo-American geography because of colonization (Magi, Maharaj & Fairhurst 2002; Pirie 1985; Wesso 1994). According to Pirie (1985), this was illustrated by the fact that most cited journals are British and American. However, local academics are currently struggling to decolonize the discipline and to infuse a South African identity that incorporates the African continent. South African geographers have heeded the call for post-apartheid transformation that requires the discipline to address local socio-economic and environmental problems.

2.5.1 Institutionalization of the discipline

Geography departments initially operated within geology departments and until the middle of the 20th century, physical geography dominated the research output (De Blij 1960). By 2004, the research output

in human geography had overtaken that of physical geography (Sumner 2006). Initially the geography departments in universities had a very small staff complement, with an average of about two to three members of staff in the 1950s (De Blij 1960; Fairhurst et al 2003). This number slowly increased to an average of eight members of staff per department (Mather 2007), which is still small compared to British, Canadian and American universities whose average staff complement was 20 per department (Fairhurst et al 2003).

The original aim of university geographical education was to supply teachers (De Blij 1960; Fairhurst et al 2003; Mather 2007; Preston-Whyte 1983). De Blij (1960) noted that almost all geography university graduates were employed by the provincial education departments. However, this situation has been reversed since the mid 1990s (Fairhurst et al 2003; Nicolau & Davis 2002). Fewer university graduates are currently opting for the teaching profession. This has implications on the supply of geography teachers to the South African high schools. Zeitsman (2002) attributes this situation to, first, the withdrawal of student bursaries which bonded the graduates to a teaching contract after completing their studies. Second, the remuneration in the teaching profession is not attractive, and so this discourages students from opting for the teaching profession.

The South African Geographical Society (SAGS) provides professional support and helps to promote geographical education, the interests of the discipline, research and the development of professional geography. Its journal is the *South African Geographical Journal*. In 1994 the SAGS merged with the Society for Geography whose journal was *South African Geography* (Fairhurst et al 2003; Pirie 1985). The members of the latter society were Afrikaner geography professionals. The impact of the apartheid policy was that it reduced the interaction between academics in historically white and those in historically black universities (Ramutsindela 2002). As a result, membership and participation of non-whites in geography societies was minimal (Van der Merwe 1996). The SAGS has been criticized for failing to design and implement strategies for black intellectual empowerment (Ramutsindela 2002). South African geographers have maintained links with the International Geographical Union (IGU) and some academics actively participate in the work of the IGU (Fairhurst et al 2003). There have been calls that university geography curricula need to be changed in order to make them more relevant and more Afrocentric (Mather 2007; Wesso 1994).

English-medium universities were relatively free to design their own curricula. They engaged in critical geography focusing on the injustices created by the apartheid policy against the black community. Afrikaans-medium universities were, however, rather conservative because they continued to retain the logical positivist framework and focused on problems that affected the white communities (Mather 2007). Literature reviewed by Nicolau & Davis (2002) shows that there were calls to restructure

geography to enable it to respond to transformation in the work of the following geographers (Binns 1999; Crush 1993; Fairhurst 1999; Gamble 1992; Hart 1994; Rogerson 1990).

Academic geography had to be restructured in response to the changing social, political and economic environment in the 1990s (Van der Merwe 1996). Recently there has been a shift towards cross-disciplinary courses or programmes, for example development, environmental management and GIS, so as to attract more students who want to acquire the knowledge and skills to enable them to obtain better paying jobs (Fairhurst et al 2003; Mather 2007; Meadows 2007; Nicolau & Davis 2002). In the case of existing courses, content has been modified so as to include applied work (Fairhurst 2001). According to Nicolau & Davis (2002), between 1996 and 2000 the discipline became more “skills and vocationally based.” After increasing the number of environmentally orientated courses, the majority of geography departments have changed their names to include environmental studies or environmental science and / or environmental management (Oelofse & Scott 2002; Meadows 2007). This development increases opportunities for addressing environmental issues through the academic discipline and school geography. University academics may influence the content of school geography through participation in designing school geography curricula. However, it is likely that the technocentric perspective could prevail due to the influence of the positivist framework within which some geographers continue to work as observed by Lammas (1992). However, academics fear that as the number of such programmes increases, this might threaten the integrity and coherence of geography as discipline (Magi et al 2002; Mather 2007).

The restructuring of academic geography has been attributed to a number of factors: the decrease in the number of students enrolling for geography courses; a less favourable funding model; the decreasing status of geography as a school subject after the introduction of new curricula; and, a reduction in the staff complement of university departments (Vlok & Zietsman 2001). According to Nicolau & Davis (2002), the restructuring programme has resulted in an increase in the enrolment of geography students especially at post-graduate level.

Because South African geography has Anglo-American origins, some of the perspectives described in Section 2.2 can be identified in the research outputs of local academics. A significant number of the academics still work within the logical positivist paradigm (Lammas 1992). The next section focuses on the routes of South African geography.

2.5.2 Some routes of South African academic geography

The early period up to the 1950s was characterized by descriptive geography without any distinct conceptual or theoretical framework (Ramutsindela 2002). Fuggle (1967), cited in Ramutsindela (2002) observes that no identifiable 'school of thought' was developed at this time.

2.5.2.1 South African perspectives on human geography

The logical positivist epistemology in the form of spatial science dominated the discipline up to the 1970s (Crush 1993; Fairhurst et al 2003; Mather 2007; Nicolau & Davis 2002). According to Pirie (1985), regional geography decreased while systematic studies underpinned by the logical positivist framework increased. During the 1970s there was relentless criticism of the quantitative revolution in spatial science, not only by some Anglo-American geographers (see Section 2.2.3), but also by some South African academics. A number of academics (Beavon & Rogerson 1981; Crush 1993; Nicolau & Davis 2002; Ramutsindela 2002; Rogerson & Browett 1986; Rogerson & Parnell 1989; Soni 1992) were concerned that research done within the logical positivist framework seemed to accept the status quo concerning the structures created by apartheid, but ignored the spatial outcomes of apartheid that affected the country's black majority. According to Lammas (1992), the logical positivist framework still had a stranglehold on South African geography because the researchers felt safer working within this framework instead of venturing into new perspectives. The logical positivist framework has also been criticised for its technicist approach to research that helps to maintain the status quo with regards to environmental problems (Fien 1993; Huckle 1993).

Wesso (1994) is critical of positivist researchers in South African geography. He argues that the oppressed were not given a voice to articulate their problems and geography underpinned by the logical positivist framework, promoted the interest of whites but excluded the concerns of the oppressed. Additionally, Ramutsindela (2001; 2002) is critical of Eurocentric approaches and the application of inappropriate models to explain South African problems during the 1970s. Crush (1993: 62), cited in Nicolau & Davis (2002), regards this as "... a thoroughly colonial sense that imported theories and methodologies are inherently and necessarily superior."

However, there were marked changes in the South African geography discipline during the 1980s, which were part of the process of decolonizing local geography (Wellings & McCarthy 1983; Ramutsindela 2002). Wellings & McCarthy (1983) and Nicolau & Davis (2002) noted an increase in the literature on poverty and injustice in the 1980s, but they recommended that South African geographers should confront the problem of praxis. Changes in the geography discipline within the South African context have been attributed to both external and internal factors (Nicolau & Davis 2002;

Ramutsindela 2002). The external factor relates to the impact of South Africans who trained overseas. Some of them introduced radical Marxist ideas into the local geography when they returned to South Africa. The second factor relates to the internal struggle for democracy that had reached its peak during the 1980s. This provided fertile ground for radical geography to thrive within a small group of geographers. Furthermore, geographers now had a holistic worldview in their study of the problem of inequality in the urban areas. They developed the concept of the apartheid city, which has become popular both locally and internationally in the analysis of urban structure (Christopher 2002; Nicolau & Davis 2002; Ramutsindela 2002).

Soni (1991), cited in Magi et al (2002), lobbied for the increased adoption of critical geography. He recommended that researchers should apply democratic processes in their practices and relationships with the participants. He also called for research that empowers the participants not only to identify and articulate their problems, but to find solutions as well. Wesso (1994) supports Soni (1991) in calling for a radically transformed geography in line with the rapid transformation within South African society in the early 1990s. According to him, academics needed to do away with a geography that was socially constructed to serve the interests of the empire, capital and apartheid. He wanted to see a situation in which the people who were formerly oppressed would become geographically empowered.

Some academics (Maharaj 2002; Ramutsindela 2002; Simon 1994; Wesso 1994) have called for South African geographers to focus more on Africa and to interact more with their African counterparts. They feel that South African geographers need to continue to decolonize their mentalities and become more independent of Anglophone perspectives. Ramutsindela (2002) notes that South African geographers hardly have any research interests in Southern Africa or the rest of the continent. Simon (1994) argues that geographers from outside the African continent appear to be showing more interest in Southern Africa than local geographers. Ramutsindela (2002: 9) puts this succinctly in his argument that:

A successful de-colonization process also requires the linking of South Africa and Africa, and the wider South ... even more worrying is the continued failure of many local geographers to appreciate material from African studies and associated journals.

Mather (2007) counters this challenge with an observation that there has been some response to the calls for decolonization of South African geography because local universities have established links with departments of some universities in Southern Africa. The links involve assistance in training members of staff and collaboration in research. Despite the criticisms noted earlier, Ramutsindela (2002) observes that local researchers are becoming more relevant in their research and are engaged in searching for suitable methodologies for analyzing policy issues.

Two different research traditions emerged in response to the call to decolonize South African research (Mather 2007). The first tradition adopted a historical perspective to reveal the effect of apartheid policies on the lives of black South Africans. The research was often interdisciplinary, empirical and involved the use of state archives and other historical collections to reconstruct apartheid geographies (Lester 2003; Maylam 1995). The second research tradition engaged in day-to-day struggles of black South Africans to obtain services such as transport and housing in 'white cities.' These researchers also studied black political activism through participation in trade union activity and in political parties (Mather 2007).

The change from apartheid to democracy rule in the 1990s resulted in a shift from 'geographies of protest' to 'geographies of reconstruction and development' (Mather 2007; Nicolau & Davis 2002). Some academics, either within institutions or as consultants, now focused on research that could assist in policy formulation. Examples of such research relate to spatial planning with respect to local economic development, urban planning, tourism development, migration and small enterprise development (Rogerson & Robinson 1999). Magi et al (2002) mention the role played by academics working in the post-apartheid era who critically analyse the socio-economic and socio-spatial impacts of neo-liberal economic policies such as Growth, Employment and Redistribution (GEAR).

South African geographers are increasingly addressing environmental issues in their research. The next two sections provide some illustrations. Environmental issues are being addressed through integrated geography and the environmental management field.

2.5.2.2 Integrated geography in South Africa

Vogel (1992) attributes the failure of geographers to tackle environmental issues to the 'insulation and poor communication' between human and physical geography specialists. She reiterates the call made earlier by Stoddart (1986) for geographers to engage in the integrated or human-environment approach to the study of environmental problems. Archer & Dodson (1997) agree with Vogel's observation and suggest that South African geography should become post-paradigmatic or postmodern so as to base the integration of the discipline on these perspectives. A post-paradigmatic or postmodernist discourse would then underpin the broader, integrated discipline.

In response to relentless criticism of geography's diverging sub-disciplines, physical geography in South Africa has followed current global trends (see Section 2.4) in that it has shifted towards integrated and applied studies (Barnard 2001; Oelofse & Scot 2002). Nevertheless, Meadows (2007) urges academics to continue to engage with the philosophical issues that underpin physical geography. According to Vogel (1992: 177), a number of geography frontiers can be tackled using the integrated or

human-environment approach such as: “the environmental impacts of mining; land degradation; assessment of historical antecedents to current environmental problems; the link between deforestation, denudation, erosion, and development strategies; the sustainable development of natural resources; climate impact; and environmental hazards of the city.” At the University of Cape Town, physical geographers engage in interdisciplinary research as they tackle issues such as “the impacts of regional climate change, land degradation, disaster risk mitigation, urban ecosystems, rural livelihoods and vulnerability, coastal environmental management and sustainability” (Meadows 2007: 132). According to Meadows, there is a need to understand how the physical environment functions and how people influence these processes. Using the integrated discipline (see Section 2.4), physical geographers can produce knowledge which is likely to improve people’s understanding of the physical environment and how to manage the impact of development programmes. This could go a long way towards reducing endemic poverty in Africa (Meadows 2007).

2.5.2.3 The role of the environmental management field in South African geography

This section draws heavily on Oelofse & Scott’s (2002) article on the contribution of the environmental management field in addressing environmental problems. After reviewing research done between 1992 and 2002, Oelofse & Scott (2002) note an increase in the number of South African geographers focusing on environmental problems. Davies (2001) cited in Oelofse & Scott (2002: 38), defines environmental management as “a set of applied activities designed to manage relationships in the environment and particularly those which arise from problematic interventions of humans.” The environmental management field is linked to geography in that it explains the relationship between people and the environment. Oelofse & Scott (2002: 38) argue that human-nature relationships connect the sub-disciplines of geography. Thus, geography plays an important role in the implementation of environmental management because “the theory, concepts and skills of geography form an important foundation for environmental management.” According Oelofse & Scott (2002) an integrated approach (see Section 2.4) that unites physical geography and human geography can be based on sustainability, environmentalism and environmental management. This idea was earlier promoted by Preston-Whyte (1983), who maintained that environmentalism is the missing link or the uniting paradigm between human and physical geography sub-disciplines (see also Section 2.6.5.5). Oelofse & Scott (2002) identify a number of themes dealing with environmental management that have been tackled by South African geographers such as:

- Debates on the meaning and applicability of the concept of sustainable development in the South African context;
- The development and implementation of the environmental management policy;
- The application of GIS in the analysis of environmental problems;

- Gender issues in environmental management;
- The development of sustainable cities;
- Food security, rural livelihoods and the environment;
- Global warming, climate change, drought and coping strategies;
- Formal and informal environmental education;
- Land degradation and soil erosion.

However, Oelofse & Scott (2002), criticize physical geographers for working within the natural science tradition and marginalizing the human agent. They also argue that the approach used in environmental management is uncritical of the role of capitalism as the main cause of poverty and environmental degradation. The uncritical attitude could also be attributed to the positivist framework within which some geographers often work, which tends to maintain the status quo (see also section 2.2.4). A further point of criticism by these authors is the lack of research on the role of the industrial sector and the gender perspective in environmental management.

Perspectives on academic geography discussed in Sections 2.2 and 2.5 above, affected both the content and pedagogical approaches of school geography. The focus now turns to geographical education.

2.6 GEOGRAPHICAL EDUCATION

The first part of the review deals with developments in school geography in England. This approach is followed because South African school geography is rooted in British geography as a result of colonization as observed in Section 2.5. The last part traces the history of the South African school geography up to the current period.

2.6.1 Paradigms and the history of geographical education

According to Marsden (2001) cited by Stoltman (2006), during the early stages of the institutionalization of school geography in the late 1800s to early 1900s, the nature of geography was widely criticized for concentrating on facts about places. This was the ‘Capes and Bays’ geography (Biddle 1985; Walford 2000). The pedagogical approach is likely to have been transmissive as well as teacher-centred and the students were treated like empty vessels which had to be filled with knowledge. The left side of Figure 2.1 illustrates this teacher-centred approach characterized by reception learning and minimal student activity. The students memorized facts and then regurgitated them during an examination.

There were suggestions that schools should implement approaches that cultivate observational skills in students. Such skills would enable them to gather information through fieldwork, analyze it and then draw conclusions that enable them to generalize through inductive reasoning. A concentric syllabus (from the known to the unknown) was also proposed where students studied the home area first and then moved to areas further away from their homes (Kent 2002; Marsden 1996; Stoltman 2006). According to Stoltman (2006) the concentric approach became a popular curriculum model internationally. The ‘Capes and Bays’ geography phase was followed by the adoption of the regional concept but the emphasis in the syllabus was still on the concentric approach (Biddle 1985; Fitzgerald 1973; Naish 2000; Thomas 1973).

The early implementation of the regional concept in school geography was based on environmental determinism (see Section 2.2.1) because there was an emphasis on causal relationships between the physical and the human environment (Biddle 1985; Marsden 1996; Thomas 1973). According to Herbertson’s approach²⁷, the physical and biological elements of the region were tackled first, followed by a study of the human responses to the physical environment. The learning of facts in the ‘Capes and Bays’ geography shifted to learning and memorization of facts and figures on specific regions in cases where the teachers were not well trained in the analytic method²⁸ that had been proposed (Fitzgerald 1973; Smith 2002). The Herbertson’s approach was the most dominant in school geography up to the 1950s (Biddle 1985). A number of factors explain this dominance. First, the requirements of the examination encouraged a stereotyped approach to regional studies. Second, the teachers were trained within the regional geography framework. Third, there was a perception among teachers that, with regards to methodology and lesson preparation, it was easier to teach regional geography (Fitzgerald 1973). Fourth, many resources were available in the form of textbooks structured according to Herbertson’s approach (Biddle 1985). Possibilism was later introduced into the study of regions in the idea of the geographical region. Proponents of this perspective, such as Unstead,²⁹ suggested that natural and human elements of the environment should be treated equally in the study of regions in school geography.

Three viewpoints or paradigms were identified during the 1970s in school geography: the spatial science; human-environment; and the regional approach. Teachers were advised to choose a specific viewpoint to guide them in designing syllabuses so as to achieve the aims of the geography course (Graves 1982). Biddle (1985) commended the Australian practice in which teachers were enlightened

²⁷ Herbertson, Andrew John (1865-1915) developed the analytical approach to the study of the concept of natural regions on which the school geography was based from 1900 to the 1950s (Biddle 1985).

²⁸ The analytical approach viewed the world as consisting of natural regions which could be analysed, compared and contrasted in terms of variations in relief and structure, temperature and rainfall, and soil and vegetation, which controlled human activities (Herbertson 1965).

²⁹ Unstead, John Frederick (1876-1965) proposed the synthetic regionalization method (Biddle 1985).

about the nature of different paradigms used in geographical research. The teachers could then use this knowledge to design syllabuses. This approach could be used in other countries to increase the teachers' awareness of the implications of these paradigms on the nature of school geography, content and pedagogical approaches.

The adoption of the spatial science perspective in school geography resulted in increased fieldwork in the study of the local environment around the schools (Robinson 1985). Morgan & Lambert (2005) observe that school geography still retains some features of the logical positivist approach where pupils test hypotheses, produce quantitative data using surveys and manipulate the data to arrive at generalizations.

Behavioural geography coexisted with spatial science in school geography for some time. It introduced the role of individual perception and decision-making in explaining the distribution of economic activities (Morgan & Lambert 2005). Humanistic geography, which emphasizes the importance of human thoughts and feelings, also grew during this period. Classroom work based on humanistic geography focuses on the student's experience of the local area. Robinson (1985: 39) observes that humanistic geography "adds a dimension to studies by bringing classroom learning into the 'real' world of students' experience and minds." Morgan & Lambert (2005) add that the humanistic framework can enable geography teachers to assist students not only to understand themselves but also to understand their environment.

Huckle (1997), one of the proponents of radical geography³⁰, criticized the dominance of the logical positivist paradigm in school geography on the grounds that it maintains the status quo (see also Sections 2.2.4 and 2.5.2.1). The implication is that geography teachers should adopt critical or radical geography with an emancipatory agenda. According to Morgan (2002), critical geography education has a number of features. Besides being critical of positivism, it promotes values education (see Section 3.3.6), which helps students to become sensitive and aware of the nature of attitudes and values of decision-makers whose decisions impact negatively on the environment. Additionally, the students are likely to learn to personally reflect on their own values and to clarify them as observed by Tilbury (1997). The pedagogical approaches used are progressive, learner-centred and attempt to empower students to think critically. The teachers use critical social theory, for example feminism, neo-Marxism and environmentalism to plan lessons (Morgan 2002), which aims to promote social justice, equity and a good environmental ethic.

³⁰ According to Morgan (2002), other references to radical geography include "geography as emancipation", which is differentiated from "geography as technical control", based on the logical positivist paradigm and "geography as mutual understanding" underpinned by the interpretivist framework. These distinctions were proposed by Johnston (1986). Walford (1981) and Fien (1999) cited by Morgan (2002) refer to "geography for social reconstruction" and "socially critical geography education" respectively.

Storm (1971), cited in Robinson (1985), suggests that radical geography, with its emphasis on action-orientated and socially concerned attitudes, could provide a framework for teaching environmental education in school geography. Furthermore, the issues-based approach and focus on poverty and underdevelopment in human geography at school level have developed because of the influence of radical geography. Unfortunately, radical geography and critical geography in general had the least influence on school geography (Morgan 2002), because teachers feared being labelled by the government as being subversive.

The Schools Council Geography 16-19 project in England is based on a variety of perspectives – positivist, humanist and radical versions of geography in the formulation of A-level syllabuses (Naish et al 1987). This is covered in greater detail in Section 2.6.4.

2.6.2 School geography and environmental education

According to Marsden (1997), the contribution of school geography to environmental education was minimal in the 19th and early 20th centuries. A similar observation has been made concerning academic geography in general with regards to addressing the impacts of human-environment interactions (see also Section 2.3). Other low status subjects in the school curriculum such as environmental studies and rural studies contributed more to environmental education than geography (Goodson 1993) (see also Section 3.3.1). It was observed that “British geography educationists, in their methodological texts and through their writings and lectures for the Geographical Association, paid scant attention to their subject’s potential for conservation education” (Marsden 1997: 16).

Bednarz (2006) states that there was a consensus during 1990s that American school geography has two perspectives; the spatial and ecological perspectives. The ecological perspective can provide a basis for incorporating environmental concerns into the teaching and learning of geography at school level. However, a limitation of this perspective is that it could promote a narrow perspective of the meaning EE and ESD as mainly focusing on the study of problems affecting the biophysical environment and pay scant attention to the human dimension.

According to Stoltman (2006), towards the end of the 20th century to the beginning of the 21st century, interest in environmental issues increased and the role of geography in education for responsible citizenship was reconsidered. Additionally, more researchers began to tackle human-environment issues in the school geography curriculum. These changes have been associated with an increase in the EE and ESD content in school geography curricula so as to provide the students with the knowledge, skills, attitudes and values required for sustainable living. Can the place of geography in the school curriculum be justified?

According to Boardman (1986), geography has special and general contributions to the aims of education. Students gain knowledge, skills, attitudes and values that are likely to contribute to the general aims of education (see Box 2.1) (Boardman 1986; IGU-CGE 1992; Pinchemel 1982).

2.6.3 The place of geography in the curriculum

The teaching of geography imparts a number of values to students. Pinchemel (1982) divides values of geography education into two categories: the absolute value, which is intrinsic in geography as a discipline of the mind; and, the relative value, which arises from geography's association with other subjects. Students gain the latter from learning geography either separately or through an integrated programme in natural or social sciences. Geography also teaches attitudes and values (see Box 2.1). The discussion of social and environmental issues can influence student's attitudes and values required for them to lead sustainable lifestyles. They also learn about the attitudes and values of decision-makers on the location of industrial activities that adversely affect the quality of the environment (Boardman 1986; IGU-CGE 1992; Pinchemel 1982).

Geography education has relative value in a number of ways (Pinchemel 1982). The collection, recording and analysis of data enables the student's learning to be contextualized in his/her environment. Students may learn the complexity of interrelationships between human and natural phenomena. They are likely to understand their habitats much better, including the human-induced problems experienced in the home area as well as in distant regions (see Box 2.1). The teaching of cultural geography enables them to appreciate the variety of people's cultural and technological achievements imprinted on the landscape (Boardman 1986; Pinchemel 1982). This should teach them to accept different civilizations to the dominant Western one. Furthermore, the concept of time and space is likely to teach students the idea of the evolution of situations that involve duration and trends. Students are also likely to learn about the interdependence of different nations (Pinchemel 1982).

Boardman (1986) observes that geography teaches students many facts about the home area and other distant places, as summarized in Box 2.1. They will know where countries are located and be able to find the location of places within them. Factual knowledge helps them to contextualize information on events obtained through the media. Geography enables the students to organize the vast amount of information from the media into a coherent whole. The factual knowledge which students acquire from learning geography forms a basis for understanding general ideas, which will enable them to understand the world around them. These general ideas are built on the understanding of basic concepts that relate to the location of phenomena in space and the relationship between people and their environment. As they grasp new ideas, students are likely to apply their previous experiences to new situations (Boardman 1986).

One of the skills developed through learning geography is graphicacy (Balchin 1972; Williams & Catling 1985). Graphicacy is the ability to understand and present information in the form of sketches, photographs, diagrams, maps, plans, charts, graphs and other non-textual, two-dimensional formats³¹ (Aldrich & Sheppard 2000). It is concerned with “the understanding and communication of spatial information that cannot be conveyed adequately by verbal or numerical means” (Boardman 1986: 15). In addition to the enhancement of graphicacy skills, geography, in association with other subjects, can develop literacy, oracy and numeracy skills (see Box 2.1). The subject provides prospects for students to practice their literacy skills through reading a wide range of geography textbooks, analyzing photographs, diagrams and other illustrations. The subject can enhance oracy or the use of spoken language as a result of discussions in the lessons. The students’ writing skills are likely to improve as they do a large variety of written assignments (Boardman 1986).

School geography can be one of the most effective vehicles for teaching EE and ESD because it deals with the impacts of human-environment interactions and on how to address them (see also section 3.3.6). The guidelines on the aims of geography education provided by the International Charter on Geographical Education (IGU-CGE 1992) present more opportunities for incorporating environmental concerns in the geography curriculum because of suggestions that geography should impart knowledge about natural and human systems together with their interactions. The *Lucerne Declaration on Geographical Education for Sustainable Development*, produced by IGU-CGE (Haubrich, Reinfried & Schleicher 2007), clarifies the contribution of geography to ESD (see also Section 3.3.6). Knowledge of the interaction between natural and human systems is likely to promote an understanding of the causes of environmental issues and how they can be managed.

In the guidelines on the aims of geography education provided in the International Charter on Geographical Education (IGU-CGE 1992), there is a greater focus on the development of skills, attitudes and values than in the 1980s school geography, described by Boardman (1986) and Pinchemel (1982). Additionally, concerns about human rights are included. These concerns can be addressed by incorporating ESD in the geography curriculum. ESD is concerned with not only the protection of the environment through the development of positive attitudes and values, but also with addressing issues of poverty, inequality and human rights (Gough 2006a) (see Section 1.1.5).

³¹ The information conveyed can be directly representative of what we see (as in photographs or drawings) or more abstract - for example information which is spatial (as in maps, plans and diagrams) or numerical (as in tables and graphs) (Aldrich & Sheppard 2000).

Box 2.1**THE AIMS OF GEOGRAPHICAL EDUCATION****Knowledge and understanding of**

1. locations and places in order to set national and international events within a geographical framework and to understand basic spatial relationships;
2. the characteristics and distribution of a selection of contrasting physical and human environments;
3. the spatial effects of the ways in which people interact with each other and with their environments;
4. different communities and cultures within our own society and elsewhere in the world, together with an awareness of people's active role in interacting with environments and the opportunities and constraints those different people face in their different environments;
5. major natural systems of the Earth (landforms, soils, water bodies, climate, vegetation) in order to understand the processes and interaction within and between ecosystems;
6. major socio-economic systems of the Earth (agriculture, settlement, transport, industry, trade, energy, population and others) in order to achieve a sense of place. This involves understanding the impact of natural conditions on human activities on the one hand, and the different ways of creating environments according to differing cultural values, religious beliefs, technical, economic and political systems on the other; and
7. structure and processes of the home region and country as daily action space; and the challenges of, and opportunities for, global interdependence.

Skills such as

1. those associated with the observation, collection, representation, analysis, interpretation and use of data, including tables, graphs, diagrams, maps, pictures and photographs developed through practical work, including investigations in the field;
2. the ability to identify questions and issues; process data; evaluate data; develop generalisations; make judgments; make decisions; solve problems through a process of enquiry;
3. the use of communication, thinking, practical and social skills to explore geographical topics in a range of scales from local to international;
4. the development of literacy, oracy, numeracy and graphicacy in association with other subjects; and,
5. personal social competence, particularly with regard to the spatial dimension of daily life.

Attitudes and Values related to

1. encouraging an appreciation of the significance of attitudes and values of those who make decisions about the management of the environment and the use of terrestrial space;
2. interest in their surroundings and in the variety of natural and human characteristics on the surface of the Earth;
3. appreciation of the beauty of the physical world and of the different living conditions of people;
4. concern for the quality and planning of the environment and human habitat for future generations;
5. readiness to use geographical knowledge and skills adequately and responsibly in private, professional and public life; and
6. respect for the rights of all people to equality; and dedication to seeking solutions to local, regional, national and international problems on the basis of the "Universal Declaration of Human Rights."

Adapted from DES (1985) cited in Boardman (1986: 21) and the International Charter on Geographical Education (IGU-CGE 1992).

The International Charter on Geographical Education (IGU-CGE 1992) also includes suggestions about confronting the current trends towards increased international linkages or globalization issues in geography education, which were excluded in the 1980s geography. Box 2.1 illustrates that geography education should teach knowledge, skills, attitudes and values to enable the students to lead more sustainable lifestyles. The students should also be able to understand the nature of human-environment interactions and be able to take action aimed at resolving environmental problems.

The changing paradigms in school geography (see Section 2.6.1) were associated with changes in pedagogical approaches used by teachers in the classroom. These pedagogical approaches range from teacher-centred didactic instruction to learner-centred approaches (Tabulawa 1997).

2.6.4 Pedagogical approaches used in school geography

Rawling (1986) and Naish, Rawling & Hart (2002) view teaching and learning strategies as a continuum ranging from teacher-centred to learner-centred methods, as illustrated in Figure 2.1. Reduced student activity and reception learning to the left of the diagram characterize teacher-centred approaches such as exposition and narration. The students depend too much on the teacher.

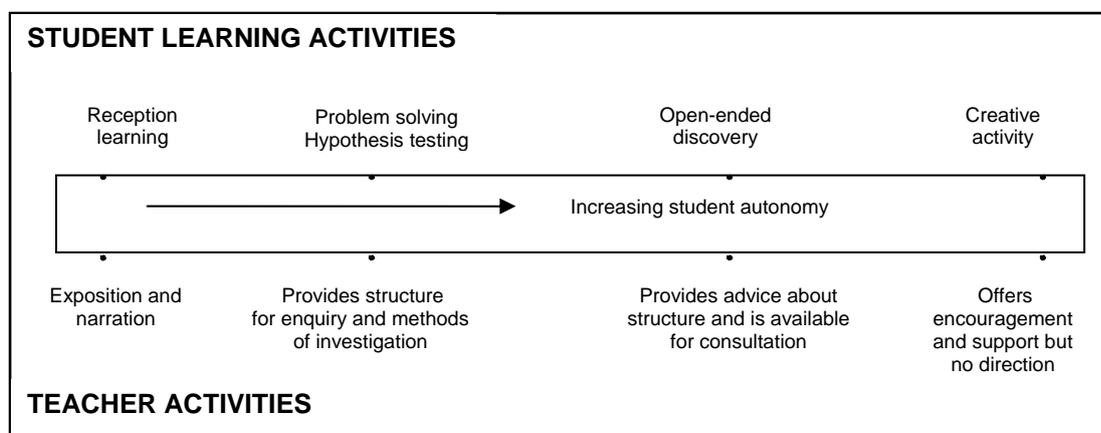


Fig 2.1 Teaching-learning continuum (Rawling 1986)

According to Morgan & Lambert (2005: 98), the pedagogical approaches to the left of the diagram are reminiscent of Freire's (1972) banking model where:

- The teacher teaches and the students are taught.
- The teacher knows a great deal and the students know a little.
- The teacher thinks and the students are thought about.
- The teacher talks and the students listen.
- The teacher chooses and enforces his or her choice and the students comply.

- The teacher chooses the course content and the students (who were not consulted) adapt it.
- The teacher is the subject of the learning process, while the students are the objects.

Towards the centre of the diagram (Figure 2.1), students engage in guided discovery where the role of the teacher is to direct student activities towards predetermined outcomes. The activities and student autonomy increase, the teacher is less dominant but still exercises a certain degree of control.

Towards the right of the diagram the teacher offers less direction, he/she encourages the students to be more creative. Teacher activity is minimal whereas the students do most of the work. The lessons are learner-centred. Approaches in the centre and right of the diagram (Figure 2.1) are ideal for the implementation of EE and ESD incorporated in school geography (see also Section 3.3.6). Lambert & Balderstone (2000), recommends an approach in which learning plays a greater role in the teaching and learning equation, for example in enquiry-based teaching and learning.

The enquiry-based teaching and learning programme for 16-19 year olds in English secondary schools provides an example of increased student activity, autonomy and reduced teacher dominance (Boardman 1986; Naish, Rawling & Hart 2002). The enquiry-based approach is defined by Cox (1984: 88), cited in Winter (1992: 142), as facilitating learning that “involves finding an answer to a question or the resolution of a problem. Inquiring is a state of mind which may be satisfied by numerous learning experiences.” Winter explains that for inquiry learning to take place, the student must be presented with a problem, an issue or a question. He defines enquiry-based learning as: “A learning process involving the investigation of a question, a problem or an issue in which the interrelationship between people and the environment is studied” (Winter 1992: 142). Inquiry learning has the following features:

- it identifies questions, issues and problems as the starting points for enquiry;
- it involves students as active participants in a sequence of meaningful learning through enquiry;
- it provides opportunities for the development of a wide range of skills and abilities (intellectual, social, practical and communication);
- it presents opportunities for fieldwork and classroom work to be closely integrated;
- it provides possibilities for open-ended enquiry in which attitudes and values may be clarified, and an open interchange of ideas and opinions can take place;
- it provides scope for an effective balance of both teacher-directed work and more independent student enquiry; and,
- it assists in the development of political literacy such that students gain an understanding of the social environment and how to participate in it.

According to Boardman (1986), enquiry-based learning falls in the centre of the teaching-learning continuum (Figure 2.1). Naish et al (1987) observed that enquiry-based learning has a people-environment approach in which students and teachers investigate the social and environmental issues.

Hanley et al (1970), cited in Winter (1992: 143), presents a number of objectives of the enquiry-based learning process:

- to initiate and develop a process of question-posing in youngsters;
- to teach a research methodology where students can look for information to answer the questions they have raised, use the framework developed in the course, and apply it to new areas;
- to help youngsters to develop the ability to use a variety of firsthand sources as evidence from which to develop hypotheses and draw conclusions;
- to conduct classroom discussions in which youngsters learn to listen to others as well as to express their own views;
- to give sanction and support to open-ended discussions where definitive answers to many questions are not found;
- to encourage students to reflect on their own experiences; and,
- to encourage the role of the teacher as resource manager rather than as an authority.

The enquiry-based approach is one of the most effective strategies through which geography teachers can impart geographical knowledge, skills, attitudes and values in students (Ballantyne 1986) when they teach EE and ESD through the geography curriculum.

After an issue or an environmental problem has been identified, Naish, Rawling & Hart (2002: 65-66) suggest that a sequence of enquiry activities can be followed; definition, description, analysis, explanation, evaluation, prediction, generalization, decision-making, personal evaluation and judgement and personal response. This means that students initially describe the background to the issue and then examine the causes of the issue and processes involved in the development of the problem. It is important to scrutinize the following: alternative viewpoints and possible solutions; what might happen and with what impacts; and, ways of assessing the impacts. The students then focus on possible decisions and their impacts. They question themselves on their role as individuals in the decision-making process and what personally motivates them to make specific decisions. Finally, they may decide as individuals how they can respond and whether they should take action on the issue.

Boardman (1986) argues that the enquiry-based learning programme creates opportunities for values education. Teaching of facts only through transmissive approaches in geography may not lead to changes in attitudes and values towards the environment (see also section 3.3.6). The enquiry-based

learning programme provides the conditions for teaching geography that creates awareness of the nature of attitudes and values of decision-makers. It also provides an opportunity for students to clarify their own values. Boardman further observes that approaches from the middle and right of the continuum diagram (Figure 2.1) can be used to develop activities that increase student's skills in values enquiry. However, Fien (1999: 145) criticises enquiry-based learning on the grounds that the approach fails "to adequately emphasise skills of social analysis, political literacy and action competence."

In order to achieve the aims and objectives of teaching EE and ESD through school geography, the World Wide Fund for Nature (WWF) (1988: 46) also recommended the use of the enquiry-based method described above. Teachers are advised to use "teaching/learning processes which recognise young people as active rather than passive participants" such as problem-solving and enquiry-based methods. WWF also advised that the teaching and learning programmes should increase opportunities for students to "carry out practical investigations, to explore and express ideas, to apply ideas and skills to new situations ... and to reflect on their own and other people's attitudes and values."

South African school geography changed from the "Capes and Bays" Eurocentric content according to developments in British academic and school geography. With time, more local and African content was incorporated in the syllabuses. The focus now turns to geographical education in South Africa.

2.6.5 Geographical education in South Africa

Teachers have grappled with the problem of shifting from examination-oriented teacher-centred approaches towards learner-centred approaches. Environmental education gradually became incorporated into the syllabuses over time, especially after democracy rule.

2.6.5.1 Geography education in the colony

Geography was first officially taught in schools in the Cape Colony in the 19th century and by the early 1900s, most primary and secondary schools throughout the country had introduced the subject (Ballantyne 1986; Cowie 1997; Wesso & Parnell 1992). According to Wesso (1994), South African school geography, like academic geography, has colonial origins. Wesso & Parnell (1992) argue that the inclusion of geography in the curriculum was part of a colonization process to incorporate colonial settlers into the English speaking British Empire. It was believed that learning of the subject encouraged geographical knowledge of the empire. According to Wesso (1994: 317):

Geography, as a school subject, was seen to be an important medium through which imperial ideology could be inculcated in the minds of young people, and it was, therefore, moulded to serve the needs of the colonial rulers.

Levy (1984: 54), cited by Ballantyne (1986) states that school geography consisted of ‘Capes and Bays’ teaching or descriptive geography “with conversational illustrations of the figure and motions of the earth and its chief physical appearances and problems on the terrestrial globe and construction of outline maps.” Physical geography was mainly taught with a limited amount of topographical human geography following an environmental determinism conceptual framework, which supported the colonialists’ worldview of racial superiority (Wesso 1994; Wesso & Parnell 1992) (see also Sections 2.2 and 2.6.1). According to Ballantyne (1986), the content and approach in teaching school geography were similar in the Cape and Natal provinces. However, in the two Boer Republics of the Orange Free State and Transvaal, the content and approach were slightly different because the education authorities in the Boer Republics were against the dominance of regional studies about Britain and the British colonies (Levy 1984; Wesso & Parnell 1992). As a result, they were generally slower in incorporating geography into the school curriculum. There was a preference for history and citizenship education in the two Boer Republics (Clark 1989). When the Union of South Africa was established in 1910, the same core syllabus was adopted throughout the country despite the fact that secondary school education fell under provincial government (Clark 1989).

A significant amount of research has been done on the development of South African secondary school geography with regards to curriculum and practice since 1910 (Ballantyne 1986; Clark 1989; Cowie 1997; Knox 1958; Ledger 1978; Levy 1984; Van der Merwe 1982; Webster 1939). However, most of the research is racially restricted to schools for ‘Whites’ (Wesso & Parnell 1992). According to the above authors, the geography syllabuses were revised from time to time in response to academic developments in the subject. Before 1963 the revision of the syllabuses was mainly undertaken by education departments and did not officially involve universities (Van der Merwe 1982).

Ballantyne (1986) notes that before 1945, geography education was strongly influenced by changes in British academic and school geography. The objectives and pedagogical approaches were influenced by the trends and experiences in British geography until recently (Levy 1984; Nicol 1974; Van der Merwe 1982; Wesso & Parnell 1992). Syllabuses mainly covered natural regions and physical geography topics before 1945. This was Herbertson’s approach (Wesso 1994) covered in Section 2.6.1. After 1945 the syllabus content increasingly included African and South African topics (Van der Merwe 1982).

2.6.5.2 Apartheid and geography education

Education in government schools had been racially segregated since the time of the colonization of South Africa. Clark (1989: 46) maintains that racial segregation in schools was initially applied ‘*de facto*’ and then later by law. The practice of separate education for different races was based on the Christian National philosophy of education (Ballantyne 1986; Christian National Education 1971; Wesso 1994; Wesso & Parnell 1992). This philosophy posited that the practice of separate education for different races was right and just, because nations and races differ in their languages, history and political institutions (Christian National Education 1971; Wesso 1994). This practice was implemented with the help of legal instruments such as the Bantu Education Act of 1953. The implementation of apartheid education resulted in a fragmented structure, in which secondary school geography was administered by 18 different departments (Ballantyne 1986). Despite the decentralized control of education, the nature and structure of secondary school geography remained the same throughout the country. According to Ballantyne (1986), this can be attributed to the role played by the South African Joint Matriculation Board (JMB) in the formulation of syllabuses and control of matriculation examination standards.

Geography was compulsory until the end of the junior secondary phase of education (Clark 1989; Nel & Binns 1999). At senior level it was an elective subject and was included in subject packages offered by Departments of Education in schools under their control (Ballantyne 1986). There were three secondary school syllabuses, namely the lower, standard and higher grade, to cater for students with differing abilities, interests and career paths. The content of these syllabuses was similar but differed in the level of difficulty (Nightingale 1985, cited by Ballantyne 1986). Ballantyne observes that the syllabuses were controlled by the Committee of Heads of Education (CHE) and formulated with the assistance of university representatives and other interested people.

2.6.5.3 Apartheid and Black education

According to Wesso (1994), the Afrikaners tried to decolonize education in order to reduce British influence on the education of their children but they re-colonized Black people at the same time through the imposition of apartheid geography. Levy (1984) observes that the education of Blacks had initially been left to missionaries who taught them *the three Rs*.³² The curriculum mainly consisted of religion, basic skills and some handiwork (Levy 1984; Ntikinca 1996; Wesso & Parnell 1992), but Levy (1984) notes that there were indications that some form of geography was taught. Clark (1989: 48) points out that the introduction of geography to non-white students was hampered by “inadequate funding, a chronic shortage of specialist teachers, a short school life, problems related to language of instruction,

³² Reading, writing and arithmetic

and a belief that a restricted curriculum, offering less range and depth, was more appropriate for the 'needs' of particular groups."

When the nationalist government took over the education of Blacks, it offered them syllabuses characterised by ethnocentrism or bias (Wesso & Parnell 1992). Even at university level Black students had to contend with a geography discipline with strong 'ideological and environmental deterministic undertones.' According to Wesso (1994), the use of textbooks written by White South Africans at school level added to instilling the inferiority of Black students versus their White counterparts. Wesso argues that this was part of the colonization of the Black student's mind, with some academics claiming that Black students' experience of apartheid geography resulted in the development of negative attitudes to the subject. This explains why the subject used to be unpopular in the Black schools (Ballantyne 1987; Magi 1981; Wesso & Parnell 1992).

Ballantyne (1986) observes that large classes and a shortage of teaching resources resulted in appalling teaching methods in 'Black' schools. In a study of Black university geography students' perception of school geography and the geography teacher, Magi (1981) found that the high failure rate in secondary school geography was attributed to unqualified teachers, poorly equipped schools, the poor geographic background of students and the apparent lack of long-term planning in schools. Magi describes the vicious circle of poor performance in which geography education in 'Black' schools was trapped. He argues that "these are the fruits of the poor educational system we have, the poor system which produces poor teachers which in turn produce poor students who become poor teachers" (Magi 1981: 150). Bloch (2009) supports this statement and urges the government to address the problems faced by previously disadvantaged schools. A survey done by Ledger (1980) in 'White' schools established that they generally had better facilities and were well equipped.

2.6.5.4 The position of geography in the secondary school curriculum

Ballantyne (1986) evaluated the status of geography in the senior secondary school curriculum by student enrolment and subject numerical status relative to alternative subjects. He noted that between 1970 and 1980 the number of students who took geography as a matriculation subject was stable. According to this study, one third of all "White" and "Black" secondary school students took geography as a matriculation subject during this period. He, however, noted a decline in the number of "Coloured" and "Asian" students who took geography as a matriculation subject. This decline was, however, contested by the inspectorate at that time on the grounds that there could have been an error because their experience was that geography education in the latter population group was in a healthy position (Ballantyne 1986). Another observation was that the majority of the geography students were "White" because they dominated in the secondary school system. It was projected that this scenario could begin

to change in the mid 1990s as a result of an increase in the enrolment of “Blacks” and “Coloured” students in secondary schools as more opportunities for education opened for them. The relative dominance of “White” students could then begin to decline. Ballantyne concluded that secondary school geography was in a healthy position in the mid 1980s. Clark (1989: 46) agrees with Ballantyne in the statement: “geography has an assured place in primary, secondary and tertiary education in South Africa.”

There were calls during the 1980s for secondary school geography education in South Africa to be utilitarian in approach and to be more technically and vocationally orientated. The implementation of this change could have repercussions on enrolment numbers and on the healthy status of the geography subject (Ballantyne 1986). However in the 1990s, Nel & Binns (1999: 7) were concerned about the fact that geography was becoming less popular with students. They attributed this to “its factual difficulty, unattractive textbooks, content overload, relatively poor examination results and the perception that geography does not prepare them for employment.”

2.6.5.5 Changes in the geography syllabuses and examinations

The JMB core syllabuses outlined the content of the secondary school geography. Syllabuses were revised twice between 1970 and 1985, namely in 1973 and 1983 (Ballantyne 1986). The 1967 syllabus comprised three main sections which were taught over a two year period: Section A on the Earth as a planet; Section B on South Africa; and Section C on Regional geography of Europe, North America, Asia, Africa, South America and Australia. The syllabus content mainly consisted of physical and regional geography (Ballantyne 1986). Hattingh (1971) and Nicol (1974) criticised the length of the geography syllabuses including the ‘Caps and Bays’ approach used during the 1960s. Hattingh (1971: 32) argued that “a syllabus which is overloaded with masses of facts which have to be memorized by students, does not offer them sufficient opportunity of arriving at independent thought by means of explanation, deduction and interpretation.”

Revised syllabuses were put into effect between 1973 and 1974. Nicol (1974), cited by Ballantyne (1986) observes that the salient features of the new 1973 syllabus were:

- a greater emphasis on understanding of concepts than factual information;
- increased content in systematic geography as compared to regional geography;
- only the standard 10 year of the theory section of the syllabus would be examined unlike during the previous years when two years of theory was examined; and,
- a practical examination was introduced in standard 10.

The syllabus change was influenced by developments in academic geography at universities.

Dunlop (1976) observes that academic geography at that time had three characteristics: a conceptually based theoretical approach, a behavioural bias and the use of quantitative techniques. According to Cowie (1997), the logical positivist paradigm of the 'new' geography was introduced into the 1973 secondary school syllabus as a result of changes in the academic discipline. While academics welcomed the new secondary school geography syllabus, practising teachers criticized it. The older generation of teachers complained about the complexity of the new concepts (related to spatial analysis and quantitative techniques), because they lacked the skills to tackle the new directions in academic geography which had been incorporated into the new syllabus (Nicol 1974). According to Van der Merwe (1982), teachers complained that there was no guidance and supplementary material on how to teach the new content. Additionally, Ballantyne (1982) and Nightingale (1985) cited by Clark (1989) point out that the degree of difficulty of the new syllabus was perceived to be too high for all matriculants, regardless of their ability, and the syllabus did not accommodate the needs of Black students. Additionally, the subject matter could not be easily integrated because of the systematic nature of the syllabus (Cowie 1997). Because the amount of material that had to be taught was too voluminous, the teachers as well as students were overburdened (Ledger 1978).

According to Ballantyne (1986), the 1983 core syllabus was introduced into schools in 1985. It included the four main traditions of geography as noted by Pattison (1964): the man-land relationship, spatial perspective, regional viewpoint and earth-science traditions (see Section 2.1). Ballantyne observes that the revision of the 1973 syllabus in 1983 involved few changes in the content. One of the significant changes was the addition of a new section on *Ecosystems, environmental balance and conservation*. This marked the beginning of incorporating environmental education in the form of conservation education in the geography syllabuses (Cowie 1997). This was a response to repeated calls by academics and conservationists such as Hurry (1978; 1979; 1980) for geography education to address environmental problems by integrating conservation education (also Section 3.3.7). Students were expected to learn ecosystem concepts, ecological processes and the human impact on the ecosystem. The quantity of information to be learned by the students was still large. There were concerns that teachers might resort to using practices that would "promote rapid assimilation of knowledge rather than the development of concepts, skills and attitudes" (Ballantyne 1986: 27).

Ballantyne (1986) observed that the 1973 JMB secondary school core syllabus did not incorporate aims and objectives of geography education in order to guide the teachers. On the other hand, the 1983 JMB secondary school core syllabus had a preamble of the general aims of geography education as well as specific objectives of the geography content. It was thus clear to the teachers, as outlined in the aims and objectives, that geography education aims to develop geographical concepts, skills, attitudes and

values in students (Ballantyne 1986). According to Ballantyne, the main goal of the syllabus was to develop the whole student and not just to transmit geographical knowledge. The 1983 syllabus aimed to develop the affective domain in addition to the cognitive domain (Cowie 1997). The main aims of the 1983 JMB secondary school core syllabus were that students should:

- acquire and develop intellectual skills and abilities which will encourage on-going education;
- adjust to a society that is undergoing rapid and far-reaching social, economic and political change;
- enter the world-of-work that is becoming increasingly more technologically orientated; and,
- develop their moral and emotional (affective) attributes (JMB core syllabus guide for geography, Standard 8, 9 and 10. 1983: 2-3, cited by Ballantyne 1986: 29).

Furthermore, the aims promoted a subject that had shifted from concern with factual knowledge to the understanding of concepts. Ballantyne (1986) perceives a move from teacher-centred to student-centred pedagogical approaches. The utilitarian aim in the syllabus is in line with popular thinking concerning the value of education during that time (Human Sciences Research Council 1981).

Ballantyne (1986) observes that knowledge, skills, perception and appraisal are the four major categories of the objectives of the 1983 secondary school geography syllabus. He argues that:

Knowledge presented to students must be meaningful and useful and should not be taught as an academic exercise but applied to everyday situations. Students must be made aware of the links that geography has with other subjects and develop an appreciation of the unity of knowledge (Ballantyne 1986: 29).

Moreover, students should be able to transfer the skills learnt to new situations. Perception objectives are related to awareness of environment and consequent development of attitudes, values and behaviour. Appraisal is the development of specific attitudes and values based on geographical and environmental concepts (Ballantyne 1986).

However, Preston-Whyte (1983) and Meadows (1985) were critical of the systematic approach followed in the 1973 and 1983 syllabuses. The systematic approach deals with certain aspects of geography separately and in depth (Castree 2009), for example climatology, biogeography and geomorphology in physical geography and agriculture, population studies and settlement in human geography. The use of the systematic approach undermines the effective teaching and learning of human-environment relations due to the fact that different aspects of geography are taught separately. It is therefore challenging to tackle environmental issues in school geography education because the students are not likely to understand the causes of such issues when the teaching and learning

programmes follow the systematic approach. Preston-Whyte (1983) and Meadows (1985) suggested the adoption of the environmental paradigm to unify the physical and human geography topics in the syllabus. According to Preston-Whyte (1983), environmental issues can be addressed more successfully because an integrated approach or the environmental paradigm enhances the understanding of human-environment relations (see also Sections 2.3, 2.4, 2.5.2.2 and 2.5.2.3).

Despite the gradual shift towards the teaching and learning of geographical concepts, skills, attitudes and values, Levy (1984), cited in Ballantyne, found that between 1926 and 1980 the secondary school geography matriculation examination mainly tested factual information on the regional content of the syllabus. After 1975 there was a noticeable shift towards the testing of translation,³³ interpretation³⁴ and application³⁵. Levy did not find any evidence, however, of questions testing students' ability to analyze, synthesize and evaluate information. Levy (1984) was concerned that the majority of the examination questions required knowledge of a specific content of the syllabus. She attributed this observation to the contribution of the most widely used textbooks which largely contained factual information. There was a tendency towards textbook-based teaching and for examiners to test the content found in the textbooks. According to Ballantyne (1986), the approach followed in some textbooks does not facilitate the development of concepts, skills, attitudes and values in students due to an overemphasis on facts.

2.6.5.6 Teaching practice

Ballantyne (1986) argued that as syllabuses and examinations change in secondary school geography, teachers should employ pedagogical approaches that best promote the development of students' concepts, skills, attitudes and values. According to him, teachers were introduced to pedagogical approaches that actively involved students in problem solving and decision-making through in-service courses in the 1970s. Examples of such methodologies include discovery worksheets, simulation games, role plays and the use of models. These learner-centred approaches have been recommended for implementing EE and ESD in the teaching and learning programmes. Teachers were also encouraged to use more fieldwork, statistical diagrams and visual material (Ballantyne 1986), but a study conducted by Levy (1980) established that teachers in both 'Black' and 'White' schools had difficulties in conducting fieldwork. According to Levy (1984), in-service courses were more successful in improving the teachers' content knowledge of the 'new' geography. Despite attending in-service courses designed to teach methodology, the teachers were rather slow or seemingly resistant to the use of student-centred practices (Levy 1984). The 1983 JMB core syllabus contained a section on guidelines for methodology to benefit teachers. The syllabus recommended inquiry-based (see Section 2.6.4) and student-centred

³³ use of student's own words to state knowledge (Ballantyne 1986: 31)

³⁴ giving reasons and evidence of understanding cause-effect relationships (Ballantyne 1986: 31)

³⁵ applying knowledge to a new situation (Ballantyne 1986: 31)

approaches, such as the use of aerial photos, maps, satellite images, statistical diagrams, quantitative techniques, fieldwork and research techniques (Ballantyne 1986). The focus now turns to curriculum change in post-apartheid South Africa.

The foregoing discussion has shown that Apartheid education was characterized by “among other things, major inequalities, high drop-out rates and failure rates, relatively poorly qualified teachers, examination-orientedness with major emphasis on learning by rote and unimaginative teaching methods” (Steyn & Wilkinson 1998: 203). These problems were mainly experienced in previously disadvantaged schools. The new democratic government therefore, felt obliged to transform the education system in order to redress the apartheid legacy (Botha 2002; Du Plessis 2005; Mokhaba 2004; Sedibe 1998; Spady & Schlebusch 1999; Steyn & Wilkinson 1998). The next section will cover education reform in post-apartheid South Africa.

2.7 CURRICULUM CHANGE IN POST-APARTHEID SOUTH AFRICA

In an effort to reform education and training, the new government radically changed apartheid education and replaced it with an Outcomes-Based Education (OBE) model (see also Section 1.2.2). This ushered in new curricula at various levels of the basic education system – the GET band (Grades R-9) and the FET band (Grades 10-12).

2.7.1 The national curriculum statement (NCS)

According to the Department of Education (2003a), the NCS Grades 10-12 (General) is a policy document that guides teaching and learning in the FET band. The NCS provides an outline of the knowledge, skills and values that should be learned. It consists of different subject policy statements, including geography. Additionally, it is based on principles derived from the Constitution of the Republic of South Africa (1996) and the Manifesto on Values, Education and Democracy (2001). These principles include “democracy, human rights, social justice, equity, non-racism, non-sexism, and *ubuntu*.” (Department of Education 2003a: 1).

The following principles form the basis of the NCS:

- social transformation;
- outcomes-based education;
- high knowledge and high skills;
- integration and applied competence;
- progression;

- articulation and portability;
- human rights, inclusivity, environmental and social justice;
- valuing indigenous knowledge systems; and,
- credibility, quality and efficiency (Department of Education 2003a: 7).

According to the Department of Education (2003a), the NCS at FET level is offered only in schools where students obtain a general education organized into subjects. The NCS's basis on OBE means that learning in the FET band is geared towards the achievement of "generic and cross-curricular" outcomes, referred to as critical and developmental outcomes. The teaching of each subject at FET level focuses on the achievement of subject-specific learning outcomes.

2.7.2 The position of geography in the new curriculum

According to Nel & Binns (1999), efforts by the state to change the syllabuses in the early 1990s did not materialize because of resistance from the teachers who did not approve of the top-down approach to the formulation of syllabuses. This meant that the 1983 geography syllabus (see Section 2.6.5.5) largely remained in use for some time until the full implementation of the new curriculum underpinned by OBE. However, according to Beets & Le Grange (2008), there were cosmetic changes to the geography syllabus during the period following South Africa's first democratic elections in 1994. The process of "curriculum revision involved exorcising racial content as well as outdated and inaccurate subject matter from school syllabuses" (Beets & Le Grange 2008: 69). Substantial changes in the geography curriculum that occurred later, introducing OBE and C2005, were part of the dismantling of the apartheid structures.

2.7.2.1 The new curriculum and school geography in the GET band

The introduction of OBE and C2005 in the late 1990s put school geography in an uncertain position (Ballantyne 1999; Beets & Le Grange 2008; Binns 1999; Le Grange & Beets 2005; Nel & Binns 1999; Ramutsindela 2001). This occurred as a result of the adoption of an integrated or interdisciplinary approach to learning, where the different subjects were collapsed into eight Learning Areas in the GET band (Grades R-9). The White Paper on Education and Training stipulates an "interdisciplinary, integrated and active approach to learning" (South Africa 1995: 22). The integration process resulted in geography being split into two in the GET band (Grades R to 9).

Human geography was incorporated into the Social Sciences Learning Area, together with history, whereas physical geography was integrated into the Natural Sciences Learning Area (Binns 1999; Mosidi 1998; Nel & Binns 1999; Ramutsindela 2001). Geography academics and school teachers feared

that the subject would be weakened and eventually lose its identity at school level (Ballantyne 1999; Beets & Le Grange 2008; Mosidi 1998). According to Huckle (1997) the separation of physical and human geography is likely to teach the students “a false separation of nature and society.” Furthermore, environmental problems are not likely to be effectively addressed in the absence of an integrated geography dealing with human-environment interactions (Goudie 1986). In other words, the weakened subject is not likely to be an effective vehicle for the teaching and learning of EE and ESD. This is reminiscent of the position of geography in some American and Australian state schools where geography teachers are grappling with maintaining the subject’s identity within an integrated social science learning programme (Binns 1999).

Research done by Ballantyne (1999) involving interviews with 10 South African geography teacher educators, to find out their perceptions of C2005, established a number of pertinent concerns. First, teacher educators were critical of the top down planning process that did not consider their contributions and so they generally did not support the changes brought by the new curriculum. Second, they doubted the efficacy of OBE itself. Third, they were concerned about what they perceived was an imminent loss of identity of school geography as a result of fragmentation into two Learning Areas. As a result, they felt “very much under threat”. Fourth, they were of the opinion that the reduction of the time allocated to teaching geography within an integrated framework would cause the value of the subject to be diminished.

Le Grange & Beets (2005) and Beets & Le Grange (2008) identified a number of problems which could arise from the splitting of geography and incorporating it into two learning areas. First, within the context of C2005, the critical outcomes and the subject specific learning outcomes were not likely to be achieved as successfully as when physical geography and human geography are integrated in one learning area. Second, the requirement of C2005 that teachers design learning programmes in the absence of guidelines on content, would further weaken the human geography component in the Social Sciences Learning Area. Teachers were not adequately trained to implement OBE and the new curriculum (Jansen 1999a; Kruss 1998; Le Grange & Reddy 1997; 2000) and thus most of them lacked the competence to design good learning programmes that could enhance the teaching of human geography. Content guidelines were, nevertheless, later provided in the form of “assessment criteria, range statements and performance indicators” (Beets & Le Grange 2008: 70). Third, Beets & Le Grange argue that some of the specific outcomes listed below for the Social Sciences Learning Area could be achieved through teaching of either human geography or history:

- make sound judgements about the development, utilisation and management of resources;
- critically understand the role of technology in social development; and,

- demonstrate an understanding of interrelationships between society and the natural environment (Beets & Le Grange 2008: 70).

In the process of designing learning programmes, teachers who have a history background might promote the learning of knowledge, skills, attitudes and values related to history at the expense of geography, resulting in the weakening of the human geography component of the Social Sciences Learning Area (Beets & Le Grange 2008).

However, there is one dissenting voice regarding the contested position of school geography during this time. Van Harmelen (1999) is seemingly, unperturbed by the impact of the curriculum changes on the status of school geography in the GET band. She sees an opportunity opening for the implementation of improved learner-centred pedagogical approaches with the introduction of C2005. According to Van Harmelen (1999), the adoption of social constructivist approaches to learning is long overdue so as to replace teacher-centred, transmissive teaching styles that promote rote learning to prepare for summative assessment. She approves of the integrated learning programmes offered through Learning Areas because, in her view, students must receive a general education in the GET band that prepares them for specialization in the FET band.

The changes which were effected through the introduction of the Revised National Curriculum Statement (RNCS) as a result of the recommendations of the Curriculum Review Committee (Chisholm et al 2000), had a bearing on the position of school geography in the GET band. According to Le Grange & Beets (2005) and Beets & Le Grange (2008), the RNCS is still underpinned by OBE with all the original critical outcomes still in place, but it is much more simplified than C2005. The specific outcomes are now in the form of fewer “curriculum-linked outcomes”, referred to as learning outcomes. There are a number of improvements in the RNCS which have strengthened the position of geography in the Social Sciences Learning Area. Le Grange & Beets (2005) and Beets & Le Grange (2008), observe a number of positive changes. First, content guidelines have been developed for each grade in the RNCS policy document. Second, although some parts of physical geography have been retained in the Natural Sciences Learning Area, geography has gained its identity in the Social Sciences. The enhanced identity is attributed not only to the specification of content noted above, but also to the formulation of distinct outcomes specifically for the geography learning area, as illustrated below:

Learning Outcome 1: Geographical enquiry

The learner will be able to use enquiry skills to investigate geographical and environmental concepts and processes.

Learning Outcome 2: Knowledge and understanding

The learner will be able to demonstrate geographical and environmental knowledge and understanding.

Learning Outcome 3: Exploring issues

The learner will be able to make informed decisions about social and environmental issues and problems” (Department of Education 2002b, cited by Beets & Le Grange 2008).

Third, according to Le Grange & Beets (2005) and Beets & Le Grange (2008), the RNCS has improved features of continuity and progression as a result of the incorporation of assessment standards which did not feature in C2005. At this level the teaching and learning of EE and ESD can be incorporated into the lessons as this is prescribed in the policy document, as illustrated in the learning outcomes (Department of Education 2002b).

The position of school geography in the FET band has not been contested because it is offered as a subject, separate from other subjects in the Human, Social Sciences and Languages learning field (Department of Education 2003b). Le Grange & Beets (2005: 267), in their article entitled *Geography education in South Africa after a decade of democracy*, conclude that “developments in the last four years place geography in a more secure position in the post-apartheid education system.”

2.7.2.2 The new curriculum and school geography in the FET (general) band

Nel & Binns (1999: 7) noted that the 1983 syllabus (see Section 2.6.5.5) had a number of shortcomings. First, the syllabus did not embrace “socially critical thinking” and it was implemented by teachers educated and trained within the “positivist and behaviourist schools of thought.” Second, concern about the environment was introduced, but there was very little focus on environmental issues. Third, there was a heavy emphasis on content and textbook knowledge to prepare for examinations. Fourth, the teaching of skills was only limited to map reading and interpretation, while the teaching and learning of attitudes and values were neglected. Last, the syllabus had a “Eurocentric focus” which excluded issues pertaining to the “life-worlds” of most of the students. Although the syllabus encouraged fieldwork, the content overload in the syllabus resulted in teachers prioritizing covering content through transmissive, teacher-centred pedagogical approaches that encouraged rote learning in order to complete the syllabus in time for examinations. Such approaches are inappropriate for teaching EE and ESD through the geography curriculum. However, there was a drastic change in the 2003 Geography NCS with regards to its philosophical underpinnings, content guidelines, pedagogical approaches and methods of assessment (Department of Education 2003a; 2003b).

The Geography NCS is based on a number of principles (see Section 2.7.1), one of which is OBE, and therefore the teaching and learning of geography in grades 10-12 are geared towards the achievement of subject-specific learning outcomes as well as “generic and cross-curricular” critical and developmental outcomes. The Geography NCS policy document has a preamble of aims. According to the Department of Education (2003b: 9), the aims of geography education in the FET band are to:

- **develop tools and skills** to research, interpret, analyse and make judgements based on the information gathered, thereby contributing to geographical literacy ... arrange and use geographical information and **to think systematically and critically about social and environmental issues and challenges** [own emphasis];
- **develop knowledge and critical understanding** of the changing nature and interrelatedness of human existence and the environment over space and time ... **understanding** of spatial distribution, **human-environment interactions, and sustainable development** [own emphasis]; and,
- prepare students to become informed, **critical and responsible citizens** who can make sound judgements and take appropriate action that **will contribute to equitable and sustainable development** of human society and the physical environment [own emphasis].

The aims of geography education outlined above show a clear focus of the Geography NCS on the teaching and learning of knowledge, skills, attitudes and values. This observation is supported by the statement on the scope of geography education, the learning outcomes, as well as the assessment standards of school geography in the FET band. According to the Department of Education (2003b: 10), the scope of geography covers: geographical skills and techniques; knowledge and understanding; and the application of skills and knowledge to practical issues and challenges. Furthermore, the three aims incorporate the teaching and learning of environmental education and education for sustainable development in geography.

The Geography NCS policy document also provides learning outcomes or “intended results of the teaching and learning” describing knowledge, skills and values to be demonstrated by students at various stages – grade 10, 11 and 12. An extract of the three learning outcomes³⁶ is given below (Department of Education 2003b: 14-16):

Learning outcome 1: Geographical skills and Techniques (practical competence)

The learner is able to demonstrate a range of geographical skills and techniques.

Learning outcome 2: Knowledge and understanding (foundational competence)

The learner is able to demonstrate knowledge and understanding of processes and spatial patterns dealing with interactions between humans, and between humans and the environment in space and time.

Learning Outcome 3: Application (reflexive competence)

The learner is able to apply geographical skills and knowledge to environmental issues and challenges, recognize values and attitudes, and demonstrate the ability to recommend solutions and strategies.

³⁶ In the OBE system Learning Outcome (LO1) and Learning Outcome (LO2) focus on the cognitive (knowledge and understanding) and psychomotor domain (skills) respectively. Learning Outcome Three (LO3) is the third subject-specific learning outcome which addresses the development of the affective domain (attitudes and values).

Assessment is integrated into teaching and learning in the new curriculum (Department of Education 2003b; Janse van Rensburg & Twala 1998). Assessment standards linked to learning outcomes are provided in order to guide teachers on criteria against which to assess learner competences (see Table 2.3). For each learning outcome, assessment standards have been designed for each grade. Furthermore, the policy document gives guidelines on methods of assessment. The new geography curriculum places a greater emphasis on continuous assessment (CASS) than the previous syllabuses where teaching and learning focused on summative assessment at the end of a learning programme (Department of Education 2003b). An illustration of the link between learning outcomes and assessment standards is provided using an extract from the Grade 10 syllabus (Table 2.3).

Table 2.3: Assessment Standards for FET geography

GRADE 10	
<p>Learning Outcomes 1 Geographical skills and Techniques (practical competence) <i>The learner is able to demonstrate a range of geographical skills and techniques.</i></p>	<p>Assessment Standards We know this when the learner is able to:</p> <ul style="list-style-type: none"> • Identify issues and formulate questions for an investigation. • Acquire information from fieldwork and a variety of other sources. • Organize information graphically, pictorially and diagrammatically. • Analyse information obtained from a variety of sources. <p>Report findings in oral and/ or written form.</p>
<p>Learning Outcomes 2 Knowledge and understanding (foundational competence) <i>The learner is able to demonstrate knowledge and understanding of processes and spatial patterns dealing with interactions between humans, and between humans and the environment in space and time.</i></p>	<p>Assessment Standards We know this when the learner is able to:</p> <ul style="list-style-type: none"> • Describe processes and associated patterns in places and regions. • Identify similarities and differences in processes and spatial patterns between places or between regions. • Describe the links between environmental problems and social injustices in a local and global context. • Describe the interdependence between humans and the environment at different scales.
<p>Learning Outcomes 3 Application (reflexive competence) <i>The learner is able to apply geographical skills and knowledge to environmental issues and challenges, recognize values and attitudes, and demonstrate the ability to recommend solutions and strategies.</i></p>	<p>Assessment Standards We know this when the learner is able to:</p> <ul style="list-style-type: none"> • Apply skills and knowledge to a range of phenomena, issues and challenges at local and global scales. • Identify different values and attitudes held by individuals and groups associated with processes, spatial patterns and human-environment interactions at local and global scales.

Source: Department of Education (2003b: 22)

The learning outcomes and assessment standards incorporate the teaching and learning of environmental education and education for sustainable development in geography. This means that the policy document creates opportunities for teaching EE and ESD by clearly articulating that the teaching

and learning of knowledge, skills, attitudes and values should be linked to EE and ESD. Additionally, the assessment standards linked to the learning outcomes guide the teachers on criteria against which to assess learner competences in environmental learning. This ensures that the teachers incorporate EE and ESD into the teaching and learning programmes.

However, the teaching of EE within an OBE framework has been criticised (Le Grange & Reddy 1997). Learning outcomes and assessment standards are likely to reduce EE to the teaching and learning of facts which are then assessed with the help of assessment standard guidelines in order to demonstrate the learning of specific outcomes. This is likely to promote the teaching of environmental knowledge at the expense of skills, attitudes and values which are necessary for the students to address environmental issues and to lead more sustainable lifestyles. The teaching of environmental education within an OBE framework will result in a weakened form of environmental education called education *about* the environment³⁷ (Le Grange & Reddy 1997). Concerning this issue, Le Grange & Reddy (1997: 15) argue: “Environmental education is concerned with process. In taking social action (action for the environment) you cannot have predetermined outcomes. Environmental outcomes are developed through a process of interaction with others in specific environmental contexts.”

The pedagogical approaches prescribed in the new NCS geography curriculum shift at policy level from teacher-centred, transmissive methods to learner-centred approaches and active learning because the NCS is underpinned by OBE (Department of Education 2003a; 2003b; Le Grange & Beets 2005). The new curriculum encourages the adoption of social constructivist approaches to learning. Van Harmelen (1999: 80) supports Vygotsky’s (1986) and Gergen’s (1985) views that active learning is based on social constructivism which “suggests that knowledge is constructed in the minds of students through the many social settings that make up their lived experiences and that this knowledge is largely a reflection of the relationship that exists between culture and language.”

The complaint about the “Eurocentric” focus of previous school syllabuses (Nel & Binns 1999), has been addressed in the geography NCS policy document. First, the contextual focus has shifted to the global in grade 10, continental (i.e. Africa) in grade 11 and national (i.e. South Africa) in grade 12 (Department of Education 2003b). Second, indigenous knowledge has been incorporated into the geography NCS (Le Grange & Beets 2005). Indigenous knowledge is defined in the South African context as “a body of knowledge embedded in African philosophical thinking and social practices that have evolved over thousands of years” (Department of Education 2003a: 9). Teachers are called upon to recognize and incorporate both western ways of knowing and indigenous knowledge systems in planning the learning programmes (Le Grange & Beets 2005).

³⁷ Education *about* the environment consists of educational programmes that are designed to provide information regarding the environment and the goal is to enable the students to obtain knowledge about the environment (Lucas 1972).

The content can be organized using either the regional studies or the thematic studies perspective. Within the thematic studies perspective, teachers can select one of the following options: the systematic approach³⁸ (see also Section 2.6.5.5), the systems approach³⁹ (see also Section 2.1) or the issues-based approach⁴⁰ (Department of Education 2003b; IGU-CGE 1992). The issues-based approach is recommended because it promotes active learning and critical thinking through the enquiry method (see also Section 2.6.4). Furthermore, the issues-based approach enables the teaching and learning of environmental themes incorporated in the curriculum to be dealt with more effectively. The enquiry method provides opportunities for students to ask questions, acquire information, organize and analyse it and then obtain answers to the issues being investigated (Department of Education 2003b; IGU-CGE 1992). The teaching and learning process could also result in the consideration of solutions or action being taken on some of the environmental issues (Corney & Middleton 1996; Tilbury 1997). According to the Department of Education (2003b: 12):

The issues-based approach enables the geographer to focus on a specific issue in a natural, built or social environment in a locational (place or regional) context. A well-developed geographical understanding of these issues can result only from a process of enquiry in which questions are asked, evidence is examined and conclusions are reached. The enquiry method provides learners with ways of thinking critically and creatively about the problems or issues they study (e.g. the impact of HIV/AIDS on population dynamics, environmental quality, socio-economic disparities, hazards and disasters, poverty and resource management in a country).

Fieldwork is an integral part of the enquiry method because students have to go out and find information on questions which they ask relating to particular environmental issues (Boardman 1986; Naish, Rawling & Hart 2002). The issues-based approach and the enquiry method create opportunities for values education (Boardman 1986). The learning of values can be achieved through the teaching and learning of environmental education and education for sustainable development through the school geography curriculum.

2.8 SUMMARY

Geography academics have experienced difficulties in providing universally acceptable definitions of the discipline because of its pluralistic and interdisciplinary nature. There is a general consensus,

³⁸ This approach enables the geographer to understand phenomena (physical and human) and their resultant patterns and impacts in a systematic way e.g. tropical cyclones, natural hazards, urbanization in a place or region (Department of Education 2003b: 12).

³⁹ The approach enables the geographer to understand the wholeness of the environment and the interdependence of its individual components (Department of Education 2003b: 12).

⁴⁰ The geographer focuses on a specific issue in a natural, built or social environment in a locational context (Department of Education 2003b: 12).

however, that the study of place, space, environment and the earth are the core themes that distinguish geography from other disciplines. The Kuhnian model has been used to show that geography has undergone epistemological and methodological changes since the time it was first institutionalized. These changes have resulted in the disintegration of the discipline into physical geography and human geography. On one hand, the physical geography sub-disciplines have borrowed their epistemology and methodology from the hard sciences. On the other hand, human geography has drawn much closer to the softer social sciences. The adoption of different paradigms in human geography has implications not only on how human-environment relationships are dealt with, but also on how environmental problems can be addressed. An integrated approach that combines physical and human geography is seen as the most appropriate manner in which to address environmental problems.

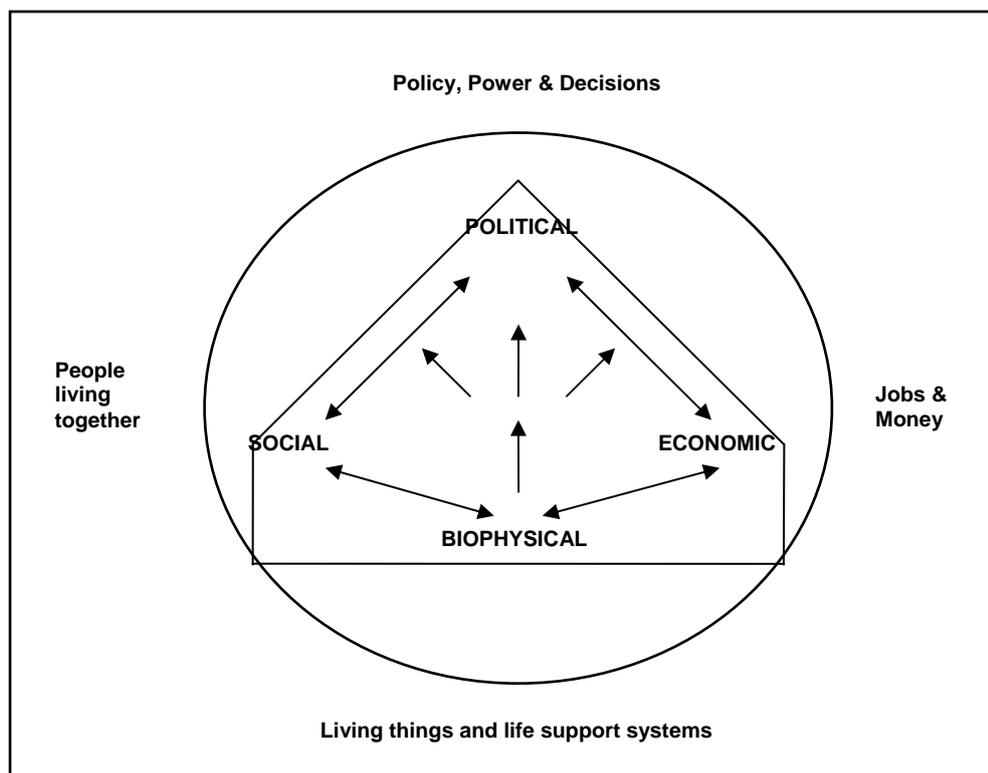
Changes in academic geography have influenced the content of school geography as well as the pedagogical approaches used by teachers. The teaching of a large quantity of examination-oriented, disconnected facts in school geography was replaced with the teaching of knowledge, skills, attitudes and values by increasing the EE and ESD content in the curriculum. The former was achieved through transmissive teaching styles whereas the latter could be accomplished through learner-centred pedagogical approaches that promote active learning such as enquiry learning.

CHAPTER 3: ENVIRONMENTAL EDUCATION / EDUCATION FOR SUSTAINABLE DEVELOPMENT

In Chapter 2, I dealt with geography, the vehicle for teaching environmental education and education for sustainable development. I showed how geography academics and teachers have tried to tackle environmental problems through a rapidly changing discipline. In this chapter I trace the history of environmental education up to its institutionalization in formal education. I also deal with the barriers in different contexts that hinder attempts to implement it in formal education. I have tried to specifically focus on South Africa which is the context of this research project. Because this research focuses on the teaching of environmental education and education for sustainable development through the geography curriculum, I also review literature on the incorporation of environmental education in geography education towards the end of the Chapter.

3.1 HISTORY OF EE

According to Cowie (1997), the EE concept has evolved in tandem with the concept of environment. Initially, the general perception was that the environment consisted only of the natural or biophysical component that excluded the impact of the human dimension (Le Grange & Reddy 2008; Reddy 2008). Janse van Rensburg (1995) cited in Le Grange & Reddy (2008) criticizes early approaches to environmental education for showing a narrow view of the environment; failure to grasp the nature of the crisis and lack of understanding of the actions to be taken. Currently the environment is perceived as being much broader, and encompassing four dimensions (see Figure 3.1). According to O'Donoghue (1993), these dimensions are part of the environment in its totality – the biophysical, social, economic and political dimensions which interact with one another. The biophysical environment provides the life-support base for all human activities. The interaction between the various dimensions, as indicated in Figure 3.1, often results in negative impacts which may be clearly manifested in the condition of the biophysical environment (Reddy 2011). The deteriorating condition of the biophysical component will in turn negatively affect the other three components (social, political and economic). The survival of humans on earth can be eventually threatened as a result of the destruction of the biophysical dimension of the environment (Rosenberg 2009). As the conception of environment became broader, the scope of EE correspondingly widened as enunciated in the UNESCO-UNEP *Tbilisi Principles* (UNESCO 1978).



Source: O'Donoghue (1993)

Figure 3.1 Components of the environment

The worsening state of the global environment (De Beer, Dreyer & Loubser 2005) described in the opening paragraph (Chapter 1) spurred scientists to lobby for increased environmental protection. One of the responses to the environmental crisis is education (Greenall 1987; Le Grange & Reddy 2008; Reddy 2008). The identification of the need to educate people to care for the environment has resulted in the growth of environmental education.

3.1.1 The origins of EE

According to Gough (1997) and Palmer (1997), EE developed in the 1960s. The environmentalism movement grew as a result of the realization that there was a looming environmental crisis characterized by, among other problems, "increasing contamination of land, air and water, the growth in world population and the continuing depletion of natural resources" (Gough 1997: 2). In the forefront of the environmentalism movement were scientists such as Rachel Carson (1962) (see also Section 2.3), who called for more information on the environment and for education to promote increased awareness of environmental problems during that time (Gough 1997; 2006b; Stevenson 1987; Vogel 1992). Patrick Geddes (1854-1933), a botanist, is believed to be the founder of EE as we currently understand it (Irwin & Lotz-Sisitka 2005). While Geddes's colleagues viewed the environment as consisting only of the rural natural environment, he had a broader and more holistic view of it that included the man-

made environment. Geddes also contributed some ideas to the educational methodology that is currently used.

Gough (1997; 2006b) points out that there was a general perception that science and technology could provide solutions to environmental problems. “These environmental problems were often seen as scientific problems which science and technology could solve, but increasingly even the scientists themselves were arguing that science and technology were not enough” (Gough 2006b: 71). Boyden (1970) disagreed with the view that science and technology could provide solutions to environmental problems in the statement:

The suggestion that all our problems will be solved through further scientific research is not only foolish, but in fact dangerous ... the environmental changes of our time have arisen out of the tremendous intensification of the interaction between cultural and natural processes. They can neither be considered as problems to be left to the natural scientists, nor as problems to be left to those concerned professionally with the phenomena of culture ... all sections of the community have a role to play, certain key groups have, at the present time, a special responsibility (Boyden 1970) cited in Gough (1997: 3).

In line with the views of other scientists during that time, Boyden (1970) appealed to educational institutions to take the lead in launching programmes to make students aware of the environmental problems. There was a tacit understanding that science education should be used as a vehicle for creating environmental awareness among students (Gough 1997). However, Palmer (1997: 6) opposes this attitude. She argues “that EE does not lie exclusively in the field of science education ... and should not be an adopted child of this field ...” This implies that most disciplines / school subjects such as geography can be used as vehicles to teach environmental education. Where did the term environmental education originate?

According to Wheeler (1975), cited in Gough (1997; 2006b), the term environmental education was first used in the United States and in Britain. Disinger (1983) and Tilbury (1997) state that the term was first used in 1948 at a meeting of the International Union for the Conservation of Nature and Natural Resources (IUCN) in Paris. However, EE under a different name, such as ecology or nature study, had been taught in the United States since the beginning of the 20th century (Terry 1971) cited by Gough (1997). Stevenson (1987: 69) explains that the main purpose of nature study was “to develop an understanding and appreciation of the natural environment through first hand observation.” In the late 1960s to early 1970s, the conception of EE was rather narrow due to the fact that people still had a very narrow view of the environment (see Section 3.1). The EE programmes involved an incorporation of studies on the biophysical environment (ecology) into the education curricula as well as “promoting

technical training and general awareness of environmental problems” (Gough 1997: 6). EE took the form of conservation education. According to Irwin & Lotz-Sisitka (2005: 39), environmental organizations worked with rather “limiting concepts and terms such as ‘conservation awareness’, ‘environmental awareness’, and ‘conservation education’ to describe what they were doing” before the term environmental education was adopted.

3.1.1.1 Defining environmental education

With regards to the nature of EE during this time, Gough (1997; 2006b) notes that there were concerns that the EE discourse was vague and so in an effort to clarify the EE field, a number of definitions were proposed. Stapp et al (1969) provide one of the definitions of EE (see section 1.1.1). They also list four objectives of EE which are to help individuals to acquire:

1. a clear understanding that man is an inseparable part of a system, consisting of man, culture, and the biophysical environment, and that man has the ability to alter interrelationships of this system;
2. a broad understanding of the biophysical environment, both natural and man-made, and its role in contemporary society;
3. a fundamental understanding of biophysical environmental problems confronting man, how these problems can be solved, and responsibility of citizens and government to work towards their solution; and,
4. attitudes of concern for the quality of the biophysical environment which will motivate citizens to participate in biophysical environmental problem-solving (Stapp et al 1969: 31) cited in Gough (1997: 7).

These objectives place a greater emphasis on addressing problems related to the biophysical environment more than on other human dimensions; the social, economic and political. The EE programmes focus more on environmental awareness and conservation education so as to promote the preservation and conservation of natural resources. The human agent as the main cause of environmental degradation is largely ignored. During this period, environmental education promoted a reactive approach characterized by technical solutions to environmental problems during the era of modernity (Sauvé 1999). Furthermore, the objectives reflect conservationist and problem-solving currents in environmental education, as noted by Sauvé (2005).

Another popular definition of EE was provided by IUCN (1970) (see Section 1.1.1) but not all academics involved in the EE discourse accept the definition. Linke (1977: 12) cited in Greenall (1987) comments: unless environmental education “is defined in a practical way which is accepted by teachers and those who administer education it cannot command a place in the formal curriculum ... and can have no continuing academic identity.” Lucas’s (1972) contribution to the EE discourse helped to provide greater clarity on the nature of EE.

3.1.1.2 Approaches to environmental education

Lucas (1972), in his doctoral dissertation entitled *Environmental education: Conceptual issues and curriculum implications*, proposed a framework for classifying environmental education programmes; education *about*, *for* and *in* the environment. His aim was to clarify the EE concept because he felt that it was ambiguous. The first two, education *about* and *for* the environment, are goal orientated whereas the last one education *in* the environment is a pedagogical approach.

In the case of education *about* the environment, the educational programmes are designed to provide information regarding the environment and the goal is to enable the students to obtain knowledge about the environment. According to Lucas (1972), the programme objectives are “cognitive.” Lucas maintains that students may achieve varying levels of cognition in learning about the environment according to Bloom’s taxonomy (Bloom et al 1974):

Students may be expected to comprehend and interpret environmental data; to analyse environmental situations into the component principles; to synthesise explanations likely to account for an environmental phenomenon that is new to the student; and to evaluate environmental data and phenomena, and, perhaps, the consequences of proposed manipulations in terms of the likely environmental responses (Lucas 1972: 102).

Additionally, Lucas (1972) observes that education *about* the environment also involves the teaching and learning of skills that enable the student to “investigate the nature of the environment.” According to Fien (1993: 15), education *about* the environment is concerned with “knowledge about natural systems and processes and the ecological, economic and political factors that influence decisions about how people use the environment.”

Examples of education *in* the environment include outdoor education programmes and any other educational programmes that take place in the environment (Lucas 1972). Fien (1993: 15-16) maintains that:

“Education through (in) the environment uses pupils’ experiences in the environment as a medium for education. The aims of this learner-centred approach to environmental education are to add reality, relevance and practical experience to learning and to provide pupils with an appreciation of the environment through direct contact with it ... it may also foster environmental concern if pupils become captivated by the importance and fragility of ecosystems ... or immersed in the values conflict over an environmental issue.”

Education *for* the environment covers programmes that “aim to assist the preservation or improvement of the environment for a particular purpose” and are designed to teach skills, as well as positive attitudes, values and behaviour towards the environment. Lucas (1972: 106) argues: “since the goal of education *for* the environment is to produce a ‘quality’ environment, citizens must be provided with the skills that are necessary to achieve this end.” Fien (1993: 16) supports Lucas’s explanation of education *for* the environment but adds that it should have a transformative nature in the statement:

Education *for* the environment has an overt agenda of values education and social change. It aims to engage pupils in the exploration and resolution of environmental issues in order to ... promote lifestyles that are compatible with the sustainable and equitable use of resources. In doing so it builds on education *about* and *through* the environment to help develop an informed concern for the environment, a sensitive environmental ethic, and the skills for participating in environmental protection and improvement.

A number of authors regard Lucas’s (1972) classification of EE programmes as useful (Fien 1993; Huckle 1983; Lee & Williams 2001; Robottom 1987). Robottom (1987) argues that education *in* and *about* the environment help to maintain the status quo with regards to unsustainable lifestyles whereas education *for* the environment is more transformative. Linke (1980) and Greenall (1980), cited by Jickling & Spork (1998), categorically state that education *for* the environment is environmental education whereas education *in* or *about* the environment cannot be called environmental education. Jickling & Spork (1998) also acknowledge the value of the Lucas’s (1972) EE categories and point out that the “activities called education *for* the environment” have helped EE practitioners to focus on the political dimension of issues as well and to clarify the socially critical aspect of environmental education.

There are however, some dissenting voices in the literature concerning Lucas’s (1972) classification of EE into education *in*, *about* and *for* the environment. Gough (1997) disapproves of the uncritical acceptance of this classification of EE. She observes that these categories have become “common slogans of the environmental education movement” (Gough 1997: xi). Jickling & Spork (1998 323) maintain that the term education *for* the environment “reflects ... the values and predilections of activists more than those of educators” and that “continued popular use of the term runs the risk of encouraging non-educative activities and alienating those whose interests are most obviously threatened.” Additionally, they argue that it is limiting and tends to hamper new developments in the EE discourse (Jickling 1997; Jickling & Spork 1998).

Huckle (1993: 63) and Fien (1993), using Habermas’s (1972) work on the *Theory of knowledge-constitutive interests*, argue that the positivist, interpretive and critical paradigms have influenced the three approaches to EE discussed above. Education *about* the environment is viewed as *education for*

environmental management and control. It is based on the positivist epistemology and its goal is technical control. Education *in* the environment, founded on the interpretive epistemology, “serves the practical human interest.” This approach is called *education for environmental awareness and interpretation* because it promotes environmental awareness and the understanding of the natural systems. Education *about* and *in* the environment, which tend to maintain the status quo with regards to unsustainable lifestyles, are believed to be the dominant education practices around the world (Robottom 1987). Lastly, education *for* the environment or *education for sustainability* is founded on critical science. The aim of *education for sustainability* is social emancipation; it is socially critical and has a transformative agenda on the society. In other words, it aims to expose political and economic pressures that harm the environment and tries to promote more sustainable lifestyles (Fien 1993).

I do not agree with the academics such as Greenall (1980) and Linke (1980), who only consider education *for* the environment as being environmental education, but reject education *about* and *in* the environment. When EE in the form of education *about*, *in* and *for* the environment is implemented through the school curriculum, the teaching and learning of knowledge, skills, attitudes and values is likely to be more effectively achieved. According to Palmer (1997) and Corney & Middleton’s (1996), these three elements, education *about*, *in* and *for* the environment, are essential in designing EE programmes in the school curriculum. Additionally, Fien (1993) argues that education *for* the environment “builds on education *about* and *through* the environment to help develop an informed concern for the environment, a sensitive environmental ethic, and the skills for participating in environmental protection and improvement.” Lucas’s (1972) contribution on education *about*, *in* and *for* the environment is quite significant in that it has helped to clarify an EE field that tends to be diffuse and nebulous at times.

Important milestones were reached in the environmentalism movement in an effort to respond to the environmental crisis (see also Section 2.3). These milestones have helped to shape the nature of EE, its scope and implementation strategies.

3.1.2 Milestones in the history of EE

The United Nations Conference on the Human Environment convened the first world environmental conference in 1972 in Stockholm. The conference accepted the importance of education to promote a caring attitude towards the environment (Gough 1997; 2006b). One of the most important outcomes of this conference was the establishment of the United Nations Environment Programme (UNEP) (Gough 1997; 2006b; Irwin & Lotz-Sisitka 2005; Reddy 2008). UNEP was assigned the task of “establishing the term ‘environmental education’ as opposed to other terms, as the internationally accepted norm and the conceptual framework within which further development could take place” (Irwin & Lotz-Sisitka

2005: 40). UNESCO and UNEP convened the first international workshop on Environmental Education in Belgrade in 1975 (UNESCO 1978). The workshop produced *The Belgrade Charter* considered as a “world-wide strategy” for EE (Cowie 1997).

The next major event, the first Intergovernmental Conference on Environmental Education, was held in Tbilisi in 1977. The main outcome of this conference was the *Tbilisi Principles of Environmental Education* (UNESCO 1978) (see Box 3.1) which would be used as a framework and guidelines for implementing EE world-wide (Irwin & Lotz-Sisitka 2005).

Additionally, Cowie (1997) notes that the Tbilisi conference took cognizance of the problem of incorporating an interdisciplinary subject in a formal schooling system that was “disciplinary and thus fragmented”. The idea of a problem-oriented approach to EE was emphasized. Furthermore, Robottom (1987) cited by Cowie (1997) noted the tendency for environmental concerns to focus more on the biophysical environment than the human dimension.

The goals and objectives of EE from the Tbilisi conference (UNESCO 1978: 26-27) are set out in the next paragraph.

1. The goals of environmental education are:

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

2. The categories of environmental education objectives are:

- **Awareness:** to help social groups and individuals acquire an awareness of and sensitivity to the total environment and its allied problems.
- **Knowledge:** to help social groups and individuals gain a variety of experience 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 towards the resolution of environmental problems.

In the implementation of environmental education in formal education, curriculum planners and teachers should ensure that they incorporate the above objectives through which the long term goals of

environmental education can be achieved. In short, environmental education programmes should impart knowledge, skills, attitudes and values required for more sustainable lifestyles or for positive environmental behaviour.

Box 3.1**THE TBILISI PRINCIPLES OF ENVIRONMENTAL EDUCATION**

Environmental education should:

1. consider the environment in its totality – natural and built, technological and social (economic, political, cultural-historical, moral, aesthetic);
2. be a continuous lifelong process, beginning at the preschool level and continuing through all formal and non-formal stages;
3. be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;
4. examine major environmental issues from local, national, regional and international points of view so that students receive insights into environmental conditions in other geographical areas;
5. focus on current and potential environmental situations while taking into account the historical perspective;
6. promote the value of and necessity for local, national and international cooperation in the prevention and solution of environmental problems;
7. explicitly consider environmental aspects in plans for development and growth;
8. enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;
9. 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;
10. help learners to discover the symptoms and real causes of environmental problems;
11. emphasise the complexity of environmental problems and thus the need to develop critical thinking and problem solving-skills; and,
12. 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.

Source: UNESCO-UNEP (1978)

According to Reddy (2008), the three conferences dealt with above were part of the UNESCO/UNEP international environmental education programme of the 1970s decade. There were a number of events in the 1980s, which had a bearing on the EE discourse. The World Conservation Strategy, produced by IUCN/ UNEP/ WWF (1980), stimulated the formulation of national and local conservation strategies globally (Gough 2006b). Irwin & Lotz-Sisitka (2005) state that the World Conservation Strategy was updated in 1991 and published as *Caring for the Earth: A strategy for sustainable living*. The authors observe that the two documents stress the role of environmental education in conservation and the promotion of sustainable use of natural resources. The International Conference on Environmental Education held in Moscow in 1987 declared that the *Tbilisi Principles* were “sound guidelines for the development of national environmental education programmes” (Irwin & Lotz-Sisitka 2005; Reddy 2008).

The World Commission on Environment and Development (WCED) published a report entitled *Our Common Future*, or the *Brundtland Report* (WCED 1987). This report popularized the highly contested concept of sustainable development (see Section 1.1.2) which is expanded in the document, *Caring for the Earth*, and dominated proceedings in the Rio Earth Summit (Irwin & Lotz-Sisitka 2005). The EE discourse began to be influenced by the sustainable development concept during the 1980s (see Section 1.1.2) (Gough 1997; Irwin & Lotz-Sisitka 2005; Palmer 1997). Gough (1997) notices the use of the term “education for sustainable development” in place of “education for the environment” in a number of documents dealing with the environmental education discourse in the 1990s. Illustrations of this trend, observed by Gough (1997), include the documents - *Caring for the Earth: A strategy for sustainable living* (IUCN 1991) and Chapter 36 (Para 2) in *Agenda 21* (UNCED 1992). The latter calls on governments to reorient “education towards sustainable development.”

According to Reddy (2008), the most important environmental education event in the 1990s was the first Earth Summit, the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in 1992. Irwin & Lotz-Sisitka (2005) observe that environmental education was prominent in the agenda of the Earth Summit. Its role as an “educational response to the environmental crisis” was emphasized. One of the main documents produced in the conference was *Agenda 21*, which outlined a programme of action to be implemented by governments to protect the environment. *Agenda 21* “defines sustainable development” and provides a “blue print for change” (Brack, Calder & Dolun 2001: 1). The importance of environmental education is covered in Chapter 36 of *Agenda 21*. Environmental education is described as those practices that involve teachers and learners in “promoting sustainable development and improving the capacity of people to address environment and development issues” (UNCED 1992, Chapter 36: 2) cited by Irwin & Lotz-Sisitka (2005: 42).

Another development at the Rio Earth Summit was the contribution of NGOs to the EE discourse. The meeting of the International Forum of NGOs and Social Movements adopted a *Treaty on Environmental Education for Sustainable Societies*. A set of principles was formulated as part of the treaty (see Box 3.2).

Gough (1997: 35) observes that some of the NGO Forum Principles significantly differ from the *Tbilisi Principles* in that they offer “a much more holistic view of education that is socially critical and reconstructionist and Gaian in approach.” Lotz-Sisitka (2002: 100) agrees with Gough and observes that *Agenda 21* and the *Treaty on Environmental Education for Sustainable Societies* describes EE as a “transformative, continuous learning process based on respect for all life.”

Box 3.2**THE NGO FORUM PRINCIPLES**

Some principles of environmental education for equitable and sustainable societies:

1. Education is the right of all; we are all learners and educators.
2. Environmental education, whether formal, non-formal or informal should be grounded in critical and innovative thinking in any place or time, promoting the transformation and construction of society.
3. Environmental education is both individual and collective. It aims to develop local and global citizenship with respect for self-determination and the sovereignty of nations.
4. Environmental education is not neutral but is value-based. It is an act of social transformation.
5. Environmental education must involve a holistic approach and thus an inter-disciplinary focus in the relation between human beings, nature and the universe.
6. Environmental education must stimulate solidarity, equality, and respect for human rights involving democratic strategies and an open climate of cultural interchange.
7. Environmental education should treat critical global issues, their causes and interrelationship in a systematic approach and within their social and historical contexts. Fundamental issues in relation to development and the environment such as population, health, peace, human rights, democracy, hunger, degradation of flora and fauna, should be perceived in this manner.
8. Environmental education must facilitate equal partnerships in the process of decision making at all levels and stages.
9. Environmental education must recover, recognize, respect, reflect and utilise indigenous history and local cultures, as well as promote cultural, linguistic and ecological diversity. This implies acknowledging the historical perspective of native peoples as a way to change ethnocentric approaches, as well as the encouragement of bilingual education.
10. Environmental education should empower all peoples and promote opportunities for grassroots democratic change and participation. This means that communities must regain control of their own destinies.
11. Environmental education values all the different forms of knowledge. Knowledge is diverse, cumulative and socially produced and should not be patented or monopolized.
12. Environmental education must be designed to enable people to manage conflicts in just and humane ways.
13. Environmental education must stimulate dialogue and cooperation among individuals and institutions in order to create new lifestyles which are based on meeting everyone's basic needs, regardless of ethnic, gender, age, religious, class, physical or mental differences.
14. Environmental education requires a democratization of the mass media and its commitment to the interests of all sectors of society. Communication is an inalienable right and the mass media must be transformed into one of the main channels of education, not only by disseminating information on an egalitarian basis, but also through exchange of means, values and experiences.
15. Environmental education must integrate knowledge, skills, values, attitudes and actions. It should convert every opportunity into an educational experience for sustainable societies.
16. Education must help develop an ethical awareness of all forms of life with which humans share this planet, respect all life cycles and impose limits on humans' exploitation of other forms of life.

Source: Irwin & Lotz-Sisitka (2005: 43-44)

Irwin & Lotz-Sisitka (2005: 44-45) made the following comments on transformative feature of the NGO Forum Principles:

These principles show greater concern for issues of social justice, equity, democracy and social transformation. For example, the principle that "we are all learners and educators" highlights the fact that we are all able to learn from each other. Other principles support a

dynamic and open climate of cultural interchange and the need to consider social and historical contexts of environmental issues and create the openings in environmental education for recognition of diverse cultural values, indigenous knowledge, environmental education processes, and a deeper understanding of the root causes of environmental issues. The principles also create a more democratic framework for educational processes, which are aimed at promoting the transformation and construction of societies, recognizing different value orientations and the stimulation of dialogue and cooperation among individuals and institutions. The NGO Forum Principles also recognize the socially constructed nature of knowledge ... as well as the need to promote cultural, linguistic and ecological diversity.

Le Grange & Reddy (2008) make a similar observation that the NGO Forum Principles are value-based in that they call for transformation of society whereas the Tbilisi Principles are value-neutral. Furthermore, the view of environmental education according to the NGO Forum Principles contrasts sharply with the one suggested in UNCED's (1992) *Agenda 21*, Chapter 36. The latter presents a technocentric perspective that accommodates development and EE is given an instrumental role to achieve the goals (Gough 1997).

The Rio Earth Summit was followed in 2002 by the World Summit on Sustainable Development (WSSD) in Johannesburg (Gough 2006b; Reddy 2008). The WSSD is also referred to as the Rio+10 summit because it was organized in order to review progress on the implementation of the programme of action set out in *Agenda 21* at the Rio Earth Summit in 1992 (Brack, Calder & Dolun 2001). WSSD also noted the importance of education for the achievement of sustainable development (Gough 2006b). After the WSSD, the scope of EE becomes broader than how it is envisaged in *Agenda 21*. According to UNESCO (2004: 7), cited in Gough (2006b), it includes "social justice and the fight against poverty as key principles of development that is sustainable." Another important development was that the DESD from 2005–2014 was proposed, discussed and adopted (see Section 1.1.4). According to Reddy (2008: 169), the DESD "is the driving force for Environmental Education (EE) at the moment and South Africa is a signatory to the United Nations' declared decade."

According to Irwin & Lotz-Sisitka (2005), one of the main impacts of the milestones dealt with above is the promotion of an "integrated" and "holistic form of environmental education." Furthermore, the milestones reaffirm the scope of EE, that it encompasses the interaction between the social, economic, political and ecological dimensions. This view of EE calls for a more holistic educational approach (Cowie 1997). Additionally, Palmer (1997) observes that governments have used the definitions, objectives and principles from documents such as the *The Belgrade Charter*, *The Tbilisi Declaration*, *The World Conservation Strategy*, *Our Common Future* and *Agenda 21* to develop EE "policies, programmes and resources" at national and community level.

The focus now shifts to the South African context where I trace the development of environmental education from conservation education. I also show how international developments helped to shape the scope of environmental education in the country. Additionally, I mainly focus on environmental education initiatives up to the early 1990s before it was widely institutionalized in formal education.

3.2 THE DEVELOPMENT OF ENVIRONMENTAL EDUCATION IN SOUTH AFRICA

Ballantyne & Oelofse (1989) point out that the history of environmental education in South Africa has been covered in detail by Irwin (1984) and Hurry (1987a). EE in its current form was adopted in South Africa in the mid-1970s as a result of the impact of the 1975 *Belgrade Charter* and the 1977 *Tbilisi Principles* (Cowie 1997; Hurry 1987b; Irwin & Lotz-Sisitka 2005). Furthermore, the NGO Forum principles have influenced South African EE practitioners because of their concerns about social justice, equity, democracy and transformation (Lotz-Sisitka 2002).

Before this, the environmental crisis was addressed through conservation education (Clacherty 1994; Hurry 1987a) defined as “the wise use of natural resources” (Irwin & Lotz-Sisitka 2005: 47). Conservation education is based on a narrow conception of the environment that only encompasses the biophysical environment (ecology and ecological processes) (see Section 3.1). According to Irwin (1981), cited by Clacherty (1994), conservation education was implemented in order to allay middle class fears concerning the possible loss of land for hunting or recreation and loss of species, especially large animals. Additionally, farmers were concerned about the loss of productive agricultural land as a result of erosion (Ballantyne & Oelofse 1989). Conservation education was later absorbed into environmental education and has become an integral part of it (Cowie 1997).

However, in South Africa and in other countries such as the US, environmental education in the early 1980s was often confused with the concept of outdoor education, “focusing on out-of-doors activities” geared towards the study of nature. The promotion of the concept of outdoor education in place of environmental education is viewed by Irwin & Lotz-Sisitka (2005) as an attempt by conservative educationists to narrow the scope of EE through the removal of the socio-political dimension which they were uncomfortable with. In the early 1990s, Clacherty (1994: 57) observes a trend towards “a more holistic approach to environmental education and the conservation of natural resources and habitats”. Institutions were set up to develop EE in South Africa.

The first international conference on EE in South Africa was held in 1982 at Treverton College, Mooi River, in Natal (Cowie 1997; Irwin & Lotz-Sisitka 2005). A wide range of South African stakeholders involved in EE met with representatives from other continents for the first time. One of the main outcomes of the conference was the launching of the Environmental Education Association of Southern

Africa (EEASA), which plays a “significant catalytic, developmental and coordinating role in the growth of environmental education” in Southern Africa (Irwin & Lotz-Sisitka 2005: 48). EEASA first launched its journal, *Southern African Journal of Environmental Education*, in 1984 and the *Environmental Education Bulletin* in 1988.

NGOs such as the Wilderness Leadership School and the Wildlife Society of South Africa (WESSA) have also played an important role in the practice of EE. According to Irwin & Lotz-Sisitka (2005: 48), these NGOs had already started teaching and practising conservation education by the 1960s. Umgeni Valley Project (UVP), established by WESSA, has also greatly contributed to the development of EE theory and practice in South Africa. Conservation education provided by NGOs was often in the form of authoritarian, top-down approaches and single event experiences designed to create environmental awareness (Clacherty 1994). O’Donoghue (1994: 65) is critical of such approaches to environmental education. He comments:

These approaches share a modernist underpinning which assumes that the transfer of information and the successful implementation of nature-experience activities will change the awareness, values and behaviour of a particular school and community target groups. This domination by a functionalist outlook has framed environmental education in this rational interventionist manner.

The Southern African Development Community Regional Environmental Education Programme (SADC-REEP) is based in UVP. UVP’s success in promoting EE can be attributed to the support from the Natal Education Department and Natal Parks Board which embraced EE more than other provincial government departments and conservation agencies (Irwin & Lotz-Sisitka 2005). According to Clacherty (1994), national government’s role in the development of EE during this time was rather limited.

However, a notable contribution of the government in this regard was the enactment of soil conservation legislation, for example, the *Environment Conservation Act of 1982* (Clacherty 1994). The Cabinet Committee on Environmental Conservation, established in 1972, was the first government body to outline the role of environmental education in achieving conservation goals and to promote the need for conservation (Ballantyne & Oelofse 1989). Furthermore, in 1989 the White Paper on Environmental Education, drafted by the Department of Environmental Affairs, was presented before parliament for discussion. The White Paper included the *Tbilisi Principles* and the concept of EE as it was known during that time (Ballantyne & Oelofse 1989). Clacherty’s (1994) criticism of the White Paper was that it omitted two of the most important *Tbilisi Principles*:

Environmental education should ... help learners to discover the symptoms and real causes of environmental problems; (and should) emphasise the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills (UNESCO-UNEP 1978: 3) cited in Clacherty (1994).

O'Donoghue (1994) criticizes the White Paper for decontextualising the environmental crisis by failing to link it with the historical socio-political conditions. Unfortunately, the conservative sections of the South African education community rejected the White Paper on Environmental Education. Other groups did not accept the White Paper on the grounds that they had been excluded from contributing their ideas during its development. Because of the controversy surrounding its drafting, the White Paper on Environmental Education was never enacted into law (Lotz-Sisitka 2002). Its impact was therefore limited (Irwin & Lotz-Sisitka 2005).

At the inception of democracy rule, efforts to transform the society in post-apartheid South Africa resulted in the formulation of national policy frameworks that have generally been conducive to the institutionalisation and implementation of environmental education in formal education (Le Grange 2002). The right of every citizen to enjoy a healthy environment is enshrined in the Bill of Rights in the Constitution of the Republic of South Africa (South Africa 1996a). Other policy documents which supported the development of environmental education are the Reconstruction and Development Programme (ANC 1994), the White Paper on Education and Training (South Africa 1995) and the White Paper on Environmental Management (South Africa 1997).

With regards to the institutionalization of environmental education in formal education, the Tbilisi and NGO Forum principles have been used as guidelines. In the next section, I deal with the implementation of environmental education in the school curriculum. The implementation of EE in formal education has been fraught with difficulties internationally. I elaborate on these difficulties in sections 3.3.3, 3.3.4 and 3.3.5.

3.3 IMPLEMENTING ENVIRONMENTAL EDUCATION IN THE SECONDARY SCHOOL CURRICULUM

In the institutionalization of EE in secondary schools, tensions have been experienced between maintaining its holistic nature and the school curriculum that is organized into fragmented disciplines. The aims of school education often clash with the goals of environmental education (see Buzhar 2004; Lam 2007; Lee 2000; Le Grange & Reddy 1997; Stevenson 1987). A number of models have been tried in an effort to incorporate EE in the secondary school curriculum.

3.3.1 Incorporation of EE in the secondary school curriculum

UNESCO (1977) proposed a number of models through which EE could be incorporated into the secondary school curriculum. In the first option, EE could be introduced as a separate subject called Environmental Studies whose status would be equal to that of the other examinable subjects. The subject could be taught by trained teachers. This option ensures that EE is not marginalized as often happens in the infusion model. The main objection of education authorities to this proposal has been that school curricula are already too overcrowded to accommodate more subjects. The other disadvantage is that the goals of teaching other subjects might clash with the EE aims, resulting in the trivialization of the latter. The introduction of Environmental Studies was tried in the UK with limited success because the subject failed to compete with established, overlapping subjects such as geography and biology (Goodson 1987; 1993; 1996).

The second option is that EE could be implemented in the form of environmental themes in vehicle subjects such as geography, history, biology, physics and other science subjects. According to Knapp (2000: 36), this option involves a block approach “in which separate and distinct environmental education courses are offered.” The main disadvantage of this option is that the effective teaching of the environmental themes would depend on the personal commitment and competence of the teachers. Additionally, the themes covered might not have any direct relationship with local environmental issues.

The third option is the integration or infusion of EE into carrier subjects such as science, geography and history. The second and third options are interdisciplinary approaches. According to the Tbilisi principles (UNESCO 1978) (see Box 3.1) and NGO Forum principles (Irwin & Lotz-Sisitka 2005) (see Box 3.2), EE in the school curriculum should be interdisciplinary. This means that the environmental themes and concepts which are integrated or infused in different subjects at secondary school level can be studied from different perspectives, for example science, geography, history etc (Loubser 1997). The perspectives from different subjects are likely to give a holistic approach to each environmental issue. Palmer (1997) observes that the teaching of such subjects as geography, geology, biology, physics and chemistry give students the ecological perspective. However, teaching EE within school subjects tends to fragment the EE concepts, making it difficult to implement the holistic perspective and to achieve values education (Tilbury, Coleman & Garlick 2005).

According to UNESCO (1977), the most effective model involves a complete overhaul of the curriculum. Curriculum change could include the introduction of new content that incorporates EE concepts, practical work and pedagogical approaches underpinned by progressive theories of education. For curriculum change to be successful, it could be preceded by research and the testing of the

feasibility of theory through pilot projects in a few schools (UNESCO 1977). The advantage of this model is that it is possible to align curriculum goals with those of education for sustainability (Huckle & Stirling 1996). An illustration of this option is the South African primary and lower secondary education, (GET band Grades R-9), where cross-curricular approaches to teaching and learning content are followed (Loubser 1997). Boundaries between different subjects have been removed to create learning areas. There are thus more opportunities for implementing a holistic approach in the teaching and learning of EE at this level (see also Section 3.3.3) (Le Grange 2003; Mosidi 1998).

3.3.2 Approaches to the teaching and learning of EE

A number of strategies and methods have been suggested for the effective teaching and learning of EE. These are clearly outlined in the Tbilisi and NGO Forum principles (see Section 3.1.2). The interdisciplinary approach is recommended in order to promote the holistic nature of EE. Furthermore, the teaching and learning programmes should integrate knowledge, skills, values, attitudes and actions. A practical approach to problem solving and experiential learning in the local environment are also recommended. The problem-solving approach could help learners to clarify values and to develop and apply critical thinking skills. Additionally, EE lessons should preferably be learner-centred, participatory and flexible so as to encourage democratic processes. This means that some of the issues related to human rights and social justice can be addressed in the teaching and learning programmes. One of the NGO Forum principles is that indigenous knowledge should be tapped and taught in EE lessons so as to introduce a local focus into the learning programmes. The NGO Forum principles go further than the Tbilisi principles in that a socially critical approach to EE is suggested in the second principle: “Environmental education, whether formal, non-formal or informal should be grounded in critical and innovative thinking in any place or time, promoting the transformation and construction of society” (Irwin & Lotz-Sisitka 2005: 43). This view has implications for strategies and methods used by teachers. Sterling (2001), cited by Eames, Cowie & Bolstad (2008: 48) calls for “a significant re-orientation of the pedagogical approaches being used, with greater attention to approaches that are transformative, that give students the tools to live and act sustainably.”

In the South African context, the Environmental Education Policy Initiative (EEPI) endorsed the Tbilisi and NGO Forum principles relating to EE strategies mentioned above. The organization called for a change in teaching and learning strategies from teaching for awareness towards skills and action-based learning in all learning institutions, including teacher education colleges and schools. Clacherty (1995: 15) suggests that pedagogical approaches should shift from transmission of information to “more active participation in learning” and that teaching and learning programmes should have the following characteristics:

- A move towards thinking skills and problem-solving, towards responsibility and awareness of the consequences of actions. Methods should include case studies, issues-based work and practical involvement in real local issues. Such work should ideally reflect the following characteristics:
 - local focus
 - participatory (within and across learning institutions)
 - across boundaries (social, economic, school, college local authority)
 - problem-solving focus
 - involve local community (industry, local authority, civic structures etc)
- Teachers and students should solve problems together; the teacher's role is to create opportunities for such learning. Active learning, as opposed to transmission, should allow students to feel part of the education process; learning to take responsibility for themselves and their actions.
- The overall style should be based on dialogue and interaction, hands-on work, learning in the context of environmental problems, issues and processes (Clacherty 1995: 15).

In addition to the above strategies and methods, Dreyer & Loubser (2005) suggest the use of some of the following techniques in order to promote active learning: questioning, discussions, debates, stories, guest speakers, peer teaching, cooperative group work, experiments, excursions and projects. In Section 2.6.4, I dealt with enquiry learning and showed that it is an appropriate pedagogical approach for teaching EE in school geography because it is learner-centred and encourages active learning. Enquiry learning is recommended for implementing values education. In section 3.3.6, I relate these strategies and methods to geography education that incorporates environmental concerns because this research focuses on the implementation of EE and ESD through the geography curriculum.

Palmer (1997) observes that EE was dominated in the 1970s by teaching about nature using the “show and tell” pedagogical approach which incorporated experiential fieldwork or education *in* the environment. There was an attempt to teach education *for* the environment through values education in the 1980s. In the 1990s “action research and student-led problem-solving fieldwork” have been introduced in order to teach education *for* the environment (Palmer 1997: 6). However, it is an exception rather than the norm for schools to be characterized by the following activities which are a model for education *for* the environment:

- personal involvement of students and emotional commitment;
- interdisciplinary learning and research;
- reflective action to improve environmental conditions; and,
- involvement of students in decision making or problem finding, in procedures, and in monitoring their work (Palmer 1997: 7).

The failure to implement the recommended model of education *for* the environment stated above has been attributed to a number of barriers (see Sections 3.3.3, 3.3.4 and 3.3.5).

The focus now turns to the South African context. Significant progress has been made, towards the institutionalization of EE in formal education, especially at policy level. However, more research is required in order to determine how teachers are implementing policy so as to identify the issues that need to be addressed with regards to the implementation of EE and ESD in formal education. This research on the implementation of EE and ESD in geography education aims to fulfil this need.

3.3.3 The implementation of environmental education in formal education in South Africa

During the period before democracy rule, there was very little environmental education in formal education (Clacherty 1994; Mosidi 1998; Reddy 2000). The subject-based curriculum and transmissive teaching methods (see also Section 2.6.5.1) presented difficulties for the implementation of EE due to its interdisciplinary nature (Ballantyne & Oelofse 1989). Furthermore, the school syllabuses dealt with environmental topics rather than issues, with a “great reliance on the provision of facts about a topic, but very little critical discussion, clarification of values, problem-solving and the like” (Clacherty 1994: 58). In such a scenario, Clacherty argues, the goals of EE cannot be achieved.

An alliance between the state and civil society, known as the Environmental Education Policy Initiative (EEPI), was formed in 1992 in order to develop curriculum policy within formal education.

EEPI adopted a participatory and open-ended approach to curriculum policy development (Clacherty 1994; Lotz-Sisitka 2002). Some of the deliberations and resolutions of EEPI’s National Education Co-ordination Committee (NECC) were included in the 1995 *White Paper on Education and Training* which gives guidelines on curriculum development in EE (Mosidi 1998: 20; Lotz-Sisitka 2002: 105):

...environmental education, involving an interdisciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of education and training system, in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources (South Africa 1995: 18).

The Department of Education thus committed itself to the implementation of EE in formal education as a cross-curricular and interdisciplinary field (Lotz-Sisitka 2002; Mosidi 1998).

In 1996 EEPI eventually became the Environmental Education Curriculum Initiative (EECI), a partnership between the state and civil society, which focused on formal education curriculum policy development (Irwin & Lotz-Sisitka 2005; Lotz-Sisitka 2002; Mosidi 1998). Members of staff from the Department of Environmental Affairs and Tourism, provincial government education departments and environmental education practitioners participated in defining EE in the new outcomes-based education, C2005.

The environment was included as one of the phase organisers as well as in some of the specific outcomes in C2005 (Lotz-Sisitka & Raven 2001). Other phase organisers were society, personal development, health and safety, entrepreneurship and communication. The phase organisers provided “a context and focus through which specific outcomes [could] be achieved at all levels and phases within General Education and Training” (Lotz, Tselane & Wagiet 1998: 5). The inclusion of the environment theme among the phase organisers ensured that environmental education activities would be part of the learning programmes in each of the eight Learning Areas of all the GET phases – Foundation, Intermediate and Senior phases (Le Grange 2002). Thus, a cross-curricular approach to teaching environmental education could now be used. The advantage of a cross-curricular approach is that environmental education can be implemented more holistically, unlike in individual career subjects where environmental themes tend to be fragmented into unrelated environmental knowledge (see also Section 3.3.1).

In section 1.2.2, I explained that the implementation of C2005 which integrated EE was fraught with difficulties. The teachers experienced difficulties in implementing OBE, some of which were related to designing teaching and learning programmes around phase organisers such as environment. The Learning for Sustainability project for the FET band and the National Environmental Education Programme for the GET band (NEEP-GET) were launched in order to resolve the design and implementation problems of the new curriculum. These programmes specifically focused on assisting the teachers to implement EE integrated in the new curriculum.

According to Maila (2003), the Learning for Sustainability project was run by a NGO which was financed by the Danish government through the Danish Cooperation for Environment and Development (DANCED). The Learning for Sustainability project was implemented in only two provinces, Mpumalanga and Gauteng. The project ran for five years from 1996 to 2000 during the period of the development, launching and implementation of the new C2005. This was a pilot project aimed at providing training and support to teachers through INSET programmes. It was meant to help them in the process of designing teaching and learning programmes that integrated the phase organiser environment in the new curriculum. Additionally, teachers would be assisted with developing teaching

and learning materials. According to Janse van Rensburg & Mhoney (2000), the Learning for Sustainability project aimed to:

- facilitate a shift from content-based to an outcomes-based approach to teaching;
- encourage and provide training in learner-centred approaches;
- introduce the action research approach in professional development and in processes of curriculum development and solving curriculum related issues; and,
- promote participatory approaches in the INSET programmes.

The experiences and lessons learnt in this project were applied in the implementation of the NEEP-GET programme (Maila 2003).

Following the recommendations of the Curriculum Review Committee (Chisholm et al 2000) (see also Section 1.2.2), a revised national curriculum document was introduced (Department of Education 2002a). Phase organisers, including “environment”, were removed from the revised curriculum, and this resulted in a number of challenges regarding the integration of environment in the curriculum (Lotz, Tselane & Wagiet 1998). The teachers not only had difficulties in implementing OBE, but they also faced challenges in identifying and interpreting environmental learning opportunities in the policy documents as well as in incorporating environmental education into the teaching and learning programmes. Some of the challenges were related to lack of awareness of appropriate pedagogical approaches recommended for implementing the new curriculum. The National Environmental Education Programme for the GET band (NEEP-GET) was set up in order to address these concerns.

NEEP-GET was set up in the Department of Education to enhance the integration of environmental education in the revised curriculum and to improve the capacity of teachers in Grades R-9 (GET) to implement environmental education incorporated in the OBE curriculum (Wagiet 2002). The NEEP-GET focused on four elements of the implementation cycle, namely: curriculum policy development, materials development, professional development, and school-based implementation. The programme was expected to contribute to the “redesigning” of the curriculum because it was implemented immediately after the review of C2005. The shortage of Learner Support Materials for teaching environmental education would also be addressed, especially in previously disadvantaged schools. In-service Education and Training (INSET) programmes would be conducted in order to improve the capacity of teachers to implement environmental education. The curriculum review committee had identified inadequate training as one of the main challenges facing teachers in the implementation of C2005. The programme encouraged school-based environmental education activities. According to Lotz, Tselane & Wagiet (1998: 5), the teachers were expected to develop school-based learning programs in order “to cater for the learners’ needs, available resources and the local environment.” The

main advantage of school-based learning programs is that they can provide opportunities for teachers and learners to address local environmental issues (Lotz-Sisitka & Raven 2001).

In the Revised National Curriculum Statement, the environment and sustainability are embodied in one of the principles that underpin the curriculum: social justice, a healthy environment, human rights and inclusivity. This principle is infused in all learning area statements as illustrated by the inclusion of issues related to “poverty, inequality, race, gender, age, disability ... HIV/AIDS” in the curriculum (Department of Education 2002a; 10) as well as the condition of the biophysical environment. The environment is incorporated in the learning outcomes and the assessment standards in all the learning areas. As a follow-on of the training that had been conducted through NEEP-GET, guidelines for incorporating environmental learning in the lessons were developed in all Learning Areas and supplied to the teachers (Department of Education 2004; NEEP-GET 2004).

According to Wagiet (2002: 30), the NEEP-GET programme underscored that environmental learning programmes should impart knowledge, skills and values using active learning approaches. Furthermore, the learning programmes should promote critical thinking as well as “involvement and action” in local environmental issues.

In the FET band there is a strong focus on environmental justice (see also Section 2.2.6), infused in all subjects (Lotz-Sisitka 2002). This means that the need to implement EE and ESD has been addressed at policy level at both the GET and the FET band. However, it appears that the Department of Education and some of the institutions of higher learning have concentrated more on enhancing the implementation of environmental education in the GET band, as illustrated by their participation in the NEEP-GET nationally. Programmes such as the NEEP-GET have assisted the Gr R-9 teachers to translate policy to practice, whereas no such programmes have focused on the Gr 10-12 teachers at national level. Similarly, more research seems to have mainly focused on the implementation of environmental education in the GET band, for example Ballantyne (1999), Le Grange (2003); Lotz-Sisitka & Raven (2001), Maila (2003) and Reddy (2000). The implementation of EE and ESD in the FET band appears to have been neglected.

This research, which focuses on the implementation of EE and ESD in the FET geography curriculum, will go a long way towards filling in this gap. I aim to explain how teachers are translating policy into practice as well as the challenges they encounter in implementing environmental education through the geography curriculum in the FET band.

Diverse strategies have been used to implement environmental education in different countries. The focus now turns to the implementation of EE and ESD in other contexts.

3.3.4 The implementation of EE and ESD in other contexts

In the following sub-sections, I deal with the implementation of EE and ESD in three countries: Tanzania, England and Poland. I chose these examples because they are at different stages in the implementation process, ranging from conservation education to education for sustainable development. These examples provide, in my opinion, varying discourses and perspectives on the implementation of EE and ESD. Additionally, they provide a range of approaches and positions which were enriching to me in this study. However, one common barrier to the effective teaching of environmental concerns infused in the subjects in all three countries is the emphasis on transmitting knowledge and limited skills to the detriment of the development of attitudes and values required for responsible environmental behaviour.

3.3.4.1 Environmental education in Tanzania

This section mainly focuses on the implementation of EE at the primary school level, due to accessibility of the relevant literature (Hogan 2007; Kimaryo 2011; Makundi 2003; Taylor 1998). At policy level, Makundi (2003) states that environmental education statements were incorporated into the Tanzanian Education and Training Policy (URT 1995) in the mid 1990s. Although these environmental statements still focused on addressing problems related to the biophysical environment, they provided guidelines for incorporating environmental education into the school curriculum (Makundi 2003). According to Hogan (2007), a document on Guidelines for Environmental Education in Primary Schools was later produced by a special unit on environmental Education, recently established by the Ministry of Education and Culture in order to promote the implementation of environmental education in formal education.

Kimaryo (2011) reveals that environmental education is infused in all primary school subjects such as social studies, science, mathematics, vocational skills, personality and sports, information communication and technology and languages. It is taught as content in some subjects, and as a teaching and learning resource or learning tasks in others. In the most recent curriculum documents, the largest amount of environmental education content is found in social studies, science, and vocational skills (Kimaryo 2011). In these subjects, the focus is on education *about* the environment and there is much less concern with education *in* or education *for* the environment (Kimaryo 2011). This means that the teachers still focus more on transmitting environmental knowledge and they neglect the teaching of skills, attitudes and values as well as commitment towards resolving environmental problems.

Other barriers have hindered the successful implementation of EE in the primary school curriculum, such as those reported by Taylor (1998). Firstly, the assessment policy excluded EE from the

examinations. Secondly, pre-service teacher-training programmes had not yet integrated EE into the training courses so as to adequately prepare the teachers to implement EE in the school curriculum. Additionally, there were no in-service courses to assist the practising teachers. Thirdly, instructional materials for teaching EE were not available. Fourthly, the government still had to design an environmental education policy in order to provide guidelines for its implementation in formal education. More recently, Kimaryo (2011) established that Tanzanian primary school teachers are experiencing many obstacles in their effort to incorporate environmental education into the teaching and learning programmes. These were categorised into curriculum related barriers, teaching and learning factors and teacher related factors. Curriculum related barriers have to do with the fact that the teacher participants felt that the syllabuses were not clear. Some of them had difficulties in identifying the environmental content in the syllabuses. Barriers related to teaching and learning factors include shortage of time, large class sizes and lack of teaching materials. Teacher related factors include lack of competence to teach environmental education and lack of support from colleagues and administration. It appears that some of the barriers identified by Taylor (1998) have persisted, such as the issues related to teacher competence and lack of teaching materials.

3.3.4.2 Environmental education in England

Chatzifotiou (2002; 2006) observes that the education policy discourse in England shifted from environmental education to education for sustainable development in the late 1990s without explaining the links between the two in order to make the implementation process easier for the teachers. The revision of the national curriculum (DfEE 1999) has included the incorporation of sustainable development in the aims and content of subjects across all the key stages (Reid, Scott & Gough 2002) as well as in the non-statutory guidelines. The non-statutory guidelines stipulated that education for sustainable development can be covered in Personal, Social and Health Education (PSHE) and citizenship education (Chatzifotiou 2002; 2006).

There are a number of barriers that have militated against the implementation of EE and ESD in formal education in England. First, the statutory guidelines emphasised the teaching of core subjects to enable the learners to acquire competencies in basic skills related to numeracy, literacy and Information and Communication Technology (ICT) at primary school level (Key Stages 1 and 2). Chatzifotiou (2002; 2006) argues that the need to achieve predetermined outcomes (in the form of competencies in basic skills) could result in ESD incorporated in the subjects being taught as information-based knowledge. As a result, the teaching of attitudes, values and skills required to resolve environmental problems is likely to be neglected as the teachers focus on information-based knowledge. This concern was raised earlier by Le Grange & Reddy (1997) with regards to the integration of environmental concerns in the OBE curriculum in South Africa. Secondly, the teachers were not legally bound to teach ESD in the

non-statutory parts of the curriculum such as PSHE and citizenship education. Consequently, there was no guarantee that ESD would be taught effectively in these aspects of the curriculum (Chatzifotiou 2002). Thirdly, the implementation of ESD is often regarded as a burden. Reid, Scott & Gough (2002: 249) state that “work related to sustainable development continues to be seen as a costly bolt-on to existing programmes, rather than as a means and opportunity [to better] achieve existing goals.” The teachers struggle with not only the meaning of ESD, but also with how they can implement it in the teaching and learning programmes. Chatzifotiou (2006) attributes the difficulties of implementing ESD to the fact that the curriculum documents do not define it clearly and that the guidelines for implementing ESD are insufficient.

Furthermore, the implementation of ESD has been done through the sustainable schools framework that integrates the curriculum, the school and the immediate community (Scott 2009). Besides focusing on what is taught in the school, the sustainable schools framework promotes visionary school leadership, good management of resources and a symbiotic relationship between the school and the community. All these elements are integrated in such a way as to work towards achieving sustainable schools and community environments. According to an evaluation report from Ofsted (2008: 5) (<http://www.ofsted.gov.uk/resources/schools-and-sustainability>), only a minority of schools managed to implement education for sustainable development satisfactorily. These schools had made strides towards achieving the goal of integrating the curriculum, the school and the community. However, in the majority of schools, education for sustainable development was marginalised in the school curriculum. The promotion of sustainability was relegated to extracurricular activities involving only a minority of learners. Furthermore, the report stated that primary schools were more successful than secondary schools in promoting sustainability.

3.3.4.3 Environmental education in Poland

Environmental and ecological content is infused in the curricula of all subjects at various levels in the education system in Poland (Grodzińska-Jurczak 2004). Environmental education programmes at primary school level mainly focus on addressing ecological issues, with the main vehicle for environmental education in upper primary school being integrated science (Buchcic & Grodzińska-Jurczak 2004). At secondary school level (gymnasium), the environmental education content is mainly infused in geography and biology but it is greater in the life sciences especially in biology (Gajuś-Lankamer 2004). The implementation of environmental education is therefore biased towards the science subjects. Additionally, environmental education is taught through an interdisciplinary environmental education track and also through extracurricular activities. At high school level (post-gymnasium), environmental education is also offered as a separate subject in addition to the

environmental track and through extra-curricular activities. It is also infused in different subjects (Cichy 2004).

According to Gajuś-Lankamer (2004), the environmental track, implemented by the science teachers, mainly deals with issues of conserving the biophysical environment. Even in those secondary schools where interdisciplinary teams had been formed, they mainly consisted of science (biology and chemistry) and geography teachers (Gajuś-Lankamer 2004). The multi-disciplinary model, which is not as effective as the interdisciplinary model of implementing the environmental education track, seemed to be fairly common (Gajuś-Lankamer 2004).

According to the new education policy implemented since the late 1990s, the teacher's role is no longer that of a dispenser of knowledge, but he/she is expected to mediate learning in order to help the learners to acquire the knowledge and skills on their own (Grodzińska-Jurczak 2004). This means that learner-centred approaches and active learning are being encouraged in the new curriculum. These pedagogical approaches are more appropriate for the implementation of EE (see Section 3.3.2). What happens in practice at the lower level of the education system, however, is different from the policy rhetoric. Inappropriate pedagogical approaches such as "talks and lecture" are often used at primary school level with minimal fieldwork and other approaches that promote active learning (Buchcic & Grodzińska-Jurczak 2004). At secondary school level (gymnasiums), the most common teaching methods are talks, textbooks and discussions. The teachers tend to promote passive learning and rote learning. Pedagogical approaches that promote active learning such as excursions, fieldwork, computer-assisted learning, practical work and problem-solving approaches are rarely used (Gajuś-Lankamer 2004). In contrast, at high school level (post-gymnasium) it appears as if learners engage in more active learning in addition to being taught through the traditional lecture method. According to Cichy (2004), the learners do much practical work involving observation, measurement and experimentation as they monitor some environmental problems. They also write reports on their findings which they occasionally present using computers and engage in discussions and seminars. Other approaches include educational games such as simulation and brain-storming.

An evaluation of the effectiveness of the implementation of the environmental education track revealed a number of challenges and prospects. Most of the school principals were not involved in the implementation of environmental education programmes (Grodzińska-Jurczak 2004). Additionally, there was generally a low level of competence among the teachers and as a result, most teachers lacked the commitment to teach EE (Gajuś-Lankamer 2004). The low level of competence explains why the teachers continue to use inappropriate pedagogical approaches mentioned above. However, biology and geography teachers were found to be more committed to teaching EE and had taken the responsibility

for the effective teaching of EE. They were better trained and they used the most appropriate pedagogical approaches, such as fieldwork (Grodzińska-Jurczak 2004).

In each of the three countries, the goals of teaching EE and ESD are not likely to be fully achieved because of the barriers that have been highlighted such as the focus on knowledge transmission, lack of training of the teachers, lack of commitment from the teachers and the narrow scope of environmental education especially in Poland. In the next section the discussion mainly focuses on barriers related to school organization, unavailability of resources in some schools and the role of teachers.

3.3.5 Barriers to the effective implementation of EE in the school curriculum

School organization can be a barrier to the achievement of environmental education aims. The decisions that teachers make on what pedagogical approaches to use are mainly influenced by school organizational elements such as syllabuses and examinations (Ballantyne & Oelofse 1989; Lee 2000; Stevenson 1987; UNESCO 1977). Teachers often teach fragmented factual information using transmissive pedagogical approaches so as to complete syllabuses in time for examinations. Additionally, teachers feel that the need to maintain order and discipline in the classrooms justifies their use of teacher-centred pedagogies (Lee 2000; Stevenson 1987). Furthermore, rigid time tables hinder the use of experiential learning and problem-solving approaches through fieldwork (see Section 3.3.7) because of the shortage of time for these activities. Many studies have identified lack of class time as a major barrier to effective teaching of EE (Ballantyne 1999; Braus 1995; Ham & Rellergert-Taylor 1988; Ham & Sewing 1988; Ko & Lee 2003; Reddy 2000).

Shortage of resources is a serious problem in African countries such as Madagascar, where a significant percentage of the population has no access to schools and some of the existing schools are overcrowded (Korhonen & Lappalainen 2004). The problem of shortage of resources is not only limited to Africa. This is what Buzhar (2004: 81) says about the situation in Macedonia in Eastern Europe:

“Most primary and secondary school teachers are forced to rely only on the most fundamental educational devices (i.e. textbooks and blackboards), as a result of the bad financial situation of their schools. Some rural areas lack the most basic facilities: the classrooms are often inadequately heated, with draughty windows, leaky roofs, and inadequate sanitary facilities; while there are even some schools in danger of complete collapse, due to the chronic-lack of maintenance and repair.”

The problems described above negatively impact on strategies and methods that the teachers are likely to use in teaching EE. Under such conditions teachers are likely to teach education *about* the environment through transmissive methods, due to shortage of resources.

Barriers related to teacher competence include lack of understanding of what EE is. This arises largely from lack of training in EE theory and method (Ballantyne 1999; Buzhar 2004; Cutter-Mackenzie & Smith 2003; Ham & Rellergert-Taylor 1988; Ham & Sewing 1988; Knapp 2000; Korhonen & Lappalainen 2004). Research conducted in Botswana established that some teachers interpret EE in the policy documents as referring to environmental management activities and environmental science (Ketlhoilwe 2007). Such interpretations of EE have implications on pedagogical approaches used and on the effectiveness of the teaching and learning programmes. With regards to the implementation of EE and ESD in South Africa, Reddy (1994) observed that many teachers were:

not familiar with environmental education processes and practices, as these were initiated and conducted in an ad hoc manner by individual teachers, non-governmental organizations (NGOs) and other non-formal bodies.

As a result, the “disjuncture between visible policy and visible practice” (Lotz-Sisitka 2002: 112) among teachers continued to be a major problem in the implementation of EE in South Africa.

Furthermore, lack of teacher competence is reflected in the dominant worldview concerning knowledge that is at odds with EE aims, strategies and methods (Buzhar 2004; Stevenson 1987). Drawing from Robottom (1987), Fien & Rawlings (1996: 12), criticise the “contrast between the practical classroom theories of many teachers, which stress academic knowledge, didactic teaching, and classroom order, and the more progressive pedagogical theory underlying goals of value transformation and social change in environmental education.”

Teacher attitudes or receptivity to change can also adversely influence the success of environmental education programmes in schools. A number of studies have shown that teachers’ resistance to innovation may be a barrier to the implementation of new education policies (Lee 2000; Tilbury, Coleman & Garlick 2005).

The focus now turns to the incorporation of environmental concerns in geography education. In Section 3.3.1, I pointed out that geography is often used as one of the vehicle subjects for teaching EE and ESD. In a subject-based curriculum such as the South African high school context, geography can play a leading role in the teaching of EE and ESD because of its concern with human-environment relationships and its interdisciplinary nature (see Section 2.1).

3.3.6 The incorporation of environmental concerns in geography education

Geography has been regarded as one of the main vehicles for teaching environmental education (see Section 3.3.1) because there are overlaps between the two (Ballantyne 1999; Cowie 1997; IGU-CGE 1992; Kent & Jackson 2000; McKeown-Ice 1994; Mosidi 1998; Reid 2002; Tilbury 1997; Williams 1996). Williams's (1996) view is that "much of what is studied in geography is focused on the environment, and much of what is considered to be environmental education is very nearly the same as what geography educators research, write and teach in their work." According to Ballantyne (1999), the aims of both environmental education and geography are similar. Both disciplines aim to promote "caring environmental attitudes, values and behaviour in students."

Environmental education can greatly benefit from geography content and methodology (see also Sections 2.6.4 and 3.3.2). Geography is concerned with the interactions between humans and the physical environment and contributes to an understanding of the processes that affect the environment (Corney & Middleton 1996; Cowie 1997; Haubrich, Reinfried & Schleicher 2007; IGU-CGE 1992; Tilbury 1997; WWF 1988). The study of geography thus promotes an interest in the management and protection of the environment. Furthermore, geographical understanding is critical to environmental education because environmental problems have a spatial dimension (Haubrich, Reinfried & Schleicher 2007; IGU-CGE 1992; Tilbury 1997; WWF 1988). Some geographical concepts such as sustainable development, exploitation, stewardship and responsibility, respect, protection, dependence and interdependence, co-operation, urbanization and industrialization, globality, complexity, citizenship, and equity are "integral" to the field of environmental education (Tilbury 1997: 108). Furthermore, some approaches which are used in geography education can significantly contribute to learners' environmental education. These approaches include problem-solving and enquiry-based learning (see Section 2.6.4), role-play, simulations and fieldwork. The learners become actively involved in practical investigations and environmental management in the local area (Tilbury 1997). Through enquiry-based learning, learners are more likely to gain the skills required "to understand the detail of specific environmental issues and to take action as responsible citizens" (Corney & Middleton 1996).

From the perspective of geography education, Lucas's (1972) categories of environmental education programmes (see Section 3.1.1.2) are applicable. Education *about* the environment enables learners to obtain knowledge and understanding of physical and human systems and their interaction through studying the local and wider environment (Corney & Middleton 1996; Palmer 1997). Education *in* (or *through*) the environment enables learners to learn skills using the environment as a "resource for learning, through fieldwork which is student-centred" (Corney & Middleton 1996: 325). Education *for* the environment develops from the first two approaches (see section 3.1.1.2). Its aim is to "promote informed concern, commitment to an environmental ethic and encouragement for students to take

responsibility for their own behaviour” (Corney & Middleton 1996: 325). Education *for* the environment can be described as “*education for sustainability*” (Huckle 1993). Henderson & Tilbury (2004), cited by Tilbury & Wortman (2006: 197), argue that *education for sustainability* concerns a change in focus from concentrating only on what content to teach students, to “envisioning schools as a place where students, adults and the community interact and learn together.”

Corney & Middleton (1996) advise geography teachers to be aware of the distinctions between the three approaches to environmental education in order to facilitate the process of planning and designing teaching and learning programmes. The definition of *education for sustainability* is provided by the Environment and Development Education Training Group (EDET) (1992), cited by Corney & Middleton (1996: 325). Education for sustainability is defined as a process which:

- enables people to understand the interdependence of all life on this planet, and the repercussions that their actions and decisions may have both now and in the future on resources, on the global community as well as their local one, and on the total environment;
- increases people’s awareness of the economic, political, social, cultural, technological and environmental forces which foster or impede sustainable development;
- develops people’s awareness, competence, attitudes and values, enabling them to be effectively involved in sustainable development at local, national and international level, and helping them to work towards a more equitable and sustainable future. In particular, it enables people to integrate environmental and economic decision-making;
- affirms the validity of different approaches contributed by environmental education and development education, and the need for the further development and integration of sustainability in these and other related cross-disciplinary educational approaches, as well as in established disciplines.

Tilbury (1997) suggests a framework for incorporating EFS into geography education programmes. She advises teachers to be clear about what EFS entails – its aims and characteristics. According to Tilbury:

“The aim of EFS is to develop and bring about immediate improvements in quality of physical and social environments and to promote sustainable living. The objective of EFS is to develop knowledge, values and attitudes, skills necessary for understanding and addressing environmental and development problems” (Tilbury 1997: 111).

The goals of EFS in geography education can be achieved through incorporating the following key components:

- knowledge of environment and development problems;
- critical thinking skills;

- values education; and,
- involvement and action (Tilbury 1997: 111-113).

According to Tilbury (1997), the component of *knowledge of environment and development problems* involves the creation of opportunities for learners to learn about the major environment and development problems through *issues-based learning*. Examples of environment and development problems are climate change, deforestation, land degradation and desertification, depletion of natural resources, loss of biodiversity, overpopulation, food security, drought, poverty, and urban decay (see also IGU-CGE 1992). Furthermore, opportunities should be created for the learners to reflect on how these issues relate to their daily lives and to “explore the term *sustainable development* and question what forms of development are desirable and acceptable” (Tilbury 1997: 112). They should also be able to reflect on how their individual *lifestyle decisions, choices and actions* affect the quality of the physical and social environment. Tilbury advises that the themes of dependence and *interdependence* should be integrated into the study of the environment and development problems. Teachers are urged to promote a *holistic outlook* showing a *multidimensional* study of the environment and development problems that includes the social, economic, political, historical, cultural and aesthetic perspectives at a *variety of scales* (Corney & Middleton 1996; Tilbury 1997). Corney & Middleton (1996) point out that the multidisciplinary approach has long been one of the main features of geography.

Concerning the component *knowledge of environment and development problems*, IGU-CGE (1992) recommends its incorporation in geography education in the Charter on Geographical Education:

“The more knowledge available in the hands of educated people capable of understanding the information, the greater the chances are of significantly reducing environmental damage and preventing future problems. Accordingly, there is a primary need to strengthen all countries, especially the developing ones, their entire education system, as a prerequisite to environment and development education.”

I find the above statement rather controversial in that it appears to promote education *about* the environment which helps to maintain the status quo with regards to perpetuating unsustainable lifestyles and the environmental damage. It is education *for* the environment underpinned by the socially critical perspective that is likely to instil environmental values and lifestyle changes (see Section 3.1.1.2). Despite the above controversial statement, the IGU-CGE acknowledges the value of the geography as a vehicle for implementing EE and ESD. The next component for incorporating EFS in geography is the development of *critical thinking skills*.

Critical thinking skills should be promoted in order to identify the root causes of environmental problems and to reflect on personal and political contributions to the environmental problems (Le Grange 2012a; Tilbury 1997; Tilbury & Wortman 2006). Tilbury (1997: 112), suggests that critical thinking can be based on a number of geographical questions:

Who makes the decisions affecting the quality of the social and physical environment?
Why are they made? According to what criteria? Whose interests do they serve? Are long-term consequences considered? Which decisions and choices affect sustainable living?
How can these be promoted? What opposition are these likely to encounter?

As learners answer these questions, they engage in an appraisal process in which they explore the value positions of different decision-makers and examine their own environmental and political values. Le Grange (2012b: 112) concurs with Tilbury (1997) that learners should be taught to “question and assess their assumptions and taken-for-granted values ... [and] in particular that greed, consumerism and an unquestioning belief in science, technology, and progress” which characterise Western(ized) societies, have resulted in unprecedented environmental damage. Corney & Middleton (1996: 330) suggest that *critical thinking skills* can be developed “in investigative fieldwork; in activities involving oral work, including discussion, role plays and simulated public enquiries; and in activities promoting aesthetic, intuitive, expressive and scientific experiences.”

Additionally, *values education* should be incorporated into geography education because education for sustainable development “is inextricably linked with values and attitudes” (Reid 2002: 224). Learners need to be *taught values for sustainable living* through geography lessons. *Values education* should include the teaching of values “of social responsibility, concern for all life forms, harmony with nature, understanding and tolerance of different values and commitment to work with and for others” (Tilbury 1997: 112). Tilbury (1997) supports Corney & Middleton (1996) on the importance of values education. Learners need to be *taught about values* to enable them to be aware of different value positions affecting the quality of the environment. The last component is *involvement and action*.

Geography education must involve learners in real or simulated processes of *environmental decision-making and action* to enable them to acquire action skills for investigating, evaluating and implementing solutions to problems (Tilbury 1997). According to Tilbury (1995) cited by Tilbury & Wortman (2006: 198), action-oriented approaches “are built around real and simulated action including negotiation, persuasion, political action, ecological management, and patterns of consumption”. At an individual level, geography education should be able to transform learners towards sustainable lifestyles. Teachers can consider the following possible forms of action for their learners:

- presentations to different groups of people – for example other classes, parents, students in other schools, members of the local community;
- displays of alternative viewpoints in school, local community centres, libraries and shopping centres;
- attendance at public inquiries and public meetings;
- letters to the press, environmental groups, politicians;
- direct local action: for example, improving the school environment, initiating more sustainable practices in school, cleaning a polluted section of the canal bank, river or coastline (Corney & Middleton 1996: 331).

Teaching and learning strategies that involve the participation of the learners are more likely to encourage them to get involved in caring for the environment through participation in conservation projects and engaging in environmentally sound decision-making processes as adults (Janse van Rensburg 2000; Shallcross & Robinson 2008; Tilbury 1997; Tilbury & Wortman 2006). Participatory learning, according to Tilbury (1997: 113), "... promotes the dynamic qualities of initiative, assertiveness, independence, commitment, readiness to accept responsibility and creativity, all of which are required for constructing a sustainable world." Teachers are advised to adopt active learning strategies such as games, simulations, and role-plays as well as class and group discussions to promote *environmental decision-making and action*.

Tilbury's (1997) views on the role of school geography in teaching EE and ESD provided me with a useful theoretical framework for analyzing the geography curriculum, framing interview questions and conducting discussions on EE and ESD strategies and methods with the teacher participants. In the next paragraph, I briefly deal with geography education during the UN DESD from 2005–2014 (see also Chapter 1).

The International Geographical Union Commission on Geography Education confirmed its commitment to Education for Sustainable Development through a document entitled *Lucerne Declaration on Geographical Education for Sustainable Development* (Haubrich, Reinfried & Schleicher 2007). The document explains the contribution of geography education to Education for Sustainable Development and provides guidelines to geography educators on how geography education at all levels can incorporate ESD in the school curriculum. Some of the suggested themes that can be incorporated into the curriculum are related to major issues in the contemporary world. It is stated in the document that:

These include a selection of issues concerning humankind and nature that are important for life, for appropriate spatial behaviour and sustainable behaviour. Themes such as global warming, energy depletion, overuse of non-renewable resources, population change, and global disparities can be used. Consideration of conflicts resulting from contradictory targets concerning environmental, economical and social sustainability is appropriate (Haubrich, Reinfried & Schleicher 2007: 246).

The document also provides helpful comments on how to interpret the controversial concept of sustainable development. According to Haubrich, Reinfried & Schleicher (2007), sustainable development touches on three components: nature, economy and society (see Section 1.1.5) and it can be interpreted as:

“the combination of ecological, economic and societal sustainability by the development of new production and consumption patterns, as well as new lifestyles, and last but not least by the creation of a new ethic for the individual through lifelong education, including Geographical Education” (Haubrich, Reinfried & Schleicher 2007: 245).

No guidelines are provided on the strategies and pedagogical approaches for teaching a geography curriculum that incorporates the sustainable development theme in the document. The focus now turns to geography and environmental education in South Africa, which is the context of this study.

There were concerns during the early 1990s that geography education in South Africa needed to address the teaching and learning of environmental problems more effectively. This period coincided with the increase in the number of environmental courses offered by geography departments in South African universities (Section 2.5.1). The next section deals with barriers that militated against the incorporation and teaching of environmental education in the geography curriculum during this time at school level.

3.3.7 School geography and environmental education in South Africa

As I traced the changes in the school geography content and approaches with time in sections 2.6 and 2.7, I mentioned that the changes were precipitated by the developments in academic geography. Another factor that influenced the changes was the need to address concerns about environmental problems (Gamble 1992; Van der Merwe 1996). In this section I elaborate on the efforts to incorporate environmental themes in the school geography.

A number of South African academics called for the incorporation of EE into geography school syllabi so as to address environmental concerns (Ballantyne & Artwell 1985; Ballantyne, Oelofse & Winter 1999; Cowie 1997; Gamble 1992; Hurry 1978; 1979; 1980; 1987a; 1987b; Meadows 1985; Preston-Whyte 1983; Ramutsindela 2001; Vogel 1992; Wesso & Parnell 1992). Hurry (1978; 1979; 1980; 1987a; 1987b) made a notable contribution with regards to the value of geography and biology in promoting conservation education. Hurry (1979: 87) argues: “What I am advocating is that we re-examine our priorities in Geography teaching and that we all give greater consideration to the creation of conservation awareness in our daily teaching of the subject.”

According to Hurry (1979), geography had the potential to contribute more to conservation education but lack of inter-subject integration between geography and other overlapping subjects promoted a fragmented approach rather than a more holistic view of knowledge. Hurry was in favour of cross-curricular approaches to the integration of conservation education in the school curriculum. Hurry (1979) also observed that the fieldwork approach used in geography could promote the learning of skills for problem-solving, but teachers do not have enough time for fieldwork (see also Section 3.3.5). Moreover, syllabuses included the study of environmental problems, but did not mention the need for learners to learn problem-solving skills (Ballantyne & Oelofse 1989). According to Wesso & Parnell (1992), the teaching and learning programmes have been too examination oriented (see also Sections 2.7.2.2 and 3.3.5).

Environmental themes were incorporated through the introduction of ecology topics into school geography syllabuses in the 1980s (see also section 2.6.5.5) (Ballantyne 1986; Cowie 1997; Hurry 1980; 1987a; 1987b; Ramutsindela 2001). Ramutsindela states that

... in 1987, the national geography curriculum introduced environmental education with the aim that students need to develop environmental awareness and the need to feel a commitment towards the environment by developing a caring attitude (South Africa 1987) cited in Ramutsindela (2001: 36).

In the example of the geography core syllabus for Std 10 in 1987 given above, the “meaning of the environment was biased towards soil, animals and plants” (Ramutsindela 2001: 36). The introduction of environmental themes into the geography syllabuses was a response to growing global concerns about the deteriorating quality of the environment (see also Section 3.1). The environmental content mainly focused on the biophysical environment and downplayed the human dimension. Ramutsindela (2001) criticizes the narrow conception of the environment that is reflected in the promotion of conservation education.

Another shortcoming of the geography syllabus was the separation of physical geography from human geography. According to Ramutsindela (2001), environmental issues could not be addressed effectively in a situation where the geography syllabus emphasized the division of physical and human geography themes. The advantage of teaching aspects of physical and human geography in an integrated manner is that environmental concerns can be addressed more effectively (see also Sections 2.4 and 2.5.2.2) (Hurry 1979; Preston-Whyte 1983; Vogel 1992). Lastly, Ramutsindela (2001) maintains that geography teachers often lacked the competence to teach ecology topics incorporated in the syllabuses.

There were no major changes in the geography secondary school syllabuses during the 1990s (see section 2.7.2.2) (Beets & Le Grange 2008). Major changes in the geography curriculum came with the launching of OBE and the geography NCS for FET (Gr 10-12) (Department of Education 2003b). In section 2.7.2.2, I illustrated that the geography NCS clearly focuses on the teaching of knowledge, skills, attitudes and values. The teaching of knowledge, skills, attitudes and values is achieved through the teaching of the traditional geography themes (see section 2.1) and EE and ESD because environmental concerns are well incorporated in the curriculum as stipulated in the *International Charter on Geography Education* (IGU-CGE 1992) and *Lucerne Declaration on Geographical Education for Sustainable Development* (Haubrich, Reinfried & Schleicher 2007). There are a lot of opportunities found in the current geography curriculum for teaching EE and ESD (see Section 2.7.2.2).

3.4 SUMMARY

The environmental education field developed from conservation education and was adopted in the mid-1970s in South Africa. Lucas's (1972) contribution on the approaches to EE – education *about, in* and *for* the environment helped to clarify the EE field. The major milestones in the history of EE such as the *Belgrade Charter*, the *Tbilisi Declaration*, the *World Conservation Strategy*, *Our Common Future* and *Agenda 21* helped to shape its nature, scope and implementation strategies.

Attempts to institutionalise EE in formal education had limited success due to the overcrowded school curricula and the fragmented disciplines that prevent the implementation of the holistic perspective of EE. Learner-centred participatory approaches that promote active learning are recommended for the teaching and learning of EE and ESD.

In the South African context, EEPI and EECI played an important role in the curriculum development and institutionalisation of EE in formal schooling. EEPI and EECI's work culminated in the inclusion of environmental education in the *White Paper on Education and Training* which provided guidelines on curriculum development in EE after democracy rule. A cross-curricular approach to teaching EE is followed at GET band but environmental concerns are infused in the subjects at FET band. Geography can play a leading role in the teaching and learning of EE because of its interdisciplinary nature and the similarities between the two with regards to content and methods.

The barriers that militate against the implementation EE and ESD include: lack of competence of the teachers, teaching for examinations and insufficient time for problem-solving activities. Case studies of EE and ESD implementation in three countries show that the transmission of knowledge is pervasive in teacher practice. Literature on the implementation of environmental education in the South African context has revealed that researchers have mainly concentrated on the GET band. This research

attempts to shed light on the implementation of EE and ESD at FET level. The aim of this research project is to find out how EE and ESD is being implemented through the secondary school geography curriculum. In chapter 4, I deal with methodology where I expand the research design elements mentioned in chapter 1.

CHAPTER 4: METHODOLOGY

I traced the development of EE and ESD from conservation education in the 1960s in Chapter 3. The institutionalization of EE and ESD in formal education has been fraught with difficulties such as the overcrowded school curricula, the fragmented school disciplines and other barriers. Geography can be used as an effective vehicle for teaching EE and ESD because there are overlaps between the two. Both Geography and EE and ESD deal with the impacts of human-environment relationships.

The aim of this research project is to find out how EE and ESD is being implemented through the secondary school geography curriculum. I would like to address questions related to: opportunities for teaching EE and ESD in the geography NCS; the geography teachers' perspectives on EE and ESD; the extent to which EE and ESD are taught by the geography teachers in the lessons; pedagogical approaches used by the geography teachers; and, the barriers to teaching EE and ESD through the geography curriculum. In this chapter, I deal with methodology where I expand on the research design elements outlined in Chapter 1. In the sections that follow, I elaborate on the interpretive paradigm that underpins the research; the qualitative case study research design; the research context; and, the data collection and analysis techniques.

4.1 THE INTERPRETIVE RESEARCH PARADIGM

According to Burrell & Morgan (1979: 227) the interpretive paradigm “embraces a wide range of philosophical and sociological thought which shares the common characteristic of attempting to understand and explain the social world primarily from the point of view of the actors directly involved in the process.”

With regards to the ontological question, those who subscribe to the interpretive research paradigm argue that there is no absolute reality. Reality or the truth is in people's minds – in other words, the ontology is relativist (Burrell & Morgan 1979; Litchman 2006; McKenna, Richardson & Manroop 2011; Merriam 2009; Willis 2007). Guba & Lincoln (1994: 110) observe that, for the interpretive researcher, “realities are apprehendable in the form of multiple, intangible mental constructions, socially and experientially based, local and specific in nature ... and dependent for their form and content on the individual persons or groups holding the constructions.” Researchers working within this paradigm study people or phenomena in context and the realities are constructed by both the researcher and the participants as they interact with each other during the research process (Flick, Von Kardorff & Steinke 2004; Henning, Van Rensburg & Smit 2004; Holloway 1997; Hudson & Ozanne 1988). Hathaway (1995: 548) defines context “as the complete fabric of local culture, people, resources,

purposes, earlier events, and future expectations that constitute time-and-space background of the immediate and particular situation.”

The epistemological question also distinguishes the interpretive paradigm from other paradigms. Researchers working within this paradigm do not seek to generalise their research findings or to formulate universal laws (Hathaway 1995; Hudson & Ozanne 1988; Lichtman 2006; McKenna, Richardson & Manroop 2011). They focus on “a specific phenomenon in a particular place and time.” According to Guba & Lincoln (1994), the researcher and participants interact and work together as partners to create the knowledge during the research process. The knowledge thus consists of “constructions” on which the researcher and the participants have agreed. Additionally, the knowledge that is constructed is not considered as consisting of immutable facts or truths, but is subject to constant revision (Merriam 2002).

The goal or purpose of a research enterprise differs according to the philosophical underpinnings of the research (Connole 1993; Guba & Lincoln 1994; Habermas 1972; O'Donoghue 2007). In the *theory of knowledge-constitutive interests*, Habermas argues that the knowledge generated by humans satisfies three categories of interests: technical control, communication, and emancipation (Ewert 1991). The interpretive paradigm is compared to the positivist and the critical paradigms in this regard. Positivists produce generalizations and universal laws in order to explain the phenomena. Additionally, they aim at improved prediction and control of physical and human phenomena (Edwards & Skinner 2009; Guba & Lincoln 1994; Hudson & Ozanne 1988; McKenna, Richardson & Manroop 2011; O'Donoghue 2007). With regards to the goal of positivist research, O'Donoghue (2007: 9) explains:

It is this interest which leads us to want to know all the facts and figures associated with the area of interest, and the answers are provided by empirical-analytic knowledge. The basis of such knowledge, it is claimed, involves careful and controlled observation, where the observer takes a dispassionate position independent of the object of observation.

According to Habermas, interpretivist researchers have a “practical cognitive” or “communication” interest (Ewert 1991). Practical knowledge refers to “the understanding of the subjective meaning of language and action in acting individuals and not merely the observation of observable events” (Ewert 1991: 351). The purpose of researchers working within the critical paradigm is to “unmask the ideologies which maintain the status quo ... and take social action to improve the quality of social life” (O'Donoghue 2007: 10).

The ontological and epistemological assumptions discussed above have implications for methodology used by researchers working within a particular paradigm. Crotty (1998: 66) supports this view in the

statement that “whenever one examines a particular methodology, one discovers a complexus of assumptions buried within it.”

The interpretive research paradigm applies to this research because I am trying to comprehend, with the help of participant geography teachers who are at the coalface of the education system, how they are implementing the new curriculum (geography NCS) that integrates environmental concerns. The multiple realities of the actual situation can best be established by interacting with the participant teachers so as to obtain their views on their interpretations of policy, perspectives on EE and ESD, and explanations on strategies employed to implement the new curriculum. Furthermore, this study does not seek to generalize the findings but the aim is to explore the “motives, meanings, reasons and other subjective experiences that are time- and context-bound” with respect to the geography teacher participants’ experiences of implementing the new curriculum (Hudson & Ozanne 1988: 511). Based on these ontological and epistemological assumptions, the most suitable methodology would be qualitative research, following a case study design.

4.2 QUALITATIVE RESEARCH METHODOLOGY

Qualitative research will allow the views of the participant geography teachers to be heard through semi-structured interviews and lesson observations used for data collection. These data collection instruments are supplemented by document analysis and qualitatively analysed questionnaires. The teachers are given an opportunity to communicate their interpretations of policy, perspectives, constraints as well as reasons or motives that explain their decisions and actions in their classroom practice. The case study design enables the study to be contextualised. The school context will help the researcher to understand the meaning of the events that are communicated by the participant teachers (Babbie & Mouton 2001).

4.2.1 What is qualitative research?

Cresswell (1998) observes that qualitative research can be defined in two ways in the literature. There are generic definitions of the term (Babbie & Mouton 2001; Cresswell 1998; Denzin & Lincoln 1994; 2003; Hoepfl 1997; Holloway 1997; Merrriam 2009) whereas other definitions compare qualitative research to quantitative research (Babbie & Mouton 2001; Denzin & Lincoln 1994; 2003; Henning, Smit & Van Rensburg 2004; Lichtman 2006). Denzin & Lincoln (1994: 2; 2003: 4-5) give the following fairly comprehensive generic definition:

Qualitative research is multi-method in focus, involving an interpretive naturalistic approach to its subject matter. This means that qualitative researchers study things in their

natural settings, attempting to make sense of or interpret phenomena in terms of meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials – case study, personal experience, introspective, life story, interview, observational, historical, interactional, and visual texts – that describe routine and problematic moments and meaning in individual's lives.

Cresswell (1998) observes that Denzin & Lincoln's definition shows that qualitative research is grounded in the interpretive paradigm as noted above (see section 4.1). The definition also suggests the importance of context in the use of the naturalistic inquiry approach. The aim or goal is not to explain, predict and control (Babbie & Mouton 2001), but to understand "the meaning people have constructed ... how they make sense of their world and the experiences they have in the world" (Merriam 1998: 6). The definition also mentions "the multiple sources of information", implying the importance of employing the triangulation of methods and data sources to corroborate the evidence in qualitative research (Cresswell 1998: 15).

Qualitative research is defined by contrasting it with quantitative research in the following statement (Denzin & Lincoln 2003: 13):

The word *qualitative* implies an emphasis on the qualities of entities and on processes and meanings that are not experimentally examined or measured (if measured at all) in terms of quantity, amount, intensity or frequency. Qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied and the situational constraints that shape inquiry. They seek answers to questions that stress how social experience is created and given meaning. In contrast, quantitative studies emphasize the measurement and analysis of causal relationships between variables, not processes. Proponents of such studies claim that their work is done from within a value-free framework.

In the comparison given above, a number of key features distinguish qualitative research from quantitative research. First, qualitative research is underpinned by the interpretive paradigm whereas quantitative research is grounded on the positivist paradigm as illustrated by the "measurement" of variables and the need to establish "causal relationships". Second, there are differences concerning the ontological assumptions. Reality is viewed as being of a socially constructed nature in qualitative research, whereas "reality exists out there" for quantitative researchers. Third, the values of both the researcher and the participants are considered in qualitative research whereas these are left out in quantitative research so as to "free" the research process of bias. I elaborate on these features in the next section.

4.2.2 Features of qualitative research

According to Holloway (1997: 7), researchers should be “immersed” in the world of participants where they collect data using strategies such as “observing, questioning and listening.” Research in the natural setting **contextualises** the participants’ experiences (Flick, Von Kardorff & Steinke 2004). Context includes conditions under which the fieldwork is conducted, the locality, as well as time and history (Holloway 1997). There are wide variations in the socio-cultural and socio-economic contexts of the secondary schools in which South African geography teachers work. Additionally, the context illuminates the decisions that these participant teachers make on strategies of implementing EE and ESD through the geography curriculum.

The rich data that is collected within a natural setting enables the researcher to write a **thick description** (Babbie & Mouton 2001; Denzin & Lincoln 1994; 2003; 2008; Flick, Von Kardorff & Steinke 2004; Holloway 1997; Lichtman 2006; Merriam 1988; 1998; 2002; 2009). A thick description entails giving graphic accounts of events and human phenomena together with the participants’ interpretations of their experiences. Denzin (1989: 83), defines a thick description as “deep, dense, detailed accounts of problematic experiences ... It presents detail, context, emotion and the web of social relationship that join persons to one another.” Thick description involves not only describing facts but also developing concepts as well as generating theories, for example, grounded theory⁴¹ (Strauss & Corbin 1994). Use of thick description enables the story of how each of the participant geography teachers grapples with the implementation of EE and ESD, to be told in sufficient detail. The data is presented through thick description in Chapter 5.

The qualitative researcher follows an **inductive approach** where a great deal of rich data is collected in the field (Hoepfl 1997; Lichtman 2006; Merriam 1988; 2002; 2009). The researcher does not begin from an already existing theory using the deductive approach, but begins by collecting data and works towards finding a theory. According to Merriam (1998; 7) “qualitative research findings are in the form of themes, categories, typologies, concepts, tentative hypotheses, even theory, which have been inductively derived from the data.” The use of thematic analysis of the qualitative data (see Section 4.5), will uncover the main themes which will be presented through thick description in Chapter 5.

Another feature of qualitative research concerns the **central role of the researcher** in the research process (Babbie & Mouton 2001; Henning, Van Rensburg & Smit 2004; Hoepfl 1997; Kelly, Terre Blanche & Durrheim 2006; Lewis 2009; Lichtman 2006; Merriam 1988; 1998; 2002; 2009). According

⁴¹ Grounded theory developed by Glaser & Strauss (1967) is a “method for generating theory inductively from data systematically gathered through empirical observations of social phenomena within naturalistic settings” (Grubs & Piantanida 2010).

to Kelly, Terre Blanche & Durrheim (2006: 276), the qualitative researcher is “the primary instrument for both collecting and analysing the data” and therefore, needs to develop the skills of collecting, analysing and interpreting qualitative data. Coffey & Atkinson (1996), cited by Lichtman (2006: 12), illustrate the role of the researcher more clearly in the statement:

“It is through his or her eyes and ears that data are constructed ... the qualitative researcher is responsible for analysing the data through an iterative process that moves back and forth between data collected and data that are analysed ... it is the qualitative researcher who interprets and makes sense of the data.”

I deal with my central role in the research process again in Section 4.4.5 where I describe the importance of maintaining a research journal. The next section provides an outline of one of the qualitative research approaches, the case study. A case study research design is used in this study.

4.2.3 The case study approach

The case study is regarded as an “approach to qualitative research” (Lichtman 2006: 73) and Cresswell (1998) states that it is one of the five traditions of qualitative research. The other four traditions are biography, phenomenological study, grounded theory and ethnography. Some academics consider a case study to be a methodology (Freebody 2003; Lichtman 2006; Willis 2007; Yin 1994). According to Stake (1994), case study inquiry is not a choice of methodology but a choice of object to be studied. It is thus identified by attention to individual cases and not by the methods of research used. Lichtman (2006) considers the case study to be a “method without any philosophical underpinnings.” Most case study inquiries, however, are carried out within the interpretive framework in which the researcher seeks to increase understanding of a particular case rather than generalization to other cases (Stevenson 2004).

The meanings of the concepts *case* and *case study* are greatly contested in the literature (Merriam 1988; Stake 1994; Stevenson 2004). According to Stake (1994: 237), “the case is a specific ... a functioning specific ... a unique bounded system.” The case may be an individual student, classroom, program or institution (Stevenson 2004). The inquiry may focus on a single case or multiple cases. A “bounded system” according to Cresswell (1998), is delimited by time and space. Yin (1994: 13) defines a case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not too clearly defined.” In this definition Yin regards a case study as a methodology and that context is an important feature of a case study (Stevenson 2004). Within education settings, Freebody (2003: 81) distinguishes case studies from

ethnographies in the statement: “Case studies focus on one particular instance of educational experience and attempt to gain theoretical and professional insights from a full documentation of that instance.”

Researchers may conduct a study using more than one case. They collect data from several cases (Merriam 1998). According to Merriam (1998: 40), “the more cases included in a study, and the greater the variation across the cases, the more compelling an interpretation is likely to be.” The inclusion of multiple cases is one of the main strategies for improving the external validity or generalizability of the findings.

I apply the case study design at two levels in the study. The first level is that of schools (see Section 4.2.3.2). There are five schools in which the study was conducted. The second level is that of the geography teacher participants drawn from each of the five schools. Two senior geography teachers were recruited from each of the five schools to make a multiple case sample of ten participants (see Section 4.2.3.3). Therefore a multiple case study design applies at the level of schools as well as at the level of the geography teacher participants. How are cases selected in a case study design?

4.2.3.1 Sampling in a case study design

Purposeful sampling is recommended for selecting a case which will be the focus of an inquiry (Cresswell 1998; Merriam 1998; Patton 2002). Cresswell (1998) suggests the selection of cases that will enable the researcher to learn different points of view concerning a particular problem. He then adds: “I may also select ordinary cases, accessible cases, or unusual cases” (Cresswell 1998: 62). According to Stake (1994), the selection of cases in a multiple case study should be guided by “balance and variety” as well as the “opportunity to learn” from unusual phenomena and contexts presented by atypical cases. Merriam (1998) suggests that the researcher should start by determining the criteria for selecting the required cases. Selection based on predetermined criteria is also referred to as *criterion sampling* (Patton 2002; Flick, von Kardorff & Steinke 2004). *Typical case sampling*, involves the selection of suitable cases with the help of key informants. According to Merriam (1998: 62) a typical case reflects “the average person, situation, or instance of the phenomenon of interest.” The researcher is advised to compile a qualitative profile of a typical case in advance. This is reminiscent of criterion sampling noted above. What should be the sample size in qualitative research?

According to Patton (2002), “there are no rules on sample size in qualitative inquiry.” The sample size depends on a number of factors and it is up to the researchers to determine the sample size (Merriam 1998). Their decisions will be determined by considerations such as: What they want to know, “the purpose of the inquiry, what’s at stake, what will be useful, what will have credibility, and what can be done with available time and resources” (Patton 2002: 244). The size of a sample in qualitative research

should not be judged using the criteria of random sampling in quantitative research. According to Patton (2002: 245), purposeful samples in case study research “should be judged according to the purpose and rationale of the study: Does the sampling strategy support the study’s purpose?” Patton emphasises that what is critical in qualitative research for validity and meaningfulness to be achieved is not the size of the sample but the richness of the information from the selected cases. Additionally, the observational / analytical capabilities of the researcher are also more important than the sample size. In the next section I explain how I selected the schools.

4.2.3.2 Sampling of schools

Multi-case sampling of high schools was done. This involved purposeful sampling of five high schools using criteria that were determined in advance. The typical case sampling or criterion sampling strategy was used (Patton 2002). The following criteria were considered before selecting the schools.

First, the selected schools are all public high schools with FET (Gr 10-12). Independent schools were not considered because some of them follow different curricula to that of public high schools. Second, the sample schools have geography in the school curriculum, which is the focus of the study. With the implementation of OBE, geography in the FET band has been retained as a subject whereas in the GET band geography has been split and incorporated into two learning areas: the Social Sciences Learning Area and the Natural Sciences Learning Area (Ramutsindela 2001). Third, the sample schools are representative of the socio-cultural and socio-economic context of the Western Cape. The racial composition of the learners in the sample schools reflects South Africa’s colonial and apartheid history. The schools were originally set up to serve the needs of different racial groups: Schools 1 and 3 were originally built to serve the Coloured communities; School 2 mainly served White communities; and, Schools 4 and 5 are located in Black townships. Furthermore, the schools were selected in two adjacent administrative districts so as to reduce time and cost of travelling.

The school selection was also influenced by the medium of instruction. Being a black African Zimbabwean national, I am not conversant in some of the local languages such as Afrikaans and therefore I selected parallel medium schools (Schools 1, 2 and 3) as well as English medium schools (Schools 4 and 5). Afrikaans and English are used to instruct the learners in parallel medium schools (Western Cape Education Department 2010). Afrikaans-only medium schools were not considered in the study as explained above. The views of Afrikaans medium teachers were, however, accommodated through interviews conducted with them using the English language in parallel medium schools 1, 2 and 3. Additionally, the school selection was influenced by accessibility. This refers to whether the principals could accommodate the research project in the schools or not. The accessibility of schools will be elaborated on in Chapter 7. Of the 14 schools which were initially contacted, only 5 principals

agreed to accommodate the research project. In order to comply with the ethical considerations (see Appendix A:1, A:2 and A:4) agreed upon with the University of Stellenbosch, the Western Cape Education Department and the participant teachers, the names of the schools will not be disclosed. A detailed description of the profiles of the five schools is given in Chapter 5 (see Section 5.1.1). The next section provides a summary of the profile of the geography teacher participants.

4.2.3.3 The sample of geography teacher participants

Two geography teachers were recruited from each of the five secondary schools in order to obtain a sample of 10 participants, comprising 8 males and 2 females. One deputy principal, who teaches geography and also performs the duties of a geography HOD, is included in the sample. There are three HODs, one subject head and five ordinary teachers. There are altogether 18 geography teachers in the five sample schools, consisting of 15 males and 3 females. This explains why the number of females in the sample is far smaller than that of the males. The racial profile of the participants is as follows: six Coloureds, three Blacks and one White. The demographic profile reflects the “racial” distribution of teachers in the selected schools.

The most senior and experienced members of staff participated in the study. Eight of the ten participants are over 40 years old whereas only two are younger than 40 years old. None of the participants is younger than 30 years old. The teaching experience of the sample of teachers ranges from 9 to 35 years. All the participants are South African nationals who received their education and training in South Africa. Only one of the participants worked as a teacher in a neighbouring country for five years.

Furthermore, all the participants are qualified teachers: three obtained a teaching diploma after Grade 12 and the other seven acquired their professional qualifications after a first degree. Of the three least qualified participants mentioned above, two hold a Lower Secondary Teaching Diploma (LSTD), which originally prepared them to teach up to Grade 9, and one holds a Higher Diploma in Education (HDE). The latter prepared the trainees to teach up to FET level (Grades 10-12). The two participants who hold LSTDs currently teach up to FET level and one of them is also the Social Sciences HOD in her school. The participants all studied geography and trained to teach the subject at secondary school level. Besides teaching, these teachers are involved in extra-curricular activities and some perform management functions as HODs or school deputy Principal.

A more detailed profile of each of the 10 participants is provided in Chapter 5 (see Section 5.1.2). The participants have been given pseudonyms in order to make it easier to identify them and to fulfil the ethical requirements of anonymity. The focus now turns to a discussion of validity and reliability issues in qualitative research.

While quantitative researchers strive to be objective or to free the research process of bias so as to address validity and reliability concerns, qualitative researchers acknowledge that the research process cannot be free of bias, but is subjective (Lichtman 2006; Babbie & Mouton 2001). Therefore, the researcher is advised to identify his / her influence on the research process and report on how he / she dealt with it (Henning, Van Rensburg & Smit 2004).

4.2.4 Addressing research rigour: validity, reliability and objectivity

Qualitative research has been widely criticised by some academics engaged in “scientific research” for its subjectivity which, in their view, threatens its validity and reliability and undermines its rigour (Denzin & Lincoln 1994; Lewis 2009; Lincoln & Guba 1985). Descriptions such as “impressionistic, anecdotal, unsystematic and biased” have been used by positivists to refer to qualitative research (Charmaz 2006: 4). Additionally, Morse et al (2002: 14) argue that “without rigour, research is worthless, becomes fiction, and loses its utility.” Rigour can be improved by paying attention to validity and reliability issues in the research process.

Some academics engaged in qualitative research have suggested alternative criteria for evaluating qualitative research (Ambert et al 1995; Corbin & Straus 1990; Denzin & Lincoln 1994; Guba & Lincoln 1981; Lincoln & Guba 1985). Guba & Lincoln (1981) replaced the term rigour with *trustworthiness* as applied to the evaluation of qualitative research. Trustworthiness is clarified by Lincoln & Guba (1985: 290) using the following question: “How can an inquirer persuade his or her audiences that the research findings of an inquiry are worth paying attention to?” Four components of trustworthiness were developed by Lincoln & Guba (1985) to replace validity, reliability and objectivity for evaluating qualitative research. Internal validity is replaced with credibility, external validity with transferability, reliability with dependability and objectivity with confirmability as illustrated below:

- Credibility (internal validity) – The “truth” of the findings, as viewed through the eyes of those being observed or interviewed and within the context in which the research is carried out.
- Transferability (external validity) – The extent to which findings can be transferred to other settings. In order for findings to be transferable, the contexts must be similar. Therefore, it is the role of the researcher to identify key aspects of the context from which the findings emerge and the extent to which they may be applicable to other contexts.
- Dependability (reliability) – The extent to which the research would produce similar or consistent findings if carried out as described, including taking into account any factors that may have affected the research results.
- Confirmability (objectivity) – Researchers need to provide evidence that corroborates the findings. Such evidence should come directly from subjects and research context, rather than the researcher's biases, motivations, or perspectives (Devers 1999: 1165).

There are a number of suggestions on how credibility (internal validity) can be addressed in qualitative research (Lincoln & Guba 1985). It is important to consider *prolonged engagement* where the researcher remains in the field for as long as possible and engages in *persistent observation* until data saturation occurs. Additionally, the use of the *triangulation* technique can improve the credibility of the research. Denzin (1978), cited by Lincoln & Guba (1985: 305), proposed four types of triangulation: the use of “multiple and different *sources, methods, investigators* and *theories*.” I used four data collection instruments: semi-structured interviews, lesson observation, document analysis and questionnaires for triangulation purposes in order to address the credibility of the findings.

Lincoln & Guba (1985) also suggest *peer debriefing*. This involves working with a colleague of the same status who assists the researcher to review his / her “perceptions, insights and analyses” (Babbie & Mouton 2001: 277). Constant reports and discussions of the research process and progress with the supervisors assisted with peer debriefing.

Member checks can also enhance the credibility of qualitative research. The researcher goes back to the participants to verify both the data and interpretations with them. Member checks have a number of benefits. First, the intentions behind the participants’ actions or the reasons for providing certain information can be assessed. Secondly, they give an opportunity to correct errors. Thirdly, more information could be obtained from the participants. Fourthly, the participants cannot afterwards deny having provided the information (Lincoln & Guba 1985). I returned to the schools for data verification with the participants after reading the transcripts and initial coding of the interviews.

According to Lincoln & Guba (1985) data needs to be adequately documented using field notes, video or audio tapes and they called this *referential adequacy*. Section 4.4.1 explains how this was applied to semi-structured interviews.

Transferability (external validity or generalisability) cannot be easily achieved in qualitative research. The knowledge gained in one context may not necessarily be relevant to a similar context elsewhere in a different time frame (Babbie & Mouton 2001). However, the researcher is advised to provide a *thick description* (see Section 4.2.2) and to engage in *purposeful sampling* in order to improve transferability (Bradley 1993; Lincoln & Guba 1985; Patton 2002). A *thick description* of concepts or themes, supported by data evidence, was used in Chapter 5 to present the story of the research findings on how EE and ESD are being implemented through the geography subject. Purposeful sampling enables the researcher to diversify the participants or cases so as to obtain the widest variety of information about a specific context. This is dealt with in Sections 4.2.3.1 and 4.2.3.2 which explain purposeful sampling and how this was applied to the selection of the sample of schools.

Lincoln & Guba (1985) argue that there can be “no validity without reliability” and hence if a qualitative research project is credible, it is dependable as well. Because the credibility (internal validity) is intertwined with dependability (reliability), the techniques such as triangulation mentioned above, which are used to enhance credibility, can also be used to improve dependability.

Because reality in qualitative research is seen through the eyes of the participants, it is value-laden and so it is regarded as subjective (Hoepfl 1997). In order to improve the confirmability (objectivity) of the findings, Lincoln & Guba (1985) suggest that an audit trail should be conducted in which the researcher assesses process as well as the product. The above advice was followed in this study by examining the following aspects of the research process: *raw data, data reduction and analysis products, data reconstruction and synthesis products, process notes, materials relating to intentions and dispositions and instrument development information* (Babbie & Mouton 2001: 278; Lincoln & Guba 1985: 319). Lather (1986) does not agree with claims made by positivists concerning objectivity and neutrality because, according to her, no research is value-free. The focus now turns to how ethical issues can be addressed in a research project.

4.3 ADDRESSING ETHICAL ISSUES

The study involves teacher participants in almost all the phases of the methodology and therefore ethical considerations are a major concern. Bogdan & Biklen (2007) recommend a number of guidelines: informed consent, voluntary participation, respect for participants’ privacy and keeping the participants’ identity anonymous in the published findings. Informed consent is regarded as the foundation of ethical practice (Cohen, Manion & Morrison 2007). It is defined by Diener & Crandall (1978), cited by Cohen, Manion & Morrison (2007: 53), as “the procedures in which individuals choose whether to participate in an investigation after being informed of facts that would be likely to influence their decisions.”

I tried to address ethical issues before entering the field for data collection. After obtaining authorization from the Western Cape Education Department (WCED) (see Appendix A:2), I communicated (see Appendix A:3) with a number of school principals in order to ask for permission to conduct research in their schools. I then obtained the teachers’ consent (see Appendix A:4) before they participated. I implemented the University of Stellenbosch ethical guidelines and the process was supervised and evaluated by the University Ethics Committee. The evidence that ethical guidelines were followed is provided by copies of the relevant documents, including an ethical clearance letter issued by the University Ethics Committee (see appendix A:1). The next section provides an outline of the research instruments used to collect data.

4.4 THE DATA COLLECTION PROCESS

I used a number of research instruments: semi-structured interviews, lesson observation, document analysis and questionnaires because qualitative research methods include “observing, questioning and listening” as the researcher works with the participants in the field (Holloway 1997: 7). The triangulation of methods and sources (see Section 4.2.4) promotes the credibility and dependability of the findings (Lincoln & Guba 1985). Additionally, I kept a journal in order to record my thoughts about the research process. However, the interview method was the main data collection instrument.

4.4.1 Interviews

A common definition of an interview is that it is a conversation between two people (Arksey & Knight 1999; Freebody 2003; Merriam 2009; Morgan 1997). DeMarrais (2004: 55), cited by Merriam (2009: 87), define an interview as a “process in which a researcher and participant engage in a conversation focused on questions related to a research study.” The purpose of an interview is clarified by Patton (2002).

According to Patton (2002), there are situations when the researcher cannot use the observation method to collect data. It is impossible to observe what people are thinking, feeling or what their intentions are. Under these circumstances, the researcher then uses interviews to obtain information that cannot be collected through observation. Additionally, researchers can only find out about past events and behaviour through conversations with people who experienced them. In certain cases, researchers can be prevented from taking part in current events. They then resort to using the interview method to collect information about the event. The decision to use the interview technique as the main method of collecting data may be influenced by the kind of information that is required and whether the interview is the best method (Merriam 2009). Dexter (1970: 11), cited by Merriam (1998), observes that interviewing may be preferred to other data collection instruments “when ... it will get *better* data or *more* data or data *at less cost* than other tactics!” According to Merriam (1998), interviewing may be the “*only*” way of obtaining data in certain situations.

Interviews are commonly categorised into three types according to the amount of structure required (Arksey & Knight 1999; Bogdan & Biklen 2007; Freebody 2003; Merriam 1988; 1998; 2009). They vary from the highly structured types in the form of questionnaires, to the unstructured types. The structured interview is mainly used in quantitative research. Bogdan & Biklen (2007) support this in the statement: “When the interviewer controls the content too rigidly, when the subject cannot tell his / her story personally in his or her own words, the interview falls out of the qualitative range.” The questions and the order in which they should be answered are determined in advance in a structured interview.

The semi-structured interview lies in the centre, between the highly structured and the unstructured interview.

The unstructured or open-ended interview is also referred to as a “guided conversation” (Rubin & Rubin 1995). The participant is persuaded to talk much more on certain themes or on other themes that might emerge during the conversation. The researcher “probes more deeply” so as to get more information from the participant. However, the three types of interviews can be combined such that the researcher shifts from one interview mode to another, depending on the type of information that he / she would like to elicit at any stage of the interview (Merriam 1998). I used the semi-structured interview because of the advantages discussed below.

Patton (2002) calls the semi-structured interview format, the interview guide approach. The researcher follows an interview guide which consists of a set of questions to guide the interview when particular information is required from each participant (Merriam 1988; 2009; Patton 2002). Most interviews in qualitative research are of the semi-structured format (Arksey & Knight 1999; Merriam 1998; 2009). The semi-structured interview has a number of advantages. First, this type of interview enables the researcher to obtain data that can be compared across the participants (Arksey & Knight 1999; Bogdan & Biklen 2007). Second, this interview format allows room for the emergence of new ideas and issues which may be followed up through probing by the interviewer (Arksey & Knight 1999; Freebody 2003; Merriam 1998; 2009). Third, the determination of issues or themes in advance enables the interview process to cover a broad range of ideas more efficiently (Patton 2002).

Kvale (1996: 88) and Kvale & Brinkmann (2009: 102) provide practical steps for conducting a complete interview. These include a number of stages: *thematizing*, *designing*, *interviewing*, *transcribing*, *analysing*, *verifying* and *reporting*. Thematizing involves formulating the aim of the interviews and deciding on the concepts to be investigated. This is followed by designing or planning the study in such a way that the seven stages of the interview are incorporated. The interviewing stage is then done using a guide. The practical steps for conducting a complete interview outlined above were used in preparing the interviews.

I compiled an interview guide with two sets of questions. The first part contained questions related to teacher practice and EE and ESD strategies (see Appendix B:2). The second part had questions aimed at exploring the teachers’ conceptualisation and perspectives on the terms “environmental education, sustainable development and education for sustainable development” (see Appendix B:3). All ten participants were interviewed and the interviews lasted for 45 minutes. Four of the five school principals were interviewed as well in order to obtain information on the school context and to find out their views on Environmental Education programmes in their schools. The fifth principal was not

interviewed because the information about his school is widely available in the public domain, for example in libraries and some internet websites. The inclusion of some principals was for triangulation purposes so as to address validity and reliability concerns through a greater number and diversity of the data sources (Lincoln & Guba 1985). An interview guide was used as well for the principals' interviews (see Appendix B:4). I conducted 30 minute interviews with four of the five principals. Before interviewing the participants I asked for permission to record the interviews and they all agreed. Getting permission from the participants was meant to address ethical concerns (see Section 4.3).

The interviews were recorded using a digital voice recorder. I preferred this equipment to the older type of audio recorder that uses cassette tapes because of its advantages noted by Kvale & Brinkmann (2009: 179). The sound quality is better and it can record for many hours uninterrupted. The interview data can then be transferred directly to a computer for storage. The recordings can be played on the computer for analysis. Transcription of the recordings can take place using a word processor. One of the advantages of audio-recording the interview is that it enables the interviewer to focus on the interviewee and give him / her full attention because the act of interviewing is “an interactive process” (Arksey & Knight 1999; Kvale & Brinkmann 2009; Patton 2002). The responses are captured word for word and more accurately than manually recording the interview (Arksey & Knight 1999). This addresses internal validity or credibility issues. Lincoln & Guba (1985) refer to documentation of data as *referential adequacy* (see Section 4.2.4). Although a videotape could have been used to enable the recording of non-verbal behaviour, I decided against using the equipment because it is “more cumbersome and intrusive than tape recording the interview” (Merriam 2009: 109).

I transferred all the interview data into my PC and played the recordings as I transcribed them using the computer word-processing software. Merriam (1998: 88) states that a “verbatim transcription of recorded interviews provides the best database for analysis.” The amount of detail in a transcript depends on the purpose of the interview. While notes summarising the main points may be sufficient for some interviews where the researcher is interested in meanings, it may be necessary to include pauses, hesitations, false starts and throat clearing where the researcher will engage in discourse analysis (Arksey & Knight 1999). I removed some of the conversational features as advised by (Arksey & Knight 1999) because I am interested in the “ideas, logic, beliefs and understandings”. In order to improve the readability of the data, some parts of the interview conversations were edited to remove colloquial features such as:

- abbreviations (isn't, aren't, weren't) – *sometimes* transcribed as 'is not' etc.;
- verbal tics, like 'er' and 'um' – usually ignored;
- pauses – either cut or shown by three dots (...); and,

- repetitions (for example, ‘What I mean ... I mean ... what I want to say is ... I mean that it is a real; problem’) – this might simply be rendered as ‘It is a real problem’ (Arksey & Knight 1999: 146).

The removal of some conversational features noted above is considered to be quite acceptable for ethical reasons because “the *publication* of incoherent and repetitive verbatim interview transcripts may involve an unethical stigmatization of specific persons or groups of people” (Kvale & Brinkmann 2009: 187). While transcribing the interviews (see Appendix B:5), I took cognizance of the need to address ethical issues, for example to maintain anonymity of the interviews (see Section 4.3) (Kvale & Brinkmann 2009). I then read the transcripts a few times so as to get familiar with the data in preparation for analysis. This was followed by verification of the interview data with the participants. The purpose of verifying the interview data is to address validity and reliability issues (see section 4.2.4). The verification exercise not only helped to clarify queries on some of the interview data but also yielded a little more data. The focus now turns to lesson observation.

4.4.2 Lesson observation

According to Kidder (1981), cited by Merriam (1988: 88), observation when used as a research tool, has a number of features. It “(1) serves a formulated research purpose, (2) is planned deliberately, (3) is recorded systematically, and (4) is subject to checks and controls on validity and reliability.” Observation is criticised on the grounds that it is subjective and as a result it is regarded as unreliable (Merriam 1988). Patton (1980: 123) cited by Merriam (1988), points out that researchers need training in order to improve their skills on “how to write descriptively; practicing the disciplined recording of field notes; knowing how to separate detail from trivia ... and using rigorous methods to validate observations.” There are a number of reasons why observation might be used in the field (Merriam 1998). First, as an observer, the researcher might become aware of things which the participants take for granted. Second, data are collected through observation for triangulation purposes, where data previously collected by means of other research instruments (such as interviews and document analysis) is validated. Third, the researcher can record behaviour or events as they are happening. Fourth, observations “provide some knowledge of the context ... specific incidents, behaviours and so on that can be used as reference points for subsequent interviews” (Merriam 1998: 96). Fifth, observation is ideal in cases where the participants are not willing to talk about a particular research topic.

A number of elements have been suggested for an observation (Bogdan & Biklen 1992; Borg & Gall 1989; Goetz & LeCompte 1984; Patton 1990; Taylor & Bogdan 1984) cited by Merriam (1998). The researcher is advised to include the following: the setting which consists of a description of the physical environment and context (this could be illustrated with the help of a diagram), information about the participants, the activities they are engaged in and how they are interacting, the frequency and duration

of their activities, the content of conversation and the particulars of the people participating in it, other pertinent information or “subtle factors” including “what does not happen” (Patton 1990: 235) and how the researcher’s own behaviour is influencing the actions of the participants.

Merriam (1998: 106) advises the researcher to comment on what he / she will do about his / her influence on the scene, including general thoughts about “setting, people and activities.” Additionally, comments could include the researcher’s “feelings, reactions, hunches, initial interpretations, and working hypotheses.” There are concerns about the influence of the observer on what is being observed. Kazdin (1982), cited by Merriam (1988: 95), explains why the activities of those being observed might be altered:

“If participants are apprehensive about being judged, they may respond in socially desirable ways; if participants are aware of being assessed, they may behave in response to the assessment conditions; and, finally, participants may regulate their behaviours from feedback obtained from observers – as when notes are taken or behaviour is attended to in a particular fashion.”

The researcher is advised to monitor his or her influence on the behaviour of those being observed, to account for the effects and to consider them when interpreting the data (Patton 1980) cited by Merriam (1988).

There is no prescribed amount of time that should be spent in collecting data through observation nor is the pattern specified. The observation periods may be long or they may be short and periodic depending on what suits the researcher (Merriam 1988). The researcher needs to record what he / she observes in a field notebook by hand or on a tape recorder in order to collect raw data for analysis later (Merriam 1998). Mechanical devices such as videotapes and tape recorders are rather obtrusive and so the researcher could write down sketchy notes during observation and then expand them later (Merriam 1998). The researcher is advised to write out field notes on what was observed as soon as possible after observation. A recommended format for field notes is that the researcher must begin by stating the time, place and purpose of the observation. Additionally, it is a useful practice to describe the participants present. According to Merriam (1988: 98) the usual content includes:

- verbal descriptions of the setting, the people, the activities;
- direct quotations or at least the substance of what people said; and
- observer’s comments – put in the margins or in the running narrative and identified by underlining, bracketing, or the initials “OC.” Observer’s comments can include the researcher’s feelings, reactions, hunches, initial interpretations, and working hypotheses.

According to Babbie & Mouton (2001), the researcher is advised to include both “empirical observations” and his / her “interpretations of them.” It is helpful to maintain a fieldwork journal in order to write down the researcher’s reflections on the experiences in the field. The journal contains the researcher’s “ideas, fears, mistakes, confusion, reactions to the experience” (Merriam 1988: 98). In the next paragraph, I comment on how I used the observation method in the schools.

Lesson observation was carried out for purposes of triangulation (Lincoln & Guba 1985). I observed one teacher in each of the five schools, that is, five out of ten teacher participants through unstructured observation. With permission from the teachers, I engaged in overt observation where I attended classes and wrote field notes during the lesson (see Appendix B:6). I mainly focused on the teaching method used by the teachers and how they incorporated concerns about the environment into their lessons. Furthermore, I paid attention to the role of teacher compared to that of the learners in the teaching and learning process. According to my schedule, I had planned to observe at least four lessons of one geography teacher in each of the five schools. That would have been altogether 20 lessons or about 15 hours of observation. I ended up observing only 9 lessons, which was less than half the originally planned number. I then decided that interviews could provide more data because the teachers could then talk about their past and present classroom practice and EE and ESD strategies.

The observation programme was interrupted by control tests which were being conducted for Grade 12 learners in some schools during the third term. The writing of these tests meant that teaching and learning for the rest of the school was affected. In some schools the time table was temporarily altered in order to accommodate the writing of these tests. As a result, it was difficult to locate the classes and the teachers because some of them were involved in running the tests. One of the teachers whom I was supposed to observe left with some learners to attend a rugby tournament for two days. The teaching and learning programmes of some schools were also interrupted by the prolonged public service industrial action. The focus now turns to document analysis.

4.4.3 Document analysis

According to Merriam (1998), the researcher can judge whether a document is useful as a data source by finding out whether it has information that is pertinent to the research question and whether it can be easily acquired. However, documents have some limitations. When compared to other research instruments such as interviews and observations, they may be incomplete. Furthermore, the source may provide unrepresentative samples or the documents may be in a form which the researcher does not understand. The researcher may also have problems with determining the “authenticity and accuracy of the documents” (Merriam 1998).

There are, however, some advantages of using documents in research. Dexter (1970: 11), cited by Merriam (1988), encourages researchers to use documents in situations when it appears that they will yield “*better data or more data or data at less cost* than other tactics.” Additionally, researchers can use data from documents in the same way as the data from interviews and observations. The data provide descriptive information, “verify emerging hypotheses, advance new categories and hypotheses, offer historical understanding, track change and development and so on” (Merriam 1988). Documents are also valuable because of their stability. Unlike in interviews and observations, the influence of the researcher is not an issue in the use of documents because his / her presence does not change what is being studied (Merriam 1998). Finally, documents can help the researcher to obtain information about the context of a particular study in qualitative research (Merriam 1988).

As soon as documents have been located, it is important to determine their authenticity and accuracy. This is achieved by checking the document’s origins and why it was written, who wrote it, and the circumstances surrounding its production (Burgess 1982), cited by Merriam (1998). Drawing from Guba & Lincoln (1981), Merriam (1998: 122) provides a list of questions to guide researchers when evaluating the authenticity and accuracy of documents:

- What is the history of the document?
- How did it come into my hands?
- What guarantee is there that it is what it pretends to be?
- Is the document complete, as originally constructed?
- Has it been tempered with or edited?
- If the document is genuine, under what circumstances and for what purposes was it produced?
- Who was / is the author?
- What was he trying to accomplish? For whom was the document intended?
- What were the maker’s sources of information? Does the document represent an eyewitness account, a second-hand account, a reconstruction of an event long prior to writing, an interpretation?
- What was or is the maker’s bias?
- To what extent was the writer likely to want to tell the truth?
- Do other documents exist that might shed additional light on the same story, event, project, programme, context? If so, are they available, accessible? Who holds them? (Merriam 1998: 122).

Furthermore, the researcher might also distinguish primary sources from secondary sources (Merriam 1998; Duffy 2005). The former “came into existence in the period under research” whereas the latter are “interpretations of events of that period based on primary sources” (Duffy 2005: 125). The next paragraph relates the use of document analysis to this study.

Like lesson observation described in Section 4.4.2 above, I use document analysis for triangulation purposes. The main document that I analyse is the geography NCS (Department of Education 2003b) with syllabuses for Grade 10, 11 and 12. The geography NCS was downloaded from the South African Department of Education website. I also examine other documents that have been produced at provincial level by the Western Cape Education Department to provide support to the geography teachers in the process of curriculum implementation. These include lesson plan templates, work schedules⁴², pace setters⁴³ (see Appendix C:1 and C:2) and Learning Programme Guidelines for geography (Department of Education 2008a). These documents were obtained from the geography HODs in the sample schools and Learning Programme Guidelines document was downloaded from the Western Cape Education Department website. In the next section I describe how I used questionnaires in the study.

4.4.4 Questionnaires

I compiled a short questionnaire (see Appendix B:1) and then asked each of the 10 participants to complete it. The questionnaire contains both closed-ended and open-ended questions (Flowerdew & Martin 1997; Johnson & Christensen 2008; Kanjee 2006). The closed-ended questions were inserted in order to capture the participants' biographic details such as age, gender, nationality, educational and professional qualifications as well as teaching experience. I included open-ended questions in order to get qualitative data from the participant's comments on some of their biographic details especially their professional qualifications. Some questions were meant to capture data on the participant's perceptions on the infusion of environmental concerns in the geography curriculum and on suggestions on how to improve the teaching and learning of EE and ESD in the geography curriculum. All the sections of the questionnaires will be analysed qualitatively through thematic analysis which is used for all the data including the interview transcripts. The next section deals with my role in the research process.

4.4.5 My role as a research instrument

I regard myself as one of the main research instruments in this qualitative research project (see section 4.2.2). For this reason, my central role required that I maintain a journal (Holly 1992). The journal enabled me to write down personal reflections on "biases, values, personal background such as gender, history, culture and socioeconomic status ..." (Cresswell 2009: 177). These factors could have

⁴² A work schedule is a year-long teaching and learning programme that indicates the order in which the content and context will be delivered for each grade. The work schedules are designed in such a way that elements of continuity, progression, learning outcomes and assessment standards are integrated. The teachers use these work schedules to design lesson plans (Department of Education 2008).

⁴³ Pace setters provide guidance on the time spent in dealing with each topic to enable the teachers to pace the teaching and learning programmes in such a way that the geography curriculum for each grade can be completed on time for examinations.

influenced my interaction with the participants or the way I interpreted the data. Furthermore, the journal enabled me to keep track of my personal journey during which my perspectives are likely to have impacted on the research process which in turn could have changed me as observed by Lichtman (2010). Additionally, the journal has also been useful for writing memos during analysis and interpretation of data. Some of the journal entries will be included in the section on personal reflections in the last chapter to enable the readers to interpret my research in the light of the information that I reveal about myself as well as my research experiences. The focus now turns to the analysis of qualitative data.

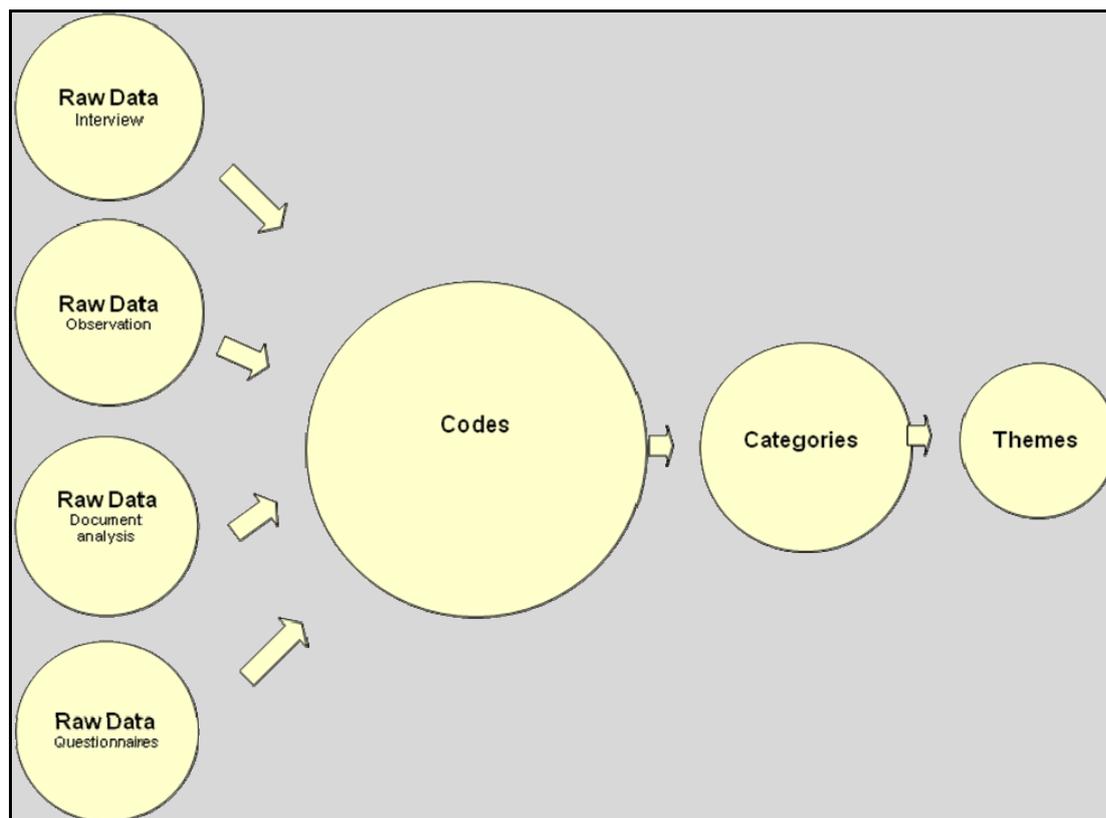
4.5 ANALYSING DATA THROUGH THEMATIC ANALYSIS

I use thematic analysis to analyse the qualitative data from semi-structured interviews, lesson observation, documents and questionnaires. According to Braun & Clarke (2006), thematic analysis is a commonly used data analysis method, but other researchers (Attride-Stirling 2001; Boyatzis 1998; Tuckett 2005) differ on what it is and how it should be done. Braun & Clarke (2006: 79) define thematic analysis as “a method of identifying, analysing and reporting patterns (themes) within the data. It minimally organises and describes your data set in (rich) detail”. A theme “captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set” (Braun & Clarke 2006: 82). Similarly, Boyatzis (1998: 4) views a theme as “a pattern found in the information that at minimum describes and organises the possible observations and at maximum interprets aspects of the phenomenon.” Additionally, thematic analysis can be regarded as a generic data analysis tool because it belongs to a class of methods which “are essentially independent of theory and epistemology, and can be applied across a range of theoretical and epistemological approaches” (Braun & Clarke 2006: 78). The thematic analysis process involves a number of phases.

The process begins with the researcher familiarizing himself / herself with the data (Braun & Clarke 2006). The transcription of interview records from audio-tapes (see Section 4.4.1) is very important because it provides an opportunity for the researcher to become familiar with the data. It is necessary to read all the data several times so as to know it very well. The qualitative data is then coded. Coding is the “process of defining what the data is all about” (Charmaz 2000: 254) and Holloway (1997: 84) observes that “concepts or themes are identified and named during the analysis.” The first step in coding is referred to as open coding (Ezzy 2002). In the coding process I focused on sentences and even whole paragraphs in order to identify and label major ideas. The coding process is iterative because one keeps moving back and forth within the data set in order to review the codes (Braun & Clarke 2006). In some cases I used *in vivo* codes (Charmaz 2000) to label the data i.e. using the language of the participants in the case of interviews. In other cases I used names of concepts and ideas derived from

literature and linked to the research questions. According to Lichtman (2010), the codes need to be constantly reviewed so that the redundant ones can be discarded or renamed. The next step is to organize the codes into categories at the next level through classification (see Figure 4.1). According to Lichtman (2010: 197), the analysis of qualitative data (thematic analysis) involves moving “from coding initial data through identification of categories to the recognition of important concepts” or themes (see Figure 4.1).

Some of the codes may be moved up to the next level to become categories, other codes may be classified into categories and the redundant codes may be discarded. At the next level the less important categories may be combined to form major categories, concepts or themes whereas other categories could simply be moved up the next level (see Figure 4.1). The redundant categories will again be discarded. The final key concepts or themes provide the story of what the data means in relation to the phenomenon being investigated (Lichtman 2006; 2010). I used Lichtman’s (2006; 2010) guidelines on analysing qualitative data because they are much clearer than those provided by Braun & Clarke (2006).



Adapted from Lichtman (2006: 168)

Figure 4.1 Stages in qualitative data analysis.

After coding the qualitative data, the codes were transferred on to excel spreadsheets (see Appendix B:7). The excel spreadsheets made further classification of the codes much easier along the rows and columns. Five columns were used in each excel page or sheet as illustrated in Appendix B:7. The

heading for the first column is **codes**, followed by **identity** and then **source**. The heading for the fourth column is **category or sub-theme** and the last column is for **major categories or themes**. Some of the codes are ‘in vivo’ where the data was coded using the language of the participants. The other data was coded using concepts derived from literature because they help to answer the research questions. The second column, with the heading identity, enables the codes to be linked to the participants’ data.

The third column with heading source, indicates the type of data: whether it is from interviews, questionnaires, document analysis or lesson analysis. The fourth column with heading category/sub-themes is used for classifying the codes into sub-themes. In the last column the categories are further classified into major categories or themes. In this case the two major themes derived from the data are **opportunities** and **challenges**. As illustrated in Figure 4.1 and Box 5.1, the sub-themes and themes become fewer than the codes.

4.6 SUMMARY

In order to find out how EE and ESD are being implemented through the secondary school geography curriculum, a qualitative research design following a case study approach has been used. This is underpinned by the interpretive research paradigm. The research findings are likely to provide an explanation that enables the readers to understand how EE and ESD are being implemented. Additionally, the qualitative research design that is used enables me to pay attention to the influence of context on the findings.

Two geography teachers invited from each of the five selected public schools made up a purposeful sample of 10 participants. The data collection instruments include semi-structured interviews, lesson observation, document analysis and questionnaires. The interviews were audio-recorded and transcribed. Field notes were written on lessons that were observed. The questionnaires were qualitatively analysed. The qualitative data were analysed through thematic analysis, involving coding and classification into categories and themes. In Chapter 5, I describe the results of the research in the form of themes that provide the story of what the data means concerning how the teacher participants are implementing EE and ESD.

CHAPTER 5: ENVIRONMENTAL CONCERNS IN THE GEOGRAPHY CURRICULUM: IS IT JUST TEACHING AND LEARNING OF KNOWLEDGE?

In the previous chapter, I dealt with methodology. I have used qualitative research following a case study design. The research is underpinned by the interpretive research paradigm where my aim is to provide an explanation that will help readers to understand how EE and ESD are being implemented through the geography curriculum in five secondary schools in the Western Cape. Data were generated using a number of research instruments: questionnaires, semi-structured interviews, document analysis and lesson observation and analysed through thematic analysis. In this chapter, I present the research results which will help me to answer the research questions related to: opportunities for teaching EE and ESD in the geography NCS; the geography teachers' perspectives on EE and ESD; the extent to which EE and ESD are taught by the geography teachers in the lessons; pedagogical approaches used by the geography teachers; and, the barriers to teaching environmental concerns infused in the geography curriculum.

5.1 THE DATA COLLECTION EXERCISE

I conducted fieldwork in five schools in 2010 over a three month period from August to October. This was followed by a second visit in May 2011 for verification of data collected through interviews and questionnaires. The verification exercise and the collection of small amounts of missing data were also conducted through phone calls to some of the teacher participants. The fieldwork was affected in some schools by the prolonged public service industrial action in 2010. Schools 2 and 3 were, however, not affected. They operated normally without any disruptions and visits to these schools occurred as planned. School 1 was forced to close for one day as a result of the invasion of the school premises by teachers from other schools. These unsolicited visitors then engaged in picketing inside the school grounds. As a result, no teaching and learning could take place under those conditions. I had to return to this school two weeks later to complete the fieldwork. Schools 4 and 5 located in the Black townships were the worst affected. These schools closed during the period of the industrial action. My visit to school 5 was delayed for two weeks and then I had to visit this school a month later than I had originally planned. In the following sections I describe the school profile so as to provide the research context.

5.1.1 The school profile

5.1.1.1 School 1

Located in the Helderberg Basin, this urban school was built for Coloured learners during the apartheid era. It is one of several high schools serving a population of over 150, 000 in the Helderberg area (City of Cape Town 2006a). The towns of Somerset West, Strand, Gordon's Bay, Sir Lowry's Pass, Macassar and Faure are located in the Helderberg Basin which is part of the City of Cape Town Metropolitan area (Penderis 1996). Schools 3 and 4 are also located in the Helderberg area.

School 1 not only serves an urban population but also the rural farming community in the vicinity of the town. Additionally, a small percentage of learners enrolled in the school are from the Black townships. The aggregated statistics from Statistics South Africa – 2001 census reveal that the largest population group found in the Helderberg area is classified as Coloured (42%), followed by White (32%) and then Black Africans (25%). The rest consists of other population groups such as Asians (City of Cape Town 2006a).

The school has a total enrolment of about 1,300 learners in Grades 8-12 (Western Cape Education Department 2010). The staff complement of 47 consists of 40 teachers and 7 support staff. According to the principal, the school enrolment increased in recent years, resulting in large classes of up to 50 learners per class in the GET band (Grades 8-9). In 2009 the problem of shortage of classroom space was so acute that one teacher did not have accommodation for her class during some lessons. The accommodation problems have since been resolved. However, 6 of the 14 geography classes are large, as shown on Table 5.1; with class sizes greater than the teacher-learner ratio of 1:33 and 1:35 recommended by provincial Western Cape Education Department and national Department of Education respectively at secondary school level. The national Department of Education (2001) implemented a teacher-learner ratio of 1:40 for all primary schools and 1:35 for all secondary schools (Peltzer et al 2005). Class sizes differ according to the popularity of some subject packages at FET level.

The principal considers the school infrastructure and facilities to be of the required standard. There are 26 classrooms, 4 science laboratories, 2 specialist rooms, 2 computer labs, 1 workshop and a library (Western Cape Education Department 2010). The library was recently converted to a classroom in order to alleviate the problem of shortage of accommodation for the learners.

Table 5.1: Geography class sizes at FET level in School 1, 2011

Grade 10		Grade 11		Grade 12	
class	size	class	size	class	size
A	43	A	38	A	38
B	28	C	36	B	11
C	30	D	38	C	33
D	35	E	30	D	28
E	20			E	38
Total	156		142		148

The unavailability of a library has implications on the availability of resources for teaching and learning of EE and ESD in the geography curriculum as the learners' ability to engage in enquiry learning on environmental issues is likely to be adversely affected. The school also has a hall. School 1 charges an annual fee of R900 per learner (Western Cape Education Department 2012), but it is not a Section 21⁴⁴ school.

According to the principal, the school is grappling with learner indiscipline emanating from antisocial activities that spill over to the school from the communities where the learners live. Poverty resulting from joblessness in some communities is also a major concern because it results in a number of parents failing to pay fees. Poverty can be attributed to the problem of unemployment and low incomes. At least one fifth (19%) of the population in the Helderberg area (City of Cape Town 2006a) is unemployed. According to the 2001 census (City of Cape Town 2006a) almost half the population (47%) in the Helderberg area earned less than R1,600 per month. This situation has possibly worsened over the years, due to high rates of migration from other parts of the Western Cape and from other parts of South Africa, especially the Eastern Cape (City of Cape Town 2006). According to the principal, the inability of some parents to pay fees adversely impacts on the school's ability to raise funds to meet its expenses.

The school curriculum at FET level consists of 17 subjects, with geography falling under Human and Social Sciences together with history. In this school, geography appears to be far more popular than history because in 2010, a total of 397 out of 668 learners (59%) at FET level (Gr 10-12) were doing

⁴⁴ According to the South African Schools Act, 1996 (Act No 84 of 1996) (South Africa 1996b), Section 21 schools are those schools that manage their own finances. The Department deposits the school allocation into the schools' account at the beginning of every financial year. This happens after the school has submitted an audited annual financial statement report. The Department manages the finances of the non-section 21 schools and they order what the schools require and the Department pays the suppliers. These financial allocations are known as school allocations and all schools are informed of their school allocations six months before the beginning of the financial year to enable schools to budget and plan for the next financial year (<http://www.kzeducation.gov.za/CorporateInformation/FAQS.aspx>).

geography whereas 156 out of 668 learners (23%) were doing history (Western Cape Education Department 2010).

5.1.1.2 School 2

This is a former Model C urban school located within the Stellenbosch Municipality of the Cape Winelands District. School 2 is one of several high schools that service the rural farming area as well as urban areas of the greater Stellenbosch Municipality with an estimated total population of 135,000 in 2006 (Stellenbosch Municipality 2008). The school was built to cater for the needs of the white population during the apartheid era. The racial profile of the learners has largely remained the same. A small percentage of Coloured and Black students are currently enrolled in the school despite the fact that the racial composition of the greater Stellenbosch area consists of 57% Coloureds, 22% Whites, 20% Black Africans and the rest consists of other racial groups such as Asians (Statistics South Africa 2001).

The greater Stellenbosch area has a high income gap between the rich and the poor. According to the 2001 census, the annual household income varied between less than R4,800 for the poorest households and over R2,000,000 for the wealthiest households and 12% of the households had no income. Additionally, at least one fifth (21%) of the economically active population was unemployed (Statistics South Africa 2001) cited by Stellenbosch Municipality (2008). According to Stellenbosch Municipality (2008: 13):

Stellenbosch is an area where great wealth in the form of wine estates, luxurious hotels, spas and leafy green suburbs exist side by side with impoverished farm workers, displaced farm dwellers, and unemployed and poor households resident in underdeveloped townships situated beyond the main industrial, commercial, entertainment and other places and spaces of leisure.

School 2 has a total enrolment of about 1,200 learners in Grades 8-12 (Western Cape Education Department 2010). There is a boarding section which accommodates about 200 learners not only from within South Africa but also from other countries in southern Africa.

The school has 38 classrooms, 6 science laboratories, 7 specialist rooms, 1 workshop, 2 computer labs and a functioning library (Western Cape Education Department 2010). It also has two halls, one of which can accommodate all the learners. School 2 is a well-resourced, Section 21 school which charges an annual fee / levy of about R20,000 per learner (Western Cape Education Department 2012). The geography classes are generally small, as shown on Table 5.2. According to the teacher-learner ratio

norm of the Western Cape Education Department of 1:33 at secondary school level, all the classes are relatively small because they have less than 30 learners each.

Table 5.2: Geography class sizes at FET level in School 2, 2011

Grade	Language Medium	Class size
10	----	24
11	----	18
12	Afrikaans	26
12	English	22
Total	Total	90

The school has a broad curriculum which consists of 25 subjects at FET level (Western Cape Education Department 2010). These include those that fall under Arts and Culture which are not offered in the other four selected schools. Arts and Culture subjects as well as Human and Social Sciences fields, are far less popular than Sciences, Mathematics, Technical and Business subjects. Geography is one of the least popular subjects in this school. It appears to be even slightly less popular than history, with a total of 101 out of 692 learners (15%) in Grades 10-12 in 2010 whereas only 81 out of 692 learners (12%) were doing geography (Western Cape Education Department 2010).

Excellent sports facilities complement the teaching and learning facilities and a large variety of sporting codes are offered at this school such as rugby, cricket, aquatic sports, hockey, tennis and indoor games among others. The teachers have very busy schedules that include coaching the learners in a variety of sporting codes and cultural activities as well as supervising inter-schools competitions during weekends.

5.1.1.3 School 3

This school is similar to School 1 in that it was built for Coloured learners during the apartheid era. It caters for the needs of the Coloured community that occupies a township near the False Bay coast in the Helderberg area. According to the 2001 census, Coloureds made up a large majority of the township population (98%) and the rest consisted of Black Africans (City of Cape Town 2006b). The school still draws most of its learners from the local township and as a result, the racial profile of the learners has largely remaining the same. A small percentage of learners come from the surrounding farms and from the Black township close by. The school falls under the jurisdiction of the Metro East Education District and Circuit (City of Cape Town District Council) (Western Cape Education Department 2010).

The total enrolment is about 1,200 learners in Grades 8-12 (Western Cape Education Department 2010). The staff complement consists of 40 teachers, 37 of whom are paid by the government and 3 by the School Governing Body. The geography classes are generally small, as shown in Table 5.3. When compared to the teacher-learner ratio norm of the Western Cape Education Department of 1:33 at secondary school level, most of the classes are relatively small because they have less than 30 learners each. The class with 34 learners also compares favourably with the national Department of Education norm of teacher-learner ratio of 1:35 at secondary school level. There is only one large class with 41 learners.

Table 5.3: Geography class sizes at FET level in School 3, 2011

Grade 10		Grade 11		Grade 12	
class	size	class	size	class	size
A	23	A	24	A	10
B	25	C	26	B	22
C	25	E	34	C	20
E	41	F	24		
F	28	G	24		
G	26				
Total	168		132		52

According to the principal, the school facilities are adequate. During the time of the research, about 30 classrooms were being used for tuition. Other rooms include 4 science laboratories, 3 specialist rooms, 2 workshops and 3 computer rooms (Western Cape Education Department 2010). The school also has a hall, but the library was recently converted to a computer room. The unavailability of a library has a negative impact on the teaching and learning of EE and ESD, as highlighted in the discussion of School 1. School 3 is a Section 21 school which charges an annual fee of R850 per learner.

The school offers similar subjects to those found in School 1 (Western Cape Education Department 2010). Geography is far more popular than history, with 324 out of 624 learners (52%) doing the subject whereas 221 out of 624 learners (35%) were doing history at FET level in 2010.

The principal pointed out that problems are experienced from time to time with the shortage of teacher-learner support material (such as paper) and the breakdown of machines, e.g. copy machines, duplicators etc. Further problems were raised by the principal, such as the shortage of finance caused by non-payment of fees by some of the parents. This is attributed to high levels of unemployment resulting from the closure and relocation of some factories that previously employed some of the township

residents. The principal also pointed out that some of the remaining factories have scaled down production, resulting in further reduction of employment opportunities. As a result, there is endemic poverty in the township. This is exacerbated by the fact that the majority of the working population in the township (59%) earned low monthly wages of less than R1,600 and that at least one fifth (21%) of the economically active population is unemployed (Statistics South Africa 2001). The principal, who is a resident of the township, supports the findings of Statistics South Africa (2001) that a significant number of residents are employed in menial, low-paying jobs.

The principal believes that the problem of unemployment has resulted in increased antisocial activities among school leavers in the community as well as among some of the learners in the school. Drug-related problems have increased among the township youth in recent years. These antisocial activities could, according to the principal, be contributing to the drop in the Matric pass rate of the school in recent years. The principal has the perception that some of the learners are no longer as committed to their school work as they used to be, several years ago.

5.1.1.4 School 4

The school is located adjacent to a Black township in the Helderberg area. The settlement lies in the Helderberg drainage basin and occupies a depression hemmed in by mountains. Therefore, temperature inversion in the mornings results in reduced visibility caused by the development of a plume of pollutants that hangs over the area. Near the school entrance, putrid garbage is dumped by the township residents and school workers in a ditch next to the road as well as along the road verges. One is immediately reminded of the perennial problem of poor service delivery that the South African township residents have to continually grapple with.

School 4 originated as a satellite of another township high school which had become seriously overcrowded. The satellite school soon became autonomous and then assumed a different name. The two high schools serve the needs of three adjacent Black townships in the Helderberg area. School 4 has an enrolment of about 1,600 Grade 8-12 learners. It falls under the jurisdiction of the Metro East Education District and Circuit (City of Cape Town District Council) (Western Cape Education Department 2010). The staff complement consists of 49 teachers. According to the principal, there are 41 classrooms, 4 science labs, 1 computer lab, a library and a hall. The school has no workshops for industrial subjects.

The school faces a number of challenges with infrastructure. According to the principal, one classroom had to be converted to a staffroom because the original staffroom had become too small to accommodate 49 teachers. This could contribute to the problem of overcrowding in the classrooms

because fewer classrooms would be available to accommodate the learners. The most serious problem, however, is the poor workmanship of the buildings. This issue has serious implications for the safety of the learners during periods of inclement weather. In 2009 the roofs of 10 classrooms were blown off by the wind during a storm, resulting in a severe shortage of classroom space. The problem was alleviated by the installation of 13 mobile classrooms. Additionally, the classroom doors have been constructed from substandard materials, with some of them now damaged and not able to close properly. Although the roofs of the classrooms have since been repaired, one classroom was still unsafe for use because the roof was not only leaking but also was unstable. During the time of the research in 2010, this classroom was not being used for teaching and learning, implying that the learners continue to experience a shortage of classrooms. This explains the problem of overcrowding in some of the classes (see Table 5.4). The 13 mobile classrooms have been retained because the school population is growing rapidly from year to year.

The school was originally built for 1,200 learners but it now accommodates about 400 more learners, resulting in overcrowding and pressure on the available infrastructure. The classrooms had recently become very overcrowded and according to the principal, some classes had up to 60 learners per class, especially in the GET band. The 13 mobile classrooms have helped to relieve pressure on the available facilities by providing more classroom space but the principal indicated that the average class size is currently still about 40. Half of the geography classes at FET level are very large, as shown in Table 5.4. Five out of the 10 geography classes have between 40 and 50 learners each. They surpass by far the teacher-learner ratio norm of the Western Cape Education Department of 1:33 and the national Department of Education norm of teacher-learner ratio of 1:35 noted above.

Table 5.4: Geography class sizes at FET level in School 4, 2011

Grade 10		Grade 11		Grade 12	
class	size	class	size	class	size
A	48	B	45	A	34
H	49	D	18	B	31
I	50	C	42	F	29
		H	35		
Total	147		140		94

The school curriculum offers 15 subjects. Geography is far more popular than history in this school, as noted in Schools 1 and 3. In 2010, 368 out of 829 learners (44%) were doing geography whereas 130 out of 829 learners (16%) were doing history at FET level (Western Cape Education Department 2010). According to the principal, the school uses the infrastructure and equipment for the benefit of the community. For example, it offers computer literacy skills to members of the community in an effort to

help to reduce unemployment. Furthermore, the school is working towards engaging the community in the development of a nutrition garden with the assistance of the Agricultural Science teachers and learners. The nutrition garden is already benefiting the school's learner-feeding scheme by supplying vegetables to supplement the food donated by the government. Unfortunately, many parents and guardians are not supportive of the education of the learners. The principal complained about the large number of learner's reports left uncollected in his office and the lack of support by parents in the school fund-raising efforts. School 4 is a no-fee paying school.

5.1.1.5 School 5

The school lies on a steep slope on the southern edge of a Black Township. As a result, there is a serious shortage of space around the school buildings for other land uses such as sports facilities. An industrial area lies behind the school to the south, causing air pollution, especially during the mornings. A sprawling informal settlement extends from the school's western fence down a valley and up the steep slopes of an elongated hill. To the north and east of the school, there is a mixture of formal and informal housing. According to Stellenbosch Municipality (2006) cited by Booij (2011), most of the housing (70%) in the township consists of informal structures which are poorly serviced with infrastructure. Next to the school gate, there is a large heap of uncollected refuse dumped by the school cleaners and township residents. The township experiences a number of social problems. Endemic poverty and a high crime rate can be attributed to a high unemployment rate estimated at between 40 and 50% (Stellenbosch Municipality 2006).

According to the principal, School 5's origins can be traced to a primary school in the 1940s. It later developed into a combined school run by Department of Education and Training (DET) (Mokotso 1999). Due to overcrowding, the school eventually split into separate institutions: a primary school and two secondary schools occupying different sites by 2007. In 2010 there were about 800 Grade 8 and Grade 10-12 learners in School 5 (Western Cape Education Department 2010). The school did not yet have Grade 9 learners because it initially relocated the FET band learners (Grades 10-12) only to the new site and left the GET band learners at the old site. The school will have a full complement of learners including Grade 8 and 9 as from 2011. The other high school offering commercial and industrial subjects is operating at the old site. The two high schools serve the needs of the township with a rapidly rising population estimated at 33,000 (Stellenbosch Municipality 2006). According to the principal, a limited number of learners commute to School 5 from other townships, for example from as far as the Helderberg area, Khayelitsha Township and the surrounding farms.

In 2010 School 5 had a staff complement of 29 teachers, 27 of whom were government-paid and 2 were paid by the School Governing Body. According to the principal, the number of teachers meets the

provincial Western Cape Education Department and national Department of Education norms of the required teacher-learner ratio of 1:33 and 1:35 respectively at secondary school level. When compared to the teacher-learner ratio norm of 1:33 stipulated by Western Cape Education Department at secondary school level, six out of twelve classes with more than 33 learners can be regarded as large. Four of the classes with above 40 learners each are seriously overcrowded. The size of the geography classes varies greatly as illustrated in Table 5.5. According to the principal, some classes are large; with class sizes ranging from 40 to 55 learners per class. This could be explained by the fact that some subject combinations are more popular at FET level than others.

Table 5.5: Geography class sizes at FET level in School 5, 2011

Grade 10		Grade 11		Grade 12	
class	size	class	size	class	Size
B	34	B	23	B	22
C	11	C	49	C	35
90D	43	D	49	D	31
E	20			E	37
F	43				
Total	151		121		125

There are 27 classrooms, 4 science labs, 1 specialist room, 1 computer room, a library and a hall. The library is not yet functioning because it has not yet been stocked with books. This has implications for the quality of teaching and learning in the school, as noted above for School 1 and 3.

The school curriculum consists of 15 subjects, with geography being far more popular than history as noted in Schools 1, 3 and 4. In 2010, a total of 437 out of 662 learners (66%) were doing geography, whereas 148 out of 662 learners (22%) were doing history at FET level (Western Cape Education Department 2010).

The school has a severe shortage of sports facilities due to shortage of space in the school premises as noted above. Additionally, the township sports facilities are not in a good condition and so the school uses sports facilities in the adjacent neighbourhood. According to the principal, the shortage of sports facilities limits the number and variety of sporting codes which can be offered to the learners. School 5 is a no-fee paying school.

The principal further highlighted a number of problems facing the school. The teaching and learning of girls is interrupted by a rather high rate of pregnancy. The nursing of their babies increases absenteeism and has a negative influence on their performance. This social problem has implications on the control

of the spread of the HIV/AIDS pandemic among the Township youth. Parents are also not supportive of the education of their children. The school administration resorts to organising meetings per grade instead of the whole school and withholding learner's reports and then asking the parents to come and personally collect the reports instead of giving them to the learners.

5.1.2 Participant profile

5.1.2.1 Maggie

Maggie is a 47 year old female teacher with 24 years teaching experience at secondary school level. She has always taught in School 1 and currently she only teaches geography. This teacher holds a Lower Secondary Teaching Diploma (LSTD) and her perception is that the standard of training that she obtained was quite high. She specialised in teaching geography. According to her, the LSTD programme included geography academic and method modules but she maintains that the programme did not adequately address concerns about the environment. She believes that she was well socialised into the profession of a geography teacher through workshops that she attended over the years and also through the guidance that she obtained from senior geography teachers.

Being the head of the Department of Social Sciences, Maggie supervises six members of staff; two geography teachers and four history teachers. Furthermore, she is a member of the School Management Team. As the Grade 12 head, she deals with all the problems pertaining to that grade except for the curricula related to the other subjects. She has a number of additional responsibilities, such as managing and coaching the school netball teams. Sometimes her weekends are taken up by netball fixtures against other schools. Although she lives outside the town where the school is located, she feels that she is very much part of the local community because of her long service in the school.

5.1.2.2 Ian

Ian is a 42 year old male teacher with 11 years teaching experience at secondary school level. He has always taught in School 1 and he only teaches geography. He holds a Higher Diploma in Education (HDE). According to this teacher, the HDE programme included geography academic and method modules. Furthermore, his view is that the academic modules adequately addressed concerns about the environment. He believes that he was well socialised into the profession of a geography teacher through workshops that he regularly attended and also through the guidance that he obtained from senior geography teachers.

This teacher is extremely busy with extra-curricular activities after school. He hardly has any time to spare because he is the school sports coordinator responsible for organising game fixtures with other schools. He manages and coaches rugby as well. Additionally, he is responsible for the school income generation activities through the tuck-shop. He lives in the adjacent town and he feels very much a member of the local community.

5.1.2.3 Johan

Johan is a 57 year old male. He is a well qualified and experienced teacher with 35 years teaching experience at secondary school level. He first taught for 5 years at another school and then transferred to School 2 where he has been teaching for 30 years. Besides teaching geography, he also teaches the physical training aspect of Life Orientation⁴⁵. He holds two Honours degrees: one in Geography and the other in Education. According to Johan, the geography modules in his undergraduate studies adequately addressed concerns about the environment. He is the Head of Department in charge of only geography and there are two other teachers in the department.

Johan lived on the school premises for 17 years as a boarding master of one of the hostels where he used to interact with members of the community. Although he now lives elsewhere outside the town, he still feels that he is part of the community. He also holds the position of head of sports and assists in coaching rugby and cricket. Additionally, he is heavily involved in the school administration because he sits in a number of committees such as the Discipline, School Governing Body and infrastructure committees.

5.1.2.4 Hilton

Hilton is a 47 year old male teacher with 20 years teaching experience at secondary school level. He taught for 14 years at another secondary school before he transferred to School 2 where he has been working for 6 years. Furthermore, he currently teaches Life Orientation as well, but geography is his main teaching subject. Hilton holds a Bachelor's degree with a major in geography and a Postgraduate Certificate in Education (PGCE). According to Hilton, the geography modules in his undergraduate studies adequately addressed concerns about the environment. He believes that he was well socialised into the profession of a geography teacher through workshops that he regularly attended and also through support from curriculum advisers.

Additionally, he is responsible for the administration and coaching of rugby and water polo. Involvement in co-curricular activities takes up most of his time in the afternoon and some of the

⁴⁵ This is a compulsory subject which involves the "study of the self in relation to others and to society" (Department of Education 2003a: 44).

weekends. Hilton is a passionate animal rights activist. In 2010 he was involved in a Save the Rhino campaign which was run through canvassing for support for the cause using the internet. Another project that he is involved in is speaking against the practice of canned lion hunting which is growing in popularity in South Africa. Hilton lives in a rural area in the Helderberg region.

5.1.2.5 Robert

Robert is a 52 year old male teacher with 27 years teaching experience at secondary school level. He first taught at a secondary school in one of the neighbouring countries for 5 years and then transferred to School 3 where he has worked for 22 years as a geography teacher. Robert is the deputy Principal of the school as well as head of the Geography Department supervising three geography teachers. He holds a Bachelor's Degree majoring in geography and he currently only teaches geography. His professional qualifications include a Bachelor of Education degree and a Higher Diploma in Education (HDE). Robert believes that he obtained first class training because theory was integrated with practical and the geography lectures were taught in well equipped laboratories. Additionally, he is of the opinion that the geography modules in his undergraduate studies adequately addressed concerns about the environment.

Although he lives elsewhere in the Helderberg area, he feels that he is part of the township community because of his long service at this school as well as his involvement in the community as a school soccer administrator. As soccer manager, Robert ensures that there are coaches for the soccer teams. He coordinates with other schools in drawing up soccer fixtures and provides general logistical support for the school soccer teams. Furthermore, he is heavily involved in general school administration because he is also the deputy school principal.

5.1.2.6 Oliver

Oliver is a 57 year old male teacher with 35 years teaching experience at secondary school level. He holds a Lower Secondary Teaching Diploma (LSTD) and specialised to teach geography. He taught at another school for 20 years and then transferred to School 3 where he has been working for 15 years. Oliver only teaches geography. According to this teacher, the LSTD programme included geography academic and method modules. Furthermore, his view is that the academic modules adequately addressed concerns about the environment. He believes that he was well socialised into the profession of a geography teacher through regular workshops organised by the Department of Education. The only extra-curricular activity that he is engaged in is supervision and training of the school choir. This teacher lives in an adjacent suburb and he feels that he is part of the local community.

5.1.2.7 Godwin

Godwin is a 47 year old male teacher with 14 years teaching experience at secondary school level. He taught in two other secondary schools before moving to School 4 where he has been teaching for four years. He teaches Life Orientation and history in addition to geography. Godwin holds the position of a geography subject head which involves assisting the Head of Department in running the department. Furthermore, he supervises four geography teachers. The Head of the Social Science Department, in charge of both geography and history, is a history specialist without any training in geography education. Godwin holds an Honours degree majoring in geography and a Higher Diploma in Education (HDE). According to this teacher, the geography modules in his undergraduate studies adequately addressed concerns about the environment. He believes that he was well socialised into the profession of a geography teacher through workshops organised by the Department of Education.

Godwin has other responsibilities in addition to being a geography subject head. He is involved in the general school administration as a member of the Extended School Management Team (ESMT) and the Academic School Management Team (ASMT). He is also the Safe Schools Coordinator responsible for the safety and security of the learners in the school. Additionally, he is one of the school soccer coaches. This teacher is a member of the local community because he lives in one of Black townships close to the school.

5.1.2.8 Vena

Vena is a 37 year old female teacher with 9 years teaching experience at secondary school level. She worked for two years at another school before moving to School 4 where she has been teaching for seven years. Furthermore, she holds a Bachelor's degree majoring in geography and a Postgraduate Certificate in Education (PGCE). She was trained to teach geography and Xhosa and her expertise is fully utilised in teaching both geography and Xhosa at this school. According to this teacher, the geography modules in her undergraduate studies adequately addressed concerns about the environment.

Although this teacher lives in a distant Cape Town suburb, she says that she feels that she is part of the local community because she shares their culture. She is involved in both cultural activities and school sport. Vena is in charge of the school traditional dancing club and assists with the supervision of school netball teams.

5.1.2.9 Lloyd

Lloyd is a 37 year old male with 15 years teaching experience at secondary school level. He has always taught in School 5. Besides teaching geography, Lloyd also teaches Computer Applications Technology (CAT). He is Head of Social Sciences and is in charge of three subjects: geography, history and Tourism Studies and supervises six teachers altogether. The Social Sciences department comprises three geography, two history and two Tourism Studies teachers. This teacher holds a Bachelor's degree with a major in geography and a Higher Diploma in Education (HDE). According to Lloyd, the geography modules in his undergraduate studies did not adequately address concerns about the environment. Lloyd is involved in school administration as a member of the School Management Team (SMT).

5.1.2.10 Thomas

Thomas is a 42 year old male teacher with 17 years teaching experience at secondary school level. He has spent most of his teaching years in School 5. He currently teaches geography and English. Thomas is disabled as a result of a car accident and moves around with the help of a wheel chair. He holds a Bachelor's degree with a major in geography and a Higher Diploma in Education (HDE). According to him, the geography modules in his undergraduate studies adequately addressed concerns about the environment. This teacher is a member of the local community because he is a resident of the township in which School 5 is located. In the following sections I describe the main themes illustrated with extracts from the teacher participants' interviews.

5.2 DATA ANALYSIS AND PRESENTATION

The data analysis process (see also section 4.5 and Appendix B:7) yielded a number of sub-themes which were further classified into major categories or themes (see Box 5.1). The first set of major themes is classified into **opportunities** which could be exploited so as to successfully implement EE and ESD through the school geography curriculum. The second set has been classified into **challenges** which act as barriers to the successful implementation of EE and ESD. The interpretive research design used in this research (see section 4.1) allows the geography teachers to communicate in the following sections, the opportunities and challenges that present themselves as the teachers try to integrate environmental concerns infused in the curriculum policy in the lessons.

Box 5.1 Main themes and sub-themes

OPPORTUNITIES

- Enabling policy framework
- Incorporation in lessons
- Enabling pedagogical approaches
- Awareness of local environmental problems and teacher initiatives

CHALLENGES

- Perspectives on EE, SD and ESD
- Challenges with pedagogical approaches
- School organization
- Inadequate resources
- Lack of awareness of EE strategies
- The role of curriculum advisors

5.3 OPPORTUNITIES FOR IMPLEMENTING EE and ESD THROUGH THE GEOGRAPHY CURRICULUM

5.3.1 An enabling policy framework

In Section 2.7.2.2 a brief analysis of the preamble of aims, scope, subject specific outcomes and assessment standards showed that environmental concerns are infused in the geography NCS (Department of Education 2003b) much more than in the previous syllabuses. Furthermore, there is a greater focus on the teaching of knowledge, skills, attitudes and values when compared to previous syllabuses where there was a heavy emphasis on content and textbook knowledge (Nel & Binns 1999). Seven of the ten teacher participants (Maggie, Ian, Johan, Hilton, Oliver, Godwin and Vena) agreed with the above observation that there are a lot of opportunities provided in the geography NCS, for teaching EE and ESD. However, three of the teachers (Robert, Lloyd and Thomas) are of the view that there are limited opportunities for teaching EE and ESD in the geography NCS.

Thomas commented:

I mainly teach Grade 10 and I think environmental issues are not included in the Grade 10 syllabus.

Their difficulties in appreciating the EE and ESD content in the geography curriculum can be attributed to the fact that they hardly refer to the preamble of aims and scope of geography education in the original curriculum document when planning to teach their lessons. Lloyd and Thomas communicated

that they refer more to work schedules and pace setters than the original geography NCS document when they plan their lessons.

Lloyd commented:

We are encouraged [by the department] to follow the pace setters because when the department sets common question papers which all schools write, they look at the pace setters regarding what they may or may not set. That is why they encourage the teachers to follow the pace setters.

Similarly, Thomas stated:

I use pace setters and the text book. I do not go to the original NCS document.

However, Lloyd later contradicts himself and acknowledges the incorporation of environmental concerns in the geography curriculum. Lloyd commented:

Environmental education is an integral part of the geography syllabus. It is something that is new.

Lloyd and Thomas teach in School 5 where Lloyd is the head of the Social Sciences Department that comprises geography, history and tourism studies (see Section 5.1.2). Lloyd's comment also shows the importance attached to teaching for the examinations at FET level in the South African education system.

Contrary to Thomas's assertion that there are no opportunities to teach EE and ESD in the Grade 10 syllabus, an analysis of the syllabus revealed that environmental concerns are incorporated in the learning outcomes and assessment standards (see Table 5.6). The relevant sections where environmental concerns are incorporated are underlined in Table 5.6. In teaching and learning towards the achievement of Learning Outcome 2, the learners are challenged with the negative consequences of human-environment interactions. In addition, there are opportunities to explore ways of managing the environmental problems. Learning Outcome 3 deals with the question of teaching and learning not only about the influence of values and attitudes of decision-makers, but also the learners' own value systems in the process of addressing environmental issues (Tilbury 1997). The corresponding assessment standards provide guidelines for the assessment of competences that should be demonstrated by the learners to indicate the achievement of the learning outcomes (see Table 5.6). Environmental concerns are incorporated in the assessment standards as well. Additionally, the curriculum document is explicit

on the fact that geography education at this level should focus on the teaching and learning of knowledge, skills, attitudes and values as noted above (Department of Education 2003b: 26).

Table 5.6: Learning outcomes and assessment standards for Grade 10

LEARNING OUTCOMES	ASSESSMENT STANDARDS
<p>Learning Outcomes 1</p> <p>Geographical skills and Techniques (practical competence)</p> <p>Learners will be expected to use a range of geographical skills and techniques at a basic level in order to use and manipulate data and information. Furthermore, learners should demonstrate the skills of reporting findings and/or expressing an opinion.</p>	<p>We know this when the learner is able to:</p> <ul style="list-style-type: none"> • <u>Identify issues and formulate questions for an investigation.</u> • <u>Acquire information from fieldwork</u> and a variety of other sources. • Organize information graphically, pictorially and diagrammatically. • Analyse information obtained from a variety of sources. • Report findings in oral and/or written form.
<p>Learning Outcomes 2</p> <p>Knowledge and understanding (foundational competence)</p> <p>Learners will be expected to demonstrate a basic operational knowledge of physical and human processes and the patterns which result from them, <u>as well as interactions between humans and the environment on a local and a global scale.</u></p>	<p>We know this when the learner is able to:</p> <ul style="list-style-type: none"> • Describe processes and associated patterns in places and regions. • Identify similarities and differences in processes and spatial patterns between places or between regions. • <u>Describe the links between environmental problems and social injustices in a local and global context.</u> • <u>Describe the interdependence between humans and the environment at different scales.</u>
<p>Learning Outcomes 3</p> <p>Application (reflexive competence)</p> <p><u>Learners will be expected to apply knowledge and skills to select and propose known solutions or strategies to manage local/continental problems, acknowledging the values, attitudes and knowledge systems which impact on the actions of those involved.</u></p>	<p>We know this when the learner is able to:</p> <ul style="list-style-type: none"> • <u>Apply skills and knowledge to a range of phenomena, issues and challenges at local and global scales.</u> • <u>Identify different values and attitudes held by individuals and groups associated with processes, spatial patterns and human-environment interactions at local and global scales.</u>

Source: Department of Education (2003b)

Environmental concerns are infused in the Grade 10 syllabus content as well. There are opportunities to teach EE and ESD in the topic *Atmosphere: weather and climate* in the section on *Impact of humans on the atmosphere and weather (e.g. the ozone issue, global warming, acid rain, the greenhouse effect)* (Department of Education 2003b: 26). Additionally, the topic on *People and places* has a section on “population issues and dilemmas including poverty, racism, employment, conflicts, inequalities, HIV and AIDS and refugees” (Department of Education 2003b: 27) and gender issues. The inclusion of these social problems in the Grade 10 syllabus provides opportunities to teach EE and ESD. Another opportunity to teach EE and ESD is in the topic *People and their organisations*. The concepts of democracy and human rights are incorporated in this topic. According to the geography NCS

(Department of Education 2003b: 27), the “section emphasises human interactions with the environment that promote democratic processes, social justice, economic sustainability and peace.”

During the interviews, a number of teachers persistently confirmed the infusion of environmental concerns in the curriculum, especially in the Grade 11 syllabus (see Table 5.7). Maggie, the Head of Social Sciences Department in School 1, pointed out that the sustainable development concept is frequently mentioned in the curriculum. She observed:

We have to teach them [the learners] what the term “sustainable development” means ... and what it means to use our resources sustainably. The sustainable development concept is not only incorporated in the geography curriculum but also in biology, Life Sciences and other subjects.

A number of teachers specifically mentioned the Grade 11 syllabus where development and sustainability themes are central to the syllabus. Johan, the Head of the geography Department of School 2 stated:

In the Grade 11 syllabus, there is a large section on development and sustainability, people and their needs which we cover for more than one term.

Hilton, who teaches in the same school as Johan, agrees with the above observation. Furthermore, his view of the incorporation of environmental concerns in the curriculum is very interesting and informative. Hilton comments:

If one looks at the Grade 11 syllabus, everything is basically about the environment. It is basically about changing the views of people about the environment through sustainable development. In the topics that we deal with like sustainable development [development and sustainability] and the people and their needs and even when we look at water masses in Africa - in all these themes we are looking at the need to protect and conserve the environment ... one central golden thread that goes straight through [the geography curriculum] is the issue about environmental education and changing peoples' attitudes, views and values about the environment.

In contrast to Robert's view that the curriculum mainly focuses on the teaching of knowledge (see Section 5.4.3), Hilton mentions the need to influence learners' attitudes and values in addition to teaching knowledge through geography education so as to promote sustainable living.

The views of some the teachers mentioned above confirm the incorporation of environmental concerns in the Grade 11 syllabus content. As observed in the Grade 10 syllabus, environmental concerns are incorporated in the learning outcomes as well as in the assessment standards of the Grade 11 syllabus (see Table 5.7). The relevant sections where environmental concerns are incorporated are underlined in Table 5.7.

Table 5.7: Learning outcomes and assessment standards for Grade 11

LEARNING OUTCOMES	ASSESSMENT STANDARDS
<p>Learning Outcomes 1 Geographical skills and Techniques (practical competence) <u>Learners will be expected to plan and structure a project/enquiry process using a range of different geographical skills and techniques at a more advanced level in order to use and manipulate data and information.</u> Furthermore, learners should demonstrate the skills of reporting findings and/or taking a substantiated position.</p>	<p>We know this when the learner is able to:</p> <ul style="list-style-type: none"> • <u>Plan and structure a project or enquiry process.</u> • <u>Acquire a variety of information from relevant primary and secondary sources which include fieldwork.</u> • Classify the acquired information according to different categories. • Analyse information obtained from a variety of sources – including fieldwork data, 1: 50 000 topographical maps, orthophoto maps and statistics. • Report findings in written, oral and/or illustrative form.
<p>Learning Outcomes 2 Knowledge and understanding (foundational competence) <u>Learners will be expected to demonstrate a basic understanding of physical and human processes and the patterns which result from them, as well as the interactions between humans and the environment on a local and a continental scale.</u></p>	<p>We know this when the learner is able to:</p> <ul style="list-style-type: none"> • Explain processes and associated spatial patterns in a range of places and regions. • Compare and contrast processes and spatial patterns between places and/or between regions. • <u>Examine issues and challenges arising from human and environment interactions in a local and continental context.</u> • <u>Explain different measures of conserving the environment while addressing human needs in a variety of contexts.</u>
<p>Learning Outcomes 3 Application (reflexive competence) <u>Learners will be expected to apply acquired knowledge and skills in order to select appropriate procedures within given parameters to propose solutions or strategies to manage local or global problems, recognising the values, attitudes and knowledge systems which inform those involved.</u></p>	<p>We know this when the learner is able to:</p> <ul style="list-style-type: none"> • <u>Apply skills and knowledge to a range of phenomena, issues and challenges at local and continental scales.</u> • <u>Examine the consequences of actions resulting from values and attitudes held by individuals and groups which influence processes, spatial patterns and human-environment interactions at local and continental scales.</u>

Source: Department of Education (2003b)

However, Hilton is critical of the over-emphasis of the sustainability theme in the Grade 11 syllabus.

Hilton commented:

At the moment the emphasis [on sustainability] is too much ... the whole Grade 11 syllabus is about environmental issues and sustainability whereas at Grade 12 the learners struggle with climatology.

Hilton would have preferred the reduction of environmental themes and the shifting of some of the physical geography topics such as climatology and river action from the Grade 12 to the Grade 11 syllabus. According to Hilton, this would address issues of lack of continuity between some physical geography topics in Grade 11 and 12.

As is the case with the Grade 10 and 11 syllabuses, environmental concerns are incorporated in the Grade 12 learning outcomes and assessment standards (see Table 5.8). The relevant sections are underlined in Table 5.8. Environmental concerns are infused in the syllabus content as well. The Grade 12 syllabus incorporates the themes on disaster management and the application of the concept of sustainability in the management of issues related to the growth of settlements, economic activities and water (Department of Education 2003b). Furthermore, opportunities are also provided for the application of local authorities' Agenda 21 for resolving issues related to the growth of settlements (Department of Education 2003b).

The geography NCS suggests strategies for implementing EE and ESD through the curriculum. First, there are many references to the term "issues" or "issues and challenges" in the preamble of the syllabuses: the aims and scope of geography education; and the learning outcomes and assessment standards (see Tables 5.6-5.8). Furthermore, issues and challenges are frequently referred to in the content of the three syllabuses. The term "issues" or "issues and challenges" refers to environmental problems: problems affecting the biophysical environment, issues with democracy, human rights and social (in)justice that result from human-environmental interactions.

Furthermore, the inclusion of the term "issues" provides an opportunity to focus on environmental and developmental problems in the teaching and learning programmes (Tilbury 1997). It also provides an opportunity to teach EE and ESD using the issues-based approach (see Section 2.7.2.2). The issues-based approach can help to improve prospects for the development of problem-solving skills and opportunities for taking action on local problems. The teachers and learners can engage in personal reflection which could bring them a step closer to personal transformation (Tilbury 1997). Secondly, the idea of critical thinking is mentioned in the purpose and scope of geography. The inclusion of the idea on critical thinking provides an opportunity for geography teachers to develop teaching and learning programmes that inculcate critical thinking.

Table 5.8: Learning outcomes and assessment standards for Grade 12

LEARNING OUTCOMES	ASSESSMENT STANDARDS
<p>Learning Outcomes 1</p> <p>Geographical skills and Techniques (practical competence)</p> <p>Learners will be expected to use a range of geographical skills and techniques in order to use and manipulate data and information. Furthermore, learners should demonstrate the skills to communicate and present findings/information reliably and accurately.</p>	<p>We know this when the learner is able to:</p> <ul style="list-style-type: none"> • <u>Plan a geographical research project of limited extent in a familiar context.</u> • Integrate information from a variety of sources. • Compare and contrast information from a variety of sources. • Analyse the acquired information in order to answer the initial question. • Substantiate the findings in written, oral or illustrative form.
<p>Learning Outcomes 2</p> <p>Knowledge and understanding (foundational competence)</p> <p>Learners will be expected to demonstrate a fundamental knowledge of physical and human processes and the patterns which result from them, <u>as well as interactions between humans and the environment on a local and a national scale.</u></p>	<p>We know this when the learner is able to:</p> <ul style="list-style-type: none"> • Explain the influence of processes and associated spatial patterns in a range of places and regions. • Account for similarities and differences in processes and spatial patterns between places and between regions. • <u>Explore possible responses to issues and challenges arising from human and environment interactions in a local and national context.</u> • <u>Examine different approaches used to sustain the environment that take into account different knowledge systems in a variety of contexts.</u>
<p>Learning Outcome 3</p> <p>Application (reflexive competence)</p> <p><u>Learners will be expected to apply acquired knowledge and skills to propose solutions or strategies to manage local or national problems, adapt known/common solutions for different problems and contexts, recognising values, attitudes and knowledge systems informing the actions of those involved.</u></p>	<p>We know this when the learner is able to:</p> <ul style="list-style-type: none"> • <u>Apply skills and knowledge to a range of phenomena, issues and challenges at local and national scales.</u> • <u>Examine values and attitudes held by individuals and groups associated with processes, spatial patterns and human-environment interactions at local and national scales.</u>

Source: Department of Education (2003b)

Critical thinking skills are required in order to identify the root causes of environmental problems and to reflect on personal and political contributions to the environmental problems (Tilbury 1997; Tilbury & Wortman 2006). Thirdly, the suggestion that learners should be involved in asking questions, collecting information, organising and analysing it and then answering questions implies that the enquiry method (see Section 2.6.4) should be used. Enquiry learning includes the use of the fieldwork technique to acquire information. According to Ballantyne (1986), enquiry learning is one of the most effective strategies for teaching geographical knowledge, skills, attitudes and values.

This discussion indicates that there are numerous opportunities for teaching EE and ESD in the geography NCS. Strategies for implementing the curriculum are also suggested. Given these opportunities, do teachers exploit them? What are their views concerning the incorporation of environmental concerns in the geography lessons?

5.3.2 The incorporation of EE and ESD in the geography lessons

There were varied responses concerning the incorporation EE and ESD in the geography lessons. Maggie comments:

I do not always plan to include EE in every lesson. It depends on what the lesson is. If I teach a lesson that has to do with different rock types, I don't necessarily include environment. I include environmental education only when it is relevant.

The implication of this response is that EE and ESD is mainly taught in human geography and less in physical geography. Maggie's response emanates from the practice of teaching physical and human geography separately, as observed by Ramutsindela (2001) (see Section 3.3.7).

Johan's response gives the impression that he does not make a conscious effort to plan for the incorporation of EE and ESD in the geography lessons. He says:

... in general, if you come across something in your lesson or in the textbook that may lead to environmental geography, then you have a discussion in the class on that. You find out from the class what they think and how they can contribute to that [addressing environmental issues].

However, Hilton's plans incorporate EE and ESD in the geography lessons. One of the classes that he taught in 2010 was Grade 11. Hilton commented:

I have my lessons on PowerPoint and so, as part of the objectives and key questions, I include sustainable development. So, sustainable development is a theme that basically runs throughout all the lessons covered in modules like people and their needs and sustainable development [development and sustainability]. So the sustainable development concept constantly comes out in the unravelling of the information.

Lloyd has a similar take to that of Maggie concerning how he incorporates EE and ESD into the geography lessons. He observes:

I do not always incorporate EE in the geography lessons. Some parts of the geography curriculum would not reflect those issues, for example if I have a lesson on mid-latitude cyclones then I would not touch on environmental issues in certain lessons. There comes a time after a series of lessons on the topic especially at the end. We usually look at [EE] at the end part of these topics. The end part of these topics will be about the relationships between people and the environment for example, but it is one of the lessons. It is not every lesson [that incorporates EE and ESD].

Like Maggie, Lloyd seems to separate the biophysical from the human environment and only considers environmental impacts when dealing with the human environment. Furthermore, Maggie and Lloyd give an impression of marginalizing EE and ESD when they implement the geography curriculum. According to them, environmental issues are not at the centre of human-environment interactions. Thomas's comment noted earlier that the Grade 10 syllabus does not include environmental issues (see Section 5.3.1) implies that he has not reflected on topical environmental issues. Therefore, he is not likely to consciously make an effort to teach EE and ESD effectively. His attitude is a reflection of the old school geography which was concerned with the teaching of a mass of facts to prepare learners for examinations (Nel & Binns 1999).

Robert's view is that, in planning the lessons, he is guided by the predetermined lesson outcomes which, according to him, do not always integrate EE and ESD. Robert seems to marginalise EE and ESD in the teaching and learning programmes. He commented:

They [the learners] normally get a worksheet based on the work they have done and right at the end there will be something on how that specific section impacts on the environment.

Robert added:

At the moment it is basically knowledge from my side. For instance I first teach knowledge of the atmosphere and climate. Within atmosphere and climate, one focuses on global warming. Global warming will not be the starting point. It will be the finishing point. If there is a problem or issue, I first give them the knowledge which we then link to the issue.

This is another illustration of Robert's tendency to treat EE and ESD as an appendage to the topic and not at the centre of human-environment interactions. Concerning the incorporation of EE and ESD in the geography lessons, Oliver who teaches in the same school as Robert observed:

We take note of the environment. We have chapters in our syllabuses: weather and climate, and then sustainable development and people and places. Therefore, in our planning, daily planning, weekly planning or yearly planning we plan ... with the environment in mind.

Oliver is referring to the Grade 11 syllabus. From the above statement, it appears that Oliver incorporates environmental concerns in most of the geography lessons. It is not enough to incorporate EE and ESD in the geography lesson plans. For the teaching and learning of EE and ESD to be more effective, the recommended pedagogical approaches such as learner-centred approaches that promote active learning should be used (see Sections 2.6.4 and 3.3.2).

5.3.3 Enabling pedagogical approaches

The participant teachers use varied pedagogical approaches to implement the new geography curriculum. Maggie's comment was:

I use learner-centred approaches most of the time. In an OBE lesson, most of the time my focus is on the learner-centred approach. When I do a structured lesson, I sometimes make a statement and then the learners speak about it. I approach the teaching of EE and ESD in the same way. I often ask the learners to give examples from places where they live. When I am dealing with a topic such as "People and their needs", where we look at informal settlements, we use illustrations of environmental problems from such places. I used for example, the whole issue with the toilets⁴⁶ that was in the newspaper.

She also mentioned that she refers in her teaching to the perennial issue of summer fires in the Western Cape. She added:

We experience a lot of fires here ... for example we had fires in the Helderberg Nature Reserve [in 2010] ... I speak a lot about the impact of fires – the effect the fire has on the fynbos [indigenous vegetation] – that it [the fynbos] needs to be destroyed by fire in order to grow. When I deal with biomes in Africa, I go into depth on the importance of veld fires.

Maggie's first comment implies that she often uses class discussions in her lessons but she pointed out that she seldom uses debates. Furthermore, there is a focus on local environmental issues in some of her lessons so as to increase the learners' awareness of local problems and hopefully to work on possible

⁴⁶ According to Tempelhoff (2012), the controversial open toilets saga was uncovered by the media in 2010. At the centre of this saga, were 2,000 water-based but unenclosed toilets in the Makhaza section of Khayelitsha Township in Cape Town. The media later uncovered 1,600 unenclosed toilets in the Rammulotsi area of Viljoenskroon in the Free State province. The open toilets saga highlighted the perennial issue of poor service delivery for some of the previously disadvantaged communities.

solutions as well. However, in the example on the issue of fires she seems to revert to the teacher-centred exposition or transmissive approach because she says “*I speak a lot about the impact of fires.*”

Maggie also regularly gives assignments on environmental issues. These are in the form of mini-projects. She stated:

I gave an assignment on global warming ... I gave my matriculants an assignment on Chapman's Peak, [to investigate] what happened in the whole mountain area – the removal of indigenous plants and all that stuff.

Ian who teaches in the same school as Maggie said that he occasionally gives research assignments to the learners as well. It appears that Maggie and Ian have given the learners similar assignments. He commented:

... when we do research assignments, I give them certain questions and then instruct them to go to the library, the internet or wherever they can find information. They bring the information back and I check whether it is relevant and then they continue with the assignment. Some of the topics are on causes and impacts of global warming. In Grade 12 the learners researched environmental problems such as the causes and the impact of rock falls along the slopes of Chapman's Peak.

Of the five schools, School 2 is the only one where geography excursions are conducted regularly and effectively used as a pedagogical approach. This is a well resourced school (see Section 5.1.1) with small geography class sizes (see Table 5.2). The total number of geography learners in 2011 at FET (Gr 10-12) level in School 2 was only 90 learners, whereas in each of the other four schools the total number of learners doing geography at the same level is four to five times greater (see Tables 5.1-5.5). Furthermore, some of the classes are large and there are more geography classes per grade. According to Johan, the Head of the Geography Department of School 2, the Grade 12s visit the Koeberg nuclear power station. The Grade 11s visit the Palmiet hydroelectric power station in Grabouw, while the Grade 10s go to the mapwork office in Mowbray and to the weather station in Cape Town. The officials at these sites then take over from the teachers and lead the learners on conducted tours of the respective sites. Additionally, with the help of audio visual aids, the learners are given information on power production, environmental impacts of power production, the processes of map production, and the measurement of weather elements. When the learners return to the school, they are given assignments based on what they observed and learned during the excursions. Johan pointed out that these excursions provide an opportunity for the learners to observe the impacts of other human-environment interactions along the way, for example agriculture, and how the negative impacts are being managed. This case is

an example of education in the environment, a pedagogical approach which promotes experiential learning (see Section 3.1.1.2).

Johan says that he generally uses both teacher-centred and learner-centred approaches. He commented:

Sometimes I give them everything [through a transmissive, teacher-centred approach] but at other times I divide them into groups and give them topics to research on and then present to the class. These group assignments can be on any topic in the syllabus.

Group work assignments are an example of a learner-centred approach as they promote active learning recommended for teaching EE and ESD (see Section 3.3.2).

Hilton had this to say about the learner-centred approach:

As a facilitator, the teacher has to make the lessons interactive where he/she gets response and feedback from the learners. I think to a large extent, I do succeed in that I try and steer away from the old paradigm of teacher-centred education where teaching is a monologue. There is always an interaction between myself and the learners. The emphasis is on the learner and not the teacher. I try to stimulate them as far as humanly possible to participate and discover the knowledge themselves. In some lessons it works very well but in others it does not. It also depends on the content and the knowledge that you are dealing with. Sometimes it is necessary to revert to the old teaching style [teacher-centred approach] for scaffolding so as to build foundational knowledge that may be lacking.

Hilton appears to understand the rationale for using learner-centred approaches as well as his role in the teaching and learning process. Hilton further elaborated:

I use various methods such as simulation, group work, role-play, debates and class discussions. At the beginning of the term I used group work where the learners were given case studies to go and read. In each case study, they had to identify a problem arising from the use of some resources. Each group was then asked to present its findings to the rest of the class. A debate ensued on environmental issues identified by the learners.

According to Oliver, excursions are occasionally organised for a limited number of learners due to shortage of finance. He gives an example:

Last year we took 25 Grade 11s to the opening of the new Berg River dam in the Boland near Franschhoek. Only 25 learners were able to contribute the R10.00 fare that had been

charged. Shortage of finance limits the number of field trips that can be organised ... The learners did not have work sheets but they got information in the form of handouts from the authorities at the dam site. No follow up assignment was given to the learners after the trip.

This pedagogical approach is likely to have been ineffectively utilised because it involved a limited number of learners. Furthermore, the learners do not appear to have been given guidelines by the teacher on what activities to engage in so as to fully exploit the opportunity of teaching EE and ESD through fieldwork.

Godwin, the subject head of School 4 commented:

We use both learner-centred and teacher-centred approaches. We sometimes give them [the learners] projects and assignments where they go and research in libraries and find the information for themselves. Sometimes we only teach them [transmissive approach], but at other times we give them tasks that they go and find information themselves.

It appears that in these projects and assignments, given by Godwin as well as by Maggie and Ian in the examples discussed above, the emphasis is on the collection of factual information by the learners. This is likely to promote the learning of knowledge at the expense of skills, attitudes and values which are required for more sustainable lifestyles.

Vena, who also teaches in School 4 said:

I use the learner-centred approach more than the teacher-centred approach. This includes discussions, tasks, assignments and projects. I sometimes assign them tasks where they look for information instead of getting it from me.

Vena appears to give projects regularly, one project per term for her Grade 11 class. She explained that the learners get information from the library in order to answer the project questions. As noted earlier, the main emphasis in the writing of projects is on the collection of factual information that promotes the learning of knowledge at the expense of skills, attitudes and values.

5.3.4 Awareness of local environmental problems and action taken

Some of the teacher participants showed that they were reasonably aware of the local environmental problems. Maggie and Ian from School 1 expressed their concerns regarding the pollution of the Lourens River which is located in the vicinity of their school.

Ian commented:

Years back people used to swim in the Lourens River, but currently the river is not so active anymore. Human activities that take place on the upstream side of the river are contributing to water pollution.

Ian is of the view that the recreational activities along the course of the river have decreased due to increased water pollution. Maggie took the initiative of cleaning a section of the same river a couple of times four years ago.

Maggie stated:

We went with the learners to clean a section of the Lourens River closest to our school. We dressed in safety wear including gloves on our hands and then removed plastic bottles, cans, plastic bags and so on from the river... The learners found the activity distasteful but they enjoyed being outside.

Maggie took a Grade 11 class for the cleaning activity. Taking the Grade 11 class instead of junior classes would enable her to link the activity to the syllabus topics. She could use the activity as a pedagogical approach for teaching water pollution.

Maggie added:

We analysed the waste and discussed the sources of the pollution. We studied the water ecosystem and I asked the learners to find out the impact of pollution on the river ecosystem. We also had a discussion about the effect of the different plants growing on the banks of the river and the fact that they clog the river up. Our visit to the river was a follow up of a lesson on rivers and the problem of pollution. We also linked this discussion to the impact of pollution of the river from informal settlements.

She has since discontinued the activity because of time constraints. Furthermore, she is concerned about the safety of learners because there has been an increase in the number of homeless persons living along the course of the river. Maggie also mentioned a topical issue in 2010 concerning the N2 project. This involved the upgrading of one of the roads which would affect adjacent residential housing close to the school.

The principal of School 3 is very concerned about environmental degradation in and around the township where School 3 is located. The quality of what used to be a recreational area for the residents has been seriously degraded. The principal attributes the degradation to two factors. First, his perception is that service delivery has deteriorated in recent years. Because of the poor refuse removal service provided by the municipality, the residents end up dumping refuse in the open areas around the township. Second, the national government awarded tenders to three mining companies to extract sand from the sand dunes for construction purposes. The demand for construction materials increased as result of the construction of the soccer stadia for the 2010 Soccer World Cup. The sand mining process has resulted in the flattening of some of the sand dunes. The principal, who is a resident of the township, believes the destruction of the sand dunes is likely to not only leave a scarred landscape but could also adversely affect the micro-climate of the township.

5.4 CHALLENGES FACED BY TEACHERS IN IMPLEMENTING EE AND ESD THROUGH THE GEOGRAPHY CURRICULUM

5.4.1 Perspectives on the subject matter

The participant teachers' perspectives on the nature of geography and geography education differ widely. Similarly, their perspectives on environmental education, sustainable development and education for sustainable development also vary. Their views on the above subjects have implications for the successful implementation of EE and ESD through the geography curriculum.

5.4.1.1 Perspectives on the nature of geography and geography education

Hilton views geography education from the perspective of assessment. Referring to the implementation of OBE and its influence on geography education, he commented:

To a large extent the teaching and learning is virtually the same because geography has always been a subject that is based on data response. You try and bring the real world into the classroom and through that you try to stimulate the learner.

According to Robert:

Geography is what can you see now in front of you? What is the impact of the objects that you see on the environment? Is it positive or negative?

Lloyd remarked:

Geography in South Africa has always had this type of [learner-centred] approach. We challenge the learner with data in assessment. They are often required to read, make deductions and draw graphs.

Lloyd's view of geography is similar to that of Hilton. Geography is viewed from the positivist perspective which promotes technical solutions to environmental problems. Furthermore, there is a tendency to maintain the status quo in the process of tackling environmental problems. Robert's view of geography is that it should incorporate environmental concerns.

5.4.1.2 Perspectives on EE

Maggie observed:

As a geographer I have got to be mindful of what is going on in the environment and I have to teach the learners about the environment. It is difficult [to teach the learners about the environment] because they do not appear to care for the environment. This is shown by the littering that occurs in the school grounds after the intervals. In spite of the fact that bins are provided all over the school grounds, the learners still leave the school grounds littered with waste. These learners do not respect the environment. I have to be careful how I behave towards the environment and I also have to tell the learners about the environment.

Ian observed:

Currently people are afraid of what is going to happen with the ozone layer and the problem of global warming. There is also concern about excessive removal of vegetation and the destruction of animal habitats which could result in some animals becoming extinct. I told the learners that we need to include their parents when educating them about these problems.

Hilton's view is that:

Environmental education is the teaching and learning about the biodiversity and how it needs to be managed but obviously the natural environment is the source that provides us with natural resources that we need to provide for ourselves. Obviously you cannot separate environmental education from sustainable development because the healthiness of

the environment is going to determine whether you will be able to sustain yourself and develop and grow.

According to Robert:

Environmental education can be education on the environment ...

Oliver stated:

My understanding of environmental education is that you have to take the learners nearer to the environment and tell them more about what happens around them, not only in class or in the textbook but what happens around.

Godwin commented:

Environmental education deals with conservation of resources: we must conserve water; we must not pollute; we must not litter; we must not cut down trees.

It appeared as if Vena had not come across the term environmental education because she asked the question:

What is environmental education?

Concerning what he understands about environmental education, Lloyd observed:

It is to make the learners sensitive about the physical environment so that they can first of all notice it. I have lived in this town for 30 years. Do I still see the mountain [located just outside the town]? So at the end of the day as part of the [aims of the] geography syllabus [curriculum], the learner should be able to:

- 1. appreciate the environment;*
- 2. handle the environment with respect; and,*
- 3. look after it because it is part of the ecosystem.*

Thomas views environmental education as:

Education that looks at all aspects of the environment.

Furthermore, Thomas is of the view that:

Geography that focuses more on environmental issues will be more interesting to the learners. There are some learners who say that they are doing geography because they were forced to go to a certain stream. Then there are those who love geography. I think incorporating something [an issue] that affects them in their environment might stimulate their interest in the lessons.

The responses of the teacher participants vary from apparent ignorance of what environmental education is (for example Vena and Robert), to environmental education as conservation education (for example the views demonstrated by Maggie, Ian, Hilton, Oliver, Godwin and Lloyd). The main reason why environmental education is viewed as conservation education is that some of the participants conceive of the environment as mainly consisting of the biophysical component. They seem to exclude the human agent that consists of the social, economic and political components that interact with each other as well as with the biophysical environment (see Section 3.1). Thomas mentioned that environmental education deals with all aspects of the environment but he did not elaborate. At least, unlike the other participants, he seems to have a broader view of the meaning of environment.

In communicating the different ways in which they make sense of environmental education, some of the participants reveal the pedagogical approaches which they are likely to use. Maggie, Ian and Oliver state that there is a need to *tell* the learners about the environment. The discourse of telling implies that they know all about environmental problems and that they are likely to use transmissive pedagogical approaches to teach knowledge about environmental problems and how to manage them. As a result, other aims of geography education such as the acquisition of skills, attitudes and values are not likely to be addressed.

5.4.1.3 Perspectives on SD and ESD

The teacher participants struggle to make sense of the meaning of the term sustainable development and education for sustainable development. Maggie's view of sustainable development is that:

We speak about the fact that their children [learners' children] should not be deprived of the resources [concern with future generations]. Environmental education and sustainable development cannot be separated because the one is dependent on the other.

Ian observed:

I asked the learners in class one time whether they had seen animals such as the rhinoceros, crayfish and abalone. Excessive extraction could result in some of these animals becoming extinct within a few years. I then told them that their kids [future

generations] will not know what the rhinoceros, crayfish or abalone looked like. They will go to the museum to see specimens of the animals.

Ian then added:

Environmental education and sustainable development are incorporated into one another.

Hilton commented:

Environmental education and sustainable development should be integrated. You cannot separate the two entities. If you want sustainable development, you need to take care of the environment. These two should be integrated.

Concerning sustainable development, Robert observed:

You must look after the resource and make sure that there is something for the next person or the next generation.

Oliver commented:

There is a relationship between environmental education and sustainable development. Both deal with the environment; the one for now and the other on a longer term. So you have to take care of the environment as it is now and also how it will be tomorrow or ten years from now.

According to Godwin, environmental education and sustainable development are synonymous.

Godwin stated:

Environmental education and sustainable development mean the same. People must be educated to sustain things. They must not just misuse them. They must conserve resources.

Lloyd had this to say about sustainable development:

Sustainable development talks about an ongoing process to secure life, to secure the future and that what we do today impacts tomorrow.

Concerning the relationship between environmental education and sustainable development, Lloyd added:

You cannot have one without the other [referring to environmental education and sustainable development]. A solution means you find an answer and that means that the issue will be solved for future generations. Sustainable development is the answer to environmental issues.

Thomas's view of sustainable development is that:

When we use our resources we must keep in mind that there are generations which are coming and so we must use them in such a way that we do not deplete the resources to enable future generations to benefit from them as well.

The dominant perspective of sustainable development revealed by the participants (Maggie, Ian, Robert, Oliver, Lloyd and Thomas) is the one promoted by WCED (1987), which I elaborate on in Chapter 6. According to the teacher participants, "sustainable development" deals with the conservation of resources to enable not only present generations but also future generations to benefit. For Godwin, the term "sustainable development" is synonymous with conservation education, which focuses on the conservation of resources. Vena had difficulty in making sense of what the term "sustainable development" means.

Regarding how she makes sense of the term "education for sustainable development", Maggie responded:

I basically do the terms with them [the learners] and ask them to be mindful of what they are doing in the environment because whatever they are doing in the environment has an impact on the sustainability of a resource.

Ian commented:

I do my best to bring in environmental education and education for sustainable development as well in some of the lessons. I normally try and incorporate those two into my lessons. Even if it does not fit I will bring it in so as to make the learners aware that it is not a once off thing. We need to continue with this.

Hilton has an interesting view of education for sustainable development:

Education for sustainable development is necessary because the problem that we have with development is that you always have the risk when you develop that you exhaust and deplete your resources. It is necessary that we have environmental awareness about the way we use our resources so that we can modify our behaviour so that we can develop at a sustained rate; that we always have resources or alternatives at our disposal to keep on developing.

Hilton added:

But the important thing that I want to stress about education for sustainable development is that it [development] should not only benefit the rich. Sustainable development can achieve the objective of getting a more even distribution of economic growth and economic wealth so that poverty in the process can be reduced. So the whole issue of poverty should also, in my understanding, be addressed in education for sustainable development.

Robert observed:

I think it [education for sustainable development] can be useful but it must be linked within the learning outcomes especially Learning Outcome Three, that deals with application. It deals with the teaching of the conservation of resources.

Godwin stated that education for sustainable development refers to conservation education. According to Lloyd, education for sustainable development can be looked at from two perspectives:

The focus can be on education as a process or education in terms of what is the learner or receiver taking with him / her. It can also be on what is being taught or how it is being taught.

Thomas responded:

I have never heard about the term. I have only heard about the term “sustainable development”.

Oliver and Vena did not appear to have come across the term “education for sustainable development”. They were struggling to make sense of what it means.

From the responses given by the teacher participants it can be observed that some of them have not come across the term “education for sustainable development”. The dominant view revealed by the

teacher participants' responses is that education for sustainable development is the same as environmental education and focuses on the conservation of resources. Hilton's perspective includes sustainable development where he mentions sustained economic growth. Furthermore, Hilton's views on education for sustainable development raise a number of questions. First, does sustained economic growth always lead to the eradication of poverty? Second, is it possible to maintain sustained economic growth without adversely affecting the environment through the depletion of the resources and the generation of various forms of pollution? Nevertheless, Hilton's perspective that issues of poverty need to be addressed is quite commendable.

5.4.2 Challenges with pedagogical approaches

5.4.2.1 Use of teacher-centred pedagogical approaches

EE and ESD cannot be taught effectively using teacher-centred, transmissive pedagogical approaches. In contrast to Hilton's practice (see Section 5.3.3), Robert, Oliver, Lloyd and Thomas acknowledged that they predominantly use the teacher-centred approach. Robert commented:

At the moment we rely heavily on the teacher-centred approach. Basically the first three quarters or two thirds of my lesson is teacher-centred. The learner-centred part is right at the end. I first give them everything. Maybe I spoil them. It could be this traditional belief that we feel they must receive everything from us. This teaching approach results from the fact that I work towards effectively achieving learner outcomes.

Similarly, Oliver predominantly uses the teacher-centred approach. Commenting on the learner-centred approach, he said:

I have heard of that [the learner-centred approach]. We do not really give much attention to that but I have heard of it. For some of the chapters in our syllabi, we let the learners first do some things and then continue with our lessons. There is not much of this though.

Oliver then continued:

I predominantly use the teacher-centred approach. Seventy five percent of my lessons are teacher-centred. I prepare the lessons and then come and present them to the learners by writing on the blackboard.

I may use an overhead projector or textbooks but the teacher is the one who presents it. He/she speaks a lot and could ask the learners questions etc.

The explanation provided by Oliver for the dominance of the teacher-centred approach in his lessons was:

I would not say I prefer it [the teacher-centred approach] but a long time ago when I trained to be a teacher, that was the main method I was trained in. Afterwards, with the coming of OBE we were exposed to the other pedagogical approaches. Because I have been teaching for more than 30 years, I still have to adapt to the other pedagogical approaches such as the learner-centred approach.

Lloyd from School 5 says the following about the pedagogical approach:

The learner-centred approach is not dominant. It depends on the circumstances and the type of learner. We believe that not all [the learners] would be mature already to be tasked with that responsibility [of working with minimum guidance]. Therefore I would say that the dominant approach is still the teacher-centred approach.

In order to justify the teacher-centred approach, Lloyd argued:

We are faced with challenges from the Department [of Education], of achieving certain outcomes. We need to go through a certain amount of work in the form of assessment tasks within a specific time and most of our learners have poor backgrounds and poor academic skills. These learners need to be nurtured. Language is also a barrier to learning – English is their second language. This means that we need more time to work through the syllabuses than in other schools. The learner-centred approach takes more time. There are opportunities where we can incorporate the learner but I would say 70% of the lessons are teacher-driven.

Although Thomas had stated initially that he predominantly used the learner-centred approach in teaching, further probing revealed that he actually uses the teacher-centred approach. Thomas teaches in the same school as Lloyd, School 5. Thomas later commented:

We are spoon-feeding them [the learners]. One of the main problems influencing learner involvement is that they struggle to express themselves because English is a second language. You realise that it takes too long to give learners adequate time to participate because of their poor language skills. Much less time is provided to learners to talk in class. Because they struggle to express themselves, the teacher gets impatient and ends up talking much more than the learners.

In Section 5.3.1, I mentioned that the main pedagogical approach that is prescribed in the geography NCS is the enquiry method (see also Sections 2.7.2.2). The method “provides learners with ways of thinking critically and creatively about the problems or issues they study (e.g. the impact of HIV/AIDS on population dynamics, environmental quality, socio-economic disparities, hazards and disasters, poverty and resource management in a country)” (Department of Education 2003b: 12). Using the enquiry method, EE and ESD can be taught more effectively because, besides the teaching of knowledge and skills, it creates awareness of the nature of attitudes and values of decision-makers. It also provides an opportunity for learners to clarify their own values (Tilbury 1997).

5.4.2.2 The enquiry approach

Most of the teacher participants have challenges with the meaning and use of the enquiry method. They view the enquiry method simply as involving research projects based on the collection of factual information from the textbooks, newspapers or the internet. When the enquiry method is used in this manner, it only promotes the learning of knowledge at the expense of skills, attitudes and values.

Maggie commented:

We have to do that [enquiry learning] because they [the learners] have to do research. In their bibliography they have to show me where they got information and how they interpreted it. My criteria are set up accordingly so that they will know what I am looking for when I am marking.

Further probing revealed that she has not taken time to reflect on the meaning of the enquiry method.

Maggie gave a conflicting statement:

I do not use it very much. My approach is that I basically use the question and answer method. I give an explanation and then I pose a question and they [the learners] speak to me – there is discussion.

Regarding the meaning of enquiry method, Maggie responded again in a contradictory manner:

I do not give much attention to that. I use a method that I find comfortable for me to go through the syllabus. If I do not feel comfortable with it, I do not use it.

According to Ian, enquiry learning involves giving research assignments and projects as noted in my comment above. Johan’s observation of enquiry learning is that:

Ideally this strategy could help to create awareness of [environmental] issues among learners and also teach them how to address issues instead of spoon-feeding them all the time with information.

Johan added:

The enquiry learning is only suitable for gifted learners. They are more likely to go out and find the information whereas the average learners are not likely to do it. Where can they get the information – libraries, the internet? Use of the method is restricted by time constraints.

Johan's first comment implies that he understands the effectiveness of enquiry learning in implementing EE and ESD through the geography curriculum but it is unfortunate that he thinks that enquiry learning can only be used by gifted learners and that it is time-consuming.

Similarly, Hilton's view of enquiry learning is that it is time consuming. He observes:

... some of the strategies like enquiry learning are very time consuming and one has a lot to cover in the syllabus [in order to prepare the learners for the exam]. So ... enquiry learning would be very difficult to implement due to the fact that one has to cover a huge amount of work. So I have not used enquiry in the way that I would have liked. We took the learners on an excursion and they had to go and collect information which they put into research reports afterwards.

Concerning his understanding of enquiry learning, Hilton remarked:

My understanding is that when you are busy with a lesson and then certain issues in the lesson arise you ask the learners to go and investigate. For example when we were dealing with the use of resources and opportunities that resources provide for people, we mentioned diamonds with reference to Congo and Sierra Leone. I asked the learners to reflect on the movie that was made on Blood Diamonds and to go and investigate and then give the class feedback on what they discovered. In doing enquiry learning, it has to be with support from the teacher. It must be followed up in class and scaffolding needs to be built. You need to make a foundation and the knowledge be built on top of each other. Otherwise it is another assignment or project you are giving them. You do not want any form of report. You want the child [learner] to go a little bit wider and [enquiry learning] enables you to widen the general knowledge of the learner pertaining to a particular subject.

According to Hilton, enquiry learning is all about increasing knowledge and not skills, attitudes and values. Robert's view of enquiry learning is that it means engaging the learners in research. He stated:

Enquiry is encouraged at FET level. They [learners] must go and do research, bring back their findings as a project or assignment. We mark them mostly on rubric ... so that they know how their marks will be allocated.

Further probing indicated that Robert is not clear on what enquiry learning entails other than research projects. He, however, acknowledged its usefulness in the teaching and learning of EE and ESD. Similarly, Oliver's view of enquiry learning is that it involves learners doing projects and assignments.

Oliver pointed out:

We are only using it [enquiry learning] in one term during the year when the learners do projects or research tasks on the environment, our cities or topics like pollution and so on. According to the Department of Education assessment guidelines, each grade does one project per year.

Concerning the research methods used by the learners, Oliver commented:

For some of the projects we give them a framework for example to go and find information on a specific topic from the library; to ask other people questions; or, to get information from newspapers.

According to Oliver's perspective, there is an emphasis on promoting the teaching of knowledge at the expense of skills, attitudes and values. However, Oliver later stated that he has not come across the term "enquiry learning" mentioned in the geography NCS document:

I have heard about it [enquiry learning] but I have not paid much attention to it.

Godwin, like most of the other participant teachers, views enquiry learning as the involvement of learners in research projects. He said:

We make use of an assessment programme ... we give projects following an assessment programme from the Department of Education. Each term there is one project per grade at FET.

However, later he stated that he has not come across the term “enquiry learning” in the geography NCS document. Vena pointed out:

I have come across the enquiry approach in the NCS document ... It means if you are teaching the learners, you should ask them questions. They could respond to those questions in an assignment ... The enquiry approach does not always mean the question and answer method. You [the teacher] can ask the learners to analyse information and pictures in a book. For example in a lesson on population, I can ask questions based on the use of pictures or cartoons in a textbook.

Vena is quite aware that enquiry learning has to do with question-posing and finding answers. In addition to finding information, enquiry learning should incorporate the teaching and learning of problem-solving skills through fieldwork, as well as values clarification (Department of Education 2003b).

On the meaning of the enquiry approach, Lloyd commented:

As I understand it, it is more of the teacher posing a question to the learner and the learner does some research and then comes back and we discuss it in class.

He then gave another view:

[Alternatively] I would not pose a question to them, but rather a statement or a hypothesis where they must go and see whether it is true or not.

The second view of enquiry learning suggested by Lloyd is informed by the positivist worldview which has been widely criticised for hindering the effective implementation of EE and ESD (see Section 3.1.1.2). Lloyd’s perception of the enquiry approach is that it means involving the learners in research but he considers it as optional. In 2010, the geography learners at FET level in Lloyd’s school (School 5) were asked to do an open-book task instead of a research project because they “*had a choice*” of methods of assessment. Because school time was shortened as a result of the staging of the 2010 Soccer World Cup, an open-book task was more expedient than a research project. The shortage of teaching time was also exacerbated by the prolonged public service strike.

Thomas stated that he has never come across the term “enquiry learning” in the NCS document. Nevertheless, he then pointed out:

We do give projects, for example where they enquire about globalisation [Grade 11 syllabus], to get information from the internet and encourage them to go to libraries. When you look at the completed projects, you notice that they have written the same thing – most of them have just plagiarised the information.

Again research, according to Thomas, involves the collection of information that enhances the learning of knowledge at the expense of skills, attitudes and values as noted above.

A supplementary curriculum document, the Learning Programme Guidelines for geography (Department of Education 2008a), provides information on the enquiry approach. The document introduces the idea of *key questions* which are meant to guide the enquiry process. The teacher participants did not mention this document but they referred much more to work schedules and pace setters which do not incorporate the idea of the key question. A few participants who referred to key questions in the interview and lesson plans, for example Ian, Hilton and Thomas, did not link key questions to the enquiry approach. Hilton uses the idea of the key questions a lot in planning lessons and in delivering the teaching and learning programmes (see Appendix B:6). When asked about how he makes sense of the key question, Hilton commented:

I think if you want to teach geography, obviously you have to look at the syllabus ... [and then ask the question], what knowledge or content am I planning to teach? To make it easier for yourself, set a key question that is in line with the content that you have to teach and from there break it up into smaller components. The key question is quite important because you want the learner to get a global picture of the information that you are trying to convey. The key question basically covers the whole span of content that you are trying to teach. Then there are smaller questions that you have to ask in order to get to the key questions ... It [the key question] is almost like an objective ... Key questions help in the development of critical thinking skills.

Fisher (1998) cited by Department of Education (2008a), cautions teachers that the question and answer approach that elicits recall of factual information from learners is not the correct way of using key questions to guide the enquiry process because it does not assist in the development of critical thinking skills. According to Fisher (1998: 21), an enquiry process, guided by key questions, should be characterised by “an investigative, open-ended orientation to the sequence of questions.”

Fieldwork is an integral part of the enquiry method because it enables the learners to go out and find information on questions which they ask relating to particular environmental issues (Boardman 1986; Naish, Rawling & Hart 2002).

5.4.2.3 Teacher's use of fieldwork activities

Maggie's response concerning her use of fieldwork was:

I do not do fieldwork these days ... We have a choice for the requirements. We can either do fieldwork for a mark or a test or a research-based assignment. In my earlier days as a teacher, I used to take the Grade 8s to the museum. I first went on my own in order to set up a worksheet. I would then take four or five buses of children to the museum. I am not doing that [fieldwork] anymore. The number of learners has increased and so the financial costs [of doing fieldwork] would be prohibitive.

An analysis of the assessment guidelines confirms that fieldwork in geography at FET level is optional as illustrated in the extract below relating to Grades 10 and 11:

Of the six tasks undertaken during the year, two tasks are tests, one is a mid-year examination and the remaining three tasks should make use of different forms of assessment such as research project (or assignment or fieldwork), a practical task (based on map skills and analysis) and a model (or case study or creative response or data handling or contextual analysis) (Department of Education 2008b: 9).

Ian, who teaches in the same school as Maggie, commented:

Fieldwork is a bit of a problem because a document came from the Department [of Education] saying that any fieldwork cannot be done during school hours. That is why we sort of stopped with fieldwork because the principal handed us a letter from the Department saying that we are not allowed to do fieldwork anymore because it affects contact time ... In the last two years there were no geography field trips in the school.

Johan pointed out that the Department of Education guidelines stipulate one field trip per class per year. Grade 10s, 11s and 12s go for an annual field trip (see Section 5.3.3) at this school (School 2).

Hilton's view is that fieldwork must be distinguished from excursions. Concerning how he interprets fieldwork, Hilton remarked:

You have to give the learner resources. For example, if you are doing a project on rivers, you give the learners a map of the river and then explain certain concepts in the project such as: Which part of the river is more polluted? Which part of the river experiences more erosion? Where is the water cleaner? What is the size of the pebbles? The learners are expected to record their information, collate the findings and then write a report.

Hilton added:

At a school like this we have limited time for teaching and it therefore makes it difficult to do fieldwork.

Besides financial constraints, Robert mentioned that there are time constraints as noted by Hilton above.

Robert remarked:

Fieldwork must not impact on the rest of the contact hours of the learners and so it is difficult to get permission from the other teachers.

Oliver has used the school premises for fieldwork. He observed:

I have not done much fieldwork but there are times when we go out and do fieldwork on the local ecosystem on the school premises.

Godwin's perspective on fieldwork is that it involves long distance excursions. Lloyd views fieldwork in a similar manner. According to Lloyd, fieldwork is limited by financial constraints (see Section 5.4.4). Vena asked the question: "What is fieldwork?" She seemed to be unclear of what fieldwork is. Thomas cannot do fieldwork because he is physically disabled.

5.4.3 School organization

The rigid school organization programme is one of the main challenges that hinder the effective implementation of EE and ESD in the school curriculum (see Section 3.3.5). Maggie pointed out that she does not have enough time to take action on environmental issues or to use fieldwork as one of the pedagogical approaches in her lessons. Referring to the action carried out in cleaning the river described above (see Section 5.3.4), Maggie stated:

*I had to ask for permission from the principal to go in the morning [during teaching time].
I also had to ask for permission from different teachers and that is very time consuming.*

Fieldwork tends to disrupt the school programme. Furthermore, preparation is also time-consuming. As a result, many teachers are not likely to use it often as a pedagogical approach.

Concerning the current lack of involvement of learners in action on issues in the local environment, Maggie commented:

I know that they are doing something in Life Orientation but in geography I did not do something like that [recently]. My time for the Grade 12s is basically to get through the curriculum, so it is seldom that I go from that path. I basically do what I have to do, set out the requirements, do the lessons and prepare them [for the exams]. For my Grade 10s, 11s and 12s, I need to have certain [amount of] work done at the end of the year. I basically focus on the curriculum so that by the time they start examinations, they will have finished most of what I wanted them to cover and what is prescribed for them in the requirements for the examinations.

Maggie mainly concentrates on teaching for syllabus completion so as to prepare the learners for examinations. As a result there is a shortage of time for taking action on environmental issues. Hilton explains why it is difficult to take action on local environmental issues:

There are many things that we can do. We could maybe have cleaned the river near the school here but unfortunately time constraints do not allow us to do that. One could have done something in the form of a project such as recycling. Such activities could make learners aware of the fact that they need to change their behaviour and attitude towards the environment.

Hilton commented further:

I do not think our school or the geography classes have been in any sense involved in any local issues. There are time constraints. In the afternoons we have sports training. We are very busy at this school. During class time it would be very difficult to get about 25 learners involved in a local activity. You cannot take the learners away from school ... what happens to their other classes that they have to attend? After school in most cases it is very difficult because they are involved in a lot of sport. During the weekends it is also difficult because that is when we play our matches in different sporting codes.

From the above comment Hilton is aware that action on environmental issues needs to be incorporated into the teaching and learning of secondary school geography but shortage of class time is one of the major constraints. Furthermore, sport takes a lot of the school time especially in the afternoon and during weekends. As a result, there is a shortage of time for other activities.

Robert appeared to be grappling with what the aims of geography curriculum should be. According to him, it mainly teaches knowledge which has to be evaluated using the examination system. Robert seems to have difficulty in deciding to what extent EE and ESD should be incorporated into the geography lessons.

Robert claimed that:

... knowledge in the South African system is something that is highly rated and at the end of the year they [the learners] must write exams. We therefore focus more on preparing them for exams. If we concentrated more on environmental issues, the learners would be conscientised about environmental studies at the end of the year but their knowledge base would not be good enough. They would then struggle to cope [with the examination].

Referring to research projects on environmental issues, Robert added:

You touch on these kinds of issues but to really discuss them in depth it is difficult because you have to come back to knowledge and information that you have to put through to the Grade 12s [to prepare them for examinations].

In the above statement, Robert seems to prioritise the teaching of knowledge so as to prepare the learners to write matriculation examinations. Furthermore, the need to finish the syllabus is likely to limit the pedagogical approaches to didactic approaches. Thomas argued:

There is another problem I am seeing [with some of the learner-centred approaches]. We have to finish the syllabuses [on time] and so using methods such debates is time-consuming.

Thomas and Hilton, referring specifically to the Grade 11 syllabus, pointed out that it is too long and thus it is difficult to finish on time for the learners to write examinations.

5.4.4 Inadequate resources

Inadequate resources can limit the pedagogical approaches at the teacher's disposal, for example fieldwork. Inadequate resources include school infrastructure and shortage of teaching and learning materials. School 2 is well resourced when compared to the other four schools. The two township schools, Schools 4 and 5, are the least resourced schools. The shortage of resources is exacerbated by the fact that Schools 4 and 5 are no-fee paying schools (see Section 5.1.1).

Robert remarked that the shortage of finance has reduced the amount of fieldwork that can be conducted. He observed:

Two years ago we took the Grade 10s to Mowbray where they construct topographic maps. We then went from there to the inner city of Cape Town to study land and air pollution. Financial constraints prevent us from conducting more field trips.

Oliver, who teaches in the same school as Robert, also confirmed the problem of financial constraints facing the school. He commented:

Our school has a restriction in that when we plan for a field trip, the first question that the parents ask is: Do you have the money? [Lack of] finance is one of the problems that restricts the use of fieldwork.

Similarly, Lloyd who teaches in a poorly resourced school (School 5) explained that the shortage of finance is one of the problems that hinders the use of fieldwork.

Lloyd argued that:

Fieldwork is encouraged but unfortunately, it goes with costs and the parents are not always willing to contribute to the costs. I would like to take my learners, for example, to the ocean so that they can experience the beach and waves. I would like them to visit other places such as the weather station. It costs money and it is difficult to raise funds for excursions. To solve this problem, I bring the real world into the classroom by using audio-visual aids such as DVDs.

A conversation with some of the school principals confirmed that there is indeed a shortage of finance in most of the selected schools (see Section 5.1.1). According to the principal of School 1, poverty caused by joblessness in some communities is a major concern because it results in a number of parents failing to pay fees. This scenario contributes to a severe shortage of finance for providing logistical support for fieldwork excursions. Similarly, in School 3 the principal explained that the shortage of finance is caused by non-payment of fees by some of the parents. The principal attributes this to high levels of unemployment resulting from the closure and relocation of some factories that used to employ some of the township residents. The principal also noted that a significant number of township residents hold low-paying menial jobs. The principal of School 4 complained about the lack of support from the parents in the school's fund-raising efforts. Schools 4 and 5 are located in Black townships which experience endemic poverty. This explains why these two schools are categorised as no-fee paying schools.

5.4.5 Lack of awareness of EE and ESD strategies

5.4.5.1 Development of critical thinking skills

According to Tilbury (1997), geography education should promote critical thinking skills which would enable the learners to uncover the root causes of environmental problems. The learners will also be able to explore and understand the value systems of the decision-makers. Additionally, the learners are provided with opportunities to reflect on how their own values contribute to the environmental problems (see Section 3.3.6). Some of the participant teachers were struggling to make sense of what critical thinking is and how it can be promoted through the geography lessons.

Maggie's experience is that only a few learners can think critically. She commented:

This applies to my classes and I also find that it is a problem in the whole school. Our learners cannot think critically... Certainly OBE promotes critical thinking because if you teach, you have to tell them there are always different ways to look at a diagram, but our children struggle with it [critical thinking].

Maggie does not show how she can help the learners to develop critical thinking through the geography lessons. It appears that assessment is at the forefront of her teaching because she refers to the ability of learners to analyse diagrams. Teaching programmes that mainly aim at enhancing performance in assessment, as illustrated by Maggie's comment, would surely not promote critical thinking in the learners because the teaching and learning programmes are likely to promote rote learning.

Maggie also observed:

Most of our learners cannot read. They continue to be promoted from one class to a higher one despite the fact that they cannot read. OBE demands of them to be able to read and interpret information but our learners do not have that skill. One thing lacking in our learners is that they do not have the skills [literacy and numeracy] but OBE demands that they should have the skills in order to make decisions and to be creative. Critical thinking is what OBE demands but the learners lack the critical thinking skills.

The problem of lack of these fundamental skills required for learning was confirmed by the principal of School 1, Maggie's school. The principal was concerned with the drop in reading, writing and numeracy skills of learners enrolling in Grade 8 from primary schools in recent years. As a result, many learners were failing to cope with learning at secondary school level. Critical thinking skills cannot be developed where the learners lack fundamental learning skills of reading, writing and numeracy.

Ian pointed out that critical thinking is a higher level skill that is likely to be achieved mostly by the intellectually gifted learners.

Ian commented:

I try to bring into all the lessons the key question and then assist them on how they must think about the key question. I also try to encourage all the learners to contribute their input without telling them whether they are right or wrong. We then try to answer the question with the input of the responses from a lot of learners.

Similarly, Johan commented that only a small number of learners in his school can think critically and that it is difficult to evaluate the achievement of critical thinking skills in the learners. Johan was not explicit on how he can promote critical thinking through the geography lessons.

In contrast to the views of other teacher participants such as Maggie and Johan, Hilton thinks that he has been successful in developing critical thinking in his learners.

Hilton commented:

The way the learners respond to things that I say is actually an indication that they are analysing and that they are thinking critically about some of the information. I think to a large extent I have succeeded in the geography class to inculcate critical thinking where the learners analyse, interpret and think objectively about things. I think I see it every day in the class – the way the learners, when they respond to certain things, they challenge me on some of the things that I will have said.

Hilton could not explain how the geography learning programmes promote critical thinking. He noted:

I am not the only one who has contributed to critical thinking. The development of critical thinking skills can also be attributed to their home background where they have a lot of exposure to the internet. I think they are also advantaged in some instances.

Hilton noted that not all learners in his geography classes can think critically. It is the more intellectually gifted learners whose critical thinking skills are highly developed.

Robert pointed out that he has occasionally exposed the learners, especially the Grade 12s, to controversial issues but he has not been successful in helping them to develop critical thinking skills. He explained that he does not know how far to go with exploring controversial issues because he has to

be mindful of the fact he has to teach knowledge in order to prepare the learners for the examinations (see also Section 5.4.3).

According to Oliver, very few learners whom he teaches can think critically. Most of them are content to accept anything they are told by the teacher. Oliver was not explicit on how he tries to promote critical thinking in the geography lessons.

Oliver commented:

I do not think we are far on that [development of critical thinking]. If I tell the learners that the sun is coming up in the east, they believe me regardless of what the reality is. They do not question whether what I am saying is acceptable or not. I think there is something wrong with a lot of the learners. Only a few of them will pose the following questions: Why is it like that? Who told you that? Who made the decision so that it is like that? Most of them tend to accept uncritically what they are told.

Godwin claims that he has been successful with the Grade 12s in developing critical thinking. He observed:

I always ask them to justify the answers they give. I ask them to give reasons for the statements that they make.

Vena was not explicit on how she promotes critical thinking in her lessons.

Lloyd claimed that he promotes critical thinking but he did not explain how he does that in the geography lessons. Lloyd commented:

We are promoting independent thinking. The challenge is that 80% of our learners are not at the stage where they can seriously debate and independently criticise certain issues.

The learners in Lloyd's school are likely to be restricted by the language from participating in class. Because English is a second language for most of the learners, many of them are likely to have communication problems as well as difficulties in comprehending learning materials (see Section 5.4.2). They are not likely to criticise what they have not understood in the first place.

Like Ian, whose comments have been noted above, Thomas explained that he tries to develop critical thinking by applying some of the geography key questions in some of the lessons. According to IGU-

CGE (1992), for any aspect of the human-environment interactions that are dealt with, the key geography questions should include:

- Where is it?
- What is it like?
- Why is it there?
- How did it happen?
- What impacts does it have?
- How should it be managed for the mutual benefit of humanity and the natural environment?

Thomas did not explain how the geography questions noted above can help to develop critical thinking.

In Section 5.3.1, I mentioned that the geography NCS (Department of Education 2003b), frequently refers to issues or issues and challenges. This provides opportunities for using the issues-based approach to enable environmental concerns incorporated in the geography curriculum to be integrated in the lessons more effectively.

5.4.5.2 Perspectives on the issues-based approach

The teacher participants had varied responses on how they make sense of and use the issues-based approach.

Maggie responded that she uses the issues-based approach when she gives the learners assignments, for example on global warming, as already noted above in Section 5.3.3. Ian does not use the issues-based approach in organising the content. He touches on environmental issues when he covers certain topics. An example, according to Ian, is the issue of the outbreak of xenophobia and the environmental problems that were created in the process of dealing with the displaced victims of xenophobia. This was covered when Ian taught “Population movements” in the Grade 10 syllabus.

Concerning the issues-based approach, Hilton commented:

You can't always use the [issues-based] approach. There are various other techniques and approaches one can use, to allow learners to discover the knowledge because the ultimate goal is you want to make a learner-centred classroom where the emphasis and the focus is on the learner. If one used the issues-based approach - that is only one method. There are other methods where you can, for example, use various types of data as visual stimuli. So you don't always use the issues-based approach.

Hilton elaborated:

I sometimes use the issues-based approach where we give learners a case-study. In the case study there will be a problem. We then have discussions on how to address the problem that was brought to their attention through the case study. We did a case study on the problem of the shrinking Nile Delta. We also looked at the problem of uneven economic development in South Africa when we covered development and sustainability in the Grade 11 syllabus.

Hilton views the issues-based approach as a pedagogical approach, while it actually is a way of organising content. According to Robert, the issues are linked at the end of the different topics (see Section 5.3.2). In other words, he does not use the issues-based approach.

Robert remarked:

If there is a problem or issue, I first give them the knowledge and the information and then from the information we link it to the issue.

Oliver struggles to make sense of issues and the issues-based approach. He commented:

I think most of the time it [the content] is issues-based but then as I told you, we switch to teacher-centred. We ask the learners questions. Do they understand? What can they think? How do they think they can help or repair things in the environment such as pollution?

Oliver later contradicts himself:

On the other hand we don't do a lot on the issues such as pollution, sustainable development, climatology [and so on]. I do not think that we are doing our best to influence the behaviour of the learners towards caring for the environment. I think that we can still do a lot more. It seems to me like we are only busy with the tip of the iceberg and we are not really going into it and to the bigger part of issues or something like the environment.

Issues-based to me means there are a lot of issues in the country and in our region. In the example of population studies, if this is an issue then we connect what we are doing in class to it.

Godwin tackles issues in the same way as Ian does. Environmental issues such as pollution are incorporated in some of the topics such as service provision. Vena also includes issues while she is teaching particular topics such as gender issues under population studies.

Lloyd commented:

It [the issues-based approach] is more evident mostly in the lower grades, for example Grade 8. Their approach is more issues-based because we are working with issues of inequality such as gender inequality and race inequality. In the upper grades we deal with the issue of global warming, droughts, floods. A big part of the curriculum is issues-based.

The participant teachers' responses reveal that some of them struggle to make sense of what issues should be incorporated into the lessons in order to effectively implement EE and ESD. None of the teachers use the issues-based approach in organising the content for the effective teaching of EE and ESD.

5.4.6 The role of curriculum advisers

The responses of the teacher participants concerning support from the curriculum advisers are mixed. Some participants were generally pleased with the assistance which they received over the years since the new curriculum was first implemented in 2003, whereas others felt that the assistance was inadequate. Regarding the implementation of EE and ESD in the new geography curriculum, some of the participants pointed out that more assistance is required from the curriculum advisers.

Maggie, the HOD of School 1, is generally happy with the assistance from the curriculum advisers over the years. She attended many workshops on how to implement the new curriculum. Additionally, she communicates regularly with them to iron out any queries concerning the geography curriculum.

Maggie commented:

In 2003 ... the subject advisers came in [to her school] and spoke to us. We had a lot of workshops around the curriculum in geography ... Even now the geography subject advisers give us enough time. They come [to school]; they phone; they email. They also set up assignments and worksheets for us [for assessment of learners].

However, Maggie feels that the curriculum advisers have not provided the support required specifically in the implementation of EE and ESD in the geography curriculum.

Similarly Johan, the HOD of School 2, is happy with the support from the curriculum advisers:

We had enough support from the Department. A couple of circuit managers and subject managers have come around. We had workshops and seminars at different schools on how to implement the new syllabuses within the framework of OBE. We don't have problems with them [curriculum advisers]. They are just a phone call or email away. They are very supportive.

Johan later contradicted himself and gave the impression that he does not need the support from the curriculum advisers. He remarked:

Nothing is new here [referring to the new curriculum]. We did this in our degrees [training]. They took the old syllabus and then moved some topics around. Urban geography will always be urban geography; climatology will always be climatology; pollution will always be pollution.

Johan is likely to stick to traditional didactic approaches to teaching that transmit factual information in order to prepare learners for examinations because he claims that there are no major changes in the curriculum. EE and ESD cannot be effectively taught using teacher-centred approaches (see Section 3.3.2).

Hilton, who teaches in the same school as Johan, is also satisfied with the support that he gets from the curriculum advisers. He commented:

I attended a lot of workshops. There was a lot of support from the Department to help us in the implementation of the new curriculum.

On the question of what he felt about the support over the years, Hilton observed:

I look at it from the point of view of whether I need any more support. If there is something that I don't understand or something that I want to implement in a better way, I can always phone the curriculum adviser. If I leave a message on his phone, he always comes back to me.

He mentioned, however, that there is need for more assistance in implementing EE and ESD in the geography curriculum.

Similarly, Robert pointed out that the support provided to him when the new curriculum was first launched was adequate. He attended workshops where the geography teachers interacted with curriculum advisers who helped them to implement the new curriculum. Referring to the current situation, Robert remarked:

Curriculum advisers interact with us on a quarterly basis ... to set standards ... to ensure that top-down directives are followed with Grade 12s [assessment].

Robert, the HOD of School 3, added that more assistance from the curriculum advisers in implementing EE and ESD would be appreciated by the geography teachers. Oliver, who teaches in the same school as Robert, pointed out that the support from the curriculum advisers was initially inadequate but gradually improved over the years. Concerning the teaching of EE and ESD in the geography curriculum, Oliver commented:

I think with regards to teaching of environment in geography, there could be better support from the Department.

Godwin, the subject head of School 4, is also satisfied with the support provided by the curriculum advisers. He pointed out that he attended staff development workshops when the new geography curriculum was first launched and the support has been sustained over the years.

Godwin remarked:

The curriculum advisers are very helpful to us. We hold regular departmental meetings with the curriculum advisers [at School 4] in order to address problems.

Vena, who teaches at the same school as Godwin, agreed with him that the support provided by curriculum advisers in the school was adequate. She stated that:

Curriculum advisers visit the school every quarter. They talk to us and visit our classes to observe some lessons. After that they call for departmental meetings where they give suggestions on how the teaching can be improved. They also set tasks, tests, and projects that we can use for assessment of the learners.

Lloyd and Thomas from School 5 have a different take on the support provided by the curriculum advisers. According to them not much support was provided by the curriculum advisers at the launch of the new curriculum and the support is still inadequate. Lloyd and Thomas also mentioned lack of support targeted at the implementation of EE and ESD in the geography curriculum. Lloyd commented:

There was not much support given. We had to attend a workshop for two or three days ... You must remember that many of the teachers came out of the old teaching methods when they were at the universities and colleges. They were never trained in the new methods of OBE ... the teachers were expected to reskill themselves within a few days.

Concerning the current situation, Lloyd observed:

We see the curriculum adviser two times a year, mainly on Grade 12 issues. The focus is on Grade 12 assessment and [on monitoring] progress in covering the curriculum.

Lloyd's comment supports the discussion in Section 5.4.3, concerning the fact that teaching and learning programmes focus on preparing learners for examinations.

Thomas is very critical of the curriculum advisers. He remarked:

We went for a one week workshop [when the curriculum was first launched]. The workshop involved implementing the geography NCS within a new OBE policy framework.

Regarding the current situation, Thomas is of the view that:

The support is poor or non-existent. They [the curriculum advisers] visit schools for moderation of continuous assessment and to collect marks, but if we want them to come and support us with materials, they do not come. They say that they are busy.

On the whole, the participant teachers' responses reveal that the curriculum advisers have generally been supportive, except in the case of School 5. However, EE and ESD implementation in the geography curriculum could be more effective if the geography teachers received more assistance from the curriculum advisers.

Furthermore, curriculum advisers influence the manner in which the teachers use the geography NCS (the curriculum document). Some teacher participants claimed that they use work schedules and pace setters and do not refer to the curriculum document. The use of work schedules and pace setters indicates that the teachers have been deskilled.

Maggie commented:

We get pace setters at the beginning of the year. The work in the pace setters has been set up for a week. We use work schedules together with pace setters.

Maggie spoke on behalf of Ian and other geography teachers in her school (School 1). Similarly, Johan uses work schedules and pace setters and hardly refers to the original NCS document. He remarked:

We put all these things on PowerPoint [lesson plans]. I don't go back to the original document [geography NCS]. My documents for micro-planning, meso-planning and macro-planning are in the computer. All my planning for the whole year is in the computer. I use work schedules and pace setters from the Department.

Oliver also uses work schedules and pace setters. He hardly refers to the original NCS document. Similarly, Lloyd and Thomas use work schedules and pace setters (see Section 5.3.1). However, Hilton, Robert, Godwin and Vena stated that although they use work schedules and pace setters, they still refer to the original NCS document frequently.

Concerning how he uses the NCS document, Hilton observed:

I have to consult it on a daily basis ... The original document provides more information on the learning outcomes and assessment criteria. One has to go back sometimes and double-check the information [in the original document]. I have also noticed that the content outline or the knowledge framework in the original NCS document differs from the one in the work schedules slightly ... I sit with the original NCS document and the work schedule to do macro-planning. I need to consult both documents as well when I do micro-planning or day to day planning.

Robert uses the original NCS document regularly to plan teaching and learning programmes for Grade 12. He commented:

One has to refer to it from time to time with Grade 12 planning because the final exam will be based on the NCS. In Grade 10 and 11 one tends to base the teaching more on the textbook ... for Grade 10 and 11 you use the work schedules, pace setters and most of the time the textbook to cover what is prescribed. For Grade 12 you make sure that you have prepared them according to the requirements of the NCS.

Vena explained that she uses the original NCS document when she plans for the term. The teachers who do not refer to the original NCS document are likely to lose sight of the aims of geography education: that teaching and learning programmes should focus not only on the acquisition of knowledge but also on the development of skills, attitudes and values required for more sustainable lifestyles. The original document is far more informative on strategies for implementing the curriculum than the work schedules and pace setters (see Section 5.3.1). Furthermore, the curriculum document is explicit on the

fact that an integrated approach (emphasizing human-environment interactions) should be used in organising the teaching and learning programmes.

5.5 SUMMARY

The school data reveals that only School 2 is well-resourced when compared to the other four schools. Schools 4 and 5 are the least resourced. This is exacerbated by the fact that they are no-fee paying schools. The shortage of resources is manifested by overcrowding in some of the geography classes, especially in Schools 4 and 5. The school context also reveals serious social and socio-economic problems in most of the sample schools. All the participants are qualified geography teachers with a long service in the profession.

The data also reveals that most of the teacher participants acknowledge the incorporation of environmental concerns in the geography curriculum. However, they grapple with a number of issues in implementing EE and ESD in the curriculum. First, some of them cannot identify EE and ESD content in the curriculum. Second, they have difficulties in deciding how far to go in teaching EE and ESD in the geography lessons. Third, some of them claim to use learner-centred approaches, some of them claim to combine the pedagogical approaches and yet others state that they predominantly use teacher-centred approaches. Fourth, other barriers include issues such as shortage of time related to school organization and shortage of resources. Fifth, some of the teacher participants are not familiar with strategies for implementing EE and ESD, such as enquiry learning, the issues-based approach and the need to inculcate critical thinking skills in the teaching and learning of geography. Sixth, their perspectives on the subject matter show inadequate understanding of the meaning of environmental education, sustainable development, education for sustainable development, the aims of geography education and the links between geography and environmental education. Some of these challenges could be addressed if more support was provided to the geography teachers through staff development by the curriculum advisers. As a result of these barriers, the geography teachers are likely to focus on teaching knowledge at the expense of developing skills, attitudes and values.

CHAPTER 6: TEACHERS GRAPPLING WITH ENVIRONMENTAL CONCERNS IN THE GEOGRAPHY CURRICULUM: A DISCUSSION

In Chapter 5, I provided the research context of the selected schools and the profiles of the teacher participants. Additionally, I described the findings of the study in the form of the main themes, classified into opportunities and challenges. The themes offer answers to questions related to: opportunities for teaching EE and ESD in the geography NCS; the geography teachers' perspectives on EE and ESD; whether the teachers incorporate the teaching of EE and ESD in the geography lessons; pedagogical approaches used by the geography teachers; and, the barriers to teaching environmental concerns infused in the geography curriculum. In this chapter, I use Spillane, Reiser & Reimer's (2002) cognitive model of the policy implementation process as a framework for discussing the findings. I also highlight other barriers that hinder the teacher participants from implementing EE and ESD, in the discussion on pedagogical approaches and strategies employed by the teacher participants in their teaching.

6.1 THE MODEL OF POLICY IMPLEMENTATION

The cognitive model of policy implementation involves the agents' sense-making regarding new policy. In order to complement other policy implementation models, Spillane, Reiser & Reimer (2002) propose the cognitive framework to explain how implementing agents make sense of new policy. They argue that policy failure can be explained by the agents' lack of understanding of the policy messages rather than the perceived lack of cooperation, acts of sabotage or resistance to change. According to Spillane, Reiser & Reimer (2002), implementing agents interpret a new policy through three interacting factors that influence their cognition or understanding of policy: individual cognitive structures (knowledge, beliefs and attitudes); the agents' situated cognition or context; and, the policy signals or the way the policy is represented. To elaborate on these factors, first, the meaning of a new policy to the implementing agents depends on individual cognition or what they already know at individual level and on their experiences. The way agents interpret information communicated by policy documents is often informed by what they already understood previously. As a result, the agents' existing understandings may interfere with their ability to interpret, understand and implement policy as originally intended (Spillane, Reiser & Reimer 2002). Second, situation or context refers to the influence of other people on the agent's sense-making. There are other actors and stakeholders who are also affected by the policy or have to implement it. At school level the agents may interact with other members of the department, the school managers and other teachers in the process of making sense of a new policy. At a meso- or macro-level this may involve school 'inspectors' and other government officials, curriculum advisers and professional associations. Third, the agents' sense-making can be influenced by the way the policy

is designed or represented. If the policy is ambiguous, then there is likely to be a wide gap between the policy rhetoric and practice due to the fact that the policy provides much room for varied interpretation and understanding by the agents (Spillane, Reiser & Reimer 2002). I discuss the teacher's sense-making in the following section.

Although Spillane, Reiser & Reimer's (2002) model appears to provide a useful framework for explaining the policy implementation process in the education sector, Blignaut (2008) cautions researchers that the model has limitations in postcolonial states such as South Africa where the context of education greatly differs from that of Western societies. The former is characterised by high levels of inequality in infrastructure provision (see also section 5.1.1) as a result of the apartheid legacy. Additionally, the meaning of context in the model is narrow as it only refers to "nature and quality of relations" (Blignaut 2008: 102) and not the broader meaning of context as referring to all the local factors that influence the teacher's sense-making and enactment of policy.

6.2 TEACHERS' SENSE-MAKING OF THE CURRICULUM

The analysis of the geography NCS document showed that environmental concerns are incorporated in the preamble of the curriculum document (the purpose and scope of geography at FET level), in the learning outcomes, assessment standards as well as in the content of the Grades 10, 11 and 12 syllabuses (see section 5.3.1). The curriculum policy document also suggests strategies for implementing EE and ESD such as the issues-based approach, the inculcation of critical thinking skills and the enquiry-based teaching and learning pedagogical approach. The sustainable development concept is a central theme in the curriculum. The geography NCS provides an enabling policy framework, with a lot of opportunities for implementing EE and ESD through the curriculum. In other contexts, the concept of sustainable development has not been explicitly emphasized in the curriculum materials in Lesotho, despite the integration of environmental concerns in the geography curriculum materials (Raselimo 2012). Similarly, Jóhannesson et al (2011) revealed that the concept of sustainable development rarely appeared in the curriculum documents from primary school right up to secondary school level in Iceland.

The majority of the teacher participants acknowledged the incorporation of environmental concerns in the geography curriculum. From the perspective of Spillane, Reiser & Reimer's (2002) model of policy implementation, these participants appear to have got the surface-level policy message as intended by the curriculum designers on the integration of environmental concerns in the curriculum document. However, the teacher participants still have to engage with deeper-level sense-making regarding the nature of geography promoted in the policy document, the nature of EE and ESD and the transformation of pedagogical approaches as communicated by the policy messages. The policy document has an

enabling framework which provides a lot of opportunities for incorporating EE and ESD into the lessons despite the fact that a minority of teachers in the sample (Robert, Lloyd and Thomas) feel that there are limited opportunities. One participant, (Thomas), categorically states that there are no opportunities for teaching EE and ESD in the Grade 10 syllabus. These three teacher participants seem to be experiencing conceptual difficulties regarding the meaning of EE and ESD as discussed in the following paragraphs. Lloyd and Thomas admitted that they hardly refer to the geography NCS document, but that they mainly use work schedules and pace setters for planning their lessons.

The preamble section of the geography NCS document, consisting of the purpose and scope of geography including the definition of the subject, is not included in the work schedules and pace setters. As a result, Lloyd and Thomas are likely to have missed the policy message concerning one of the most important aims of school geography at FET level; that it strives to promote more sustainable lifestyles through the teaching and learning of skills, attitudes and values in addition to knowledge and understanding. The admission by Lloyd, Thomas and other teacher participants that they mainly use work schedules, pace setters and other guideline documents developed by curriculum advisers shows the influence of situated cognition or context on the agents' understanding of policy as observed by Spillane, Reiser & Reimer (2002). The exclusive use of these supplementary documents in place of the geography NCS prevents the teachers from productively engaging with the curriculum document in order to make sense of the policy messages. In the following paragraphs, I deal with how the teacher participants make sense of EE and ESD.

The cognitive framework can be used to explain how the teacher participants make sense of EE and ESD through individual cognition (Spillane, Reiser & Reimer 2002). The geography teacher participants interpret EE and ESD individually from the perspective of what they already know as noted above. This study revealed that the teacher participants individually experience conceptual barriers regarding the nature of EE and ESD. Their responses indicate that environmental education is concerned with creating awareness concerning environmental problems. The teacher participants seem to focus on "fostering awareness by communicating information about environmental issues" (O'Donoghue 1993: 29) so as to change the behaviour of the learners towards the environment. Maggie's view is that she has to "*teach*" or "*tell the learners about the environment*" because she disapproves of their uncaring behaviour towards the physical environment (the school premises). Her conception of environmental education is that it mainly focuses on modifying behaviour towards the biophysical environment through imparting environmental knowledge. Maggie also reveals the pedagogical approach which she is likely to use. *Teaching* or *telling* about the environment implies that she is likely to use teacher-centred approaches to transmit environmental knowledge in the form of "hard facts" (O'Donoghue 1993: 29). According to Ian, environmental education is concerned with "*education about environmental problems.*" He has a similar perspective to that of Maggie in that he

believes that the transmission of environmental knowledge will translate into positive behaviour towards the environment. Furthermore, Ian's perspective is that of conservation education which focuses on the protection of the biophysical environment. This is illustrated by the fact that he expresses concern at the rapid loss of biodiversity as a result of the destruction of the biophysical environment. Like Maggie and Ian, Godwin explicitly states that environmental education is conservation education.

Hilton's perspective is that of conservation education because he is concerned with "*teaching and learning about biodiversity*" and how it should be managed. He displays an anthropocentric, technocratic and instrumentalist view of the environment (O'Riordan 1999) because he values the biophysical environment in terms of benefits that humans can derive from it with regards to the resources that can be extracted to promote economic growth. According to Hilton, environmental problems can be managed technically. Oliver continues with the discourse of telling or transmission of environmental knowledge. He hints at the idea of using experiential learning to teach about the environment. Robert seems to struggle with making sense of the meaning of environmental education and so does Vena. Robert follows the trend discussed above that environmental education is concerned with education *about* the environment. Most of the teacher participants view environmental education as relating to the transmission of environmental knowledge at the expense of skills, attitudes and values. Other studies conducted in southern Africa by Kethloilwe (2007) in Botswana and Raselimo (2012) in Lesotho showed that teachers generally view EE as being concerned with environmental management or conservation education as revealed in this study. Additionally, in East Africa, Kimaryo (2011) established that primary school teachers in Tanzania predominantly viewed environmental education and education for sustainable development as providing them with knowledge and skills or as education *about* the environment, much like participants in this research.

These findings resonate with those of Ham & Sewing (1988) who established through interviews of elementary school teachers in Idaho State in the US that the effective teaching of environmental education was being hindered by conceptual barriers among other constraints. In Ham & Sewing's (1988) study, the teachers' definitions of environmental education mainly focused on the cognitive aspects of EE (environmental knowledge) and tended to leave out the affective aspects (attitudes and values). According to Ham & Sewing (1988: 19) the teacher participants "tended to stress teaching knowledge or awareness of the contents of the environment, learning to use resources wisely or learning about interactions or interdependencies."

In this study, Ian and Lloyd hint at teaching about interdependencies in the natural environment. Ian mentions the link between vegetation destruction and the loss of animals and Lloyd refers to the importance of the ecosystem. Unlike the other teacher participants, Thomas hints at the fact that the environment consists of more components than just the biophysical environment but he does not

elaborate. Lloyd and Hilton's perspectives of environmental education differ, to a certain extent, from the perspectives revealed by the other teacher participants in that they incorporate the development of the affective domain (attitudes and values) whereas the other participants mainly focus on the cognitive aspects (environmental knowledge) (see Ham & Sewing 1988). Lloyd suggests that the geography curriculum should promote attitudes and values of appreciating the natural environment. Unlike Hilton, who displays an anthropocentric view of the environment noted earlier, Lloyd seems to be in favour of non-consumptive uses of the natural environment. According to Lloyd environmental education should promote stewardship of the natural environment among the learners as illustrated by the suggestion that the learners should "*look after it [the biophysical environment] because it is part of the ecosystem.*" Lloyd, unlike Hilton, hints that environmental education should promote an ecocentric as opposed to an anthropocentric view of nature (O'Riordan 1999) in the following statement: "*As part of the aims of the geography syllabus [curriculum]⁴⁷ the learners should be able to handle the environment with respect.*" Despite the anthropocentric view of the environment mentioned earlier, Hilton argues that the geography curriculum, by integrating environmental concerns, aims to develop the affective domain in addition to the cognitive domain. Hilton observed:

We are looking at the need to protect and conserve the environment ... One central golden thread that goes straight through [the geography curriculum] is the issue about environmental education and changing peoples' attitudes, views and values about the environment.

The teacher participants generally view environment as only consisting of the biophysical component that excludes the human dimension (social, political and economic components). As a result, the general perception of environmental education revealed by the teacher participants is still that of conservation education where they promote the teaching of knowledge and protection of the biophysical environment and tend to exclude the human dimension. However, two of the participants feel that EE should instil attitudes and values of caring for the biophysical environment.

The definition of the term *environment* in the geography NCS (Department of Education 2003b: 69) is that it refers to:

Surroundings; the totality of things that in anyway may affect an organism, including physical and cultural conditions; a region characterised by a certain set of physical conditions; the physical, built and social environment

⁴⁷ Inserted by author

This definition mentions the importance of both the (bio)physical and human dimensions in the concept of environment. However, the notion of interaction between the various components of the environment is excluded from the above definition making it inadequate. According to Corney (2000: 305) the environmental subject matter deals with “inter-relationships between ecological, social, economic and political factors” (see also section 3.1). The teacher participants seem to focus more on the biophysical environment when trying to make sense of the meaning of environmental education showing that they have probably not paid attention to the above definition provided by the curriculum document. Some of the teacher participants, who mainly use work schedules and pace setters, hardly refer to the geography NCS as observed earlier and thus miss some of the essential policy messages. In the case of the other participants, the meaning of environment as referring only to the biophysical component is likely to be now so entrenched in their minds that it is not easy for them to notice and accept other ideas on the meaning of environment (Spillane, Reiser & Reimer 2000).

Furthermore, the teacher participants view environmental education as being closely linked to sustainable development, expressing the view communicated by Ian that the “two are incorporated into one another.” The teacher participants’ views on sustainable development are derived from the perspective promoted by the Brundtland Report, *Our Common Future* (WCED 1987). In the geography NCS document, the definition of *sustainability* extracted from the Brundtland Report is that it is “a way of living that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Department of Education 2003b: 70). The aim of sustainable development, according to the Brundtland Report, is to achieve both intra-generational and inter-generational equity through using resources sustainably. This refers to promoting equitable distribution of wealth within nations and between nations and also ensuring that future generations will enjoy the same quality of life as the current generation (Hattingh 2002; Martin 2011; Mpotokwane 2002; Purvis & Grainger 2004). Some of the teacher participants, except Hilton, seem to focus mainly on the need to achieve inter-generational equity rather than intra-generational equity. This view is likely to be derived from the definition of sustainability noted above provided by the curriculum document. However, Vena struggles to make sense of the meaning of not only environmental education as noted above, but also of sustainable development. It is likely that Vena mainly uses work schedules and pace setters which are not as informative on sustainable development and the goals of teaching geography as the original geography NCS document.

None of the participants confronted the problematic nature of the idea of sustainable development (see section 1.1.2). They appeared to accept the definition provided by the Brundtland Report uncritically. This is illustrated by Lloyd’s comment that “sustainable development is the answer to environmental issues.” This uncritical stance could be derived from the way the concept is represented in the policy document. The geography NCS document does not advise the teachers about the problematic nature of

the idea of sustainable development so as to promote deeper-level sense-making about the concept (Spillane, Reiser & Reimer 2002). According to Taylor, Nathan & Coll (2003), 13 primary and secondary school teachers in New Zealand who participated in an interview concerning their perceptions on Education for Sustainability, were all familiar with the term sustainable development. They generally held a similar view of sustainable development to that of the teacher participants in this study. This is the view derived from WCED (1987) that sustainable development is concerned with promoting inter-generational equity through the sustainable use of resources. However, 3 out of the 13 teachers from the New Zealand sample pointed to the fact that the concept of sustainable development is problematic because it is difficult to reconcile political pressures with economic development and environmental protection (Taylor, Nathan & Coll 2003).

Additionally, the teacher participants struggle to make sense of the notion of education for sustainable development. It appears as if most of them have not come across the term as indicated by their responses, for example Ian, Oliver, Vena, Lloyd and Thomas (see section 5.4.1.2). Maggie interprets education for sustainable development as referring to conservation education which aims to achieve sustainability of resources through promoting positive behaviour towards the environment. According to Maggie, the term is synonymous with environmental education which she interprets as conservation education as discussed above. Similarly, the views of Robert and Godwin are that education for sustainable development refers to conservation education. However, Robert acknowledges the behaviourism inherent in OBE (see Le Grange & Reddy 1997) by pointing out that ESD is implemented through one of the learning outcomes (LO3) which deals with application of knowledge and skills. Ian associates education for sustainable development with environmental education but has difficulties in making sense of what it entails.

Hilton's anthropocentric view is again illustrated in his thoughts on education for sustainable development. According to him, education for sustainable development focuses on creating awareness of the need to conserve resources to enable economic growth to take place without any interruption. The aim of ESD is to modify behaviour towards the environment. Hilton again displays an unproblematic view of sustainable development where it is possible to maintain the same rates of economic growth despite the environmental impacts. However, he brings in a different perspective from that of the other participants concerning the issue of poverty. Hilton argues that there is need to address the issue of poverty in order to achieve intra-generational equity in addition to ensuring security of resources supply for future generations. Winter (2007: 349) underscores the need for policy documents to highlight the fact that teachers should critically reflect on current popular meanings of sustainable development and education for sustainable development. She draws attention to the need for policy implementers to engage with the "fundamental incompatibility between the concepts sustainability and development" noted above.

The terms environmental education and education for sustainable development are missing from the geography NCS document leading to conceptual difficulties with their meaning among the teacher participants. Chatzifotiou (2002) found that lack of clarity in the definition of terms such as environment, sustainable development and education for sustainable development in the National Curriculum documents of primary schools in England and Wales can cause confusion among teachers. Chatzifotiou (2002) argues that the above problem is exacerbated by the fact that the general literature lacks clarity on the terms sustainable development and education for sustainable development (see section 1.1.2). The Oxfordshire County Council (2002) cited in Summers, Childs & Corney (2005) found that lack of understanding of sustainable development among other constraints, hindered the implementation of education for sustainable development in some of the local schools in England. It is important for the teachers to engage with definitions of these terms to enable them to make sense of EE and ESD. This process is likely to help them to work towards achieving the goals of teaching EE and ESD through the implementation of appropriate teaching and learning programmes.

The teacher participants' perspectives on EE still reflect what Van Rooyen (1998: 118) referred to as a "distinct lack of understanding of the nature of EE and the implications for its incorporation in the school curriculum." Ian with 11 years teaching experience has a similar perspective on environmental education to the rest of the teacher participants. Surprisingly, Vena with only 9 years teaching experience was apparently ignorant of the term environmental education. This shows the continued neglect of EE and ESD courses in pre-service teacher training programmes in some, if not all of the South African higher education institutions. The conceptual barriers discussed earlier are revealed in how some of the teacher participants try to incorporate EE and ESD in the lessons.

In trying to incorporate EE and ESD in the lessons the teacher participants have to grapple with the meaning of EE and ESD and how to integrate environmental concerns in the lessons. There is a tendency to incorporate more EE and ESD themes in the human geography lessons than in the physical geography lessons as illustrated by Maggie and Lloyd's practice (see section 5.3.2). It is likely that the content in the curriculum document is stated in such a way that the link between human activities and environmental problems is clear whereas the teacher participants might have difficulties in identifying the link in some of the physical geography content in certain sections of the curriculum document. The difficulty of integrating EE and ESD is likely to be caused by the participants' conceptual difficulties on the meaning of EE and ESD and lack of understanding of the nature of geography. Robert also struggles with deciding how much EE and ESD to incorporate in the lessons without losing time required for teaching "knowledge" in order to complete the syllabuses in time to write examinations (see section 5.4.3). Furthermore, EE and ESD seem to be marginalised in some instances, for example, in the case of Lloyd and Robert who stated that they consider human impacts at the end of a series of lessons especially when they are teaching physical geography topics. Thomas is not likely to consciously

consider ways of effectively teaching EE and ESD if he cannot identify environmental concerns infused in the Grade 10 syllabus.

The perspective of school geography promoted by the Geography Policy framework is that: “Geography is a science that studies physical and human processes and spatial patterns on Earth in an integrated way over space and time” (Department of Education 2003b: 9). This means that the teachers should make an effort to integrate the physical and human processes as far as possible in designing teaching and learning programmes, so that the learners can realize that environmental problems result from human-environment interactions. Academics (Douglas 1986; Goudie 1986; Guelke 1989; Kates 1987; Stoddart 1987; Turner 2002) have argued for a united discipline (integrated physical and human geography) to enable environmental problems to be addressed more effectively (see sections 2.3 and 2.4). The geography NCS document (Department of Education 2003b: 11) attempts to clarify the integrated approach in order to enable the incorporation of EE and ESD using the example below:

... a study of physical processes that influence soil erosion, for example, must consider how human activities on the land also contribute to the process. The geographer needs to know why soil erosion is occurring and should understand the social, political and economic circumstances that may cause people to influence the rate of soil erosion in a place or in the broader region.

However, the rest of the policy is represented in such a way that physical geography and human geography topics are separated, making it difficult for the teacher participants to envisage an integrated approach. The insistence of the teacher participants in separating physical and human geography shows that they have either ignored or not understood the above policy message (Spillane, Reiser & Reimer 2002), that geography needs to be treated in an integrated manner.

Some of the teacher participants’ views on the nature of geography can be explained using the individual cognition aspect of the cognitive framework (Spillane, Reiser & Reimer 2002). One of the participants, Johan stated that the design of the new geography curriculum involved the shifting around of topics that were found in the old geography syllabuses (see section 5.4.6). According to him, the new geography curriculum is the same as the old one except for the differences in the assessment methods. Johan is therefore not likely to pay much attention to the implementation strategies suggested in the curriculum document such as enquiry approach that incorporates fieldwork. He is likely to continue with teacher-centred approaches which he used in the old curriculum. According to Spillane, Reiser & Reimer (2002), there is a tendency for implementing agents to make “superficial connections rather than deeper connection” when they are trying to make sense of new policy and this may lead to their failure to interpret and understand the policy as originally intended.

Hilton and Lloyd view school geography from the positivist perspective which was dominant when they were still at secondary school and in their undergraduate training courses (Nel & Binns (1999). Most of the teacher participants, including Hilton and Lloyd, have a long teaching service ranging from 15 to 35 years (see section 5.1.2). Hilton and Lloyd view school geography as involving quantitative techniques where the learners are presented with a lot of data to work on. According to Nel & Binns (1999), the teachers who were trained within the behaviourist are likely to continue working within these epistemological viewpoints in the new curriculum. They are likely to have an objectivist view of knowledge which has been heavily criticised for promoting technical solutions to environmental problems and helping to maintain the status quo with regards to unsustainable lifestyles (Stevenson 2007) (see section 2.2.4 and 3.1.1.2). This perspective is likely to hinder some of the teacher participants from learning about and using other pedagogical approaches that are more appropriate for teaching EE and ESD such as those based on the socially critical perspective (Fien 1993; Huckle 1997). Furthermore, the teacher participants' epistemologies noted above are likely to hinder them from identifying strategies suggested in the curriculum document, for incorporating environmental concerns in the lessons.

Situation or context also affects the teacher participants' sense-making (Spillane, Reiser & Reimer 2002) regarding the requirements of the new geography curriculum. In the South African context, the geography curriculum advisers greatly influence the interpretation of policy. As policy mediators and advisers, curriculum advisers influence the way in which policy is interpreted, understood and implemented through interacting with the geography teachers at individual level, school level as well as through meetings and staff development workshops at district, provincial and national level (see section 5.4.6). According to the teacher participants, the curriculum advisers have been silent on the incorporation of environmental concerns in the geography curriculum and on how to implement EE and ESD. As a result, some of the teacher participants such as Thomas (see section 5.3.1) have difficulties in identifying EE and ESD themes in the geography curriculum. Nevertheless, the curriculum advisers have generally been supportive to the geography teacher participants except in School 5 where Thomas and Lloyd feel that they need more support. There is need for the curriculum advisers to pay more attention to the implementation of EE and ESD because environmental concerns are incorporated in the geography curriculum. The curriculum advisers need to provide the required support to the geography teachers in the implementation of EE and ESD.

The policy signals or the way the policy is represented can influence the agents' sense-making (Spillane, Reiser & Reimer 2002). A number of teacher participants (Maggie, Ian, Johan, Oliver, Lloyd and Thomas) acknowledged that they do not refer to the geography NCS document during lesson preparation (see section 5.4.6). This is illustrated by the fact that some of the teacher participants such as Oliver, Godwin and Thomas (see section 5.4.2.2) admitted that they have not come across the

enquiry approach in the curriculum document. It is not clear what their reasons are for ignoring the geography NCS document. The design or representation of the policy document could explain why some of the teacher participants are reluctant to refer to it. The new policy document is large and cumbersome. Probably they feel that the reading process is time consuming. This is an illustration of the impact of the technician model of curriculum planning⁴⁸. The geography teachers have become deskilled (Hargreaves 1994; Reddy 2000) due to the fact that there was minimum consultation in the process of designing the new curriculum. Additionally, they have limited professional development to assist them with the implementation process. As a result, they have become technicians who heavily rely on curriculum advisers for sense-making or interpretation of policy as shown by the religious adherence to prepared work schedules and pace setters from the Western Cape Education Department in this study (see section 5.4.6). Bantwini (2010), researching on the implementation of the RNCS in one of the districts in the Eastern Cape province of South Africa, found that many teachers had not made an effort to study the curriculum document on their own. The teacher participants complained that the curriculum document was too thick and time-consuming to read. Additionally, they stated that the document is unclear and that they needed assistance to make sense of the policy.

Effective training and better support from the Department of Basic Education could improve the teachers' capacity to make sense of the policy and as a result implement the curriculum as was originally intended. Eight of the ten teacher participants (Ian, Johan, Hilton, Robert, Oliver, Godwin, Vena and Thomas) mentioned that concerns about the environment were addressed during their pre-service training. This could imply that they were trained to teach EE and ESD through the geography curriculum. Only, Maggie and Lloyd stated that their pre-service training courses did not adequately prepare them to teach EE and ESD. Most of the teacher participants have a long teaching service (15-35 years). Their courses are likely to have included conservation education (see sections 3.1.1) and not EE and ESD as it is currently conceptualised. Conservation education is based on a narrow view of the environment which excludes the human dimension (social, economic and political). The period during which the teacher participants were trained was characterised by conservative attitudes towards both education⁴⁹ (see Christian National Education 1971; Flanagan 1992; Nel & Binns 1999) and the

⁴⁸ The curriculum development process, aimed at achieving educational transformation after the inception of democracy rule, followed the Research, Development, Dissemination and Adoption model (RDDA), where the Department of Education engaged "experts" to design the curriculum, with little or no involvement of teachers (Jansen 1997; Le Grange & Reddy 1997; Kruss 1998; Reddy 2000).

⁴⁹ Christian National Education incorporating Bantu education was underpinned by the philosophy of Fundamental Pedagogics. This promoted "unquestioning acceptance of authority" and was "presented to student teachers as universal scientific basis from which the educator was to lead a child to adulthood, a process which required inter alia obedience to authority" (Janse van Rensburg & Mhoney 2000: 43-44).

According to Symmonds (1996: 7) some of the main features of Christian National Education were that:

- It helped to maintain the status quo;
- A transmissive teaching style which encouraged rote learning was mainly used;
- Students were regarded as empty vessels to be filled with knowledge;
- Learners were passive and were not regarded as co-constructors of knowledge;

environment. This aspect of the teacher participants' background explains why the general view of EE and ESD which they reveal is that of conservation education as noted above in section 5.4.1.2.

Lack of training was found to be one of the main barriers that is likely to hinder the implementation of EE by high school geography teachers (Ballantyne, Oelofse & Winter 1999) and primary school teachers (Reddy 2000) in South Africa. Kimaryo (2011) established that primary school teachers were not well trained in the implementation of environmental education in Tanzanian schools. Additionally, the teachers had not been provided with INSET courses either, in order to enhance their capacity to successfully teach environmental education. In a study done by Ham & Sewing (1988) in the US, the majority of the teacher participants ranked lack of knowledge about EE among other barriers as "most important" to "important". In this study the teachers generally felt that they had not been adequately prepared and trained to conduct environmental education. A number of other studies have established that lack of effective pre-service and in-service training of teachers in EE is one of the major barriers to its effective implementation in the school curriculum (see also section 3.3.4 and 3.3.5) (Braus 1995; Ham & Sewing 1988; Gajus-Lankamer 2004; Grace & Sharp 2000; Taylor 1998).

In the foregoing discussion I used Spillane, Reiser & Reimer's (2002) cognitive model of policy implementation to show how the teacher participants make sense of EE and ESD, as a curriculum innovation in geography education. Spillane, Reiser & Reimer (2002) argue that their model does not replace other models of policy implementation but it supplements them. In the following sections I discuss the pedagogical approaches used by the teacher participants and highlight some of the barriers that hinder the successful implementation of EE and ESD as a curriculum innovation in geography education. Besides experiencing difficulties in making sense of and interpreting the curriculum document, the teacher participants grapple with using appropriate pedagogical approaches.

6.3 TEACHERS GRAPPLING WITH PEDAGOGICAL ASPECTS AND STRATEGIES

6.3.1 Opportunities for learner-centred approaches

The teacher participants generally interpret enquiry learning suggested in the curriculum document as referring to research projects or assignments. These research projects are teacher-directed and designed in such a way that the learners obtain factual information from library books, newspapers and the internet. This (mis)interpretation of enquiry learning has been reported by Spillane, Reiser & Reimer (2002) in the US. Attempts to introduce inquiry pedagogy in science education have been thwarted by the tendency to understand it as just an extension of library research. The policy documents originally

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- The teacher was the main source of all knowledge; and,
 - Scientism was glorified.

intended that the teachers should facilitate the development of question posing, investigation and argumentation among students in science education. According to Gentner, Rattermann & Forbus (1993) cited in Spillane, Reiser & Reimer (2002: 396), this interpretation of enquiry learning can be explained by the fact that “people often rely on superficial similarities when accessing related information from memory ...” The teacher participants in this study are applying what they already know about research projects and assignments because their education and training focused on teaching of knowledge to enhance success in the examinations (Ballantyne & Oelofse 1989; Nel & Binns 1999). Spillane, Reiser & Reimer (2002) argue that this tendency to view new policy messages as familiar may prevent change and thus result in policy failure.

Such projects and assignments which are teacher-directed and carried out only through library research are likely to promote the teaching and learning of knowledge at the expense of skills, attitudes and values required for responsible environmental behaviour.

Although the Learning Programme Guidelines for geography (Department of Education 2008a), provide information on enquiry learning, some of the teachers are likely to have missed the policy messages about the enquiry approach because they rely more on work schedules and pace setters than on the geography NCS and Learning Programme Guidelines. Some of the teacher participants, (for example Ian, Hilton and Thomas), use the idea of key questions suggested in the Learning Programme Guidelines (Department of Education 2008a: 26) in planning and teaching the lessons, but they do not link the key questions to the enquiry approach. This is illustrated by Hilton’s comments on how he uses key questions: *“I have my lessons on PowerPoint and so, as part of the objectives and key questions, I include sustainable development.”*

The idea of key questions is used by some of the teacher participants to focus the teaching and learning programmes on the content and context of the teaching and learning programmes. The key questions are useful in the implementation of EE and ESD through the curriculum because they guide the enquiry process. The teacher and learners can formulate questions that guide their investigations as they seek answers to local environmental issues. The idea of key questions which can help the teachers and learners to apply the enquiry approach (Department of Education 2008a), appears to have been incorporated into the behaviourist perspective in which the teacher participants were trained (Nel & Binns 1999). According to Spillane, Reiser & Reimer (2002: 398), the tendency for implementing agents to see “new ideas as familiar” is a stumbling block to policy implementation as illustrated in this study. It appears as if some of the teacher participants interpret key questions as objectives. Spillane, Reiser & Reimer (2002) further point out that the new ideas in the policy messages may be incorporated into the agents’ “knowledge structures and beliefs” without focusing on areas where new policy differs fundamentally from previous policies resulting in superficial changes. Corney (2000) and Roberts

(2010) observe that there are varied interpretations of the meaning of enquiry learning and of how it is practised among geography teachers in England despite the fact that the teachers are increasingly being called upon to use it. Enquiry learning means much more than mere research, based on factual knowledge as revealed by the teacher participants in this study. In the implementation of the geography NCS, the enquiry process can incorporate teaching and learning through the issues-based approach, investigation through fieldwork, problem-solving activities, and the development of critical thinking skills as well as values clarification in addition to gathering knowledge in order to promote more sustainable lifestyles (see section 2.6.4).

The implementation of EE and ESD within the OBE policy framework means that the teachers can exploit the opportunities provided by the OBE features of learner-centred approaches that promote active learning (Le Grange & Reddy 1997; Meerkotter 1998). Three of the teacher participants (Maggie, Hilton and Vena) pointed out that they predominantly use learner-centred approaches in their teaching. Maggie stated that she encourages active learning through class discussions, assignments and projects. She also incorporates local issues into the teaching and learning programmes. Hilton articulated the importance of using learner-centred approaches to enable the learners to engage in active learning (see section 5.2.2), through a variety of methods such as simulation, group work, role-play, debates, class discussions and problem-based case studies. Vena stated that she mainly uses learner-centred approaches such as discussions, tasks, assignments and projects. Because School 2 is well-resourced when compared to the other five schools, field excursions involving all the geography learners are used regularly. Another three teacher participants (Ian, Johan and Godwin) communicated that they use both learner-centred and teacher-centred methods. Ian uses class discussions and research assignments in an effort to incorporate learner-centred approaches. Johan mentioned group work assignments and presentations that are used to encourage active learning in his lessons. Godwin uses projects and assignments among other pedagogical approaches.

It is not likely that the teacher participants understand what learner-centred approaches are. Their views appear to be simplistic perceptions of learner-centred approaches as just learner activities. Hilton, unlike the other participants, engages in deeper reflections regarding perspectives on teaching and learning including his role in the teaching-learning situation. In the context of the implementation of environmental concerns in C2005, Janse van Rensburg & Lotz-Sisitka (2000) found that teachers participating in the Learning for Sustainability pilot project in Mpumalanga and Gauteng provinces, generally had surface-level interpretations of learner-centred approaches. The teachers did not understand the constructivist learning theories underpinning the approach as well as their roles in the teaching-learning process. In this study it is not likely that the teacher participants understand constructivist epistemology that underpins learner-centred approaches either because their education and training was underpinned by behaviourist perspectives (Nel & Binns 1999) including the

philosophy of Fundamental Pedagogics (see section 6.2) (Janse van Rensburg & Mhoney 2000). According to Spillane, Reiser & Reimers's (2002) cognitive model, implementing agents tend to focus on "superficial similarities" when presented with new policy requiring them to make profound changes in their behaviour or classroom practice resulting in only limited changes in their behaviour or practice.

The use of learner-centred approaches is likely to be hindered by the shortage of resources in some schools. Some classrooms had bare walls, without additional teaching and learning materials such as charts. In some schools the only learning resources were textbooks and the blackboard in the classrooms, for example in Schools 4 and 5. In School 3 half of the Grade 10 learners, where lesson observation was conducted, had textbooks. Three schools, (Schools 1, 2 and 3), had an additional teaching and learning resource in the form of an overhead projector and computer in the classroom for PowerPoint lesson presentations. This is the main mode of lesson presentation in School 2. However, use of PowerPoint lesson presentations is likely to encourage frequent use of the lecture method by the teacher and note-taking by the learners. Through the Western Cape Education Department's Khanya project, previously disadvantaged secondary schools in the province have been provided with computer laboratories but the number of computers is still inadequate. Geography teachers can use this Information Communications Technology (ICT) resource to promote learner-centred approaches in the teaching and learning programmes. However, priority is given to learners doing computer-based subjects such as Computer Applications Technology (CAT) and some Mathematics programmes using MasterMaths software. Only two of the selected schools, Schools 2 and 4 had functioning libraries or media centres, but Schools 1 and 3 had converted their libraries into an extra classroom and computer laboratory respectively, while the library in School 5 still had to be stocked with books.

A lot of the learner-centred activities indicated above by the teacher participants are likely to be directed by them resulting in the lessons becoming more teacher-centred rather than learner-centred. Despite the claims of using learner-centred approaches by some teacher participants noted above, the limited lesson observation of five of the ten teacher participants showed that they predominantly used didactic approaches which promote rote learning.

In some lessons only two or three learners responded to questions which had been asked by the teacher while the rest of the learners quietly copied information into their books (See Appendix B:6). Some of the teachers provided notes either on slides or on the blackboard for the learners to copy. A whole lesson in some cases was set aside for learners to quietly copy information from the blackboard. This practice promotes rote learning of knowledge with the aim of preparing learners for examinations. Such classroom conditions of inadequate resources and traditional teaching practices, are not conducive to the effective teaching and learning of EE and ESD. EE and ESD needs to be implemented through learner-centred approaches that promote active learning. Ballantyne, Oelofse & Winter (1999: 90)

found evidence in an international survey that South African teachers and teacher educators “tend be directing the teaching/learning environment more than their counterparts”, approaches I find dominant in this study. Raselimo (2012) found that geography teachers in Lesotho predominantly used textbooks and dominated the teaching-learning process despite claims that they used learner-centred approaches, much like the teacher participants in this study.

While the use of research projects noted earlier, in implementing the geography curriculum is commendable in that it promotes active learning among the learners and also provides them with an opportunity to focus on environmental issues, the teacher participants tend to promote the teaching of knowledge at the expense of skills, attitudes and values. Some teachers revealed that learners obtain factual information from libraries, the internet or newspapers when they do the projects. Furthermore, one of the teacher participants, Robert acknowledges the importance attached to teaching knowledge for examinations. He constantly refers to the importance of transmitting knowledge through the geography lessons. The lesson observation also shows that the teachers transmit factual information to prepare learners for examinations. The teaching of environmental knowledge alone is not likely to result in responsible environmental behaviour. Similarly, it has been observed in other parts of the world that teachers tend to concentrate more on the transmission of environmental knowledge and neglect the teaching of skills, attitudes and values (Ballantyne 1999; Braus 1995; Buzhar 2004; Ramsey, Hungerford & Volk 1992; Stevenson 2007). In the US context, Braus (1995) observed that teachers mainly teach environmental knowledge and awareness in environmental education. Many teachers “emphasize awareness and knowledge - especially the facts ... [and have] done much less with developing skills, investigating values, and creating a commitment to take action” (Braus 1995: S48).

Ballantyne & Packer (1996) propose that environmental educators should teach knowledge, skills, attitudes, values and behaviour in an integrated manner using constructivist approaches. It has been observed that “neither a knowledge-based approach nor a values-education approach in isolation is adequate to fulfil the aims of environmental education” (Ballantyne & Packer 1996: 26). Constructivist approaches can be used to develop the cognitive domain through the use of group learning where the learners get opportunities “to explain, elaborate, or defend their positions to others” (Ballantyne & Packer 1996: 28). This “uncertainty, questioning, and criticism leads to dissatisfaction with inadequate conceptions, mental experimentation with new conceptions, and the integration and elaboration of knowledge in new ways” (Brown & Palinscar 1989) cited by Ballantyne & Packer (1996: 28). According to Ballantyne & Packer (1996) the development of values and attitudes could be achieved through outdoor experiences or fieldwork which enables them to observe environmental issues and to discuss how they can improve the environment. Additionally, the use of journals for critical reflection and story telling can help to enhance the growth of the affective domain as well. Hungerford & Volk

(1990: 15) suggest that environmental behaviour should be taught through “the issue investigation and action model”. This involves the creation of opportunities to engage with real life issues which are of interest to the learners. The learners investigate the issues in depth, formulate strategies for resolving the issues, evaluate the strategies and then put them into action where possible. The strategies outlined above can help the geography teachers to achieve goals of teaching EE and ESD through the geography curriculum: promoting the learning of more sustainable lifestyles through teaching environmental knowledge, skills, attitudes and values.

6.3.2 Persistence of teacher-centred approaches

While some of the teacher participants (see section 6.3.1) claimed that they use learner-centred approaches, four participants (Robert, Oliver, Lloyd and Thomas) acknowledged that they predominantly use the teacher-centred approach. Robert and Oliver argue that it is the main pedagogical approach that they are used to which they acquired from their pre-service training programmes. They have 27 years and 35 years teaching experience respectively. Lloyd and Thomas on the other hand, argue that the poor language skills of the learners prevent them from meaningfully participating in class discussions. Lloyd also feels that “*the learner-centred approach takes more time*” resulting in problems with finishing the syllabuses in time for examinations. These problems, according to Lloyd, force the teachers to dominate the lessons through transmissive approaches. Besides teaching in order to complete syllabuses, these participants appear to have difficulties in making sense of prescribed pedagogical approaches such as enquiry-based teaching and learning and the issues-based approach. As a result, they continue working with a pedagogical approach which they are more familiar with. These four teachers are likely to focus more on teaching environmental knowledge or education *about* the environment and neglect teaching education *for* the environment which incorporates the teaching of critical thinking skills and values education in addition to environmental knowledge (see section 3.1.1.2). This finding concurs with what Ballantyne, Oelofse & Winter (1999: 90) established through an international survey that South African high school geography teachers generally use teacher-centred approaches which place less emphasis on “the development of skills, critical thinking, investigation and taking appropriate action [on environmental issues].”

According to Stevenson (2007) and Blignaut (2008) the teachers’ decisions to use particular pedagogical approaches can be explained by their epistemologies. This refers to their selection of knowledge, how it is organised and their beliefs about how knowledge should be transmitted (Stevenson 2007). Blignaut (2008: 103) observes that “assumptions about knowledge as objective, value-free unchangeable facts need to be replaced with a recognition of knowledge as being developed and promulgated by people in particular socio-political contexts with particular value assumptions.” The teacher participants who dominate the teaching-learning process and

rely on textbooks as revealed in this study by Robert, Oliver, Lloyd and Thomas are likely to have an objectivist view of knowledge (Stevenson 2007).

According to Ko & Lee (2003), the continued use of exposition methods in teaching science subjects in some Hong Kong high schools is one of the barriers that prevents the effective implementation of EE in the science curriculum. The teachers in this study were found to be more inclined to use the lecture method and textbooks which promote the teaching of knowledge for syllabus completion and examinations. Despite the policy changes towards learner-centred approaches in schools in Singapore, the teachers' classroom practice has remained "strongly teacher-centred" (Curd-Christiansen & Silver 2012). Similarly, there has been limited change in classroom practice despite the introduction of reforms aimed at replacing teacher-centred, transmissive approaches with learner-centred, enquiry-based approaches in Chinese schools (Yan 2012). Additionally, it has been observed that didactic teacher-centred approaches in geography education are not as effective as enquiry approaches in promoting positive behaviour towards the environment (Ballantyne, Oelofse & Winter 1999; Yeung 2002).

Yeung (2002) argues that enquiry learning used with the issues-based approach enables learners to engage in critical reflection on how the profit motive of decision-makers can contribute to environmental problems and on what action they can take to improve the environment. Furthermore, enquiry teaching "gives more attention to concern and willingness to act and hence is more conducive to the development of problem-solving skills and positive environmental behaviour" than didactic approaches (Yeung 2002: 252). Kwan & So (2008) also support the educational value of enquiry learning using the issues-based approach to teach EE and ESD. They found that the enquiry approach focusing on an environmental problem in the field can be an effective method of teaching education *for* the environment to senior geography learners in Hong Kong. Additionally, the learners were able to practise their critical thinking and problem solving skills. Didactic approaches tend to persist in schools because they are organised to teach knowledge to prepare the learners for examinations (see section 3.3.5) (Stevenson 2007; Yeung 2002). As a result, the teachers experience pressure not only from the school management but also from learners and parents to produce good results. This pressure tends to reinforce the use of didactic approaches among teachers (Lam 2007). Tabulawa (2004) found that senior learners in some Botswana secondary schools clandestinely forced the teachers to continue using didactic approaches by feigning ignorance when asked to respond to questions during the lessons.

6.3.3 Issues with fieldwork

Fieldwork, which is recommended in the geography NCS document (5.3.1), can be used as part of the enquiry learning process (see sections 2.6.4). In this study fieldwork is generally interpreted by the

teacher participants as referring to long distance excursions to other places. According to Spillane, Reiser & Reimer's (2002) cognitive framework, the teacher participants interpret fieldwork from what they previously understood about its meaning from their education and training as well as teaching experiences. This is illustrated by the examples of excursions as well as perceptions of the teacher participants such as Ian, Johan, Robert, Godwin, Lloyd and Thomas concerning the fieldwork technique revealed in Chapter 5. Fieldwork conducted by the geography teachers (Johan and Hilton) in School 2 is a typical example of the traditional field excursion type. The learners engage in conducted tours of the sites which they visit and they are given information about these sites by the officials. They passively write notes to enable them to complete assignments when they return to school (see section 5.3.3). These learners are likely to learn knowledge at the expense of skills, attitudes and values required for the development of positive environmental behaviour. None of the teacher participants except Maggie mentions the possibility of doing fieldwork in local areas in the vicinity of the school so as to investigate local environmental issues (see section 3.3.2). Maggie visited a local river with some of her learners for a fieldwork lesson which was combined with cleaning the river four years ago (see section 5.3.4). Only Oliver mentions that he has used the school premises to do an outdoor lesson on the ecosystem. Hilton from School 2 commented that the fieldwork they engage in is "*not fieldwork in the sense that fieldwork should be.*" His view of fieldwork is that it should be enquiry-based (see section 5.4.2.3).

A review of the literature concerning type of fieldwork carried out by geography teachers internationally shows that the traditional field excursion type of fieldwork is quite common (Oosta, De Vriesa & Van der Scheeb 2011). Additionally, Chew (2008) established that most of the fieldwork conducted by geography teachers in Singapore is the traditional field excursion type where there is limited geographical enquiry and discovery. This type of fieldwork can be regarded as an extension of didactic classroom teaching focusing mainly on the teaching of knowledge because "... students tend to adopt relatively passive academic role during an excursion, unable to interpret the landscape critically with the teacher seen as the all knowing provider of knowledge" (Chew 2008: 324). Similarly, Han & Foskett (2007) found that geography fieldwork conducted by senior high school teachers in Taiwan mainly promotes the teaching of classroom knowledge more than skills development. However, Oosta, De Vriesa & Van der Scheeb (2011) observe a change towards learner-centred, enquiry-based or problem-based fieldwork in Hong Kong (see Kwan & Chan 2004; Kwan & So 2008; Yeung 2002), which can promote the effective teaching of EE and ESD in the geography curriculum. Additionally, Smith's (1999) research revealed that fieldwork in England has become more enquiry-based.

Linked to the problem dealt with above is the fact that some of the teacher participants lack the skill of using fieldwork as a result of the fact that they were not trained on the fieldwork techniques

(Ballantyne, Oelofse & Winter 1999), and on how to integrate it into the teaching and learning programmes. This is why they generally interpret it as referring to excursions. Vena was apparently ignorant of the term fieldwork. The effective teaching of environmental concerns in the geography curriculum can be carried out through enquiry-based fieldwork so as to promote active learning, problem-solving skills and critical thinking, clarification of values and the development of positive behaviour towards the environment (Ballantyne & Packer 1996; Yeung 2002).

Furthermore, large classes and unfavourable teacher-learner ratios especially in schools 1, 4 and 5 (see Tables 5.1, 5.4 and 5.5) coupled with deteriorating learner discipline (see section 5.1.1) pose challenges to fieldwork activities. School 2 and 3 have reasonably small geography classes but the latter has a greater number of classes per grade doing geography at FET level (see tables 5.2 and 5.3). Additionally, the teacher participants from Schools 1, 3, 4 and 5, revealed that financial constraints prevent them from using the fieldwork technique. Schools 4 and 5 are no-fee paying schools due their location in the poorest areas. Schools 1 and 3 also have limited financial resources despite the fact that the learners pay fees because, according to the school principals, a significant number of poor parents fail to pay fees. Some of the teacher participants stated that shortage of time tends to limit the amount of fieldwork.

The time allocated for geography lessons in the school timetable is such that for teachers to incorporate fieldwork activities, they would have to disrupt the rest of the school timetable (see section 5.4.2). Furthermore, there are other school activities that demand the geography teachers' time such as supervision of sports and cultural activities during the afternoon and some weekends (see section 5.1.1). The teachers also have other school responsibilities such as administrative work which take up their time. Therefore such a large workload on teachers leaves very little time outside the teaching hours to engage in fieldwork. Furthermore, the need to finish syllabuses in order to prepare the learners for examinations has a bearing on the pedagogical approaches that are preferred by teachers (Ballantyne, Oelofse & Winter 1999; Stevenson 2007; Wesso & Parnell 1992). These findings support those of Reddy (2000) who established that some Western Cape primary school teachers in South Africa are prevented from effectively carrying out EE fieldwork activities by barriers that include lack of time, shortage of finance and other resources, large classes, poor learner discipline and lack of training. Furthermore, South African high school geography teachers and teacher educators in an international survey pointed to time constraints, personal heavy workloads and lack of training as being the main barriers that hinder the incorporation of EE in the geography lessons (Ballantyne, Oelofse & Winter 1999). Earlier on, Hurry (1979) identified lack of time as a major stumbling block that prevented South African high school geography teachers from using fieldwork. In Taiwan, Han & Foskett (2007) established that geography teachers are mainly constrained by safety issues, large classes and the impact of the fieldwork activities on the school time table. The latter raises concerns related to the effect of

lessons missed by the teachers on the performance of the students in an examination focused school system.

Despite the fact that the curriculum document suggests that fieldwork should be used as part of enquiry learning, the assessment guidelines stipulate that it is optional (Department of Education 2008b). This means that the teachers can assess other tasks such as a research project or an assignment in place of fieldwork (see section 5.4.3) for purposes of compiling the learners' portfolio of marks (Department of Education 2008b). Because fieldwork is not a requirement for purposes of assessment, some of the geography teachers are likely to select easier ways of assessing learners than fieldwork given the perceived constraints of doing fieldwork discussed above. With limited fieldwork, the teaching of EE and ESD is likely to be ineffective. Because of the perceived constraints of using fieldwork noted above, geography teachers ranked fieldwork skills as least important when compared to the development of environmental awareness, knowledge or concepts, personal environmental ethic and attitudes among other items in an international survey (Ballantyne 1999). Furthermore, South African high school geography teachers, like their international counterparts, revealed that they generally lack support for fieldwork as an approach to provide opportunities for learners to tackle environmental issues (Ballantyne, Oelofse & Winter 1999).

6.3.4 Taking action on local environmental issues

None of the teacher participants except Maggie have worked with the learners to address local environmental issues. Maggie involved her geography learners in cleaning a local river a few times four years ago (see section 5.3.4). She has since stopped because of constraints such as safety concerns, large classes, lack of time and an increased workload. Lack of involvement of the other participants could be explained by lack of awareness of the strategies of implementing EE and ESD. Additionally, logistical barriers (Ham & Sewing 1988) created by elements of the school organization (Stevenson 2007) and shortage of resources pose a major challenge to those teachers who might want to take action on local environmental issues (see section 3.2.3). Interestingly, Hilton is involved in his personal capacity as an animal rights activist but he has not involved any of his learners (see section 5.1.1). Ballantyne, Oelofse & Winter (1999: 87) established that South African high school geography teachers generally support the idea that they should develop the learners' environmental awareness and knowledge "rather than encouraging the students to translate their understanding into personal action for the environment."

A number of studies have repeatedly shown that there is little or no relationship between the teaching of environmental knowledge and the development of responsible environmental behaviour (Hungerford & Volk 1990; Kollmuss & Agyeman 2002; Vare & Scott (2007). Hungerford & Volk (1990) suggest that

the implementation of the issue investigation and action model can promote responsible environmental behaviour. They argue that the issue investigation and action process can positively affect learners' attitudes and values towards the environment. Additionally, the learners learn skills (for example problem-solving and decision-making skills) during the issue investigation process. Lastly, they then learn to take action on the issues that they have successfully investigated. Taking action on the issues can involve evaluating different courses of action resulting in the development of critical thinking skills.

6.3.5 The issues-based approach

None of the teacher participants uses the issues-based approach to organise content for teaching and learning geography. Maggie and Ian pointed out that they use the issues-based approach when they give learners assignments and research projects. Some of the teacher participants for example Oliver, Hilton and Robert struggle to make sense of the meaning and importance of the issues-based approach in the effective teaching of EE and ESD in the geography curriculum. Hilton argues that other pedagogical approaches are just as good as the issues-based approach (see section 5.4.5.2). Hilton's view is illustrated by this comment: *"If one used the issues-based approach, that is only one method. There are other methods where you can, for example, use various types of data as visual stimuli."* The teacher participants teach the content as it appears in the syllabuses of the different grades at FET level. All the teacher participants use the systematic approach following the guidelines provided by work schedules and pace setters which are provided by the Western Cape Education Department. In the systematic approach (see section 2.2.2), the different themes are taught separately, for example weather studies, ecosystems, landforms, people and their needs in the Grade 10 syllabus. The geography teachers tackle environmental issues such as pollution, global warming, gender issues etc while they are teaching the different themes. The teachers are likely to teach *about* the issues incorporated in the syllabus themes and thus transmit environmental knowledge at the expense of skills, attitudes and values. The systematic approach has been criticized (Preston-Whyte 1983; Meadows 1985) on the grounds that it undermines the effective teaching and learning of human-environment relations (see section 2.6.5.5). The integration of the different themes using the issues-based approach could make the learners realise that environmental problems result from human-environment interactions.

The curriculum could be implemented using the issued-based enquiry approach focusing on some of the local environmental problems (Reddy 2000; Wilmot & Norton 2004). A study conducted with Western Cape primary school teachers in South Africa by Reddy (2000) was an action research project aimed at equipping them with skills of designing issues-based curricula so as to effectively incorporate environmental concerns in the teaching and learning programmes. Wilmot & Norton (2004) developed and trialled an issues-based enquiry teaching and learning programme for geography for Grade 9 learners in two South African schools in the Eastern Cape. These two studies show the value of the

issues-based enquiry approach for implementing EE and ESD in the school curriculum. Furthermore, the issues-based approach creates an opportunity for the learners to have a holistic perspective on the environmental problems (Braun 2005). According to Hill (1993) and Yeung (2002), the issues-based approach can contribute to the development of critical thinking skills. The issues-based inquiry “has the potential for developing a critical perspective, a set of habits that together are called critical and reflective thinking” (Hill 1993: 73).

6.3.6 Inculcating critical thinking skills

An exploration of the teacher participants’ views on how they could promote critical thinking skills in geography education revealed that some of them (Maggie and Vena) were not clear of what critical thinking entails (see section 5.4.5.1) despite the fact that it is not only one of the critical outcomes of OBE, but it is also prescribed in the geography NCS document. Additionally, the teacher participants were generally not clear of what strategies could be used to promote critical thinking in the geography teaching and learning programmes. Some of the teacher participants such as Maggie, Johan, Robert, Oliver and Lloyd acknowledged that critical thinking skills are poorly developed among many learners in their schools (see section 5.4.5.1). Maggie shifted the blame on generally falling standards of education in her school. Ian, Godwin and Thomas claimed that they have been able to promote critical thinking skills through challenging the learners with the key geography questions. Although Hilton claimed that some of the learners whom he teaches can think critically, he could not explain how the geography teaching and learning programmes promote the development of critical thinking skills. He, however, acknowledged that the privileged status of most of the learners in School 2 exposes them to a lot of information through the media and internet. If the geography teachers continue to teach using didactic, teacher-centred approaches that encourage rote learning of environmental knowledge as discussed in sections 6.3.1 and 6.3.2, they are likely to reinforce the acceptance of the status quo with regards to unsustainable lifestyles (see Stevenson 2007).

Robottom (1996) cited by Lotz-Sisitka (2002) is concerned that EE’s focus on environmental issues tackled through critical and reflexive skills is difficult to institutionalize in school curricula. He fears that its incorporation into the school curricula might result in “centrally indicated, decontextualised content for environmental learning, and assessment of technical knowledge and skills” (Lotz-Sisitka 2002: 101), a concern also expressed by Le Grange & Reddy (1997) with regards to the South African context. Kwan & Stimpson (2003: 123) concur with Robottom (1996) regarding the implementation of EE and ESD in the core curriculum of schools in Singapore. They point out that “curriculum detail stresses information of a dominantly scientific nature reflecting a largely academic rationalist, rather than socially critical, approach” due to the fact that education is oriented towards examinations.

6.4 SUMMARY

Despite an enabling policy framework provided by the geography NCS to implement EE and ESD so as to achieve the goal of teaching knowledge, skills, attitudes, values and positive environmental behaviour, the above discussion has shown that this goal is not likely to be achieved. This research reveals that in their efforts to implement EE and ESD, the teacher participants, mainly teach environmental knowledge. There are a number of barriers that hinder them from successfully implementing EE and ESD. First, they face conceptual barriers regarding the meaning of EE, SD and ESD and the nature of geography. The participants still mainly view EE and ESD as conservation education dealing with only the protection of the biophysical environment. Additionally, their perception of teaching EE and ESD is that creating awareness of environmental problems by transmitting environmental knowledge can result in positive environmental behaviour. Second, the centrist curriculum development process has reduced the teachers to technicians, using work schedules and pace setters but not reflectively engaging with the NCS individually so as to develop appropriate pedagogical content knowledge. Third, because the participants are experiencing difficulties with the prescribed pedagogical approaches and strategies such as enquiry learning including fieldwork and the issues-based approach, they continue using teacher-centred didactic approaches which are not appropriate for teaching EE and ESD. Fourth, the shortage of resources and other barriers hinder the use of learner-centred approaches such as fieldwork. Fifth, it is evident that these participants have not been trained and neither do they have support specifically with implementing EE and ESD. Sixth, because schools are organized in such a way that they are examination-oriented, preparation for examinations takes precedence over other activities resulting in the marginalisation of EE and ESD. All these constraints help to explain why there is a gap between policy rhetoric and practice revealed by this research in the implementation of EE and ESD through the geography curriculum.

To place this discussion in the context of curriculum implementation research mentioned in Chapter 1, the integration of environmental concerns in the school curricula took place during a period of far reaching, systemic educational changes after the inception of democracy rule in South Africa (Reddy 2011). The teachers had to contend with not only a new and more complex OBE system underpinning the new curricula but also with implementing EE and ESD through the new curricula (Lotz, Tselane & Wagiet 1998). According to Reddy (2011), these widespread educational changes had to happen within a short period of time. It is therefore, not surprising that numerous implementation problems were experienced (see also Chisholm et al 2000). The implementation problems continue to be experienced, as revealed in this research that the participants largely use didactic, teacher-centred pedagogical approaches to transmit environmental knowledge as a result of the influence of barriers discussed above. In the next chapter, I conclude the research, suggest recommendations for both policy and further research and end with reflections on the research process.

CHAPTER 7: SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND REFLECTIONS

In Chapter 6, I interpreted and discussed the data provided by the teacher participants using Spillane, Reiser & Reimer's (2002) cognitive model of the policy implementation process as a framework for discussing the findings. I also discussed the pedagogical approaches and strategies employed by the teachers to implement the curriculum including the barriers that hinder them from using the strategies that are prescribed in the curriculum document. This was done in order to achieve the main aim of this study: to find out how EE and ESD are being implemented through the geography curriculum in South African secondary schools. The study deals with teachers as curriculum implementers and will help to explain the problematic policy-practice gap in the implementation of EE and ESD, a curriculum innovation in geography education. Chapter 7 is the concluding chapter in which I first provide a summary of the research project and then the conclusions and recommendations. The chapter ends with a section on personal reflections and comments on methodological reflections and limitations.

7.1 SUMMARY

The state of the environment continues to deteriorate globally. This is reflected in the high rate of biodiversity loss and the visible consequences of global warming and climate change. The destruction of the biophysical environment will have a negative impact on the other components; the social, the economic and the political. The deterioration of the human environment has recently manifested itself in increased levels of poverty and disease epidemics such as the HIV/AIDS pandemic in sub-Saharan Africa. Furthermore, the population's vulnerability to disasters appears to have increased in recent years. In order to respond to the worsening state of the global environment, the teaching and learning of environmental education and education for sustainability should be improved in schools. Geography can play a leading role in imparting knowledge, skills, attitudes, values and behaviour required to protect the environment in a subject-based curriculum, for example at FET level in South African secondary schools.

The EE concept has evolved in tandem with the concept of environment. Because the environment was initially regarded as referring only to the biophysical component, environmental education was initially conceived of as focusing on conservation education whose goal is the protection of the biophysical environment. This is illustrated by Stapp et al's (1969) definition of EE which takes a narrow view of the environment, focusing on the protection of the biophysical environment and excludes the human components. EE is currently conceptualised as being based on a broader, more holistic view of the environment which consists of the interacting biophysical, social, economic and political components.

The human components are sustained by the biophysical component. Unlike Stapp et al's (1969) definition of EE, the IUCN (1970) acknowledges the interconnectedness of the four dimensions of the environment. The approaches to studying environmental education proposed by Lucas (1972) in the form of education *about*, *in* and *for* the environment helped to further clarify the environmental education concept.

There are many discourses on the meaning of sustainable development focusing on the link between environmental education and sustainable development and the differences / similarities between EE and ESD. The most popular definition of sustainable development coined by WCED (1987: 48) is that it refers to "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development is concerned with economic development, social development and protecting the environment. There are concerns that the concept of sustainable development is unashamedly linked with economic growth, excessive extraction of resources from the environment and instrumentalism. According to some environmental educationists such as Robottom (2007), the advent of the ESD discourse and DESD could promote economic development at the expense of the quality of the environment.

This research project is first contextualized within geographical education research in South Africa and then within implementation research in general. Geographical education research in South Africa mainly focuses on four areas: the academic geography discipline; geography education in the context of C2005; pedagogical aspects of the school geography; and, the role of geography as a vehicle for teaching environmental education. This research aims to promote the environmental education and education for sustainable development discourse from the perspective of geography education at secondary school level in the South African context. The research has been done against the background of the DESD (2005-2014).

The broader context of this research project is that of curriculum innovation and implementation, because it focuses on curriculum implementation taking place following the far reaching educational changes in post-apartheid South Africa. According Fullan & Pomfret (1977) and Fullan (2001), education policy reforms generally have a limited impact on the teachers' classroom practice and as a result, there is often a pronounced gap between policy rhetoric and practice due to a number of factors. One of the most important factors concerns teacher attributes because teachers play a central role in the success or failure of the implementation of curriculum innovations.

Despite the shortcomings and implementation problems of C2005 launched in 1997, its advent after 1994 provided an opportunity and space for infusing environmental education. It is necessary to find out whether South African education has been re-oriented towards sustainable development during the

DESD. In order to investigate the above problem, the main research question focuses on *how EE and ESD are being implemented through the secondary school geography curriculum.*

In order to answer the above question, a qualitative case study research design underpinned by the interpretive research paradigm, was used. The case study research design highlights the influence of context on the findings. This involved 10 geography teacher participants comprising 8 males and 2 females from five secondary schools selected through purposeful sampling. The following criteria were considered in selecting the sample of schools. First, the selected schools are all public high schools with FET and independent schools were excluded. Second, the sample schools are representative of the socio-cultural and socio-economic context of the Western Cape. Thirdly, the schools have geography in the school curriculum. The most senior, qualified and experienced members of staff participated in the study. The participants all studied geography and trained to teach the subject at secondary school level. Eight of the ten participants are over 40 years old whereas only two are less than 40 years old. None of the participants is less than 30 years old. The teaching experience of the sample of teachers ranges from 9 to 35 years.

A number of research instruments were used to collect data in the field. Data were generated from questionnaires given to the participating teachers and semi-structured interviews conducted with them. Data were also generated from lesson observations and the analysis of documents such as the geography NCS, work schedules and lesson plans. The use of different research instruments ensured the triangulation of data sources in order to address issues of validity and reliability.

Field notes were written on lessons that were observed. The interviews were recorded and then transcribed verbatim. The qualitative data were then analysed through thematic analysis (Attride-Stirling 2001; Boyatzis 1998; Braun & Clarke 2006), which involved the initial coding process using ‘in vivo’ codes. The coding stage was followed by the classification of the codes into categories which were then classified into major themes. Tables of codes, categories and themes were compiled on Excel spreadsheets. The research findings were then presented as a thick description of the main themes including their sub-themes. The themes were illustrated with prolific quotations of the participants’ views extracted from the interview transcripts and other documents. The literature review was conducted throughout the study in order to provide both the conceptual framework for the study and to support the research findings.

It is difficult to define geography because of its complex interdisciplinary nature. Geography straddles the physical and human aspects of the earth’s surface and overlaps between natural sciences, social sciences and humanities. Nevertheless, it is generally accepted that the core of geography includes the study of location and distribution, place, spatial interaction, region and people-environment

relationships (IGU-CGE 1992). Because geography is concerned with the study of people-environment relationships, it is often regarded as one of the most important carrier subjects for teaching EE and ESD in schools.

Academic geography has been studied through different lenses or schools of geographical thought which include regionalism, logical positivism, humanism, marxism, critical geography and postmodernism. Some of these paradigms have limitations in that they prevent the discipline from being used as an effective vehicle for teaching EE and ESD. On one hand, the positivist paradigm has been criticised for excluding human values and concerns with social justice whereas humanism, according to critics, is anthropocentric and tends to promote technocentric human-environment relationships. The Marxist perspective of critical geography, has contributed the environmental justice concept which is useful for incorporating environmental concerns into the school geography curriculum. Postmodernism offers a critical perspective that examines how the issue of unequal power relations contributes to the understanding of the causes of environmental problems.

When the environmentalism movement began during the 1960s, the contribution of geographers was much less than that of scientists. The minimal contribution of geographers to the environmentalism movement has been attributed to a number of factors: the positivist paradigm that dominated geographical thought during this period; the division of geography into human and physical components underpinned by different paradigms; and, the introduction of new disciplines that focused more on environmental management than geography. It is believed that an integrated geography approach can address problems resulting from human-environment interactions much better than teaching physical and human geography separately.

Changes in the South African geography discipline have closely followed developments in Anglo-American geography because of colonization. Local academics are currently struggling to decolonize the discipline and to infuse a South African identity that incorporates the African continent. South African geographers have heeded the call for post-apartheid transformation that requires the discipline to help to address local socio-economic and environmental problems. Changes in school geography followed developments in academic geography.

During the early stages of the institutionalization of school geography in the late 1800s to early 1900s, the nature of geography was widely criticized for concentrating on facts about places taught through transmissive teacher-centred methods. This was the 'capes and bays' geography (Biddle 1985; Walford 2000). In England, school geography currently has elements of the positivism, humanism and radical geography. The enquiry approach to teaching and learning has been introduced in school geography. The approach involves learners asking key geography questions and it is recommended for the

investigation of environmental issues. In order to find answers to the questions, the learners are forced to carry out investigations through research that involves conducting fieldwork. The enquiry approach is learner-centred and encourages active learning in the geography lessons. Geography education in South Africa followed developments in school geography in England.

The post-1994 educational changes resulted in concerns that the status of geography in the education system was in the process of being reduced. However, the launching of RNCS (Department of Education 2002a) clarified the status of the subject in an integrated social studies curriculum in the GET band. The position of geography in the FET band is currently secure because it is offered as a separate subject. The geography NCS for FET (Department of Education 2003b) provides a lot of opportunities for teaching and learning EE and ESD because environmental concerns are infused in the purpose and scope of geography, the learning outcomes and assessment standards as well as in the content.

Milestones in the history of environmental education help to promote an “integrated” and “holistic form of environmental education.” Furthermore, the milestones reaffirm the scope of EE, that it encompasses the interaction between the social, economic, political and ecological dimensions. Environmental education in South Africa developed from conservation education in the mid-1970s. EE in South Africa is concerned not only with the protection of the biophysical environment but also with social justice, equity, democracy and transformation. The Environmental Education Association of Southern Africa (EEASA) has played a leading role in the development of environmental education in South Africa.

Attempts by the government in South Africa to introduce environmental education before 1994 were foiled when the 1989 *White Paper on Environmental Education* was not enacted into law because some of the stakeholders were excluded from the drafting process. Following the work of EEPI and EEI, environmental education was included in the 1995 *White Paper on Education and Training*, which provided guidelines for integrating environmental concerns into the school curricula. EE is infused in the school curricular at GET and FET in the South African school system. The training of teachers to implement EE mainly focused on teachers operating in the GET band through the NEEP-GET programme.

The implementation of EE in formal education has been fraught with difficulties internationally. A number of barriers that hinder its successful implementation have been identified such as lack of training, lack of lesson time, shortage of resources and an examination-focused school system. Additionally, tensions have been experienced between maintaining its holistic nature and the school curriculum that is organized into fragmented disciplines. The aims of school education often clash with the goals of environmental education. A number of models have been tried in an effort to incorporate

environmental concerns in the secondary school curriculum but the best model is one where a cross-curricular approach is used because EE has an interdisciplinary nature.

According to the *Tbilisi Principles of Environmental Education* (UNESCO 1978), the teaching and learning programmes should integrate knowledge, skills, values, attitudes and actions using learner-centred approaches that encourage active learning. The enquiry approach underpinned by constructivist learning theories is recommended because it encourages question-posing, investigation of environmental issues through fieldwork, problem-solving, decision-making, reflection and critical thinking. Geography is considered an ideal vehicle for implementing EE and ESD in schools because of its interdisciplinarity, similar methods of teaching and overlapping content. Tilbury (1997) suggests a framework for incorporating EFS into geography education which includes the following: knowledge of environment and development problems; critical thinking skills; values education; and, involvement and action.

The results of the study show that the sustainable development theme is central to the curriculum. Additionally, strategies of implementing EE and ESD such as the enquiry approach, the issues-based approach, the need to take action on local environmental problems and the need to impart critical thinking skills, are suggested. The majority of the teacher participants acknowledge the incorporation of environmental concerns in the curriculum. However, three of the teacher participants have difficulties in identifying environmental concerns in the curriculum. There is a tendency to marginalise EE and ESD in the teaching of physical geography topics. This is likely to result from some of the participants' failure to engage with and reflect on the nature of geography particularly the integrated approach that is promoted by the curriculum document. The teacher participants mainly consider the inclusion of EE and ESD when they teach human geography topics despite the suggestion by the curriculum document that the integrated approach should be used in teaching geography. The reliance on work schedules and pace setters means that some teachers do not read the original policy document and thus miss the policy messages on the need to use the integrated approach and on the role of geography in teaching EE and ESD.

The teacher participants have difficulties in making sense of the meaning of environmental education, sustainable development and education for sustainable development. Some of the definitions provided by the policy document are inadequate and misleading resulting in conceptual difficulties for the teachers. Most of the teacher participants have not come across the concept of education for sustainable development. These conceptual difficulties help to explain why some of the teacher participants have difficulties in incorporating EE and ESD in the lessons.

Although some of the teacher participants claim that they use learner-centred approaches, it appears as if they have difficulties in distinguishing learner activities from learner-centred approaches underpinned by constructivist learning theories. They generally have problems in using the enquiry learning approach prescribed in the curriculum. Other teacher participants prefer using traditional teacher-centred approaches which enable them to finish syllabuses in time for examinations. The use of learner-centred approaches such as fieldwork could be hindered by shortage of resources, class time, large classes, deteriorating discipline and a heavy work load. The perception of the teacher participants is that curriculum advisors have been silent on the incorporation of environmental concerns in the curriculum. The teacher participants revealed that curriculum advisers have not provided support that mainly focuses on the implementation of EE and ESD in the geography curriculum.

7.2 CONCLUSIONS AND RECOMMENDATIONS

The research project investigates the implementation of EE and ESD through the geography curriculum in South African secondary schools in the FET band (Grade 10-12). In order to guide the investigation process a number of questions were asked. The main question is:

How are EE and ESD being implemented through the school geography curriculum in South African secondary schools?

This question was broken down into the following sub-questions to provide guidelines for the data collection phase of the research process:

- 1. What opportunities for teaching EE and ESD are there in the geography NCS?*
- 2. What are the geography teachers' perspectives on EE and ESD?*
- 3. How much EE and ESD are taught by the teachers in the geography subject?*
- 4. What methods of teaching dominate in geography instruction?*
- 5. Are there any barriers to teaching EE and ESD in geography and if so, how can they be overcome?*

The above questions were largely answered but there are a number of limitations in the research process as discussed in the section on reflections.

7.2.1 Conclusions

The conclusions for each research sub-question are treated separately in the sections that follow.

7.2.1.1 What opportunities for teaching EE and ESD are there in the geography NCS?

Environmental concerns are incorporated into the geography NCS document (Department of Education 2003b): in the preamble of the curriculum document (the purpose and scope of the geography subject) at FET level; in the learning outcomes; assessment standards; and, in the content of the Grades 10, 11 and 12 syllabuses. The curriculum policy document also suggests strategies for implementing EE and ESD such as the issues-based approach, the inculcation of critical thinking skills and the enquiry-based teaching and learning pedagogical approach. The sustainable development concept is a central theme in the curriculum. The geography NCS therefore, provides an enabling policy framework because it provides a lot of opportunities for teaching and learning EE and ESD. Unlike the previous curricula which emphasised the teaching of knowledge and limited skills, the geography NCS document clearly states that the main goal of teaching geography is to impart knowledge, skills, attitudes and values required for more sustainable lifestyles. The majority of the teacher participants acknowledge the incorporation of environmental concerns in the policy document. However, a minority maintains that there are limited opportunities, with one participant categorically denying the infusion of environmental concerns in the Grade 10 syllabus of the curriculum document. It is likely that this participant still views the process of teaching geography as the transmission of a mass of facts, in order to prepare the learners for examinations.

7.2.1.2 What are the geography teachers' perspectives on EE and ESD?

The teacher participants individually experience conceptual barriers regarding the nature of EE and ESD. The general perspective is that environmental education involves the teaching of information about environmental issues in order to create awareness and to promote positive behaviour towards the biophysical environment. Furthermore, the teacher participants generally view the concept of environment as only consisting of the biophysical component that excludes the human dimension (social, political and economic components). As a result, the general perception of environmental education revealed by the teacher participants is still that of conservation education which mainly focuses on the teaching of knowledge and protection of the biophysical environment and excludes the human dimension. While most of the teacher participants focus on the cognitive domain in making sense of environmental education, two participants include the affective domain that focuses on the inculcation of attitudes and values. The view of EE and ESD as referring to the transmission of environmental knowledge has implications on the pedagogical approach which is likely to be used by the teacher participants. They are likely to favour teacher-centred approaches to transmit environmental knowledge, promoting rote learning and the acceptance of the status quo of unsustainable lifestyles.

There are tensions between the teacher participants' views on the goal of teaching EE and the goal of geography education articulated in the policy document (see 7.2.1.1). Most of the teacher participants view EE as being mainly concerned with the transmission of environmental knowledge whereas the policy message communicates that the goal of geography education is to impart knowledge, skills, attitudes and values. With such perspectives on EE, the goal of providing opportunities for the learners to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment as stated in Tbilisi Principles (UNESCO-UNEP 1978), is not likely to be achieved.

The teacher participants' view of the notion of sustainable development is derived from definition promoted by WCED (1987), but they concentrate more on inter-generational equity and exclude intra-generational equity. Only one participant has a perspective of sustainable development that also includes the need to address the issue of poverty. The policy document promotes an uncritical stance on sustainable development and as a result, the participants do not confront the problematic nature of the concept. A few participants view education for sustainable development as being synonymous with environmental education which mainly focuses on conservation of resources, but most of the participants have not come across the notion of education for sustainable development.

7.2.1.3 How much EE and ESD are taught by the teachers in the geography subject?

Most of the teacher participants acknowledged the infusion of environmental concerns in the geography NCS, but they experienced difficulties in incorporating environmental concerns into the lessons. As a result, some of them prefer greater inclusion of environmental concerns in human geography than physical geography. This difficulty reveals lack of understanding of the nature of not only EE and ESD but also that of the nature geography promoted by the curriculum document. The geography NCS document promotes an integrated approach to the teaching and learning programmes, where human and physical geography are integrated in the study of environmental issues in order to provide a more holistic approach. Such an approach enables the learners to understand that environmental issues result from human-environment interactions. In the case of the participants who have difficulties in identifying EE and ESD themes and concepts in the curriculum document, teaching geography lessons is likely to be "business as usual". They are likely to teach the geography lessons as they have always taught in the past, teaching geographical facts without consciously making an effort to integrate EE and ESD in the lessons.

7.2.1.4 What methods of teaching dominate in geography instruction?

Some of the teacher participants' views of learner-centred approaches appear to be simplistic perceptions of learner-centred approaches as just learner activities. It is not likely that the participants

understand the constructivist learning theories underpinning the learner-centred approach as well as their roles in the teaching-learning process due to their behaviouralist education and training background. They have surface-level interpretations of learner-centred approaches, for example enquiry learning is understood as referring to learners doing research based on the collection of factual information from library books, newspapers and the internet. Although the enquiry approach is prescribed in the geography NCS document, most teacher participants have difficulties in making sense of its meaning and using it in the classroom.

Fieldwork is interpreted as long distance excursions dominated by didactic, teacher-centred approaches focusing on transmission of environmental knowledge. Fieldwork excursions involving all the FET geography learners are conducted regularly in only one well-resourced school out of the five sample schools. The barriers that hinder the fieldwork activities include financial constraints, shortage of time, a large workload, an examination-oriented school system, large classes and an ambiguous policy message on fieldwork.

Some teacher participants have stuck to the traditional teacher-centred approaches due to the examination-oriented school system, shortage of resources and possible lack of confidence in the learner-centred approaches. The teacher participants use the systematic approach to teach physical and human geography themes separately, instead of the issues-based integrated approach. Additionally, they have difficulties in making sense of and using the issues-based approach. It appeared as if the teacher participants have not reflected on how the geography teaching and learning programmes can inculcate critical thinking. Teacher-centred approaches that promote rote learning of environmental knowledge are therefore likely to be the norm in most of the teacher-participants' classrooms.

7.2.1.5 Are there any barriers to teaching EE and ESD in geography and if so, how can they be overcome?

While the policy provides an enabling framework, with a lot of opportunities for implementing EE and ESD through the geography NCS as noted above, the teacher participants face a number of challenges or barriers. These include:

- conceptual barriers regarding the definition of environmental education, sustainable development, education for sustainable development and the notion of integrated geography;
- difficulties in identifying EE and ESD opportunities in the curriculum document;
- difficulties in identifying, making sense of and using the strategies and appropriate pedagogical approaches for implementing EE and ESD such as enquiry learning including fieldwork, the issues-based approach, development of critical thinking skills and taking action on local problems;

- lack of pre-service and in-service training focusing on EE and ESD;
- lack of support from curriculum advisers on the implementation of EE and ESD;
- use of teacher-centred didactic approaches that promote rote learning and reinforce unsustainable lifestyles;
- a focus on teaching of facts or environmental knowledge for examinations with less focus on the development of skills, attitudes and values;
- barriers that hinder fieldwork activities;
- the participants' behaviourist education and training background and objectivist view of knowledge.

As a result of these barriers, it is not likely that EE and ESD will be implemented successfully through the geography curriculum. Suggestions on how to overcome the barriers will be included under the section on recommendations on policy.

7.2.2 Recommendations

In the following sections, I deal with recommendations on policy and on future research. The recommendations on policy could help to address some of the barriers that hinder the implementation of EE and ESD through the geography curriculum.

7.2.2.1 Implications on policy

EE and ESD can be implemented more successfully within the context of the whole school approach (Gough 2006c; 2011; Shallcross & Robinson 2008; Tilbury, Coleman & Garlick 2005). This involves the school administration, all the teachers, learners, parents and other members of the community. Because environmental concerns are infused in the curricula of all the subjects (Department of Education 2003a) in the FET band, the whole school approach would enable the geography teachers to get support not only from the school principal and other teachers but also from the parents and the rest of the community. Additionally, the geography teachers could collaborate with teachers from other subject departments in teaching some of the themes and in conducting fieldwork because EE and ESD require an interdisciplinary approach (UNESCO 1978; 2004). In the whole school approach, the school can be organised in such way that it can accommodate the teaching and learning of EE and ESD by providing more class time through flexible timetables. The whole school approach is in line with current thinking (complexity theory) that the implementation of educational change is likely to be more successful where each school is viewed as a complex system consisting of interacting elements (Hoban 2002; Reddy 2011).

To improve the capacity of the teachers to implement EE and ESD, training and support are essential. There is need for EE and ESD to be integrated into pre-service teacher training programmes. Additionally, on-going professional development (INSET) should be carried out in order to provide support with the implementation of curriculum innovations such as environmental concerns infused in the geography NCS. The curriculum advisers need to be incorporated into the training programmes because the teachers greatly rely on them for guidance and support in making sense of and implementing EE and ESD integrated in the curriculum, as revealed in this study. Training and support help to enhance the teachers' role of change agents in the implementation of curriculum innovations as observed by Fullan (1991; 1993).

It is high time that the professionalism of teachers was restored in order to counter the recent deskilling that has taken place in the teaching profession. This will enable the use of participatory, bottom-up approaches in curriculum design to be successful. The teachers are likely to gain skills and therefore implement curricula more successfully. In this study some teacher participants showed that given the platform, they can be effective change agents. For example, one teacher participant is an animal rights activist when he is not in school and another participant cleaned a river near her school with a group of learners.

EE and ESD need to be integrated into assessment programmes as suggested by Clacherty (1995) and Tilbury (1997). According to Tilbury (1997), each of the four components of education for sustainability infused into school geography such as knowledge of environment and development problems, critical thinking skills, environmental values and attitudes and environmental action can be assessed using a range of techniques. Tilbury (1997) suggests the testing of environmental knowledge through the traditional written exam and process-oriented forms of assessment for critical thinking skills. Observation, recording and learner diaries can be used to evaluate changes in attitudes and values. Lastly, involvement and action can be assessed through observation. Integrating EE and ESD in the school assessment programme can help to ensure that teachers do not use the excuse of teaching for examinations to exclude EE and ESD from the teaching and learning programmes.

7.2.2.2 Implications on future research

First, I recommend that action research that integrates teachers as co-researchers needs be used to assist the teachers to design issues-based teaching and learning programmes that partially focus on local environmental problems (see Reddy 2000; Wilmot & Norton 2004). This would go a long way towards training the teachers to use enquiry learning including fieldwork. Additionally, it can help the geography teachers to move away from the notion that fieldwork must always involve long distance excursions.

Second, this research can be replicated with a sample of younger teachers, for example with less than five years teaching service, to find out how their perspectives on EE and ESD and practice of enquiry learning differ from the sample of older teachers in this study. The differences could provide an indication of the extent to which the University Faculties of Education in South Africa have transformed their training programmes to prepare students to teach environmental concerns integrated in the school curricula.

7.3 REFLECTIONS

In this section I first outline the difficulty of accessing some schools. I use letters of the alphabet to refer to the schools so as to distinguish them from the sample schools where fieldwork was eventually conducted. The inclusion of a school in the sample depended to a large extent on the willingness of the school principals to accommodate the research project. I also describe my research experience, my personal background and what I perceive to be my influence on the research process.

7.3.1 Access to schools

The first attempt to access schools was made in the middle of February in 2010. Altogether I contacted 14 schools, but I got permission from the principals of five schools. Initial phoning to the schools did not bring any positive results. The heads of schools asked me to communicate in writing. I then emailed three schools (Schools A, B and C) in the vicinity of Stellenbosch University but the emails were not answered. School D could not accommodate my research project. It turned out that this school was using the services of a relief teacher because the geography teacher was on leave. I also tried to use known contacts to access the schools. The deputy principal of School E had promised to assist me with access to his school, but later he did not cooperate. Similarly, another teacher, a known contact, did not respond to numerous attempts to communicate with her either by phone or emails despite the fact that she had promised to assist me with access to School F where she is stationed. Attempts to communicate with the principal of the same school also failed. The telephone was initially out of order and when I eventually got through to the school, the school principal was either in a meeting or out of school. I did not manage to communicate my request to the principal of School F.

I contacted the Western Cape Education Department early in February 2010 and only received a positive response towards the end of July in the form of a letter of authorization (see Appendix A:2). The letter of authorization made access to the schools much easier because the school principals demanded this letter before issuing letters of consent.

In the case of School G, I phoned a couple of times but could not get a chance to speak to the principal. He was either in a meeting or was out of school. I then faxed the required documents which included the authorization letter from the Western Cape Education Department but when I phoned later, the principal claimed that he had not received the documents. I then re-sent the documents to the secretary. A follow up visit to the school did not yield any positive results because the principal was not in school. This principal did not respond to my request to do fieldwork at this school. In School H, I was told that the school could not accommodate any postgraduate students because it already had undergraduate students on teaching practice. I made a number of calls to School I, before I could get hold of the school principal. At the principal's request, I faxed the required documents to him but a follow up conversation showed that the principal was unwilling to accommodate my research project. He responded that he was still considering my request but he eventually did not respond. Similarly, the response of the principal in School J was negative. This principal seems to have a negative attitude towards school geography. He pointed out that the geography subject is in the process of being phased out at FET level in his school. An examination of the Western Cape Education Department schools database (<http://wcedemis.pgwc.gov.za/wced/findaschool.html>) showed that the Humanities and Social science as well as Arts and Culture subjects are very unpopular in this school when compared to Mathematics, Sciences, Business and Technical subjects at FET level (Western Cape Education Department 2010). This is reminiscent of the status of geography in School 2 (see section 5.1.1). Both schools are former model C schools.

The problem of access to schools was exacerbated by the fact that I am a foreign student who cannot speak Afrikaans and several schools in some districts of the Western Cape use Afrikaans as a medium of instruction. Considering that the data collection exercise required me to observe lessons, this exercise would not have been possible in the Afrikaans medium schools. A compromise was to work with parallel medium schools where I could observe English medium classes.

7.3.2 Personal background

I do not have previous experience in using qualitative research methods. Furthermore, I am still engaged in an ongoing struggle to reorient my worldview from that of believer in the existence of absolute truth to an appreciation of relativist ontology that characterizes alternative paradigms or post-paradigmatic thinking. Lack of experience in qualitative research can be attributed to my academic and professional background. I received colonial education characterized by rote learning of the geography of the Britain and the British Commonwealth member countries in an examination-oriented school system. Additionally, I have a long service as a secondary school geography teacher, using didactic approaches because of my training within the behaviouralist schools of thought. My training and socialisation in the teaching profession instilled an objectivist view of knowledge.

My journey to PhD involved studying academic geography from under-graduate to Masters level underpinned by the positivist epistemology. Since the time I embarked on this project in 2009, my journey has involved not only personal but also intellectual growth. This included learning to do qualitative research for first time and learning about EE and ESD and the challenges of implementing it in high schools through geography education. I also got the opportunity to learn about South Africa's OBE system and the challenges experienced by secondary school teachers in implementing it. Through my interaction with the teacher participants and engagement with the geography NCS document, I was exposed to more progressive pedagogical approaches. Furthermore, I learned to maintain a journal for the first time, although I struggled with the traditional, cultural belief that one's thoughts are private and should not be revealed through writing them down.

7.3.3 Methodological reflections

I conducted fieldwork in five schools where I spent one week in each of them. However, my fieldwork was seriously disrupted in August 2010 by the prolonged public service strike that lasted for about three weeks. Of the five selected schools, two former black schools (Schools 4 and 5) were hardest hit by the strike because the schools closed temporarily as a result of the absence of the teachers. Two other schools, (School 1 and 3), experienced minor disruptions and the fifth one (School 2), a former Model C school was not affected by the strike. I had to reschedule the fieldwork for the two township schools (Schools 4 and 5). One of the schools (School 1) which I had visited for four days was invaded on the fifth day by some members of one of the teacher unions who occupied the school grounds and picketed inside the school premises. I was forced to leave the school immediately because no teaching and learning could take place under those conditions as a result of intimidation tactics perpetrated by the union members. I resumed my visits during the following week when the situation returned to normal.

In the field I experienced what Walford (1991: 1) meant when he observed that the "careful, objective, step-by-step model of the research process is actually a fraud." There were a few hiccups in the document analysis process because some teachers did not give me their lesson plans for the lessons which I had observed. One referred me to the head of department and the other one claimed that lesson plans had been discontinued by the department of education. Additionally, the schools do not have detailed schemes of work. They use work schedules and pace setters prepared for them by the Western Cape Education Department. These consist of a list of topics in the form of rearranged syllabuses.

Lesson observation was generally problematic except in School 2. In School 1, I observed only one lesson because there were organizational issues at the beginning of the week and then on Friday the school was interrupted by the forced strike mentioned above. In School 3, I again observed only one lesson because of organizational issues pertaining to the class which I was supposed to observe. In

School 4, I observed only two lessons because the teacher was so late in reporting to the other lessons that I decided to leave the classroom. In school 5 only two lessons could be observed due to the fact that the school programme had already been disrupted by the strike.

The interview process yielded some data but I had to cut the number of interviews to one only per teacher due to the fact that they have a very busy teaching schedule. Initially I had planned to conduct at least four interviews per teacher. I was thus forced to make a compromise as noted by Walford (1991) because of unforeseen circumstances. I also realized that in order to get a better picture of the implementation of EE and ESD, I should interview not only the Geography HODs and ordinary geography teachers but also the school principals in order to validate the data. In one of the schools, the HOD is a history specialist without any training in geography education. I therefore interviewed the geography subject head instead. Additionally, I interviewed the principals of four schools because of their accessibility. From the time when I first contacted them, they personally communicated with me and showed interest in my research. My experience at the fifth school was that the principal communicated with me through his secretary and I did not see him. It appeared as if he was not as accessible as the other four principals. The documentation that I required from him was provided by the school secretary on his behalf whereas in the other four schools either the principal or the deputy principal provided me with the documentation that I required in the form of a letter of consent.

The data collection exercise was also affected by the language factor. Being an international student, I cannot speak, read or write some of the local languages such as Afrikaans and Xhosa which are mainly used in the Western Cape. Additionally, being a foreigner and not conversant with the local languages denied me an insider (emic) perspective of the South African secondary school. Babbie & Mouton (2001: 271) observe that “differences in language, race, culture, beliefs, etc all introduce potential barriers between the researcher and the research participants.” My choice of schools was therefore limited to those with parallel or dual medium of instruction. In these schools both Afrikaans and English or Xhosa and English are used. A significant number of schools use Afrikaans only as a medium of instruction and so my access to these schools was prevented by the language factor. Although information on the internet indicates that the former black schools use English as a medium of instruction, my experience in one former black school was that the teachers use both the home language Xhosa and English to instruct the learners. The language factor also negatively influenced the interviews. I felt that some of the interviewee’s responses were restricted by the language factor. In some cases I felt that some of the interviewees did not answer the question that was asked. It was a bit of a challenge to get a relevant answer in a few cases even where I tried to provide guidance. This problem was alleviated by engaging in a verification exercise where I revisited the schools in 2011 in order to seek clarification of the interview data which was not clear. An ideal solution could probably have been

to use an interpreter so as to provide some of the interviewees with an opportunity to use a language that they were more comfortable with.

7.3.4 Limitations

A major limitation of the research process is that the observation method was rather unsuccessful. Although I had planned to observe at least 20 lessons in total for 5 teacher participants, I observed 9 lessons only in total due to issues explained above in Section 7.3.3. Another limitation was the lack of cooperation of some of the teacher participants. In spite of requests for lesson plans and learners' written assignments and projects, I did not get any samples of these documents from the teacher participants. Furthermore, because most of the teacher participants in this study have a long teaching service which varies from 15 to 35 years, their perspectives and understandings of EE and ESD implemented through the geography NCS as well as classroom practice might differ from that of a sample of recently qualified, younger teachers for example with less than 5 years teaching service. However, using the data obtained through semi-structured interviews, biographic questionnaires, limited observation and document analysis, I was able to obtain credible stories of how EE and ESD are being implemented through the geography curriculum at FET level.

7.3.5 My influence on the research process

I felt that my position as a PhD student was rather intimidating to some of the teacher participants. It appeared as if they regarded me as a highly educated person who could possibly expose their shortcomings. As a result, most of the participants did not cooperate with sharing their learners' written assignments and other documents. A few participants appeared to re-live their experiences as novice teachers in the past, being harshly criticised by school inspectors. I made an effort to calm them by explaining that I had not come to evaluate them, but to share their day to day experiences in teaching geography. Most of the participants eventually relaxed as we continued working together. Additionally, two teacher participants exaggerated their contributions to the improvement of the school's sustainability initiatives so as to create a positive image. The data verification exercise conducted during the second visit in 2011 helped to improve the validity of the data. Conversations with the principals and one other member of staff in one of the sample schools helped to validate data and so I discarded some of the exaggerated accounts. Initially, I had some difficulties in conducting interviews due to inexperience. The main difficulty was related to sticking to the time agreed on but this issue was eventually resolved.

7.4 CLOSING REMARKS

A lot of progress has been made at policy level in re-orienting geography education at FET level in South Africa towards the teaching of EE and ESD during the United Nations DESD. This is illustrated by the integration of the environmental and social justice principles as well as the sustainable development concept in the geography NCS document. Despite the enabling policy framework, this research has shown that the implementation of EE and ESD through the geography NCS is not likely to be successful because of a number of barriers that have been highlighted. There are common barriers that are likely to hinder the implementation of EE and ESD regardless of school context. These include lack of training and support, the behaviouralist education and training background of the older teachers and the school organizational elements that include shortage of time and an examination-oriented school system. As a result of the difficulties experienced by the teachers in making sense of the nature of EE and ESD and in using prescribed pedagogical approaches such as enquiry learning, they are likely to continue using didactic, teacher-centred approaches to transmit environmental knowledge. In such a scenario, the gap between the intended and the enacted curriculum will continue to be a major concern. The contribution of this study is in two fields: geography education research and in the broader field of curriculum innovation and implementation research.

The purpose of this study was to stimulate conversations concerning the need for more effective teaching and learning of EE and ESD through the geography curriculum at FET level in order to address the deteriorating state of the global environment. Other studies which will follow could produce a model of guidelines for the implementation of EE and ESD through the geography curriculum. The study highlights the need for teachers to ask themselves fundamental questions regarding “why” school geography is being taught and to reflect on the purpose of geography education at FET level instead of only focusing on content and pedagogical approaches. The geography NCS (Department of Education 2003b) clearly articulates that one of the main goals of teaching geography at FET level is to impart knowledge, skills, attitudes and values required to live more sustainably. This goal could be achieved by making geography a more effective vehicle for teaching EE and ESD.

Through the issues-based approach, the teachers can use the local environment as a teaching and learning resource for the geography lessons. In some of the geography lessons, the teachers could assist the learners to use the enquiry approach to investigate local issues, to examine and evaluate possible solutions to local environmental problems illustrated in the description of the context of Schools 1, 3, 4 and 5 (see Section 5.1.1). These problems include a deteriorating biophysical environment characterised by an increase in uncollected garbage and water pollution. Such problems have been exacerbated by poor service delivery in the Townships. Social problems affecting local communities include inequality, worsening poverty, unemployment, crime, teenage pregnancy, drug addiction and HIV/AIDS.

From the perspective of curriculum innovation and implementation research, the study explains the problematic policy-practice gap in the implementation of EE and ESD. This study sheds light on and validates other studies that have been conducted in the past on barriers that affect the implementation of EE and ESD internationally. Furthermore, it highlights the need to address teacher attributes and contextual factors so as to enhance the teacher's role of a change agent in the policy implementation process. The study revealed the following teacher attributes:

- The teacher participants have not been trained to teach EE and ESD.
- They have conceptual difficulties regarding the meaning of EE, SD, ESD and the notion of integrated geography.
- They do not adequately focus on and reflect on the goals of teaching geography.
- Some of them do not engage sufficiently with the curriculum document in order to translate the subject knowledge into pedagogical content knowledge. Additionally, some of the teacher participants work as technicians and use supplementary documents supplied by the Western Cape Education Department in place of the geography NCS to implement the geography curriculum.
- They have difficulties in making sense of and implementing the enquiry-based approach including fieldwork, the issues-based approach and imparting critical thinking skills.
- Teacher-directed and transmissive pedagogical approaches were evident. These are inappropriate for implementing EE and ESD through the geography curriculum.

Additionally, the study reveals a number of contextual factors which act as barriers to the implementation of EE and ESD in the sample schools. Most of the sample schools experience a shortage of resources, especially finance to conduct fieldwork activities. Schools are organized in such a way that EE and ESD are marginalised because of rigid time tables and the need to teach for examinations. Unless these and other contextual factors are addressed, the implementation of EE and ESD through the geography curriculum will not be successful.

The insights provided by this study will be invaluable in the conceptualisation of professional development programmes aimed at the following:

- addressing the teacher attributes and contextual factors revealed by the study;
- improving the teachers' classroom practice in geography education; and,
- better implementation of EE and ESD through the geography curriculum.

Finally, the contested nature of sustainable development and education for sustainable development can act as a barrier to the successful implementation of ESD in the school context. Academics are therefore urged to provide contributions that will lead to conceptual clarity of the above terms instead of further

obscuring the meaning (see also Section 1.1.2). There is need engage with the EE, SD and ESD concepts so as to clarify them in the South African school context. This will help to address the conceptual difficulties displayed by the teacher participants in this study.

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APPENDIX A:1 ETHICAL CLEARANCE



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11 August 2010

Tel.: 021 - 808-9183
Enquiries: Sidney Engelbrecht
Email: sidney@sun.ac.za

Reference No. 315/2010

Ms C Dube
Department of Curriculum Studies
University of Stellenbosch
STELLENBOSCH
7602

Ms C Dube

APPLICATION FOR ETHICAL CLEARANCE

With regards to your application, I would like to inform you that the project, *Implementing education for sustainable development: The role of Geography in South African secondary schools*, has been approved on condition that:

1. The researcher/s remain within the procedures and protocols indicated in the proposal;
2. The researcher/s stay within the boundaries of applicable national legislation, institutional guidelines, and applicable standards of scientific rigor that are followed within this field of study and that
3. Any substantive changes to this research project should be brought to the attention of the Ethics Committee with a view to obtain ethical clearance for it.

We wish you success with your research activities.

Best regards



Sidney Engelbrecht
.....
MR SF ENGELBRECHT

Secretary: Research Ethics Committee: Human Research (Non-Health)



APPENDIX A:2 WCED AUTHORISATION LETTERS

Navrae
Enquiries
IMibuzo

Dr A.T Wyngaard



Telefoon
Telephone
IFoni
Faks
Fax
IFeksi

021 467 9272

Wes-Kaap Onderwysdepartement

Western Cape Education Department

Verwysing
Reference
ISalathiso

20100716-0072

ISEbe leMfundo leNtshona Koloni

Mrs Carolina Dube
2 Lobella Court
Stellenbosch
7602

Dear Mrs Carolina Dube

**RESEARCH PROPOSAL: IMPLEMENTING EDUCATION FOR SUSTAINABLE DEVELOPMENT:
THE ROLE OF GEOGRAPHY IN SOUTH AFRICAN SECONDARY SCHOOLS**

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **1 April 2011 till 30 September 2011**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number.
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

**The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000**

Kind regards.
Signed: Audrey T Wyngaard
for: **HEAD: EDUCATION**
DATE: 11 April 2011

Navrae
Enquiries Dr A.T Wyngaard
IMibuzo

Telefoon
Telephone 021 467 9272
IFoni

Faks
Fax (021) 425-7445
IFeksi

Verwysing
Reference 20100716-0072
ISalathiso



Wes-Kaap Onderwysdepartement

Western Cape Education Department

ISEBE leMfundo leNtshona Koloni

Mrs Carolina Dube
2 Lobelia Court
Stellenbosch
7602

Dear Mrs Carolina Dube

RESEARCH PROPOSAL: IMPLEMENTING EDUCATION FOR SUSTAINABLE DEVELOPMENT: THE ROLE OF GEOGRAPHY IN SOUTH AFRICAN SECONDARY SCHOOLS

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **01 July 2010 till 30 September 2010**.
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number.
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

**The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000**

We wish you success in your research.

Kind regards.
Signed: Audrey T Wyngaard
for: **HEAD: EDUCATION**
DATE: 16 July 2010

MELD ASSEBLIEF VERWYSINGSNOMMERS IN ALLE KORRESPONDENSIE / PLEASE QUOTE REFERENCE NUMBERS IN ALL CORRESPONDENCE /
NCEDA UBHALE INOMBOLO ZESALATHISO KUYO YONKE IMBALELWANO

GRAND CENTRAL TOWERS, LAER-PARLEMENTSTRAAT, PRIVAATSAK X9114, KAAPSTAD 8000
GRAND CENTRAL TOWERS, LOWER PARLIAMENT STREET, PRIVATE BAG X9114, CAPE TOWN 8000

WEB: <http://wced.wcape.gov.za>

INBELSENTRUM /CALL CENTRE

INDIENSNEMING- EN SALARISNAVRAE/EMPLOYMENT AND SALARY QUERIES ☎0861 92 33 22

VEILIGE SKOLE/SAFE SCHOOLS ☎ 0800 45 46 47

APPENDIX A:3 PROMOTER'S LETTER



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TO WHOM IT MAY CONCERN

July 2010

This is to certify that **Ms Carolina Dube (Stud Num: 14949288)** is known to me and that she is a registered student at the above University. She is currently registered for a Doctoral Degree in Education (PhD) with a focus on Geography Education in Secondary schools.

This is to request that you please consider this application of **Ms Dube** for permission to work with teachers in your school favourably. She would like to work with Geography teachers in Grades 10, 11 and possibly 12 regarding the inclusion and teaching of topics related to the environment and environmental problems. This research project is to follow up on the inclusion of environment as a curriculum topic in Geography and how teachers are managing this in classrooms.

I feel that the insights gained from this research work will benefit education as a whole and Geography education in particular both in the Western Cape region and probably in the country as a whole.

Please do not hesitate to contact me if you need more information

Thank you for your co-operation.

Yours truly

CPSReddy

Prof CPS Reddy

Research Supervisor

Head: Dept Curriculum Studies, Faculty of Education, Stellenbosch University

Email: cpsr@sun.ac.za



Fakulteit Opvoedkunde • Faculty of Education

Departement Kurrikulumstudie • Department of Curriculum Studies

Privaat Sak/Private Bag X1 • Matieland 7602 • Suid-Afrika/South Africa

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<http://www.sun.ac.za>



APPENDIX A:4 CONSENT FORM



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STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH

IMPLEMENTING EDUCATION FOR SUSTAINABLE DEVELOPMENT: THE ROLE OF GEOGRAPHY IN SOUTH AFRICAN SECONDARY SCHOOLS.

You are asked to participate in a research study conducted by:

Carolina Dube – Bsc ZOU, Hons SU, Msc SU, from the Curriculum Studies Department, Faculty of Education, Stellenbosch University.

The results will contribute to a PhD dissertation and publication in journal articles. You were selected as a possible participant in this study because you teach geography at secondary school level (FET), which is the focus of my study.

1. PURPOSE OF THE STUDY

The study is designed to establish how much Environmental Education (EE) / Education for Sustainable Development (ESD) is infused in the geography NCS; whether teachers' classroom practice is oriented towards implementing EE / ESD; and, the barriers preventing the successful implementation of EE / ESD.

2. PROCEDURES

If you volunteer to participate in this study, I would ask you to do the following things:

1. You will be asked to fill in a short questionnaire to provide details about yourself. Such details will enhance my understanding of your classroom practice.
2. The researcher would like to attend four of your lessons and observe how you conduct them. I will write field notes on what I observe. My motive is not criticism but to obtain information on the orientation of classroom practice towards ESD. I will also be interested in examining lesson plans, schemes of work and textbooks to determine to what extent EE / ESD have been included.
3. You will be asked to participate in four interviews lasting not more than 30 minutes each to enable the researcher to gain insight on your classroom practice. The interview will be a follow up of the lesson observation at your school so that I can seek clarification on what was observed. The interviews will be audio-taped so as to collect the data for interpretation and analysis later.

3. POTENTIAL RISKS AND DISCOMFORTS

You might feel uncomfortable with my presence in your classroom but rest assured that it will be a great learning experience for me. I would like to understand how and why the teachers operate the way they do in the classroom. I am bound by the University regulations to keep all the information which I will gather confidential.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

There are potential benefits in participating in the research. You are likely to get exposure to new ideas. There is an opportunity to reflect on your practice in the teaching of the geography subject.

My research is likely to contribute to increased knowledge on ESD and its incorporation in the school context. Hopefully, learners might acquire not only knowledge and skills through better teaching of ESD in geography but also positive values, attitudes and behaviour towards the environmental protection.

5. PAYMENT FOR PARTICIPATION

You will not receive payment for participating.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality of the data obtained from each participant will be maintained by means of use of pseudonyms when I refer to you in the dissertation or in journal articles. The name of your school will not be disclosed.

The data will be kept in my private computer and in memory sticks. These will be located in a private room which is not shared with other students. I am the only one who uses the computer and will therefore ensure that the data will be safe. The interviews will be transcribed immediately. The analysis of transcriptions and data obtained in the fieldwork will take place simultaneously as the fieldwork is being done. The development of a coding system will enable the data to be searched for regularities and patterns as well as for topics covered by the collected data. In the dissertation some direct quotations from the interview might be written but I will ask for permission from you to use the quotations.

The information could be released to my promoter should the need arise but he is aware of the University regulations concerning the protection of participant confidentiality. The information could be released only if I experience problems in analyzing the data. There is nobody else to whom the information could be released other than my promoter.

You have a right to review the tapes but we will have to negotiate on what you would like to be edited. I will be the only one with access to the tapes. They will be erased as soon as the research project is completed. The outputs of the research project will be a dissertation and journal articles.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so. Should I feel that your cooperation is not adequate and compromises the data collection process, I will terminate your participation.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact myself,
Carolina Dube, PhD Student
Department of Curriculum Studies, Faculty of Education
Email: 14949288@sun.ac.za
Tel: 076 740 1706

Or my promoter [Professor Chris Reddy](#) - Departmental Chairperson
 Department of Curriculum Studies, Faculty of Education
 Email: cpsr@sun.ac.za
 Tel: +27 21 808 2259
 Office 4013, Fourth Floor

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouché@sun.ac.za; 021 808 4622] at the Division for Research Development.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to [*me/the subject/the participant*] by [*name of relevant person*] in [*Afrikaans/English/Xhosa/other*] and [*I am/the subject is/the participant is*] in command of this language or it was satisfactorily translated to [*me/him/her*]. [*I/the participant/the subject*] was given the opportunity to ask questions and these questions were answered to [*my/his/her*] satisfaction.

[*I hereby consent voluntarily to participate in this study/I hereby consent that the subject/participant may participate in this study.*] I have been given a copy of this form.

 Name of Subject/Participant

 Name of Legal Representative (if applicable)

 Signature of Subject/Participant or Legal Representative

 Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ [*name of the subject/participant*] and/or [*his/her*] representative _____ [*name of the representative*]. [*He/she*] was encouraged and given ample time to ask me any questions. This conversation was conducted in [*Afrikaans/*English/*Xhosa/*Other*] and [*no translator was used/this conversation was translated into* _____ by _____].

 Signature of Investigator

 Date

APPENDIX B:1 QUESTIONNAIRE FOR GEOGRAPHY TEACHERS

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BIOGRAPHICAL DETAILS								
1. Indicate your gender with an X in the correct box			Male	Female				
2. Indicate your age with an X in one of the boxes below								
25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
3. Nationality (indicate in one of the boxes below with an X)								
South African		Other						
State your country of origin if you are not a South African								
4. For how long have you served as a teacher at secondary school level?								
< 1 year	1-5 years	6-10 years	11-15 years	16-20 years	21 or more years			
5. Have you taught at primary school level?			YES	NO				
6. If your answer to the above question is YES, state the number of years in the box.								
7. Have you served as a lecturer at a college or university?				YES	NO			
8. If your answer to the above question is YES, state the number of years in the next box.								
9. Highest level of academic education (indicate with an X in the correct box below)								
Matriculation (Grade 12 / Std 10)								

First Degree		
Honours Degree		
Masters Degree		
Other		
If you selected other above state the qualification here		
10. What is the highest level at which you studied geography?		
11. Professional qualifications (indicate with an X in the correct box below)		
PGCE		
Bachelor of education		
Honours Degree in education		
Masters in education		
Other		
If you selected other above state the qualification here		
12. Do you think you were adequately trained to teach geography at (FET) level	YES	NO
If your answer above is YES, explain why you say so.		
Did the geography method modules and lectures include Environmental Education (EE) / Education for Sustainable Development (ESD) within the geography subject?	YES	NO
If your answer to question 12 is NO, what action have you taken to improve your content knowledge of the subject and teaching methods?		

--

13. What do you think of the infusion of EE / ESD in the geography National Curriculum Statement? Select one of the answers below to answer the question

a. There are a lot of opportunities to teach EE / ESD

b. There are a few opportunities to teach EE / ESD

c. There are no opportunities to teach EE / ESD

d. I have never heard about EE / ESD

14. Write down your own suggestions on how the teaching of EE / ESD in geography can be improved?

--



Thank you for your co-operation

C Dube Bsc ZOU, Hons SU, Msc SU

PhD Student

Stellenbosch University

Tel +27 76 740 1706

APPENDIX B:2 INTERVIEW GUIDE 1 FOR TEACHERS

1. Lesson Planning
 - a. Do you include teaching of Environmental Education / Education for Sustainable development in the lesson objectives?
 - b. Is there evidence of learner-centred approaches to teaching in your lesson plans?
2. Is your classroom arrangement conducive to group work?
3. Organisation of Content:
 - a. Do your lessons focus on a problem, namely, issue-based approach?
 - b. How far do you include the study of the local environment in the content?
4. Methodology: How does the teacher use the following approaches to encourage active learning?
 - a. Group work;
 - b. Class discussions and debates on environmental problems;
 - c. Fieldwork;
 - d. Role play;
 - e. Learners doing research, collecting data and reporting their findings – enquiry learning;
 - f. Other relevant approaches.
5. How does the teacher manage the class to encourage participation of most of the learners?
6. To what extent are learners involved with local issues / problems? Is there evidence of action that pupils have taken towards resolving issues in the local environment?
7. How does the teacher encourage the development of critical thinking skills during the lessons?
8. How did the coming of OBE affect your classroom practice in the geography subject?

APPENDIX B:3 INTERVIEW GUIDE 2 FOR TEACHERS

1. What is your understanding of the following:
 - a. Environmental education?
 - b. Sustainable development?
 - c. Education for sustainable development

2. Do you think you have been successful in the teaching of positive values, attitudes and behaviour towards the environment?

APPENDIX B:4 INTERVIEW GUIDE FOR SCHOOL PRINCIPALS

1. Please give a brief history of the school.
2. Which areas does the school draw pupils from?
3. Please describe the school facilities that are available for teaching and learning generally.
4. What are the current conditions that affect teaching and learning
 - a. positively?
 - b. negatively?
5. What are your comments on environmental education activities in the school?

APPENDIX B:5 SAMPLE TRANSCRIPT – INTERVIEW RESPONSES FROM HILTON

1. Lesson plan

a) Is the teaching of Environmental Education / Education for Sustainable Development included in the lesson objectives

If you look at the lesson plan, the lesson plan doesn't make actually provision for objectives. But what I do is I have got my lessons on PowerPoint right, and so as part of the objectives and key questions I include sustainable development. So sustainable development is a theme that basically runs throughout all the lessons that you do when you cover modules like people and their needs and sustainable development. So that topic of sustainable development is constantly going to come out, you know, in the unraveling of the information. Environmental education – if one looks at the grade 11 syllabus, everything is basically about the environment, so it's basically about changing the attitudes and the views of people about the environment through sustainable development. The topics that we dealt with like sustainable development and the people and their needs and even when we looked at water masses in Africa, all those themes eventually comes down to things like how can we protect and conserve the environment. So in all of it, you know, when you are busy with teaching that is one central golden thread that is going to go straight through, you know, the issue of sustainable development and the issue about environmental education and changing people's attitudes and views and values about the environment. So I would say ja the lesson plans do makes provision for that because it allows you to set out your key questions and you got on your lesson plan also strategy, how you are going to develop each of the key questions during the lesson.

b) Is there evidence of learner-centred approaches to teaching in the lesson plan?

The learner-centred approach is where the educator becomes the facilitator and the teaching and learning is focused on the learner. So in other words you as a facilitator is going to make your lessons interactive where you get response and feedback from the learners. I think to a large extent I do succeed in that because I try and steer away from the old paradigm of teacher-centred education, you know, where teaching is a monologue. Through your observation, I think you, would have seen maybe that there is always maybe not from all the learners but from most of the learners in the class there is always interaction between myself and them. The emphasis is on the learner and as an educator I would try and stimulate them

as far as humanly possible to participate and discover the knowledge themselves. Some lessons it works very well but in other lessons it does not always work so well. It also depends on the content and the knowledge that you are dealing with where you can maybe have a fully blown learner-centred approach and sometimes it's also necessary maybe to just go back to the old teaching style where you have to sometimes do scaffolding because sometimes there is a lack of foundational knowledge about certain topics. So you have to go and sometimes build up the foundation before you go to the learner-centred approach. But I think at this school we do that very well, I would say.

2. Is **classroom arrangement** conducive to group work?

3. **Organization of content**

a) **Does the lesson focus on a problem, namely, issue-based approach?**

I would say we do use it. We do use the issue-centred approach in some of the classes. You can't always use that approach, the issue-centred approach. It's once again it boils down to, I mean, there various techniques and approaches on can use, you know, to allow learners to discover the knowledge because your ultimate goal is you want to make a learner-centred classroom, where the emphasis and the focus is on the learner. If one used the issue-based approach, that is only one method, you know, option that one can use. There is other ways also where you can, for example, use various types of data. You can use various types of visual stimuli, you know, to get your learners engaged into a particular topic. So you don't always have to use the issue-based. But in some cases we will do that. You know, will have an issue-based approach where we give learners like a case study or case studies and in these case studies, for example, there will be a problem and they will become aware of the problem somewhere in the world or somewhere in Africa. We will then have discussions on how to address the problem that was brought to their attention through the case study. We looked at problems, for example, we did a case study on the Nile Delta when we dealt with water masses, the destruction of the Nile Delta, how the Nile Delta is actually shrinking and what the causes of that are. So that problem was presented to them. Other problems that we dealt when we looked at development and sustainability was the uneven economic development in South Africa where I showed them a map and we looked at how uneven, you know, how development takes place in South Africa in four core centres and then we discussed the problem and then we looked at strategies how will, for example GEAR, and how does the

development of transport corridors and the development of growth poles, how will that assist to create more even economic development. So in many cases we had that problem solving approach, so we did definitely attend to that as well.

b) Is the study of the local environment included in the content?

Ja we didn't specifically have a project about the local environment but we had a talk about, specifically with the Grade 11s about *Think Globally and Act Locally*. So we spoke about, you know, how important it is to be aware of what you do locally and it will have not only implications within your local area but also on a provincial and national scale and eventually on a global scale. So we didn't specifically do a field trip, you know. There are many things that we can do, you know, we could have maybe cleaned the river around the school here but unfortunately time constraints doesn't allow us to do that. But one would have done something in the form of a project, maybe have something like recycling, you know, or hostel learners to bring recyclable waste to the school, and stuff like that, so that we can make learners aware of the fact that it is important that we want to see a change in their behaviour, a change in their attitude towards the environment. Concerning the talk – another teacher and I conducted it. It was a lesson about the way we relate to our resources and the way we use our resources. In the process that we use our resources we cause a lot of problems, you know, with the utilization of resources, and so we are still further going to look at more examples when we go to energy use and management, you know, how we use our energy resources unwisely leads to some pollution, global warming and all that stuff. So what they need to understand there is the importance that our contribution, you know, to the way we use our energy resources, for example, doesn't only have local implications but it also has global implications. It also has implications for the continent. Now a nice example – I will tell you how we got to that is when we looked at water masses, we spoke about rivers. You will find that many rivers are used by different nations. If you take the Nile river, for example, and you take the Zaire river, is used by various nations so what the one nation does to the water quality is not only going to affect that nation but also the nation further downstream that also is depended on that particular resource. That's where it comes and what you do here locally will have an impact, you understand, on other people as well that live in other parts of the world, other regions or other areas.

4. Methodology: How does the teacher use the following approaches to encourage active learning?

a) Groupwork

I use a various methods. I've got simulations, group works, we've got role plays, we've got debates and we've got class discussions. I've been using them at the beginning of the term where we had an example of groupwork. What we did was we had case studies, text or articles which they had to go and read and then they had to identify the problem with the use of resources, and then each group had to come in front and do a small little presentation and the other groups were allowed to react on that and from there were developed a debate like a central theme. You know, for example, is it right, you know, to allow poaching to take place? Or is it right that rhino horns, for example, should be used as an aphrodisiac? We had a debate, we had a group for and a group against and we had a debate about it.

Simulations – if you go to water masses, you can actually bring in there a lot of climatology if you look at the topic about water masses and stuff so you can bring in climatology in that and you can actually build it in there because it deals with, for example, the ocean as a source of moisture and the role of the ocean in climate so there one can actually integrate examples of simulations into your teaching strategy where I explain to the learners about land and sea breezes. In groups they had to make an active PowerPoint presentation to show the circulation, you know, of air from the sea to the land and then from the land to the sea.

b) Class discussions and debates on environmental problems

c) Fieldwork

d) Role play

e) Learners doing research, collecting data and reporting their findings – enquiry learning eg projects

Ja at the moment, you know, some of the teaching strategies like enquiry learning is a very time consuming process, and one has a lot to cover, you know, in the syllabus, you know. So during the enquiry learning it would be very difficult to implement due to fact that one has to cover a huge amount of work. So I have not used enquiry in the sense that I would want to use it, you understand. But I guess, we took the learners on an excursion and they had to go and collect information, you understand and at the end of the day they had to put this information into a report about hydro-electricity and stuff like that. Qt so you hardly use fieldwork? – Not fieldwork in the sense that fieldwork should be done.

f) Other relevant approaches

5. How does the teacher manage the class to encourage participation of most of the learners?

6. Local issues

a) **To what extent are learners involved with local issues / problems?**

b) **Is there evidence of action that pupils have taken towards resolving issues in the local environment?**

I don't think we've been involved in any way as far as maybe clean up operations are and things like that. But I don't think our school or the geography class has been in any sense involved in any local issues, not in geography but in the other subject that I am involved in like in Life Orientation, we had a project where we had sort of like a community outreach. Learners were divided into groups of five and they had to go and identify an issue in the local community and they actually had to go there and spend six hours, for example at the hospital or at the municipality. Some of the learners went to farms where they worked with underprivileged children in projects like rugby or sport development with them but not in geography. What is the problem as to why you don't involve yourselves in action, acting on problems? I think it's just a matter of time. You see in the afternoons we have sports training. We are very busy at this school, you understand, so we have sport and during class time it would be very difficult to get, let's say, 25 or 30 learners involved in an activity, local activity. You can't take the learners away from school because what happens to your other classes and what happens to their other classes that they must attend. After school in most cases it's very difficult because you are going to exclude a lot of learners because they are involved in a lot of sport, you see, after school and we have sport practice and training and all that kind of stuff. On weekends it's also difficult because Saturdays we play most of our sport, we play rugby and on Fridays we play water polo, you know, and cricket and stuff like that.

7. How does the teacher encourage the development of critical thinking skills during the lesson?

I think if you have observed the learners you would notice that the way they sometimes respond to things that I say is actually an indication that they are analyzing and they are thinking critically sometimes about some of the information. I think to a large extent also we have succeeded in the geography class to inculcate sort of critical thinking where learners

analyse and interpret and think objectively about things, you know. I think I see it everyday in the class the way learners, when they respond to certain things they will challenge you sometimes on some of the things that you say. How do you think you achieved that, you know, - development of critical thinking? Let me think now. Look it's not only me as an educator on my own but I think its probably also things that happen at home and because the learners also have a lot of exposure to, you know, they have a lot of exposure to the internet. I think they are quite advantaged in most instances. The critical thinking, I'm just a contributor. I am not the only person that I would say has brought about critical thinking. It's not everybody also in the class that thinks critically. It is some of the stronger learners that will look at things critically and will evaluate what you say. So you can't identify your contribution as such? Yes it is difficult to identify my contribution.

8. How has the coming of OBE influenced the teaching of geography

To a large extent the teaching and the learning is virtually the same because geography has always been a subject that's been based on data response. It's always been a subject that you use, you know, you try and bring the real world into the classroom and through that you try to stimulate the learner. You can show the learner a landform and you can show the learner a lot of stuff about the landform. How does this landform differ from the other one? So there has always been the interactive kind of relationship between educator and learner in the geography and so to me it wasn't, how can I say, a 90° turn that I had to make. On the other hand the administration was a little bit different, with portfolios and learner portfolio, educator portfolio and the way you assess, you know. Those things were all new. So that part of outcomes-based education had a significant impact, severe impact, you know, the different kinds of assessment, formative and normative and all those kinds of things. But the teaching as such to me wasn't a huge, can I say, different experience because geography has always been that subject, you know, - it allows you as a subject, most of the knowledge, most of the content allows you to have sort of learner-centred approach. I believe that is in fact the best way to teach geography because, you understand, I don't think you can teach geography by standing in front and you are busy, say, with stream piracy but you don't show the learners a diagram or sketch.

RESPONSES ON THE NATURE OF EE/ESD

1. What is your understanding of environmental education?

Environmental education is teaching and learning about the biodiversity and how it needs to be managed but obviously the natural environment is the source that provides us with natural resources, resources that we need to provide for ourselves. Obviously into that with environmental education, you can't separate environmental education from sustainable development because the healthiness of the environment is going to determine whether you will be able to sustain yourself and develop and grow.

2. What is your understanding of sustainable development?

I would say these things should be integrated, environmental education and sustainable development. You can't separate the two entities. If you want sustainable development you need to take care of the environment, those two things should be integrated. You can't treat them as separate entities.

3. What is your understanding of Education for sustainable development

Education for sustainable development is necessary, you understand, because the problem that we have with development is that you always have the risk when you develop that you exhaust and deplete and exploit your resources. It's necessary that we have an environmental awareness, you know, about the way we use our sources so that we can modify our behaviour so that we develop at a sustained rate, that we always have resources or alternatives at our disposal to keep on developing. But the important thing that I want to stress there about education for sustainable development is that it should not only benefit once again the rich, you understand. Sustainable development can achieve the objective of getting a more even distribution, you know, of economic growth and economic wealth and stuff like that so that poverty in the process can be reduced. So the whole issue of poverty should also, in my understanding, be addressed in education for sustainable development or more emphasis on that.

4. Do you think you have been successful in the teaching of positive values, attitudes and behaviour towards the environment?

Ja I hope so. One would want to see the learners modify their behaviour in the long term, you know. One would want to see that they modify their behaviour, they modify their lifestyles at

home. You know, small little things like saving electricity, recycling, trying to conserve animal species in their garden or whatever, small little things. Unfortunately I've got no way to test. The only thing is that when they write an exam and I ask them questions, doesn't mean they have inculcated that environmental education and sustainable development into their hearts. It will just be a matter of I have to answer or I give you the answer on a piece of paper or does it have any value for them in terms of changing their lifestyle.

APPENDIX B:6 LESSON OBSERVATION NOTES

1. IAN – School 1

This was a 45 minute lesson taught to 36 pupils in the Grade 10 English medium class. The lesson topic was on “Population movements: Migration”. Only one lesson was observed.

Description of method of teaching

The teacher used a laptop and overhead projector to show slides with notes on migration concepts and causes of migration such as push and pull factors. The lesson focused on general concepts, with local examples mentioned occasionally. The teacher used a transmissive teaching style incorporating the question and answer method. The lesson was teacher-centred because most of the information was provided by the teacher and he talked much more than the pupils. No other resource materials were used other than a laptop, overhead projector and photocopied notes. The pupils did not use textbooks. The classroom arrangement was conducive to group work.

Description of pupil activity

Most of the pupils were copying notes from the slides during the lesson. A few pupils responded to the questions that were asked. The answers from the pupils showed that they were very familiar with migration processes. There was, therefore, no need for the teacher to talk much more than the pupils. At the end of the lesson, the pupils were given photocopied, illustrated notes and instructed to elaborate on the push and pull factors as part of their homework.

These notes could have been used more effectively during the lesson to set up group work activities. Although the pupils sat in groups of four, the teacher did not give them any activities that required them to work in groups.

Inclusion of EE/ESD in the lesson

EE/ESD was not included in the notes that were displayed in the slides. The teacher told the pupils that it is important to deal with environmental education in geography but did not incorporate it in the lesson on migration. The teacher then said:

We must include EE in geography for example the camps that were created as a result of the xenophobic attacks in 2008 and the problems associated with the creation of such camps.

The issue of xenophobic attacks on foreigners was just mentioned in passing. The teacher also referred to environmental problems out of context. He pointed out in the middle of the lesson on migration that he often advises the pupils to save energy and water: that he has often emphasised to the pupils that it is important to protect the environment through carefully using electricity and water at home. This interruption of the lesson on “Migration” was meant for me to hear that he includes environmental education in the lessons.

The issue of xenophobic attacks on foreigners in 2008 was relevant but could have been used more effectively to teach EE/ESD. Additionally, the lesson is not likely to have promoted the development of critical thinking skills as no opportunities were provided to reflect on issues and to consider attitudes and values of decision-makers.

A case study of one of South Africa’s informal settlements could have been more effectively used to illustrate the consequences of rural-urban migration. Such a case study could have incorporated EE/ESD by showing environmental issues resulting from human-environment interactions: the deteriorating condition of the biophysical environment, poverty, crime and social (in)justice issues, poor service delivery, human rights issues, unemployment, conflicts over limited resources and xenophobic attacks on foreigners etc.

2. HILTON – School 2

a. First lesson

This was a 50 minute lesson taught to 18 pupils in the Grade 11 English medium class. The lesson topic was on “**Resource use and conservation**”.

Description of method of teaching

The teacher used a computer and overhead projector to present information on *exploitation, depletion, preservation and conservation of resources* using PowerPoint slides. The information was well illustrated and well researched. The teacher occasionally used the

question and answer method. The teaching style was mainly transmissive. Far more information had been compiled by the teacher than was provided in the school textbooks. The teacher started the lesson by discussing answers to questions that had been assigned to the pupils during the previous lesson. The structure of the lesson was guided by the key questions provided in the next paragraph. Although the key questions could have promoted opportunities for active learning through discussions and debates, the teacher presented the information on the slides and lectured to the pupils most of the time. This didactic approach is often used to efficiently transmit information in an examination-focused school system (Stevenson 2007). However, at the end of the lesson the pupils were given key questions to tackle for their homework in order to prepare for the next lesson.

The following key questions guided the lesson:

- What factors determine/influence the way people relate to resources?
- Why is there an increase in demand for resources in modern day times?
- Discuss the following ways of resource utilization:
 - exploitation;
 - depletion;
 - preservation; and,
 - conservation.
- Why does exploitation occur?
- What is meant by physical and economic exhaustion?
- Why is preservation of resources sometimes used as a management strategy?
- Why is conservation necessary?
- When is a resource extinct?
- What is resource management?

Description of pupil activity

Pupils copied notes from the slides during the lesson. Only a few pupils answered the questions that the teacher occasionally asked.

Inclusion of EE/ESD in the lesson

In a lesson on “**Resource use and conservation**”, EE/ESD can be incorporated without difficulty. Some of the key ideas included by the teacher in the lesson were on:

- how people relate to the environment;
- the impact of economic development on the level of resource use;
- the importance of environmental education
- environmental impact assessments;
- sustainable resource use; and,
- resource management.

EE/ESD was clearly incorporated in the lesson and the question of dealing with the influence of attitudes and values in the exploitation and management of resources was handled very well. The teacher is very passionate about education for sustainability as illustrated by his awareness of current environmental issues in both the South African and the African context in general.

b. Second lesson

This was a 50 minute lesson taught to 18 pupils in the Grade 11 English medium class. The lesson topic was on “**Raw materials, opportunities and conflicts [in resource use]**”.

Description of method of teaching

The lesson started with a discussion of the answers to questions that had been assigned to the pupils at the end of the previous lesson. The pupils had been asked to research on the answers and bring them for discussion. The questions are provided below:

- What opportunities arise when a country in Africa has natural resources?
- Who benefits from these resources in LEDCs?
- Why and how do conflicts arise over the use of natural resources in Africa?

The teacher, as in the previous lesson, used a computer and overhead projector to present information on PowerPoint slides. These notes elaborated on the answers that had been given by the pupils at the beginning of the lesson. The lesson covered the problem of conflict over resources in addition to opportunities presented by the availability of raw materials. In this lesson there was greater amount of pupil activity than in the first lesson. The extract given below shows how the teacher would integrate pupil and teacher activities in the lesson:

- Divide class into groups/pairs
- Assign a key question to investigate (8 minutes)

- Show slide 3 to assign key questions
- Groups /pairs give feedback
- Teacher check views, intervenes, facilitates and supplements views.
- Learners take down notes.

The key questions that guided the lesson are provided below. The teacher planned to use these key questions to stimulate pupil activities noted above.

- What opportunities arise when a country in Africa has natural resources?
- Who benefits from these resources in LEDC`s?
- Why and how do conflicts arise over the use of natural resources in Africa?
- What is a National Park?
- Why do we need National Parks in Africa?
- Why do we have conflicts over land-use in national parks?
- How should National Parks be managed?

However, the pupils seemed to be more interested in copying the teacher's notes from the slides than in contributing their own ideas during the lesson. The interest in the teacher's information is likely to be motivated by the need to acquire "better" information so that they can be successful in the examinations.

Description of pupil activity

As in the previous lesson, the pupils were copying notes from the slides during the lesson. Only a few pupils answered the questions that he occasionally asked. Additionally, only a few contributed meaningfully to the group work activities. At the end of the lesson, the pupils were given key questions for homework on national parks in order to prepare for the next lesson. The key questions are outlined below:

- What is a National Park?
- Why do we need National Parks in Africa?
- Why do we have conflicts over land-use in national parks?
- How should National Parks be managed?

Inclusion of EE/ESD in the lesson

This was handled very well. However, the element of personal involvement of the pupils as individuals or as groups, was missing, together with the need to reflect on their role and what they can do as individuals to live more sustainably.

c. Third lesson

This was a 50 minute lesson taught to 18 pupils in the Grade 11 English medium class. The lesson topic was on “**National Parks**”.

Description of method of teaching

As in the previous lessons, the teacher started with a discussion of the answers to the key questions that had been assigned at the end of the previous lesson. He then used a computer and overhead projector to present information on slides in order to elaborate on the pupils’ answers. The teacher covered the following key questions:

- What are national parks?
- Why are national parks necessary?
- Conflicts in national parks
- Management of national parks

Towards the end of the lesson, the teacher divided the class into groups and assigned them tasks. An extract of part of the teacher’s lesson strategy is provided below:

- Divide class into pairs
- Assign a case study to each pair
- Pairs investigate source of conflict, nature of conflict, steps taken, views, opinions and attitudes etc. (5 min)
- Pairs give feedback to rest of class

Description of pupil activity

There was a discussion at the beginning but this only involved a few pupils. The other pupils quietly copied notes from the slides into their books. The pupils participated in group work towards the end of the lesson. As observed in the previous lesson, the pupils were more interested in the teacher’s notes on the slides than in the tasks that had been assigned to them.

Inclusion of EE/ESD in the lesson

The clarification of attitudes and value systems was done very well. This was however, achieved through the lecture method or exposition where the teacher told the pupils how attitudes and values influence exploitation and management of resources. However, the teacher did not provide the pupils with opportunities for personal involvement and reflection on their contribution to unsustainable resource utilization.

3. RORBET – School 3

This was a 50 minute lesson taught to 26 pupils in the Grade 10 English medium class. The lesson topic was on “**Intrusive igneous landforms**”. Only one lesson was observed.

Description of method of teaching including pupil activities

The lesson was textbook-based. Some parts of the textbook had been photocopied and given to the pupils to paste into their notebooks. This was a task which the pupils would do later during the lesson. The pupils were instructed to copy the word check or glossary of new terms from the textbook into their notebooks. While this was happening, some pupils were asked to volunteer to go and illustrate the new terms with the help of diagrams on blackboard. Pupils were later asked to work in pairs the task on landforms which they had been given earlier. Some pupils did not follow the instructions; they continued sitting individually. Because some of the pupils had no access books, their participation was limited.

Inclusion of EE/ESD

The lesson did not incorporate EE / ESD.

4. VENA – School 4**a. First lesson**

This was a 45 minute lesson taught to 34 pupils in the Grade 11 English medium class. The lesson topic was on “**Interpretation of a satellite image**”.

Description of method of teaching including pupil activities

This was a learner-centred lesson in which the pupils worked on an Activity in their textbooks in groups of four or five. The activity was based on the interpretation of a satellite image. The pupils assisted each other through discussions in their groups but they wrote the answers individually. The teacher then provided them with answers and then asked them to mark and then correct the wrong answers. She moved around the classroom during the lesson and assisted the pupils who were experiencing difficulties.

Inclusion of EE/ESD

EE/ESD was not incorporated into the lesson.

b. Second lesson

This was a 45 minute lesson taught to 34 pupils in the Grade 11 English medium class. The lesson topic was on “**Development**”.

Description of method of teaching and pupil activities

The teacher told the learners at the beginning of the lessons that they would write notes. She then wrote notes on the backboard quietly and the pupils copied them. They copied notes on a lesson that had been taught on the previous day. During the lesson the teacher was moving around and checking the learners’ progress in writing the notes. She was also helping them to read the notes in cases where they could not see her writing.

The study could have been more contextualized. The notes covered development patterns in the North and South without identifying the countries.

The classroom is bare. It has no charts and other learning resources on the walls.

Inclusion of EE/ESD

EE/ESD was not incorporated into the lesson on Development.

5. THOMAS – School 5**a. First Lesson**

This was a 60 minute lesson taught to 43 pupils in the Grade 11 English medium class. The lesson topic was on “**The role of globalization in development / Gender and development**”.

Description of method of teaching including pupil activities

The first part of the lesson focused on the definition of *Globalization* as well as its advantages and disadvantages. The teacher tried to involve the pupils in the discussions by posing questions but less than 5 out of 43 pupils participated in the discussions. The discussions were limited to a few pupils sitting in the front row. It appeared as if the teacher did not encourage the rest of the pupils to participate. Most pupils are disadvantaged because they are not proficient in the English language which is used as medium of instruction. English is a second language.

The second part of the lesson focused on *Gender issues and development*. The teacher covered the section briefly. Although the lesson addressed an issue in which the pupils could have actively participated, the teacher wrote information on the topic on the board and did not create opportunities for the pupils to participate. The pupils were not given a chance to explore the issue. The lesson was teacher-centred. The teacher used a transmissive teaching style because he talked far more than the pupils. The pupils sat individually and not in groups.

The classroom is bare. It has no charts on the walls or any other teaching and learning resources other than the pupils’ textbooks. All the pupils have textbooks but these were not used during the lesson.

Inclusion of EE/ESD

The teacher briefly incorporated EE/ESD by mentioning that one of the disadvantages of globalisation is the negative impact on the environment but this was not clarified adequately. He touched on global warming and the measures to tackle climate change such as the Kyoto protocol but the explanation was not clear. The lesson is not likely to promote the development of critical thinking skills because no opportunities were provided for the pupils to reflect on issues and to consider attitudes and values of not only the decision-makers but also their own.

b. Second lesson

This was a 60 minute lesson taught to 43 pupils in the Grade 11 English medium class. The lesson topic was on “**The role of globalization in development / Gender and development**”.

Description of method of teaching including pupil activities

The pupils spent the whole lesson copying notes from the blackboard on “**The role of globalization in development / Gender and development**”. The topics had been covered during the previous lesson.

APPENDIX B:7 ILLUSTRATION OF DATA ANALYSIS (THEMATIC ANALYSIS)

CODE	IDENTITY	SOURCE	CATEGORY	THEME
Is there evidence of learner-centred approaches to teaching in the lesson plan?				
Assignments / learner-centred approach	HoD-Sch2	Interview	Enabling pedagogical	Opportunity
e.g Assignments on Chapman's peak	Tr-Sch1	Interview	Enabling pedagogical	Opportunity
Claims success with learner-centred approach	Tr-Sch2	Interview	Enabling pedagogical	Opportunity
Completion of some assignments in class	Tr-Sch1	Interview	Enabling pedagogical	Opportunity
Could be other way round in a learner-centred approach	HoD-Sch3	Interview		
Defn – learner-centred approach	Tr-Sch5	Interview		
Defn – teacher-centred approach	Tr-Sch5	Interview		
Discovery method	Tr-Sch2	Interview	Enabling pedagogical	Opportunity
Discussion method	HoD-Sch1	Interview	Enabling pedagogical	Opportunity
Discussions	Tr-Sch2	Interview	Enabling pedagogical	Opportunity
DoE demands force teachers to use teacher-centred	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
DoE pace setters forcing use of teacher-centred	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
e.g.s of assignments	Tr-Sch4	Interview	Enabling pedagogical	Opportunity
Educator as facilitator	Tr-Sch2	Interview	Enabling pedagogical	Opportunity
Elaboration of teacher-centred approach	Tr-Sch3	Interview	Lack of awareness of EE	Opportunity
Groupwork	HoD-Sch2	Interview	Enabling pedagogical	Opportunity
Has stuck to traditional methods	HoD-Sch3	Interview	Lack of awareness of EE	Challenge
Lack of clarity on learner-centred approach	Tr-Sch1	Interview	Lack of awareness of EE	Opportunity
Learner participation & teacher as facilitator	HoD-Sch3	Interview	Enabling pedagogical	Opportunity
Learner-centred approach as learner-driven	HoD-Sch5	Interview	Enabling pedagogical	Opportunity
Learner-centred approach dominant	Tr-Sch5	Interview	Enabling pedagogical	Opportunity
Teacher talks more due to learner's problems with	Tr-Sch5	Verification	Challenge	Challenge
Learner-centred approach is dominant	HoD-Sch1	Interview	Enabling pedagogical	Opportunity
Learner-centred approach is interactive	Tr-Sch2	Interview	Enabling pedagogical	Opportunity
Learner-centred approach when there is opportunity	HoD-Sch2	Interview	Enabling pedagogical	Opportunity
Learners bringing knowledge in Learner-centred	HoD-Sch3	Interview	Enabling pedagogical	Opportunity
Learners taking a major role in their education	Tr-Sch4	Interview	Enabling pedagogical	Opportunity
Long service – trained in old methods	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
Mixed methods for scaffolding	Tr-Sch2	Interview	Enabling pedagogical	Opportunity
Not clear of learner-centred approach	Sh-Sch4	Interview	Lack of awareness of EE	Challenge

How does the teacher use the following approach to to encourage active learning: groupwork?

CODE	IDENTITY	SOURCE	CATEGORY	THEME
Appears to use groupwork regularly	Sh-Sch4	Interview	Enabling pedagogical	Opportunity
Assessment of groupwork problematic	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Benefits of groupwork	Sh-Sch4	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Tr-Sch1	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Sh-Sch4	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Sh-Sch4	Verification	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	HoD-Sch3	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Tr-Sch3	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Tr-Sch4	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is not conducive to groupwork	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	Tr-Sch2	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	HoD-Sch2	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	Tr-Sch5	Interview	Lack of awareness of EE	Challenge
Desks rearranged when the need arises	HoD-Sch2	Interview	Enabling pedagogical	Opportunity
Difficulties with groupwork	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
Disadvantage of GW – only one or two learners	HoD-Sch1	Verification	Lack of awareness of EE	Challenge
Disadvantage of GW – only one or two learners	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
Frequency of groupwork -one or two / week / fortnight	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
Frequency of groupwork use – 1 / week	Tr-Sch4	Interview	Lack of awareness of EE	Challenge
Groupwork difficult	HoD-Sch1	Interview	Challenge	Challenge
Groupwork Noisy	Tr-Sch1	Interview	Challenge	Challenge
Groupwork Noisy	HoD-Sch1	Interview	Challenge	Challenge
Groupwork sometimes used	HoD-Sch2	Interview	Enabling pedagogical	Opportunity
Overcrowded classes - but enough furniture	Sh-Sch4	Verification	Inadequate resources	Challenge
Large classes	HoD-Sch1	Interview	Inadequate resources	Challenge
Large classes	HoD-Sch1	Interview	Inadequate resources	Challenge
Large classes	Tr-Sch1	Interview	Inadequate resources	Challenge
Large classes	HoD-Sch5	Interview	Inadequate resources	Challenge
Large classes	Tr-Sch5	Interview	Inadequate resources	Challenge
Less groupwork now	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Little group work	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Low frequency of groupwork – 1 or 2 / term	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Minimal use of groupwork	Tr-Sch4	Interview	Lack of awareness of EE	Challenge

How does the teacher use the following approach to to encourage active learning: groupwork?

CODE	IDENTITY	SOURCE	CATEGORY	THEME
Appears to use groupwork regularly	Sh-Sch4	Interview	Enabling pedagogical	Opportunity
Assessment of groupwork problematic	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Benefits of groupwork	Sh-Sch4	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Tr-Sch1	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Sh-Sch4	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Sh-Sch4	Verification	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	HoD-Sch3	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Tr-Sch3	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Tr-Sch4	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is not conducive to groupwork	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	Tr-Sch2	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	HoD-Sch2	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	Tr-Sch5	Interview	Lack of awareness of EE	Challenge
Desks rearranged when the need arises	HoD-Sch2	Interview	Enabling pedagogical	Opportunity
Difficulties with groupwork	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
Disadvantage of GW – only one or two learners	HoD-Sch1	Verification	Lack of awareness of EE	Challenge
Disadvantage of GW – only one or two learners	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
Frequency of groupwork -one or two / week / fortnight	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
Frequency of groupwork use – 1 / week	Tr-Sch4	Interview	Lack of awareness of EE	Challenge
Groupwork difficult	HoD-Sch1	Interview	Challenge	Challenge
Groupwork Noisy	Tr-Sch1	Interview	Challenge	Challenge
Groupwork Noisy	HoD-Sch1	Interview	Challenge	Challenge
Groupwork sometimes used	HoD-Sch2	Interview	Enabling pedagogical	Opportunity
Overcrowded classes - but enough furniture	Sh-Sch4	Verification	Inadequate resources	Challenge
Large classes	HoD-Sch1	Interview	Inadequate resources	Challenge
Large classes	HoD-Sch1	Interview	Inadequate resources	Challenge
Large classes	Tr-Sch1	Interview	Inadequate resources	Challenge
Large classes	HoD-Sch5	Interview	Inadequate resources	Challenge
Large classes	Tr-Sch5	Interview	Inadequate resources	Challenge
Less groupwork now	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Little group work	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Low frequency of groupwork – 1 or 2 / term	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Minimal use of groupwork	Tr-Sch4	Interview	Lack of awareness of EE	Challenge

How does the teacher use the following approach to to encourage active learning: role play?

CODE	IDENTITY	SOURCE	CATEGORY	THEME
No role play due to teacher preference	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
No role play	Sh-Sch4	Interview	Lack of awareness of EE	Challenge
No role play – large classes and discipline problems	Tr-Sch5	Interview	Lack of awareness of EE	Challenge
No role play – not familiar with method	Tr-Sch4	Interview	Lack of awareness of EE	Challenge
No role play due to teacher preference	HoD-Sch2	Interview	Lack of awareness of EE	Challenge
No role play due to teacher preference	HoD-Sch3	Interview	Lack of awareness of EE	Challenge
No role play - more comfortable with traditional method	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
Rarely used	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Uses role play	Tr-Sch2	Interview	Enabling pedagogical app	Opportunity
Could not explain how he uses role play	Tr-Sch2	Verification	Lack of awareness of EE	teaching strategies
Uses role play	Tr-Sch3	Interview	Enabling pedagogical app	Opportunity

How does the teacher use the following approach to to encourage active learning: learners doing research, collecting data, and repor

CODE	IDENTITY	SOURCE	CATEGORY	THEME
DoE guidelines on projects	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
DoE guidelines on projects	HoD-Sch2	Interview	Lack of awareness of EE	Challenge
DoE guidelines on projects	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
DoE guidelines on projects	Tr-Sch4	Interview	Lack of awareness of EE	Challenge
DoE guidelines on projects – 1 / year / grade	HoD-Sch3	Interview	Lack of awareness of EE	Challenge
DoE guidelines on projects Pace setters	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
e.g fieldwork – pollution survey	HoD-Sch5	Interview	Enabling pedagogical app	Opportunity
e.g fieldwork as project	HoD-Sch5	Interview	Enabling pedagogical app	Opportunity
Enquiry learning = assessment tasks	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
Enquiry learning = collection of factual knowledge –	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Enquiry learning = projects	Tr-Sch4	Interview	Enabling pedagogical app	Opportunity
Enquiry learning = projects	HoD-Sch5	Interview	Enabling pedagogical app	Opportunity
Enquiry learning = projects	HoD-Sch5	Interview	Enabling pedagogical app	Opportunity
Enquiry learning = projects and field trips	HoD-Sch2	Interview	Enabling pedagogical app	Opportunity
Enquiry learning = research assignments / projects	Tr-Sch1	Interview	Enabling pedagogical app	Opportunity
Enquiry learning = research projects	HoD-Sch3	Interview	Enabling pedagogical app	Opportunity
Enquiry learning = textbook-based projects	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Enquiry learning is a requirement in the curriculum	HoD-Sch3	Interview	Enabling pedagogical app	Opportunity
Enquiry learning is time consuming	Tr-Sch2	Interview	School organization	Challenge
Geo excursions not the same as field work	Tr-Sch2	Interview	Lack of awareness of EE	Challenge
Issue-based assignments	HoD-Sch1	Interview	Enabling pedagogical app	Opportunity
Not clear of meaning of enquiry learning	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
One project / grade / term Is this above minimum	Sh-Sch4	Interview		
Problem of dishonesty and cheating in projects	HoD-Sch5	Interview	Challenge	Challenge
Projects an assessment tool – learners given marking rut	HoD-Sch1	Interview	Challenge	Challenge
Projects mainly based on books and newspapers	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
Projects mainly based on research from books	Tr-Sch4	Interview	Lack of awareness of EE	Challenge
Projects on environmental problems	Tr-Sch4	Interview	Enabling pedagogical app	Opportunity
Stipulated in assessment programme	Sh-Sch4	Interview		
Teaching to finish syllabus	Tr-Sch2	Interview	School organization	Challenge
eg of how fieldwork can be used	Tr-Sch2	Verification	Enabling pedagogical app	Opportunity
Opportunity to engage in fieldwork not used	Tr-Sch3	Verification	Lack of awareness of EE	Challenge
Check role of DoE above				

Follow up interview on enquiry learning: What is your understanding of the enquiry approach?

CODE	IDENTITY	SOURCE	CATEGORY	THEMES
Lack of clarity on meaning of enquiry approach	HoD-Sch1	Verification	Challenge	Challenge
Enquiry approach = Pps asking questions in class and get	HoD-Sch1	Verification	Challenge	Challenge
Does not use enquiry approach	HoD-Sch1	Verification	Lack of awareness of EE	Challenge
Lack of clarity on meaning of enquiry approach	HoD-Sch2	Verification	Lack of awareness of EE	Challenge
Acknowledges the importance of enquiry approach in tea	HoD-Sch2	Verification	Opportunity	Opportunity
Enquiry learning is for gifted learners	HoD-Sch2	Verification	Challenge	Challenge
Enquiry approach and time constraints	HoD-Sch2	Verification	School organization	Challenge
Idea of key questions in the lesson plan	Tr-Sch2	Verification	Opportunity	Opportunity
Key question promotes critical thinking	Tr-Sch2	Verification	Opportunity	Opportunity
Key question clarifies content	Tr-Sch2	Verification	Opportunity	Opportunity
Views on enquiry learning	Tr-Sch2	Verification	Challenge	Challenge
Lack of clarity on meaning of enquiry approach	Tr-Sch2	Verification	Challenge	Challenge
Enquiry approach and time constraints	Tr-Sch2	Verification	School organization	Challenge
Teaching for exams	Tr-Sch2	Verification	School organization	Challenge
Teaching to finish syllabus for exams	Tr-Sch2	Verification	School organization	Challenge
Lack of clarity on meaning of enquiry approach	HoD-Sch3	Verification	Challenge	Challenge
Enquiry learning = questions followed by discussions	HoD-Sch3	Verification	Lack of awareness of EE	Challenge
Less use of enquiry learning at FET	HoD-Sch3	Verification	Lack of awareness of EE	Challenge
Lack of awareness of enquiry approach	Tr-Sch3	Verification	Lack of awareness of EE	Challenge
Lack of awareness of enquiry approach	Sh-Sch4	Verification	Lack of awareness of EE	Challenge
Claims to be aware of enquiry learning	Tr-Sch4	Verification	Opportunity	Opportunity
Enquiry learning = questions followed by discussions	Tr-Sch4	Verification	Challenge	Challenge
Claims to use the enquiry learning	Tr-Sch4	Verification	Opportunity	Opportunity
Illustrations of enquiry approach	Tr-Sch4	Verification	Challenge	Challenge
Enquiry learning = research projects	HoD-Sch5	Verification	Enabling pedagogical app	Opportunity
Illustrations of enquiry approach	HoD-Sch5	Verification	Enabling pedagogical app	Opportunity
Enquiry learning is optional	HoD-Sch5	Verification	Lack of awareness of EE	Challenge
Strategy viewed from perspective of assessment	HoD-Sch5	Verification	Challenge	Challenge
Implication that enquiry approach is time-consuming	HoD-Sch5	Verification	School organization	Challenge
Option of open-book in place of enquiry approach is like	HoD-Sch5	Verification	Lack of awareness of EE	Challenge
Enquiry could be the geography questions	Tr-Sch5	Verification	Opportunity	Opportunity
Lack of awareness of enquiry approach	Tr-Sch5	Verification	Lack of awareness of EE	Challenge
DoE guidelines limiting use of enquiry approach	Sh-Sch4	Verification	Lack of awareness of EE	Challenge

How does the teacher use the following approach to to encourage active learning: groupwork?

CODE	IDENTITY	SOURCE	CATEGORY	THEMES
Appears to use groupwork regularly	Sh-Sch4	Interview	Enabling pedagogical	Opportunity
Assessment of groupwork problematic	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Benefits of groupwork	Sh-Sch4	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Tr-Sch1	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Sh-Sch4	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Sh-Sch4	Verification	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	HoD-Sch3	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Tr-Sch3	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is conducive to groupwork	Tr-Sch4	Interview	Enabling pedagogical	Opportunity
Classroom arrangement is not conducive to groupwork	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	Tr-Sch2	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	HoD-Sch2	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Classroom arrangement is not conducive to groupwork	Tr-Sch5	Interview	Lack of awareness of EE	Challenge
Desks rearranged when the need arises	HoD-Sch2	Interview	Enabling pedagogical	Opportunity
Difficulties with groupwork	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
Disadvantage of GW – only one or two learners	HoD-Sch1	Verification	Lack of awareness of EE	Challenge
Disadvantage of GW – only one or two learners	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
Frequency of groupwork -one or two / week / fortnight	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
Frequency of groupwork use – 1 / week	Tr-Sch4	Interview	Lack of awareness of EE	Challenge
Groupwork difficult	HoD-Sch1	Interview	Challenge	Challenge
Groupwork Noisy	Tr-Sch1	Interview	Challenge	Challenge
Groupwork Noisy	HoD-Sch1	Interview	Challenge	Challenge
Groupwork sometimes used	HoD-Sch2	Interview	Enabling pedagogical	Opportunity
Overcrowded classes - but enough furniture	Sh-Sch4	Verification	Inadequate resources	Challenge
Large classes	HoD-Sch1	Interview	Inadequate resources	Challenge
Large classes	HoD-Sch1	Interview	Inadequate resources	Challenge
Large classes	Tr-Sch1	Interview	Inadequate resources	Challenge
Large classes	HoD-Sch5	Interview	Inadequate resources	Challenge
Large classes	Tr-Sch5	Interview	Inadequate resources	Challenge
Less groupwork now	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Little group work	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Low frequency of groupwork – 1 or 2 / term	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Minimal use of groupwork	Tr-Sch4	Interview	Lack of awareness of EE	Challenge

How does the teacher use the following approach to to encourage active learning: discussions and debates?

CODE	IDENTITY	SOURCE	CATEGORY	THEMES
Class discussions are frequent	Tr-Sch4	Interview	Enabling pedagogical app	Opportunity
Class Discussions used	Tr-Sch5	Interview	Enabling pedagogical app	Opportunity
Debate on global warming	HoD-Sch1	Interview	Enabling pedagogical app	Opportunity
Debates are infrequent	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
Debates are rarely used	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Discussion of local issues	HoD-Sch1	Interview	Enabling pedagogical app	Opportunity
Discussion of topical issues	HoD-Sch1	Interview	Enabling pedagogical app	Opportunity
Discussions based on learners' personal experience	HoD-Sch5	Interview	Enabling pedagogical app	Opportunity
Discussions used regularly	Tr-Sch2	Interview	Enabling pedagogical app	Opportunity
Discussions used regularly but no debates	HoD-Sch2	Interview	Enabling pedagogical app	Opportunity
Few class discussions	HoD-Sch3	Interview	Lack of awareness of EE	Challenge
Class discussions Frequency of use – 1 / week	Tr-Sch4	Interview	Enabling pedagogical app	Opportunity
Frequent discussions	HoD-Sch1	Interview	Enabling pedagogical app	Opportunity
Good participation in class discussions	Sh-Sch4	Interview	Enabling pedagogical app	Opportunity
Ignorance reducing frequency of discussions	Tr-Sch3	Interview	Challenge	
Infrequent debates	HoD-Sch3	Interview	Lack of awareness of EE	Challenge
Learners do not read	Tr-Sch3	Interview	Challenge	Challenge
Need to finish syllabus limits the methods used.	Tr-Sch5	Interview	School organization	Challenge
No debates	Sh-Sch4	Interview	Lack of awareness of EE	Challenge
No debates	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
No debates on env. issues this year	HoD-Sch3	Interview	Lack of awareness of EE	Challenge
No formal debate	Tr-Sch5	Interview	Lack of awareness of EE	Challenge
One debate	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Poor language skills Poor participation	Tr-Sch3	Interview	Challenge	Challenge
Poor participation in class discussions	Tr-Sch3	Interview	Challenge	Challenge
Sometimes uses debates	Tr-Sch4	Verification	Enabling pedagogical app	Opportunity
One debate / once / week	Tr-Sch4	Verification	Enabling pedagogical app	Opportunity

How does the teacher use the following approach to encourage active learning: fieldwork?

CODE	IDENTITY	SOURCE	CATEGORY	THEMES
Fieldwork 1 / yr – infrequent	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Planning excursion to nature reserve	HoD-Sch1	Verification	Enabling pedagogical app	Opportunity
Arbor day celebrated with outdoor lesson	Tr-Sch3	Interview	Enabling pedagogical app	Opportunity
Concern with contact hours in considering fieldwk	HoD-Sch3	Interview	School organization	Challenge
Disruption of school routine	HoD-Sch3	Interview	School organization	Challenge
DoE directive on fieldwork	Tr-Sch1	Verify this	Lack of awareness of EE	Challenge
DoE guidelines – 1 field trip / class / year – field work i	HoD-Sch2	Interview	Lack of awareness of EE	Challenge
DoE guidelines -Fieldwork optional	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
DoE guidelines on fieldwk	HoD-Sch3	Interview	Lack of awareness of EE	Challenge
DoE guidelines on fieldwk	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
e.g of field work	Tr-Sch3	Interview	Enabling pedagogical app	Opportunity
E.g. mixed group taken for excursion at FET	Sh-Sch4	Interview	Enabling pedagogical app	Opportunity
E.g. of field trip but aims and objectives not clear	Tr-Sch4	Interview	Lack of awareness of EE	Challenge
Example of school ground – studying ecosystem	Tr-Sch3	Interview	Enabling pedagogical app	Opportunity
Fieldwork = Excursions	Sh-Sch4	Interview	Lack of awareness of EE	Challenge
Field excursions at FET	HoD-Sch2	Interview	Enabling pedagogical app	Opportunity
Field trips every year for a specific grade	Tr-Sch3	Interview	Enabling pedagogical app	Opportunity
Field work = excursions	HoD-Sch5	Interview	Lack of awareness of EE	Challenge
Field work hardly used	Tr-Sch4	Interview	Lack of awareness of EE	Challenge
Field work is costly	HoD-Sch5	Interview	Inadequate resources	Challenge
Fieldwork = excursions	HoD-Sch1	Interview	Lack of awareness of EE	Challenge
Fieldwork = excursions	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Fieldwork = long excursions	Tr-Sch3	Interview	Lack of awareness of EE	Challenge
Fieldwork must not reduce contact time	Tr-Sch1	Interview	School organization	Challenge
Fieldwork = excursion	Tr-Sch4	Interview	Lack of awareness of EE	Challenge
Fieldwork stopped two years ago	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Fieldwork used as both assessment and teaching method	HoD-Sch1	Interview		
Fieldwork used to be done in the past	Tr-Sch1	Interview	Lack of awareness of EE	Challenge
Fieldwork with GET around school	HoD-Sch2	Verification	Enabling pedagogical app	Opportunity
Financial constraints for field work	HoD-Sch1	Interview	Inadequate resources	Challenge
Financial constraints for field work	HoD-Sch3	Interview	Inadequate resources	Challenge
Financial constraints for field work	Tr-Sch3	Interview	Inadequate resources	Challenge
Financial constraints for field work	Sh-Sch4	Interview	Inadequate resources	Challenge
Fieldwork not the same as excursions	Tr-Sch2	Verification	Enabling pedagogical app	Opportunity

APPENDIX C:1 PACE SETTER

WESTERN CAPE EDUCATION DEPARTMENT

DIRECTORATE: CURRICULUM DEVELOPMENT

FET NCS

PACE SETTER FOR GRADE 11



2008

SUBJECT: GEOGRAPHY

PACE SETTER FOR GEOGRAPHY: GRADE 11

TERM 1 (11 weeks)

Learning Outcome and Assessment Standard	Content	Assessment	Week	Completed
11.1.	<p>A. Geographical skills and techniques</p> <ul style="list-style-type: none"> ▪ Using atlases: to familiarise and empower learners to use atlases on various themes as a rich source of spatially and non-spatially referenced data and information. ▪ Map use and map skills: includes reading and analysis of maps, orthophoto maps, aerial photographs and graphic data; executing different techniques, for example: <ul style="list-style-type: none"> ▪ consolidation and more advanced application of map skills and techniques done in Grade 10 on ▪ topographical maps, aerial photos and orthophoto maps; ▪ reading, analysis and interpretation of 1:50 000 topographical maps and orthophotos, integrating concepts done in content section. 	<p>Daily:</p> <ul style="list-style-type: none"> • Pre-knowledge from Grade 10 Map work • Map work assignment from topographic and orthophoto maps 	1 - 3	

11.1. 11.2 11.3	<p>B. THE SIGNIFICANCE OF WATER MASSES</p> <p>Context: Africa and the World</p> <ul style="list-style-type: none"> ▪ The hydrological cycle. ▪ Water masses of Africa: oceans, permanent ice, lakes, swamps, etc. ▪ Climate change: effects of El Niño and La Niña in Africa. ▪ Hazards (flooding and drought) and the response of humans. ▪ Oceans as a major source of moisture and oxygen for the atmosphere, protein food and energy supply. ▪ Coastal environments: natural forces – erosion, deposition. ▪ Hazards and environmental management of hydrological systems (e.g. rivers, coastal resource management). <p>As needed to start with Data handling Assignment</p>	<p>Daily</p> <p>Data handling Assignment:</p> <p>E.g.</p> <ul style="list-style-type: none"> • Discuss set of criteria for assignment 	4 -5	
11.1. 11.2 11.3	<p>B. THE SIGNIFICANCE OF WATER MASSES</p> <ul style="list-style-type: none"> ▪ Role of oceans: climate control, world trade and as a source of food. ▪ Impact of humans on oceans (e.g. pollution, over-exploitation). 	Hand in stage 1 of Data handling Assignment	6-7	
11.1. 11.2 11.3	<p>B. THE SIGNIFICANCE OF WATER MASSES</p> <ul style="list-style-type: none"> ▪ Forms of exploitation and its impact on sustainable living (e.g. commercial and subsistence fishing, mining, dumping of waste). 	PoA : Completion of Data handling Assignment	8	
11.1. 11.2 11.3		PoA: March Tests Based on Significance of Water Masses	9 – 10	

TERM 2
(11 weeks)

Learning Outcome and Assessment Standard	Content	Assessment	Week	Completed
11.1. 11.2 11.3	<p>ECOSYSTEMS (biotic and abiotic components) Context: Africa and the World</p> <ul style="list-style-type: none"> ▪ Concepts (e.g. biosphere, ecosystem, biome, food webs and chains). ▪ Ecological processes (e.g. energy flow, nutrient cycling, self regulation). ▪ Soil processes, soil profile and soil forming factors. 	<p>Daily</p> <ul style="list-style-type: none"> • Worksheets 	1	
11.1. 11.2 11.3	<p>ECOSYSTEMS (biotic and abiotic components) Context: Africa and the World</p> <ul style="list-style-type: none"> ▪ Human impact on ecosystems and the consequences. ▪ Vegetation regions in Africa: <ul style="list-style-type: none"> ○ distribution; ○ comparing different biomes; ○ human impact on different biomes. ▪ Environmental relationships (influence of climate, soil, topography, veld fires on biomes). 	<p>PoA</p> <ul style="list-style-type: none"> • Research of the impact of humans on ecosystems and its consequences in the Western Cape • Case studies 	2 - 3	
11.1. 11.2 11.3	<p>D. DEVELOPMENT AND SUSTAINABILITY Context: Africa and the World</p> <ul style="list-style-type: none"> • Concepts of 'development' and 'sustainability' at global and national scales. • Indicators of development (social or economic) and sustainability. • Models and theories of development over time. • Rural and urban development: successes and failures. • The unevenness of development globally (North/South divide). 	<p>Daily</p> <ul style="list-style-type: none"> • Worksheets 	4 - 6	

11.1. 11.2 11.3	DEVELOPMENT AND SUSTAINABILITY: <ul style="list-style-type: none"> • Contrasting developed and developing countries in terms of indicators. • Role of agriculture, industry, aid, globalisation in development using case studies. • Gender issues related to development. • Changing patterns of agriculture, industry, transport, trade and settlement. • Strategies by people, organisations and nations to address development problems. • Application of development strategies in local context. 	PoA : Research on changing patterns of agriculture, industry, transport and trade and the influence on economy in different provinces of South Africa Research Task Hand in stage 1	7 - 8	
		Revision	9	
11.1. 11.2 11.3		PoA: Mid-year examination	10 - 11	

**TERM 3
(10 weeks)**

Learning Outcome and Assessment Standard	Content	Assessment	Week	Completed
11.1 11.2 11.3	GEOGRAPHICAL SKILLS AND TECHNIQUES: <ul style="list-style-type: none"> ▪ Map projections: Mercator. ▪ Fieldwork: using local maps/photos; recording geographical information in the local area. ▪ Functional elements of a GIS including: <ul style="list-style-type: none"> ○ data acquisition; ○ satellite remote sensing as a digital data source; ○ preprocessing; ○ data processing. 	Daily <ul style="list-style-type: none"> • Practical work on computer • Class discussion • Assignments 	1- 5	
11.1 11.2 11.3	E. PEOPLE AND THEIR NEEDS CONTEXT: AFRICA <ul style="list-style-type: none"> • Resource use and management: <ul style="list-style-type: none"> ○ resources and their uses; ○ distribution and utilisation of renewable and non-renewable natural resources; ○ concepts of 'resources exploitation', 'resource depletion', 'resource preservation', 'resource conservation' 	Daily <ul style="list-style-type: none"> • Concept maps/spider diagrams 	6	

11.1 11.2 11.3	<p>E. PEOPLE AND THEIR NEEDS CONTEXT: AFRICA</p> <ul style="list-style-type: none"> • Extraction of raw materials, the conflicts and opportunities that are created; <ul style="list-style-type: none"> ○ land use conflicts in national parks; ○ the impact of values and attitudes of people affected. • Energy use and management: <ul style="list-style-type: none"> ○ increasing demand for energy; ○ relative and changing importance of fossil fuels, nuclear power and alternative energy sources; 	<p>Daily</p> <ul style="list-style-type: none"> • Worksheets • Project Creative Response: E.g. Discuss set of criteria for assignment 	7 - 8	
11.1 11.2 11.3	<p>E. PEOPLE AND THEIR NEEDS CONTEXT: AFRICA The environmental costs of energy provision;</p> <ul style="list-style-type: none"> • causes and effects of energy production related to pollution; • causes and consequences of acid rain and the importance of international co-operation; environmental effects of resource and energy consumption on world temperatures; 	<p>Daily</p> <ul style="list-style-type: none"> • Class discussion • Assignments <p>Creative Research Project: Hand in stage 1</p>	9	
11.1 11.2 11.3	<p>E. PEOPLE AND THEIR NEEDS CONTEXT: AFRICA The environmental costs of energy provision;</p> <ul style="list-style-type: none"> • sustainable energy principles and approaches – consider new forms of energy and approaches to energy conservation. 	<p>Daily</p> <ul style="list-style-type: none"> • Class discussion • Assignments 	10	
		<p>PoA: Test Final Hand in Creative Response</p>	11	

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TERM 4
(9 weeks)

Learning Outcome and Assessment Standard	Content & Context	Assessment	Week	Completed
11.1. 11.2 11.3	Revision: Theory Map work	Revision	1 - 4	
11.1 11.2 11.3 .	GRADE 11 EXAMINATIONS	PoA: Final examination	5 -10	

APPENDIX C:2 GRADE 12: WORK SCHEDULE 2008

TERM ONE: 16 January - 30 March

MODULES: Geographical Skills and Techniques/ Climate and Weather/ People and Their Needs

WEEKS	KNOWLEDGE FOCI	ASSESSMENT ACTIVITIES	LO 1					LO 2				LO 3		LTSM	REFLECTION	INTEGRATION
			ASSESSMENT STANDARDS													
			12.1.1	12.1.2	12.1.3	12.1.4	12.1.5	12.2.1	12.2.2	12.2.3	12.2.4	12.3.1	12.3.2			
1	Map use and Skills Map Projections	Baseline ass. Worksheet		√		√	√		√			√		Maps/Atlas/Photos/ Q&A/ Class interaction/ Pre know.		
2	Map use and skills Map projections Atlas Interpretation	Map work games Cass: # Map work assignment		√		√	√		√			√		Maps/Atlas/Photos/Orthoph / Q&A/ PP Slide show/ Class interaction/ Map trix		CAT IT
3	Global Air Circulation and Weather patterns. Changes in Energy balance	Worksheets Class Test			√	√	√	√	√				√	Animations/ Diagrams/ Maps/IKS	Review: Assign m.	PS
4	Pressure Patterns and Air Flow Mid-Latitude cyclones	Discussion Presentations	√	√			√			√			√	Synoptic Charts/ Weather reports and Satellite images		PS
5	Tropical Cyclones Anticyclonic Circulation Climate Hazards	Debates Cass: # Control Test 1 # Present Case Study: TPC's 2005-2006	√		√		√	√				√	√	Synoptic Charts/ Weather reports and Satellite images Diagrams/ Picture/ Photos/ Class interaction/ Internet tracking of TPC/ Animations		CAT IT
6	Local Climates: Urban and Valleys Climatic Regions: Global and Regional	Mind mapping Worksheets Cass: # Data handling				√	√	√	√	√			√	PP Slide show/Observation/ Newspaper clippings/ Diagrams/ Picture/ Photos/ Class interaction/ Thematic maps/ Animations	Review: C- Test	
7	Economic Sectors and influence	Worksheets						√	√	√			√	Graphs/ Statistics/ Atlas/		ML,

	GDP/Employment etc.												Indicators/ News/ Tables/ News/ Maps/ Internet		E
8	Influence of other factors on peoples needs e.g. social	Discussions / Interviews Case Study	√		√	√	√			√	√	√			E CS
9	Role and Perc. of decision-makers on economic activities	Discussions Debates	√							√	√	√	√		
10	Impact of humans on location of eco. Activities& impact of location change of eco. Activities on humans	Role plays Debates Cass: # Control Test 2	√				√	√		√		√		Revisio n	TO CS
11	Response of people to injustice	Discussion / Debates Cass: # Investigation	√	√	√		√			√		√		Revisio n	
SCHOOL CONTEXTS : Athletics - Internal/Triangular = 2 school days// Public holidays 20/21 March = 2 days//															