ASSESSING THE IMPLEMENTATION OF ENVIRONMENTAL EDUCATION IN SELECTED VOSLOORUS TOWNSHIP SCHOOLS

BY

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DECLARATION

I, *Neo Tsotetsi*, declare that **Assessing the implementation of environmental education in selected Vosloorus township schools** is my own work, and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references. I further declare that I submitted the dissertation to originality checking software (Turnitin), and that it falls within the accepted requirements for originality. I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.

_____ **July 2021**

Neo Tsotetsi

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ABSTRACT

The aim of the study is to assess how teachers from selected primary schools in the Vosloorus township, implement Environmental Education. To that end, Kolb's (1984) experiential learning theory was employed as theoretical framework. Data were collected by means of face-to-face interviews, focus group interviews, and observation. Three primary schools in Vosloorus were sampled. One experienced teacher who specialises in Social or Natural Sciences was selected purposively from each school, along with a group of six to eight learners. Convenience sampling was employed, since the various participants, in their respective settings, were readily available to take part in the study. In the process of analysing the data, predefined themes and categories that emerged from the content analysis, were used. The findings emerging from the study indicated that the methods most frequently employed in teaching the content of Environmental Education, were lecturing and question-and-answer. Due to the demanding curriculum, teachers were unable to mitigate environmental problems outside of the classroom; they had divergent perceptions and understandings of the concept of EE; they met with their learners' parents once a year to discuss environmental problems and some even conducted annual clean-up campaigns; and most teachers attended workshops related to those Environmental Education components which are incorporated in the natural and social sciences. The findings of the study led to a number of recommendations being made, namely that learners should be encouraged to pick up any waste papers on the school terrain; teachers should enrol for, and attend, Environmental Education courses and workshops at least once a year, to deepen their understanding of the concept; and Environmental Education should not only be based on action, but when teaching the content of the subject, teachers need to employ diverse teaching methods.

Key words: Environment, Environmental Education, Land Pollution, Sustainability, Sustainable Development

KHOTHATSO

Maikaelelo a thutopatlisiso ke go tlhatlhoba ka fa barutabana go tswa mo dikolong tse di potlana tse di tlhophilweng mo toropong ya Vosloorus, ba diragatsang Thuto ya Tikologo ka teng. Ho finyella seo, khopolo ea ho ithuta ea Kolb (1984) e ile ea sebelisoa e le moralo oa theory. Lintlha li ile tsa bokelloa ka lipuisano tsa sefahleho le sefahleho, lipuisano tsa lihlopha tse tsepamisitsoeng maikutlo, le ho shebella. Ho ile ha etsoa sampole likolo tse tharo tsa mathomo Vosloorus. Tichere e 'ngoe e nang le phihlelo e sebetsanang ka ho khetheha le Saense ea Sechaba kapa ea Tlhaho e ile ea khethoa ka morero oa sekolo ka seng, hammoho le sehlopha sa liithuti tse tšeletseng ho isa ho tse robeli. Ho ile ha sebelisoa sampole e bonolo, kaha barupeluoa ba fapaneng, maemong a bona, ba ne ba fumaneha habonolo ho nka karolo thutong. Mo thulaganyong ya go sekaseka datha, go dirisitswe dithitokgang tse di tlhalositsweng pele le dikarolo tse di tlhageletsweng mo tshekatshekong ya diteng. Liphuputso tse hlahileng liphuputsong li bonts'itse hore mekhoa e sebelisoang hangata ha ho rutoa litaba tsa Thuto ea Tikoloho, e ne e le ho fana ka thuto le lipotso le likarabo. Ka lebaka la kharikhulamo e boima, matichere a ile a sitoa ho fokotsa mathata a tikoloho ka ntle ho phaposi ea ho rutela; ba ne ba na le maikutlo a fapaneng le kutloisiso ea mohopolo oa EE; ba ne ba kopana le batsoali ba liithuti tsa bona hang ka selemo ho buisana ka mathata a tikoloho 'me ba bang ba bile ba etsa matšolo a selemo le selemo a ho hloekisa; 'me matichere a mangata a ile a ea lithupelong tse amanang le likarolo tseo tsa Thuto ea Tikoloho tse kenyellelitsoeng thutong ea mahlale a tlhaho le a sechaba. Liphuputso tsa phuputso li entse hore ho etsoe likhothaletso tse ngata, e leng hore baithuti ba lokela ho khothaletsoa ho nka lipampiri life kapa life tsa litšila sebakeng sa sekolo; matitjhere a lokela ho ingodisa, le ho ba teng, dithutong le dithupelong tsa Tikoloho bonyane hang ka selemo, ho tebisa kutlwisiso ya bona ya mohopolo; le Thuto ea Tikoloho ha ea lokela ho theoa feela ketsong, empa ha ho ruta litaba tsa thuto, matichere a lokela ho sebelisa mekhoa e fapaneng ea ho ruta.

Mantsoe a bohlokoa: Tikoloho, Thuto ea Tikoloho, Tšilafalo ea Mobu, Moshoelella, Ntlafatso ea Moshoelella.

ISIQINISEKISO

Inhloso yalolu cwaningo ukuhlola ukuthi othisha bezikole zamabanga aphansi ezikhethiwe eziselokishini laseVosloorus, bayisebenzisa kanjani i-Environmental Education. Ukufeza lokho, ithiyori yokufunda ngokuzibonela ka-Kolb (1984) yasetshenziswa njengohlaka lwethiyori. Idatha yaqoqwa ngokusebenzisa izingxoxo zobuso nobuso, izingxoxo zamaqembu okugxilwe kuwo, kanye nokubhekwa. Kuthathwe izikole ezintathu zamabanga aphansi eVosloorus. Omunye uthisha onokuhlangenwe nakho osebenza ngokukhethekile kwezeNhlalakahle noma Isayensi Yemvelo wakhethwa ngokuhlosiwe esikoleni ngasinye, kanye neqembu labafundi abayisithupha kuya kwabayisishiyagalombili. Kwasetshenziswa amasampula alula, njengoba abahlanganyeli abehlukene, ezimeni zabo ezihlukene, babetholakala kalula ukuze babambe iqhaza ocwaningweni. Enqubweni yokuhlaziya idatha, kusetshenziswe izingqikithi ezichazwe ngaphambilini nezigaba ezivela ekuhlaziyeni okuqukethwe. Okutholwe ocwaningweni kukhomba ukuthi izindlela ezisetshenziswa kakhulu ekufundiseni okuqukethwe yi-Environmental Education, wukufundisa kanye nemibuzo nezimpendulo. Ngenxa yekharikhulamu enzima, othisha abakwazanga ukudambisa izinkinga zemvelo ngaphandle kwekilasi; babenemibono nokuqonda okuhlukene komqondo we-EE; babehlangana nabazali babafundi babo kanye ngonyaka ukuze baxoxe ngezinkinga zemvelo futhi abanye baze benze imikhankaso yonyaka yokuhlanza; futhi iningi lothisha lihambele imihlangano yokucobelelana ngolwazi ehlobene nalezo zingxenye Zemfundo Yezemvelo ezifakwe kusayensi yemvelo nenhlalakahle. Okutholwe kulolu cwaningo kuholele ekutheni kwenziwe izincomo eziningi, okungukuthi abafundi kumele bakhuthazwe ukuthi bacoshe noma yiziphi izincwadi ezilahlile endaweni yesikole; Othisha kufanele babhalisele, futhi bethamele izifundo zemfundo yezeMvelo kanye nemihlangano yokucobelelana ngolwazi okungenani kanye ngonyaka, ukuze bajulise ukuqonda kwabo lo mqondo; kanye Nokufundisa Ngezemvelo akufanele kusekelwe ezenzweni kuphela, kodwa lapho kufundiswa okuqukethwe yisifundo, othisha kudingeka basebenzise izindlela zokufundisa ezihlukahlukene.

Amagama angukhiye: Imvelo, Imfundo Yezemvelo, Ukungcoliswa Komhlaba, Ukusimama, Intuthuko Esimeme

GLOSSARY OF TERMS

Environment

The environment is an area in which both living and non-living things live together, according to Kanyimba (2009, p. 22). In relation to this study, the definition pertains to the significance of both the biotic and abiotic components found in our environment.

Environmental Education

As indicated in the Tbilisi Declaration, "[e]nvironmental education is a learning process that increases people's knowledge [of], and awareness about, the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action" (Unesco, 1978). In the context of this study, Environmental Education was deemed to enable teachers, learners and parents to acquire or develop knowledge and essential skills, such as recycling and the fixing or reporting of leaking taps, to address those environmental issues which are evident in Vosloorus township.

Land Pollution

This refers to the "[u]nwelcome concentration of substances that are beyond the environment's capacity to handle" (Share-net, 1999). In the context of this study, land pollution is one of the environmental issues found to manifest themselves in Vosloorus township schools.

Sustainability

This involves maintaining resources so that future generations will be able to use, or enjoy, those same resources (Shava, 2000). In relation to the action research study, water was conserved for future generations by fixing leaking taps, and through teachers and learners using buckets to wash their hands, as a strategy to conserve water.

Sustainable Development

As the Brundtland report indicates, this term pertains to the "[a]bility to make development sustainable, to ensure that it meets the needs of the present without

comprising the ability of the future generations to meet their own needs” (World Commission on Environment and Development [WCED], 1987). In this instance, while growing crops, parents and learners adopted and implemented crop rotation systems, to ensure that the soil would be fertile for future plantings.

ACRONYMS AND ABBREVIATIONS

AR	action research
ATP	annual teaching plan
C2005	Curriculum 2005
CAPS	Curriculum and Assessment Policy Statement
CERI	Centre for Educational Research and Innovation
CPTD	continuing professional teacher development
DESD	Decade of Education for Sustainable Development
DoE	Department of Education
EE	Environmental Education
EEASA	Environmental Education Association of Southern Africa
EPA	(Ethiopian) Environmental Protection Authority
ESD	Education for Sustainable Development
FET	Further Education and Training
GDE	Gauteng Department of Education
GET	General Education and Training
HL	home language
IDRC	International Development Research Centre
IEEP	International Environmental Education Program
IUCN	International Union for the Conservation of Nature
Leesp	Lesotho Environmental Education Support Project
MDGs	millennium development goals
MoE	Ministry of Education
NCS	National Curriculum Statement
NCF	Nigeria Conservation Foundation
NGO	non-governmental organisation
NS	Natural Science
OBE	Outcomes-based Education
PD	professional development
RNCS	Revised National Curriculum Statement
RSA	Republic of South Africa
SACE	South African Council for Educators
SADC	Southern African Development Community
SMT	school management team
SS	Social Science
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Program
Unesco	United Nations Educational, Scientific and Cultural Organisation
URT	United Republic of Tanzania
USSR	Union of Soviet Socialist Republics

WCED	World Commission on Environment and Development
Wessa	Wildlife and Environment Society of Southern Africa
WHO	World Health Organization
WSSD	World Summit on Sustainable Development

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CHAPTER 1:
ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Current environmental crises, such as land, air and water pollution, as well as deforestation in communities around the world, need to be eradicated through the effective implementation of Environmental Education (EE) in schools. All members of the community should assume shared responsibility, to ensure that the resources of our planet are sustained, thereby affording current and future generations an opportunity to utilise and enjoy the earth's resources.

Having reviewed the existing body of literature in this field, a number of recent studies were identified, including those by Makhoba (2009), Kimaryo (2011), Ramsaroop and van Rooyen (2013), and Mohammed (2016), but none of them considered the partnership between school and community, in ensuring the effective implementation of EE. Furthermore, none of those researchers investigated the importance of professional development, as a means of ensuring the effective implementation of EE in schools. The studies conducted by the abovementioned authors did not make use of action research (AR) either. Notably, AR is acknowledged to be useful in endeavours aimed at improving the implementation of EE to combat environmental problems, and was therefore applied in the Vosloorus township where this study was undertaken. To address the identified gaps in the literature, the researcher conducted face-to-face and focus group interviews, in addition to undertaking observation, with a view to determining the following:

- How do schools form partnerships with the community, to ensure the effective implementation of EE?
- How do teachers acquire knowledge regarding the implementation of EE?

In addressing these issues in a systematic manner, Chapter 1 outlines the background to the study, the problem statement, as well as the research question and sub-questions. In addition, the chapter offers insight into the rationale behind the study, its aims and objectives, as well as any delimitations and limitations which

were identified, the research approach and methodology, the population, the sampling process, adherence to research ethics, and, in addition, offers a definition of relevant terms.

1.2 BACKGROUND

According to Schudel et al. (2008), the postapartheid African National Congress (ANC) government integrated EE in the school curriculum. Known as Curriculum 2005, its focus was on outcomes-based education (OBE) (Schudel et al., 2008). The White Paper on Education and Training, issued by the Department of Education (DoE, 1995, p. 25), notes that

> EE as an integrated active approach to learning, must be a vital element of all levels and programmes of the education and training system, in order to create environmentally literate and active citizens and ensur[e] that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources.

According to the South African constitution (Republic of South Africa [RSA], 1996a, p. 11),

> everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefits of the present and future generation, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecological sustainable development and use of natural resources, while promoting justifiable economic and social development.

These quotes clearly indicate government's concern about the degradation of the earth's resources and the concomitant effects on populations (Makhoba, 2009, p. 2). According to Loubser (2008, p. 4), principle four of the 12 principles adopted at the Tbilisi Conference, the United Nations Educational, Scientific and Cultural Organization (Unesco) recommends that EE address environmental issues at the local, national, and international levels. As Fauville et al. (2014) state, EE should ideally be discussed in the media as often as possible, so that politicians are compelled to afford related issues the vital attention they deserve. One of the aims of EE is to improve the health of individuals (Mind.org, 2007; Pretty et al., 2009). According to Evans et al. (2005), other benefits, besides improving people's health,

include protecting the earth's natural resources through educational programmes. A study which assessed the implementation of EE in Vosloorus township schools was deemed worthwhile, since many South African schools in similar contexts are exposed to an environment characterised by littering, water pollution, inadequate sanitation, deforestation, and communities which contribute (wittingly or unwittingly) to activities associated with air pollution, such as the burning of papers or waste. As Harmse (2008) remarks, in South Africa, coal is still used as the primary source of energy. Balmer (2017) confirms that coal is often used in township households and small enterprises, because most people can afford to buy it.

Makhoba (2009, p. 2) elaborates by conceding that illegal dumping and littering affect the environment badly, inviting rats and other rodents to breed. Maama (2016, p. 10) concurs, stating that unresolved environmental issues could cause an array of illnesses, including lung cancer, and for those living near sites (such as schools) where these problems obtain, the health of learners, staff, and community members may be affected. In support of the above, the World Health Organization (WHO, 2009) states that the quality of life of approximately 23 per cent of populations living in Africa is badly affected, with high mortality rates due to water pollution, poor hygiene, and inadequate sanitation, while poor resource management, the use of dangerous fuels, atmospheric pollution and inadequate infrastructure are equally harmful contributors to this scenario. Many of these issues were (and continue to be) evident in the area of Vosloorus, where the study reported on here, was conducted.

1.3 RATIONALE

A study assessing the implementation of EE in Vosloorus schools is worthwhile, as it can be assumed that a lack of communication among community members, teachers and learners in connection with the process of implementing EE, accompanied by poor teaching methods, contribute to the environmental problems that are evident in the larger township. O'Donoghue (1993, p. 35) suggests that teachers and parents should build a coherent relationship, to address and solve environmental problems. Loubser (2008, p. 20) proposes that parents, teachers, and learners must meet, to clean up areas that are polluted. In this regard, Quezada (2014) maintains that parents, teachers, and learners must not view their respective roles in isolation, but should rather find ways of working together. The environmental problems in

Vosloorus township spurred this researcher's interest in conducting an AR study, to find out how primary schools in that area integrate EE. Indeed, AR is a suitable research design for the context of this study, which supports the eradication of environmental issues through action.

1.4 PROBLEM STATEMENT

As a factor, the poor implementation of EE by teachers might be contributing to the environmental problems which are in evidence in Vosloorus township. Teachers from that township might not involve learners or community members in efforts to implement EE. As a result, community members and learners clearly engage in activities that are harmful to the environment, amongst others, by littering, burning wood and coal, advancing deforestation, and practising inadequate sanitation. The impact which this type of behaviour has on the environment is contrary what the constitution of South Africa (RSA, 1996a, p. 11) advocates, namely the right of each citizen to have his/her health and wellbeing safeguarded, by living in an environment which is not harmful now, or will not become so in the future. Legislation, amongst others, can help to prevent pollution and the degradation of the natural world, while promoting conservation, and ensuring that development initiatives are ecologically sustainable. After all, economic and social progress cannot come at the cost of our natural resources (RSA, 1996a).

Perhaps teachers in this country are not sufficiently motivating or encouraging this generation of learners to look after their environment. Also, some methods of teaching may prevent learners from addressing environmental problems which arise in their schools or residential areas. Rosenberg (2009, p. 60), who is adamant that learners should be taught well, identifies fieldwork as an appropriate method to use, to remedy environmental problems in their immediate area. Certainly, the environmental problems facing a community can, to some extent, be associated with teachers' failure to implement the EE which is taught in schools.

1.5 RESEARCH QUESTION AND SUB-QUESTIONS

To assess the implementation of EE in Vosloorus township schools, the following main research question had to be addressed:

Main question:

How do teachers implement EE in teaching and learning?

A number of sub-questions emerged from the main question:

- What is teachers' understanding of the concept of EE?
- Which teaching methods do teachers use, when delivering content aligned to EE?
- What are the challenges facing teachers, when teaching EE in schools?
- How do teachers form partnerships with the parents, to ensure the effective implementation of EE?
- How do learners behave towards their environment?
- How do teachers acquire knowledge regarding the implementation of EE?

1.6 AIM AND OBJECTIVES OF THE STUDY

1.6.1 Aim of the Study

The aim of the study was to assess how teachers from selected Vosloorus township schools, implement EE.

1.6.2 Objectives of the Study

The following objectives were set, namely to

- assess teachers' understanding of the concept of EE
- examine the methods of teaching and learning EE, which teachers use
- examine the challenges facing teachers, when teaching EE in schools
- explore the relationship/partnership between teachers and parents in remedying environmental issues
- understand learners' behaviour towards the environment
- explore the ways in which teachers acquire knowledge of the implementation of EE.

1.7 RESEARCH METHODOLOGY AND APPROACH

The research approach selected for this study, was qualitative in nature. The qualitative approach enabled an in-depth exploration of how EE is implemented in Vosloorus township schools, by allowing the researcher to converse with the selected participants, in order to collect data. As a research paradigm, constructivism was employed, to enable the researcher to gain knowledge by interacting with the study participants. Data were collected by means of semi-structured interviews, focus group interviews, and observation. Face-to-face interviews were deemed suitable, as the researcher sought to gather in-depth information from the participants about the implementation of EE, specifically by Grade 7 teachers from each school, who had experience in teaching Social Sciences (SS) and Natural Sciences (NS). Teachers were sampled purposively to take part in these interviews, along with groups of six learners. That allowed the researcher to learn more about the learners' reactions to the way in which EE was implemented. Grade 7 teachers who taught subject content which is aligned to EE, were observed while teaching. In addition, the learners' attitudes and behaviour towards the environment, were observed. Field notes were used to record and reflect what occurred during the observation process.

1.8 RESEARCH DESIGN

Dick (2010, p. 4) defines AR as a method which seeks to doing research through action, with the word "action" simply referring to bringing about a transformation or change in a certain community. In employing AR as research design, the researcher was able to collect data while the teachers and learners continued with their daily responsibilities of teaching and learning. According to McMillan and Schumacher (2014, p. 6), AR is conducted in four phases, with the researcher

- selecting a topic, focus, or issue to be studied
- collecting data
- analysing those data, and then
- taking action based on the results/findings.

1.9 DATA ANALYSIS

The researcher employed conventional content analysis, in analysing the data. During that process, predefined themes and categories were used, which had emerged from the content analysis. The researcher carefully read the transcribed data, line by line, before dividing those data into meaningful analytical units (i.e., data segmentation). In coding the data line by line, labels were awarded to each code, for example, “knowledge and understanding of EE”.

1.10 POPULATION AND SAMPLING

The population used for the study comprised Grade 7 learners, and teachers who teach NS and SS. The study focused on Grade 7 learners, since previous investigations into the implementation of EE mainly focused on grades 8–12. Selecting Grade 7 learners therefore opened up the possibility of other findings emerging. A non-probability sampling method deemed applicable for the study was convenience sampling, because, geographically speaking, it was easier for the researcher to reach the teachers and learners participating in the study. Three primary schools in Vosloorus township were selected, since that area is exposed to air and water pollution, littering, inadequate sanitation and deforestation. Each teacher who was purposively sampled from a participating school, was someone with vast experience in teaching Grade 7 NS or SS. The sampled teachers were specifically observed while delivering lesson content aligned to EE.

1.11 THEORETICAL FRAMEWORK

Kolb’s (1984) experiential learning theory views learning as a continuous process in which knowledge is created through the transformation of experience. Palmberg and Kuru (2000) view EE as experiential, advising that teachers need to ensure that learners interact closely with nature. Kolb’s (1984) experiential learning theory was deemed appropriate, as the ideas which he puts forward, align with AR. One of the aims of AR is to effect change in a particular community, through action (Dick, 2010, p. 4). Learners learn through experience, and in this instance they were encouraged

to pick up papers after break, to help mitigate land pollution. Kolb's (1984) experiential learning theory further views learning as a cycle, which sees participants experiencing an abstract concept (through concrete experiences), investigating the concept (through active experimentation), reflecting on the experience (through reflective observation), and generalising how the concept works and relates to previously established experiences.

1.12 RESEARCH ETHICS

In this study, participants were informed beforehand about the nature of the study, and why it was being conducted. They were also informed that if they wished to withdraw from the study at any time, they would be free to do so without being penalised in any way. The researcher made it clear that participation in the study was voluntary, therefore no one would be forced to participate, or be compensated for taking part. A declaration form was provided to the participants, requiring them to state whether or not they agreed to participate (see Appendix M). The researcher adhered to privacy concerns, by ensured that the names of the participants and their schools remained anonymous.

1.13 DELIMITATIONS OF THE STUDY

According to Simon and Goes (2013), the delimitations of a study are those characteristics that emerge due to limitations imposed by the scope of a study. According to Best and Kahn (2006, p. 37), delimitations are any boundaries which are imposed on a study. This section outlines the weaknesses of the study, as well as the delimitations which were identified.

The delimitations which came to light, were that the study took place in Vosloorus township, which is situated to the east of Katlehong and Alberton. Most of the participants lived in Vosloorus at the time. Grade 7 learners and their teachers were the only participants included in the study, with six learners from each school participating in focus group interviews, and three Grade 7 teachers (one from each participating school) being interviewed. The findings of this study can therefore not

be generalised to the greater East Rand area, or to a particular segment of the primary school cohort of learners.

1.14 DEFINITION OF TERMS

For a thorough understanding of what this study involves, a number of terms were defined. Included were “environment”, which describes the habitat of both living and non-living things (Kanyimba, 2009, p. 22). EE was described as a learning process which builds on people’s existing knowledge, and raises awareness about the environment, the challenges facing our natural world, and how we can develop the skills and expertise which will enable humanity to address associated challenges by changing attitudes, and encouraging informed decision making and responsible action (Unesco, 1978). ‘Land pollution’ refers to the unwanted concentration of various substances (litter, rubbish) that exceeds what the environment can handle (i.e., degrade) naturally (Share-net, 1999). ‘Sustainability’ pertains to the ability of this generation to maintain natural resources, so that generations to come can enjoy or continue to profit from them (Shava, 2000). ‘Sustainable development’ involves this generation meeting the needs of the present (housing, water provision, electricity, food security), without comprising the ability of the next generation to meet its own needs (WCED, 1987).

1.15 CHAPTER DEMARCATION

This section looks at the demarcation of the chapters presented in the study.

- **Chapter 1**: **Orientation of the Study**

The introduction and background were addressed in this chapter, which also covered the problem statement, research question and sub-questions, and the aims and objectives of the study. Furthermore, the current chapter touched on the rationale, problem statement, research methodology and approach employed. In addition, the research design, data analysis, population and sampling were addressed. The sub-headings addressed, included the theoretical framework, research ethics, the delimitation and limitations of the study, a definition of terms, and the chapter demarcation.

- **Chapter 2**: **Literature Review**

This chapter covers the literature related to the implementation of EE in schools. Here, Kolb's (1984) experiential learning theory is addressed in greater depth. The extant body of literature is discussed under various headings, including the South African education system, a description of the concept "environment", a definition and brief history of EE, an overview of education for sustainable development (ESD), the components of EE and various methods of teaching/learning the subject, implementing EE through water conservation and waste management, some of the challenges facing teachers in implementing EE, the partnership between the school and the community in resolving environmental issues, as well as teacher training and professional development in EE and experiential learning theory.

- **Chapter 3: Research Methodology and Approach**

The third chapter describes how the study reported on here, was conducted. Discussion in this segment is based on the approaches which the researcher selected, the research paradigm and research design, and the methods used to collect data. Ethical issues taken into consideration when collecting data, are also set out here.

- **Chapter 4: Data Presentation, Analysis and Interpretation**

In this chapter, the data are analysed and discussed in depth. Data analysis was done by employing content analysis, and the process is detailed here. This chapter unfolds according to the headings of data presentation; and the analysis of the face-to-face interviews, focus group interviews, and observations. This is followed by a synthesis of the chapter.

- **Chapter 5: Summary, Recommendations and Conclusion**

This chapter offers a summary of the preceding chapters. Here, the findings and recommendations are discussed, and the researcher explains how the study will contribute to the existing body of knowledge, taking into account the stated limitations. Recommendations are made for further research, before the study is concluded.

1.16 SUMMARY

AR was used to assess the implementation of EE in selected Vosloorus township schools, as described in the present chapter. The researcher provided an introduction and background to the study, stated the identified problem, and spelled out the research questions and accompanying sub-questions. The chapter unpacked the rationale, aims, objectives, delimitation and limitations of the study, the research approach and methodology employed, and outlined the population, the sampling used, and the research ethics adhered to, in addition to defining core terms. Chapter 2 reports on the researcher's literature review, as it pertains to the implementation of EE in South African schools. Theories that methodologically support the study of the implementation of EE in selected Vosloorus schools, are explained in detail in the next chapter.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

As responsible citizens, teachers and parents have a duty to ensure that the environment in which they live, work and play, is not subjected to pollution, deforestation or a lack of sanitation. Quezada (2014, p. 2) suggests that schools must form a cohesive partnership with the parents of their learners, in working to combat and alleviate environmental problems. This chapter explores how teachers can implement EE to do just that. To that end, the existing body of literature will be reviewed under the following subheadings: the South African education system, a description of what exactly is meant by the word “environment”, a definition of EE and the history thereof, the notion of educating the youth and others for sustainable development, the components and methods of teaching/learning EE, implementing EE through water conservation and waste management, some of the challenges or obstacles confronting teachers in the implementation of EE, the partnership between schools and the community in resolving environmental issues, and teacher training and professional development in EE, and how experiential learning theory guides this study’s methodology and the subsequent analysis.

2.2 DESCRIPTION OF THE WORD “ENVIRONMENT”

Teachers, learners and members of the larger community live in what can be described as their environment. To clarify the concept of EE, one needs to understand what exactly is meant by “environment”. The inhabitants of South Africa live in unique environments, and their attitudes and behaviour towards the environment differ due to historical factors which are influenced by social inequalities (Madiya, 2009; Madikizela-Madiya, 2012, p. 74). People attach different meanings to what constitutes “the environment”, often on the basis of their field of expertise. Kanyimba (2009, p. 22) views the natural environment as a habitat in which both living and non-living things exist together, adding that an environment may also be seen as the “natural conditions in which people and animals live”. By contrast, O’Donoghue and Janse van Rensburg (1995, p. 8) view the environment as encompassing a cohesive relationship among four dimensions, namely the political, economic, biophysical, and social (see figure 2.1).

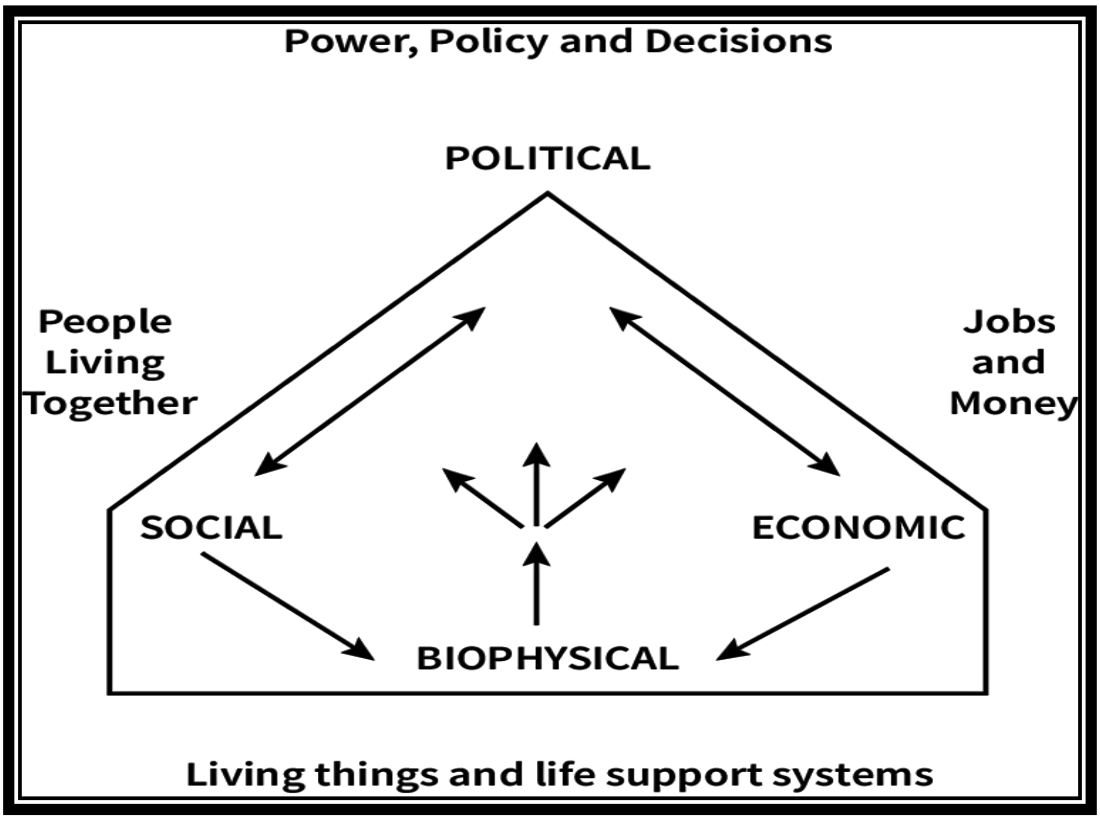


Figure 2.1: O'Donoghue's Model of the Environment
Source: O'Donoghue and Janse van Rensburg (1995, p. 8)

Figure 2.1 depicts the relationship among the various dimensions which make up the environment. The biophysical dimension refers to things that exist on this planet, and which can be classified as either biotic or abiotic factors (i.e., living and non-living things). The social system has to do with people living together in their respective environments, but also how the different environments interact – what might be deemed "adequate" knowledge of the environment will depend on what value people, given their different cultures, assign to it. The economic dimension refers to the jobs that are available to people, which enable them to access money which can be used to pay for the resources and services on which they depend. Importantly, activities which are associated with the economy can have a significant impact on the environment. In turn, the environment could also harm people's and enterprises' economic activities: if the soil is no longer productive, those working in the agricultural sector may lose their jobs and livelihoods. Also, if more jobs are created more resources are needed, and the environment may be destroyed. The political dimension refers to the power which is in the hands of politicians, who may (or may

not) promulgate policies to grant or deny individuals access to resources (O'Donoghue & Janse van Rensburg, 1995; O'Donoghue & Russo, 2004).

Anyone who is willing to preserve the environment, needs adequate knowledge of, and skills which are relevant to, that environment. If citizens have a thorough understanding of their own environment, and the interrelationships between environmental phenomena, that will most likely foster in them a respect for the world around them. They will come to understand that, by sustaining the resources available in their environment, other individuals will be able to utilise those same resources, which form part of the larger environment. One of the ways of acquiring knowledge about sustaining the environment, is through education which focuses on environmental issues (Kimaryo, 2011, p. 26).

2.3 DEFINITION OF ENVIRONMENTAL EDUCATION

Early American linear models can be helpful for defining the concept of EE. As Yeshalem (2013, p. 27) states, such models assume that environmental knowledge is vital for empowering learners to be conscious of, and to have a deep concern for, their environment. From a concern about the environment, individuals may eventually develop pro-environmental behaviour, which is the ultimate goal of EE. Figure 2.2 offers a schematic presentation of a linear model.

Figure 2.2 Early US Linear Model
Source: Kollmuss and Agyeman (2002)

Dobrinski and Upitis (2008, p. 15) concede that different people have very different views about what exactly EE encompasses. As the findings of this study will reveal, the sampled participants also held different perceptions in this regard (more on this later). Dobrinski and Upitis (p. 15) further explain that EE can be defined as education about and for the environment. Unesco's (1978) Tbilisi Declaration notes that EE cannot solely be seen as dealing with a study of the environment: it must

encompass a process of learning, with the intention of broadening our awareness of environmental challenges, and expanding our knowledge about environmental problems. As the International Union for the Conservation of Nature (IUCN, 1971) avers, EE education should be seen as an ongoing process during which values are taken into consideration, and concepts are clarified. That serves to help us acquire the necessary skills, to understand and acknowledge the interrelatedness of people, cultures, and the environment. Taylor et al. (cited in Msezane, 2014) point out that EE is, first and foremost, a discipline that encourages humanity to prioritise the protection of the earth's natural resources.

2.4 COMPONENTS OF ENVIRONMENTAL EDUCATION

A closer look at the components of EE, can assist in defining the term.

2.4.1 Environmental Education as Education about the Environment

The discipline of EE involves an investigation being conducted, by a particular person, scholar or group, with the aim of developing in-depth knowledge about the natural world we live in, the issues and problems affecting that world, and what skills we, as its inhabitants, need to develop, if we are to remedy and combat environmental problems. This view of the environment emerged when countries around the world started to meet, to formulate policies related to environmental protection and the sustainability of resources. For the effective implementation of EE in schools, those who teacher this subject need to develop in-depth knowledge about their environment (Kimaryo, 2011).

2.4.2 Environmental Education as Education In or Through the Environment

Knowledge about the environment is seldom sufficient to enable people to resolve the array of environmental issues and problems reported in communities around the world. Although people may be knowledgeable about their own environment, they may not be able to take appropriate action to resolve related problems in their communities, and for that reason, EE as education in or through the environment, emerged. Dreyer and Loubser (2014, p. 158) believe that, for starters, learners should not only be involved in learning about the environment, but should be active

in identifying and solving problems on their own. That knowledge can then, conceivably, be passed down from one generation to the next.

2.4.3 Environmental Education as Education For the Environment

EE not only looks at education *about* the environment, but also at education *for* the environment. This dimension involves an ethical component. Learning about EE seeks to improve the environment, by encouraging people to develop a love of the natural world around them, so that they will be in a position to take action against problems which threaten that delicate balance (Lee & Williams, 2001). Furthermore, this component of EE supports the need to learn, by taking action. In doing so, there is a need to raise awareness and launch persuasive campaigns urging people to act responsibly towards their own environment (Tilbury, 1995).

The abovementioned components of EE cannot be viewed in isolation from one another, as they are interrelated. In addition, when implementing EE, all three components should be taken into account, since they unfold on different levels during the implementation process (Kimaryo, 2011).

2.5 HISTORY OF ENVIRONMENTAL EDUCATION

Incredibly, the implementation of EE started as far back as the times of the ancient Egyptians (Irwin & Lotz-Sisitka, 2005). In the course of time, many countries around the world started to express an interest in implementing education which focuses on the environment, and began hosting local and international conferences on the topic (Irwin & Lotz-Sisitka, 2005). Most EE policies were drafted during conferences held in different countries of the world, indicating that this is a truly global issue. In this section, the history of EE is discussed under the following sub-headings: EE in the international context, and its manifestation in Africa (specifically in southern and South Africa)(Irwin& Lotz-Sisitka 2005).

2.5.1 History of Environmental Education In the International Context

According to Irwin and Lotz-Sisitka (2005), educational programmes emerging from China almost 3 000 years ago, indicated an interest in reforestation and sustainable production. Palmer (2002) mentions that in 1979 China organised a conference during which the need was identified to formally implement EE in schools. The

outcome was that different schools in different cities and provinces, were chosen to participate in pilot projects.

According to Palmer (2002, p. 5), the United Kingdom was the first country to use the term “Environmental Education” at the Keele Conference, held in 1965. Some scholars, however, maintain that the term was first employed by Thomas Pritchard in 1948 in France, at the gathering of the IUCN. Palmer (p. 5) argues that the term was already used in the book *Communitus*, published by Paul and Percival Goodman, in 1947, and adds that Unesco held a biosphere conference in Paris in 1968, which sought to align curriculum materials with the study of the environment, and to develop syllabi for all levels of education (p. 5). According to Kassas (2002), EE was considered as the first priority on the agenda of the UN Conference on the Human Environment, held in Stockholm in 1972. One of the recommendations stemming from that gathering, and which was widely adopted, called on both the United Nations Environment Programme (UNEP) and Unesco to develop an international programme for EE.

In 1975, UNEP and Unesco formed a partnership to organise a workshop in Belgrade (in the then Yugoslavia), and as Kassas (2002) explains, that was followed by an international gathering which became known as the Tbilisi Conference, held in the then Union of Soviet Socialist Republics (USSR) in October 1977. The conference adopted the following 12 principles for the effective implementation of EE:

1. Consider the environment in its totality, both natural and social
2. Make EE a continuous, life-long process
3. Ensure that EE is interdisciplinary in its approach
4. Examine major environmental issues from the local, national, regional, and international viewpoints
5. Concentrate on current and potential environmental contexts or situations, while taking historical perspectives into consideration
6. Promote the value of, and need for, local, national, and international cooperation, in preventing and solving environmental problems

7. Explicitly consider environmental aspects in planning for development and growth
8. Motivate learners to play their role in planning their learning experiences, and provide them with opportunities to make their own decisions, and accept the consequences thereof
9. Relate environmental sensitivity, knowledge, and problem-solving skills and values classification to every age group, with special emphasis on sensitivity to the learner community in the early years
10. Assist learners to find out more about the symptoms and real causes of environmental problems
11. Address the complexity of environmental problems, and thus the need to develop critical thinking and problem-solving skills
12. Employ different educational strategies, based on practical activities and problem solving.

The Tbilisi Conference also witnessed the creation and launch of the International Environmental Education Program (IEEP). In 1987, a second related international conference, the Moscow Congress on Environmental Education and Training, was held, and during the gathering attendees came up with an international strategy for improving EE and related training, into the early 1990s (Kassas, 2002). According to Irwin and Lotz-Sisitka (2005), countries subsequently met in 1992 in Rio de Janeiro, Brazil, for the United Nations Conference on Environmental Education (UNCED), where the focus was on the role of EE as a means of solving environmental crises.

2.5.2 History of Environmental Education in Africa

According to Irwin and Lotz-Sisitka (2005), in ancient Egypt, the pharaoh sent his scribes to educate farmers so that they would grow their crops near the banks of the Nile River, rather than on them: the aim in growing natural crops, was to combat the erosion of the river banks, and eventually to prevent the disappearance of fertile land. Rosenberg (2009, p. 8) explains that, in Africa there were already signs of the growing importance of EE in the 1950s when, for example, in some parts, African church leaders who headed up communities, implemented educational programmes with the aim of remedying soil erosion. According to Kimaryo (2011, p. 15), in 1990 Tanzania included EE in the school curriculum in response to not only local

environmental problems, but also global concerns. The thought behind this move was that including EE in the school curriculum would boost the economy of Tanzania, due to the country's dependency on its natural resources (United Republic of Tanzania [URT], 2004). According to Bosah (2013), in Nigeria, the Nigeria Conservation Foundation (NCF) encouraged the inclusion of EE in the school curriculum exactly because of the alarming prevalence of environmental problems in that country. As Bosah (2013) elaborates, a workshop for teachers on the integration of EE in the school curriculum, held in 1990, was funded by Unesco, thereby confirming the broad base of interest. According to Yeshalem (2013), in 2002 the Ethiopian Environmental Protection Authority (EPA) formulated an EE policy to support the integration of EE in all subjects. As Yeshalem (2013) mentions, Ethiopia's EPA is responsible for ensuring that EE-related activities in schools are both inspected and monitored. That country's Ministry of Education (MoE) and the Ethiopian EPA entered into a partnership, to ensure that environmental issues would be thoroughly addressed during the process of curriculum development (Yeshalem, 2013).

2.5.3 History of Environmental Education in Southern Africa

Post the Rio Summit of 1992, the Southern African Development Community (SADC) came up with a multilateral strategy, which favoured critical thinking and creativity when it came to the implementation of environmentally based learning (Robitaille et al., 2013, pp. 15–16). However, even though SADC encourages teachers to show critical thought and be creative when implementing EE, many southern African educators lack the skills and knowledge needed to do so. The problem arises when teachers are not afforded an opportunity to be trained on teaching content related to EE. In addition, EE in southern African counties is integrated into different subjects (Ketlhoilwe, 2003). Rosenberg (2009, p. 8) explains that in 1984, a group of activists in the southern African region was actively involved in EE-related activities, gathering informally in Swaziland, before later forming EEASA, the Environmental Education Association of Southern Africa. This organisation played a marked role in adopting a set of goals and guiding principles for EE, as formulated at Unesco's 1977 Tbilisi Conference. In a neighbouring country of South Africa, the Lesotho Environmental Education Support Project (Leesp) was aimed at helping that country to introduce EE across its national school curriculum,

to combat problems associated with soil degradation – a project lasting three years (2001–2004) (Leesp, 2004). According to Obol et al. (2003), Angola, as a former colony of Portugal, did not have an EE policy at the time, but the country was in the process of developing an environmental strategy and revising the curriculum, so that EE could officially form part of the school syllabus.

2.5.4 History of Environmental Education in South Africa

According to Irwin and Lotz-Sisitka (2005), education related to conservation in South Africa became part of EE in the 1970s, and remains part of it to this day. Rosenberg (2009, p. 8) points out that between the 1970s and the 1980s, conservation education was valued by many, with its stated aim being to protect Africa's wildlife and the wilderness from becoming extinct. In the 1970s, the non-governmental organisation (NGO) known as the Wildlife and Environment Society of South Africa (Wessa), worked towards conserving nature, playing a significant role in educating people about the environment. As an example, they accompanied groups of environmental learners to wilderness areas, on educational excursions. According to Rosenberg (2009, pp. 8–9), postapartheid South Africa experienced a notable change during the period of transformation to a new democratic state in the early 1990s. The Environmental Education Association of Southern Africa (EEASA), together with other environmental bodies, came together to formulate new EE and education-related policies. In addition, as Rosenberg (pp. 8–9) explains, in 2002, South Africa hosted a world summit on sustainable development in Johannesburg, where topics such as environmental conservation, social development, and poverty alleviation were discussed. EE was defined as having cross-curricular importance, and in accordance with Curriculum 2005 (C2005) (DoE, 1997), all educators in all learning areas had an opportunity to teach content aligned with EE.

2.6 EDUCATION FOR SUSTAINABLE DEVELOPMENT

Wals and Jickling (2002) believe that "sustainability" should not have a fixed and single definition. According to Shava (2000), for a resource to be sustainable, it should be maintained in such a way that future generations are able to benefit from it. By contrast, Hebe (2009, p. 24) views sustainability as ensuring the existence of something, or maintaining it. The concept of "sustainable development" has been

criticised as both confusing and contradictory, for not taking present and future generations into consideration (le Grange, 2011). According to Fien (1993, p. 10), “sustainable living” implies that there is a strategy for moving away from development that is sustainable in nature. As such “sustainable living” was the term employed at the second World Conservation Strategy Conference, entitled “Caring for the earth” (IUCN, UNEP, WWF, & Unesco, 1991).

The Earth Summit (UNCED) which took place in Rio, investigated the role of EE as a solution to environmental problems. At that summit, a policy commonly known as Agenda 21, was formulated, which focused on issues as diverse as poverty alleviation, and the importance of the rights of women and indigenous people in achieving sustainable development. Chapter 36 of Agenda 21 “describes environmental education processes as those which include teachers and learners who are willing to promote sustainable development and advanc[e] the knowledge of the people in addressing environmental and development issues” (UNCED, 1992). According to Sauvé (1996, p. 18), one of the goals of sustainable development is to advance EE around the globe. EE and ESD share the same vision, which is to ensure that we, as humans, live in a better world or keep improving conditions in this world, and that such an undertaking be characterised by a balance between the economy, ecology, and society (McKeown & Hopkins, 2005). In addition, Chapter 36 of Agenda 21 (UNCED, 1992) identified the need to implement EE in different settings, and for that reason many countries began doing just that. Lotz-Sisitka (2004) and Salim (2002) mention the achievements of Agenda 21 as including the following:

- Science and technology were identified as playing an essential role in assisting humans to understand the environment
- International organisations around the world were urged to take part in activities aimed at promoting sustainable development
- The global mortality rate has been declining, healthcare has improved, and education is available to increasing numbers of people in both rural and urban areas
- Many conferences are being held to discuss environmental issues, which is encouraging news.

Agenda 21 did have shortcomings, however, since many countries (especially in Africa) are not technologically advanced, which hampers mitigation efforts. Numerous regions are subject to extreme weather conditions, with global warming resulting in rising sea levels, flooding and desertification (Salim, 2002). Sachs (2002, p. 20) acknowledges that there is a vast gap between developed and developing nations (such as South Africa, Brazil and Swaziland, to name but a few). As Willis (2011, p. 1) states, members of the United Nations (UN) met in September 2000 to adopt several millennium development goals (MDGs), with goal number 7 advocating the need to ensure environmental sustainability. One of the values underlying the UN Millennium Declaration is showing respect for nature by maintaining it, so that future generations will inherit a cleaner, better conserved planet (Kate et al., 2005, p. 10). According to Tilbury (2003, p. 111), in 2002, South Africa hosted the World Summit on Sustainable Development (WSSD), during which the vital importance of education was recognised. The document flowing from that summit, advocated for the following:

- The integration of sustainable development in the school curriculum, across subjects
- That ESD be accessible to everyone
- That all members of society become lifelong learners in the field of ESD.

Where ESD is included in the school curriculum, teachers must be well informed about the various methods deemed suitable for teaching related topics. Another recommendation is that teachers shift away from a teacher-centred approach, to a learner-centred approach, as that will enable learners to analyse and critique scenarios, and make good decisions on their own, now and into the future. Laurie et al. (2016, p. 239) highlight possible future challenges in implementing ESD across the school curriculum, admitting that appropriate integration and the lack of professional development for teachers, must receive urgent attention. Worryingly, even if teachers do undergo professional development in ESD, learners might still not be able to fully understand what the concept entails, if it is presented in a fragmented manner. As le Grange (2013) mentions, at the WSSD, three pillars of sustainable development were identified, namely the social, environmental and economic, and all three are essential in ensuring sustainable development. A communiqué issued in 2012, recommended that the period 2005–2015 be known as

the UN Decade of Education for Sustainable Development (DESD) (Tbilisi+35, 2012). One of the domains which Unesco (2005) outlined, is to raise awareness among the broader public about sustainability, which includes making them aware of the interrelationship between economic, social, and environmental issues.

In 1994, the IUCN designed the Egg of Sustainability Model, which places the environment at the centre of human endeavour (Keiner, 2004, p. 384). The diagram shows the relationship between the ecosystem and people as interdependent, and overlapping (Kate et al., 2005).

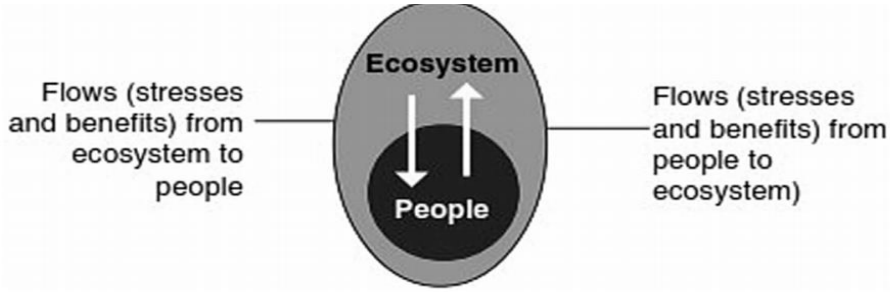


Figure 2.3: IUCN's Egg of Sustainability Model
Source: IDRC (1997)

2.7 SOUTH AFRICAN EDUCATION SYSTEM

The South African schools curriculum has undergone several transformations during the postapartheid era. Pre-1994, the curriculum was content based, requiring learners to learn only the content set out in their textbooks (Lemmer & van Wyk, 2010, p. 248). As Dreyer and van Schalkwyk (2015, p. 6) explain, a content-based approach enables learners to memorise content, without any in-depth understanding. According to Jacobs et al. (2000, p. 280), norms-based reference assessment was the dominant type in use, and it mainly involved comparing the performance of one learner to that of other learners. Norms-based assessment also focuses on the mark which a learner obtains, rather than how fair, valid and/or reliable the assessment was (Killen, 2007, p. 342). Calitz et al. (1982, p. 71) confirm that tests were mostly used to assess the competency of learners, with formative tests teaching learners to work under pressure, and using their marks to determine their level of achievement. Such assessment causes learners to experience significant stress, as they are

compelled to memorise content in bulk, without truly understanding it, or knowing how to apply it.

According to Brandt (2010, p. 147), the new democratic dispensation in South Africa brought changes to the curriculum, including a move from a teacher-centred to a learner-centred approach. These changes were guided by the National Education Policy Act, 27 of 1996 (RSA, 1996b). Pretorius (2010, p. 124) states that in March 1997, the Department of Education (DoE) informed the nation about C2005, which was to be implemented in the following year (1998), from Grade 1. However, it took ten years for the curriculum to be rolled out to all grades. As Pretorius (p. 124) elaborates, C2005 was formally known as the outcomes-based education (OBE) curriculum. Gultig et al. (2002, p. 29) note that OBE was also introduced in other (mainly developed) countries, such as Australia and Britain, where it had achieved some success. Many South African teachers, however, encountered challenges in implementing C2005, as they had not been trained to implement the approach, and the ambiguous terminology used made it difficult to understand. In addition, teachers did not have access to a range of resources, as required by this approach (Pretorius, 2010, p. 124). Given the challenges around C2005, the curriculum was revisited in 2000 (Christie, 2008, p. 131). During the review process, the then Education minister recommended that a task review committee research the design of the curriculum. That committee advised that the workload of the curriculum in the General Education and Training (GET) phase (R–9), be reduced. In addition, the committee decided to reduce the eight learning areas to six, and concluded that ample time needed to be allocated to languages and Mathematics. It also recommended that the National Curriculum Statement (NCS) and Revised National Curriculum Statement (RNCS) retain the 12 critical outcomes, but remove the 66 specific outcomes (Chisholm, 2003). Despite the challenges of C2005, some teachers were not content with the review, admitting to being anxious about their duties and roles, which were still not well demarcated or explained. Some teachers did not understand the proposed new RNCS and NCS (see below) curricula, and felt that the number of days allocated for related training, was insufficient. C2005 (DoE, 1997) was revised in 2002, and the new curriculum, the RNCS for the GET band, and the NCS for the Further Education and Training (FET) phase, were born (DBE, 2011, p. 4). Chisholm (2003) recalls that the

implementation of the RNCS commenced in 2004 in the Foundation Phase, whereas for the FET, implementation started in 2006. Bjorklund (2015, p. 4) mentions that the RNCS was severely criticised by teachers, because in practice it was not an easy task to implement the curriculum in classes which still lacked sufficient resources. Teachers also complained about the paperwork, explaining that their administrative duties did not leave them much time for teaching. As Bjorklund (p. 1) elaborates, the MoE in South Africa later felt a need to revise the curriculum yet again, and in 2012 the RNCS and NCS were incorporated into one document known as the Curriculum and Assessment Policy Statement (CAPS).

2.8 IMPLEMENTATION OF THE METHODS OF TEACHING AND LEARNING IN ENVIRONMENTAL EDUCATION

Not only does each learner have a preferred mode of learning, but as Dreyer and Loubser (2014, p. 168) point out, teachers must also use different methods of teaching to accommodate diverse modes, so that learners can demonstrate their knowledge, skills, values, and attitudes during the process of teaching and learning.

According to McCarty et al. (2018), learners from low-income schools spend most of their time in the classroom listening to their teachers, from the beginning of a lesson until the end, without engaging with them. To combat this, as Schnack (1994) and Jensen (1995) recommend, EE must be based on action, not a chalk-and-talk approach. For that reason, they call for wide-scale “action competency”, which is the ability to identify and address (environmental) issues and problems in society (Schnack, 1994; Jensen, 1995). As will become evident later in this dissertation, despite the advice of McCarty et al. (2018), from the findings reported on here, the dominant methods which teachers used when teaching EE-related content, were lecturing and the question-and-answer method. The advice of Jensen (1995) and Schnack (1994) did not appear to be heeded either, with little action-based teaching and learning in evidence during observation of the study participants. Kolb’s (1984) theory of experiential learning states that learners learn better by experiencing or doing something. In township schools, where classes are overcrowded, many teachers may find it difficult to transmit the content of EE, or to use action-based teaching, as they may be concerned about the safety of the learners outside of the

classroom. In this regard, Ko and Lee (2003) concede that many teachers are not confident about teaching EE outside of the classroom, especially when dealing with large classes which make learners difficult to manage.

Simovska (2000) states that the term “action competency” is well known in EE, and is used in numerous countries around the world, including Australia, Denmark, South Africa, and Macedonia. Simovska (2000) concedes that there are different levels of competency, such as the practical, fundamental, and reflexive. A fourth type is applied competency, which puts the learner in a position to take action now, and in the future. Reflexive competency allows learners to reflect on their own work and experience, so that they will be better able to identify potential areas of improvement; fundamental competency enables them to explain why they are doing what they are doing (i.e., to motivate their actions); and practical competency is what enables them to do something, or to perform at a predetermined level (Simovska, 2000). Gardner (2006), whose theory deals with multiple intelligences, classifies kinaesthetic learners as those who learn better by touching, doing, and/or moving.

Environmental educators who use the interpretivist approach, are advised to use methods that encourage the larger community to become involved in solving environmental problems – for instance, pollution is something they can see with their own eyes, within their neighbourhoods. One such method is experiential learning (Schulze, 2014, pp. 73–74). Palmberg and Kuru (2000) view EE as experiential, in that it enables teachers to bring their learners closer to nature, or to bring nature to the classroom. As Genc (2015, p. 107) proposes, project-based or experiential learning is essential for learners, because it enhances their critical thinking and problem-solving skills, which they can apply in a real-world situation. Indeed, action projects for EE should be used by environmental educators (so-called “green” teachers), to address immediate environmental problems where they can do so. Rosenberg (2009, p. 72) suggests that examples of such projects could include making a poster to address environmental problems that need to be investigated, participating in a dramatic play, or demonstrating work-related art, which can be used to communicate elements of the issue to peers or the public at large. Other examples are writing a letter to the council to dispose of an illegal rubbish dump, taking part in projects focused on recycling, and starting and sustaining a food

garden. Meichtry and Smith (2007) explain that when learners interact with their immediate or local environment, a strong relationship develops between them and the environment; also, most learners would prefer their lessons to be linked to a concrete, real-world situation (McCarty et al., 2018). Games are another preferred method of teaching, allowing learners to enjoy themselves while learning in an active way, in an atmosphere that is not demanding, harmful or intimidating. Many games do not just involve play – they perform an essential role in developing learners' intelligence. Teachers can teach the content aligned to EE through playing related games, thereby improving the environmental behaviours of their charges (Hewitt, 1997). Place-based education happens when a local area is used as a site for learning about the environment, according to van Petegem et al. (2007). Woodhouse and Knapp (2000) agree that place-based education enables learners to learn how to sustain the natural resources in their immediate and surrounding areas, so that even their children's children will have the opportunity to benefit from the beauty of the fauna and flora.

Certain methods of teaching have been proven to bring disadvantages – as Killen (2007, p. 211) explains, the problem-solving strategy may be one of them:

- If students work independently, without the assistance of a teacher, they may not discover or identify things which they are supposed to learn
- Lessons to teach problem-solving skills require a great deal of planning on the part of the teacher or facilitator
- Learners may encounter challenges with self-directed learning, because of their traditional upbringing.

Killen (2007) also outlines the disadvantages of cooperative learning and role-play:

- Some learners do not like to work in groups, but prefer to work alone
- The teacher will have to record the performance of each learner participating in a task, and will thus spend more time evaluating individuals and calculating their marks
- The ability and social status of the learners may influence the functioning of cooperative groups.

Role-play may be negative, in that it

- can waste a huge amount of time
- may cause learners to become emotional while involved in the situation being investigated or acted out, and
- is ineffective, when some learners are not willing to participate, for whatever reason.

2.9 IMPLEMENTING ENVIRONMENTAL EDUCATION THROUGH WATER CONSERVATION AND WASTE MANAGEMENT

2.9.1 Water Conservation

According to Rosenberg (2009), South Africa is considered to be a dry country. Therefore, it is essential that its inhabitants look after this resource, to ensure that it remains sustainable. The recent drought in Cape Town and environs, is a case in point. As Rosenberg (2009) mentions, many schools are now conducting water audits, to determine how much water they consume, and how they can save this valuable resource. In addition, many schools have taken action by fixing leaking taps and growing indigenous plants that do not require much water.

2.9.2 Waste Management

As Dreyer and Loubser (2014, p. 7) found, many communities discard papers and plastic bags, rather than disposing of them properly, leaving the verges of our country's roads and highways strewn with litter. One of the challenges which many municipalities face, is to dispose of the solid waste material which is produced – this includes substances that can no longer be utilised, and need to be disposed of. Dreyer and Loubser (2014) confirm that in South Africa, a high percentage of waste (95%+) is dumped in landfills or on open terrain.

2.10 SOME CHALLENGES IN IMPLEMENTING ENVIRONMENTAL EDUCATION

As a discipline, EE is integrated into all subjects, which affords teachers an opportunity to address environmental problems in the subjects they teach (Bohn, 1997). Despite this theoretical integration, teachers still face the challenge of applying what they teach, in a practical way (Dreyer & Loubser, 2014). Pulkkinen

(2006) claims that most teachers are able to integrate EE in the Life Sciences and Geography, as much of the subject content already deals with the environment. Worryingly, a study conducted by Mudaly and Ismail (2016, p. 76) revealed that teachers do not receive much (if any) support from their school management teams (SMTs), and if that body is disinterested in EE, it will impede the successful implementation thereof. According to Dillon et al. (2006, p. 108), the following factors may hinder the implementation of outdoor education:

- Teachers may be concerned about the health and safety of their learners
- Curriculum requirements prohibit teachers from teaching content related to EE, outside of the classroom
- There is a general lack of time to implement EE effectively
- Many schools lack the resources which will enhance the teaching and learning of EE.

As will be confirmed later in this study when the researcher reports on the findings, Dillon et al. (p. 108) are indeed correct in stating that the implementation of EE outside of the classroom is hindered by time constraints, with teachers being pressed for time by a demanding CAPS curriculum.

2.11 BENEFITS OF IMPLEMENTING ENVIRONMENTAL EDUCATION

In learning through EE, learners are able to identify plants and animals, and their relationship with other phenomena occurring within the natural environment (Gardner, 2006). According to Flogaitis and Agelidou (2003), EE enables learners to develop skills and knowledge that will help humanity to mitigate environmental problems now, and in the years to come. EE also enables learners to develop a positive attitude towards, and appreciation for, their environment and the world at large. This statement (Flogaitis & Agelidou, 2003) was found to be true, since the AR which this researcher conducted, enabled learners from the sampled Vosloorus township schools to take a stand in mitigating environmental issues, by engaging in action campaigns that included cleaning operations, the recycling of white paper, and the reporting and/or fixing of leaking taps.

2.12 TEACHER TRAINING AND PROFESSIONAL DEVELOPMENT FOR ENVIRONMENTAL EDUCATION

According to Villegas-Reimers (2003), a professional teacher is considered to be one of the most valuable tools in ensuring the delivery of a quality education in schools. Effective professional development may take the form of interaction among educators, and with other stakeholders, such as administrators and parents (Villegas-Reimers, 2003). According to Ernst and Erikson (2018, p. 3), continuous professional support for teachers is an invaluable strategy in upskilling their professional development. Paul and Volk (2002) suggest that teachers who continuously undergo professional development regarding EE, are more likely to implement related programmes. For Winther (2005), teachers must have regular contact with facilitators, if they are to improve their implementation of EE. As will be shown later, the research reported on in this dissertation, disproved the findings of Winther (2005) and Paul and Volk (2002), revealing that many educators continue to struggle to implement EE effectively, despite attending related workshops. In this regard, the findings of Gordon (2009, p. 36) more closely match those reported on here, confirming that even though teachers undergo professional EE development, this does not guarantee that they will be confident about such implementation. As West (2002) notes, mentoring can be used as a means of professional development for teachers, including for EE. Mentoring is even considered vital for ensuring the effective implementation of EE: Bozman and Feeney (2007, p. 722) view it as a process in which knowledge is transmitted from an experienced person (mentor) to an inexperienced one (mentee). In the process of mentoring, mentors provide both social and emotional support (Whitaker, 2000). During the apartheid era, the training of teachers occurred along racial lines: most black teachers in South Africa went to teacher training colleges, and teachers who obtained their qualifications at these institutions were considered to be underqualified. Teacher training colleges enabled students to enrol for teaching certificates and diplomas presented by underqualified lecturers, whereas their white counterparts went to institutions that employed qualified lecturers, and were well resourced (Hugo et al., 2010).

The *Higher Education Qualifications Framework* (RSA, 2007), section 48, states that teachers need to empower themselves by gaining knowledge, upgrading their

qualifications, and regularly attending subject-specific workshops. Teachers who complete formal university courses are awarded professional development (PD) points, which may also be attained through training activities which are accredited in any of the following categories: programmes that are led by the school or the DoE; qualification programmes; programmes offered by NGOs, teachers' unions, community or faith-based organisations, or other approved providers; and self-chosen activities (RSA, 2007) (section 54). According to Lemmer and van Wyk (2010, p. 259), continuous PD for teachers in this country is spearheaded by the South African Council for Educators (SACE). As Gordon (2009, p. 36) explains, stakeholders such as the DoE are involved in making decisions related to continuous professional teacher development (CPTD). Mudaly and Ismail (2016, p. 75) suggest that teachers have different views concerning PD, as indicated by the summary below:

- Workshops tend not to start on time, and some teachers have alleged that facilitators only read the CAPS policy document to them
- Facilitators do not teach attendees how to, in turn, teach certain concepts to their learners
- Teachers report gaining nothing from the workshops
- The views and opinions of newly appointed teachers are not taken into consideration by their mentors or senior counterparts.

2.13 PARTNERSHIPS BETWEEN THE SCHOOL AND THE COMMUNITY, IN REDUCING ENVIRONMENTAL PROBLEMS

Bronfenbrenner's (1979) theory of ecological systems states that the behaviour and attitudes of learners reflect the community from which they come. For Hewitt (1997), a curriculum that only includes theoretical knowledge may not have a marked impact on the environment, therefore learners must actively participate in the life of their community, by working to solve environmental problems. The ideal is to engage learners in community projects which will motivate them to become more active at the local and international levels. Loubser (2008, p. 19) explains that EE action activities in the community may include cleaning up a sidewalk marred by litter, or a local river bank. According to Uzzell (1999, pp. 409–411), different models can be

used in establishing a partnership between the school and the local community (see figure 2.4).

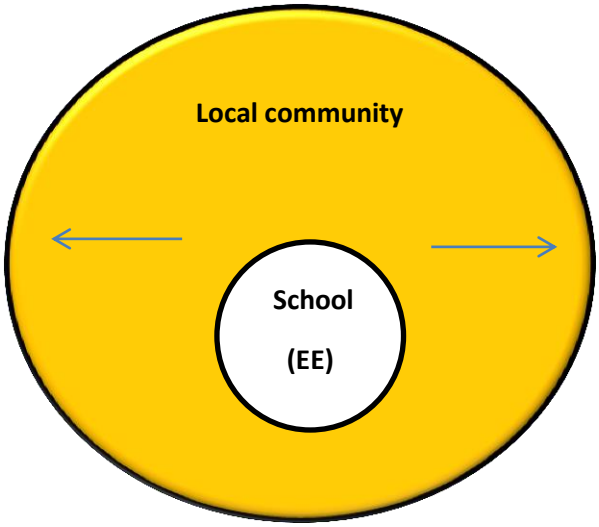


Figure 2.4: **Model 1: The School as an Isolated Island**

In this model, EE is only implemented in the classroom, where learners learn about environmental issues by reading newspapers or magazines, and doing role-play. The community is not involved, thus the model views the school as an isolated island. Based on the findings of this study, the researcher can report that this model (Uzzell, 1999, pp. 409–411) was not evident in the sampled schools, where teachers met with parents once a year, to discuss environmental issues.

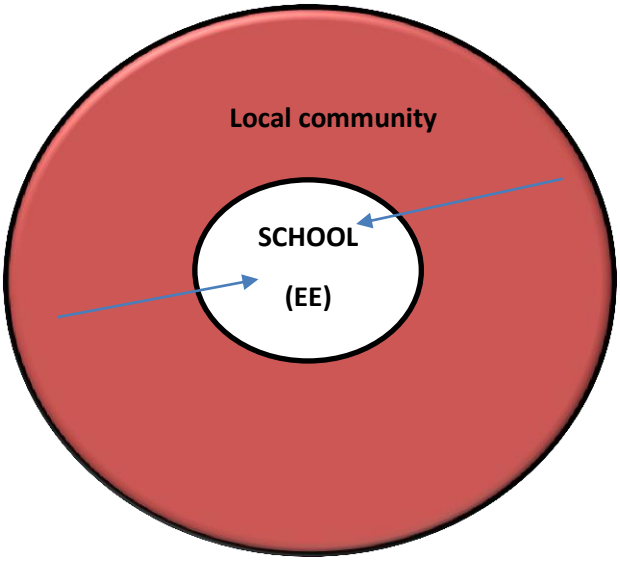


Figure 2.5: Model 2: The Local Community is invited into the School

In terms of this model, the local community is invited by the school to have a say in how to improve the content being delivered to the learners, and to ensure that that content is authentic and relevant.

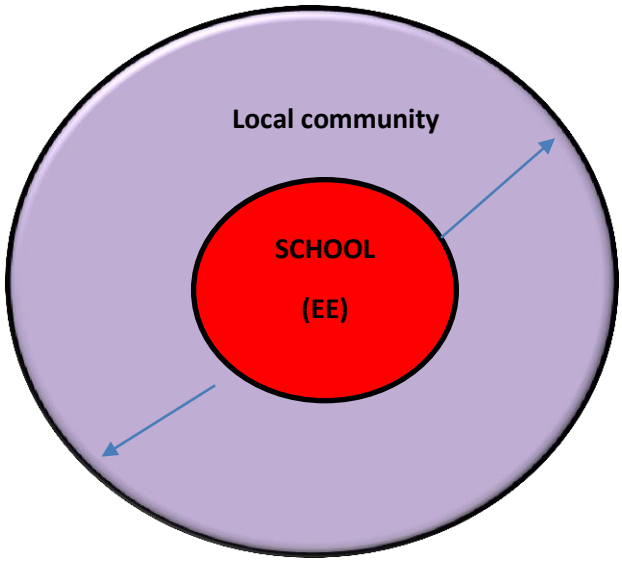


Figure 2.6: Model 3: The School as a Guest in the Local Community

In this model, learners present the EE activities that they have learned in the classroom to the local community, so that the members of the latter can change their behaviour and attitude towards the environment.

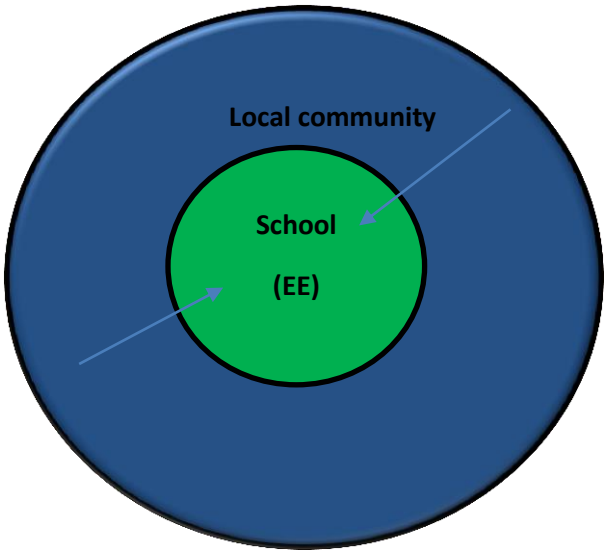


Figure 2.7: Model 4: The School as Social Agent

Here, as the model indicates, the school works with the local community to resolve environmental problems; learners work in the community during school time, to encourage parents and politicians to join them to remedy issues of concern in their

community. The findings of this study corroborate those associated with this model by Uzzell (1999, pp. 409–411), since the researcher found that the sampled schools did form partnerships with the parents, in an attempt to address environmental problems, for example, through clean-up campaigns. Nevertheless, such campaigns and meetings between parents and teachers should not be conducted only once a year, but should be held at least once per term.

The above models explain the relationship between schools and the community in implementing EE. Model 1 highlights how schools are isolated from the community, and implement EE without engaging or interacting with anyone in that community. Such schools prefer to implement EE through role-play, dramatisation, and/or experiential learning, and by reading and discussing articles on pertinent subjects. Model 2 encourages schools to meet with the parents, in order to come up with solutions aimed at improving methods of teaching the content which is delivered to the learners, and ensuring that the content is authentic. In terms of Model 3, the school invites members of the local community to attend sessions aimed at educating them about identified environmental issues in their neighbourhood. Learners may present any EE topic on such occasions. Model 4 suggests that the implementation of EE should be based on interaction between schools and the local community, but that such engagement must enable learners to work with local residents, to solve environmental problems. Furthermore, during periods devoted to teaching and learning, learners should go out into the local community, and clean up areas which are polluted.

2.14 THEORETICAL FRAMEWORK

To support the AR study, Kolb's (1984) experiential learning theory, as outlined in figure 2.8, was used.

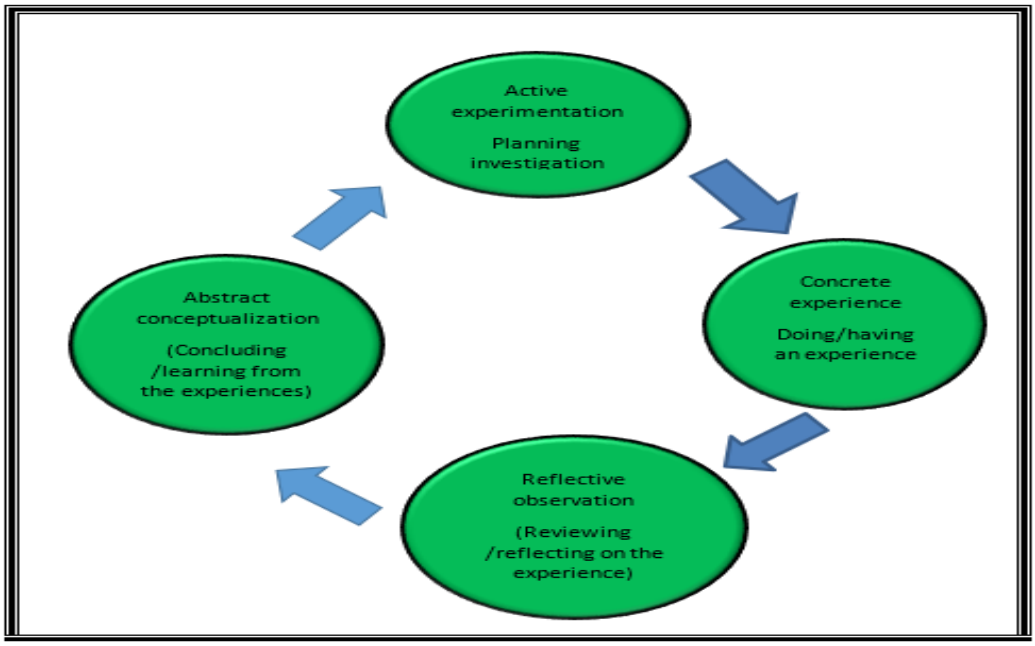


Figure 2.8: Kolb's Experiential Learning Cycle
Source: Kolb (1984)

Kolb's (1984) experiential learning theory views learning as a continuous process in which knowledge is created through the transformation of experience. Palmberg and Kuru (2000) view EE as experiential, and for that reason the expectation is that teachers will afford learners an opportunity to engage directly with nature. Kolb's (1984) experiential learning theory was deemed appropriate to use, as his ideas align with the AR process and goal of bringing change to a community, through action (Dick, 2010, p. 4). The cycles of Kolb's (1984) experiential learning theory, as displayed in figure 2.8, have participants engaging with an abstract concept (through hands-on experience), investigating that concept more closely (through hands-on experimentation), reflecting on the experience (reflective observation), and then generalising how the concept works and relates to previously established experiences. Each part of the cycle merits a more in-depth discussion.

- **Concrete Experience (Doing/Having an Experience)**

Field trips are a way of connecting learners with their own environment (Ernst et al., 2014). Some researchers (Ernst et al., 2014) consider field trips or outdoor experiences as a form of experiential learning. Schools might, for instance, organise educational tours which take learners to the nearest wetland to remove waste material that is polluting the water and harming marine species. According to Rijsberman (2006), given that water is scarce in certain areas which are heavily

populated, schools can set an example by conserving water. They may do so by storing water in drums or buckets, to use for irrigating food gardens, cleaning the toilets, or cooking (provided it is potable, of course).

- **Active Experimentation (Planning Investigation)**

To implement experiential learning in the teaching of EE, educators must first plan, before they teach outside of the classroom. Planning must include what their learners will be doing during the process of experiential learning; how they will learn; what must be done to assess their knowledge, skills or values; and how the evidence which is produced by the learners, will be recorded (Dreyer, 2014, p. 9).

- **Reflective Observation (Reviewing/Reflecting on the Experience)**

“Reflective teachers need time, practice and an environment that supports the development and organization of the reflection process” (North Central Regional Educational Laboratory, 2006). According to Woolfolk (2014, p. 9), good teachers reflect often and honestly on their work, so that they are in a position to address areas that need improvement. As the DoE (1999, p. 57) indicates, self-assessment enables a learner to reflect on his/her experiences during the process of learning. Teachers might reflect on experiential learning for EE, to identify other areas of improvement, and the same applies to the learners, as that will allow them to come up with strategies to enable them to do better in future, when engaging in experiential activities. In addition, learners and/or teachers can mark informal assessment tasks (DBE, 2011, p. 47), for an objective evaluation of their progress.

- **Conceptualisation (Concluding/Learning from the Experience)**

Learners can make an enormous contribution to the environment, through activities such as recycling and water conservation (Centre for Educational Research and Innovation [CERI], 1999). As research has shown, learners learn better through practical activities (Dreyer & Loubser, 2014, p. 161): if they learn by doing, they will make the connection that removing waste material from a wetland, will help to save marine and other species living in or near the water, and keep the ecosystem healthy.

2.15 SUMMARY

The literature review in this chapter investigated how teachers can implement EE in schools. The discussion covered changes in the South African school curriculum, drilled down into the meaning of the word “environment”, looked at various definitions of EE and the history thereof, interrogated what ESD encompasses, highlighted the components of EE and methods of teaching/learning it, discussed how to implement EE through water conservation and waste management, specified some of the challenges facing teachers as they implement EE across subjects, looked at partnerships between the school and the community in resolving environmental issues, focused on the current state of teacher training and professional development in EE, and shone a light on the tenets of experiential learning theory. Chapter 3 looks at the methodology adopted in this study.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 INTRODUCTION

According to Given (2008, p. 2), “[m]ethodology consists of the actions to be taken in the study and the reasons for these actions in testing or generating theory”. The purpose of research methodology is to explain how a study is to be conducted, by referring to the following aspects: the research approach and research design, the research paradigm employed, the research setting, sampling strategies and the sample, how to ensure rigour, the data-collection procedure(s)/technique(s), the process of data analysis and interpretation, and ethical compliance. In this chapter, the abovementioned aspects of the research study are explained in more detail.

3.2 RESEARCH APPROACH

The research approach selected for this study was qualitative in nature, since it allows for an in-depth exploration of the topic under study – in this case, how EE is implemented in township schools. According to Salkind (2010), “[q]ualitative research, also known as qualitative inquiry, is an umbrella term used to cover a wide variety of research methods and methodologies that provide holistic, in-depth accounts and attempt to reflect the complicated, contextual, interactive, and interpretive nature of our social world”.

Creswell and Creswell (2018, p. 250) view qualitative research as involving an in-depth study which permits the researcher to investigate the behaviour of people or groups, in their own, natural setting(s). This method allows the investigator or researcher to better understand the views and opinions of each study participant (Creswell & Creswell, 2018). The methods which are predominantly used in qualitative research to collect data, are interviews, observation, and document analysis (to obtain visual data). McMillan and Schumacher (2014, p. 346) describe qualitative research as

- a study of behaviour which emerges naturally within a given setting

- being context sensitive, allowing the researcher to understand the behaviour which occurs, since it is assumed that human behaviour is influenced by the setting
- using direct data collection (i.e., the researcher collects evidence directly, through observation and interviews).
- the gathering of rich, narrative descriptions of evidence, collected in the form of words.

3.3 RESEARCH PARADIGM

Guba and Lincoln (1994) view a paradigm as a collection of beliefs and views, taken from different people, that guides either the research action or an investigation into a phenomenon. Here, the interpretivist paradigm was employed, which, as McMillan and Schumacher (2010, p. 6) explain, involves knowledge being gained or constructed when interacting with study participants who have an opportunity to share their own experiences of a phenomenon, within a setting with is natural to them. Given (2008), however, states that interpretive research serves as a framework within the domain of social science research, “that is invested in philosophical and methodological ways of understanding social reality”.

In examining the ontology behind this study, the researcher focused on the various assumptions which are made, to establish whether there are indeed “multiple socially constructed realities” which exist (Scotland, 2012). The type of ontology employed was relativism, which states that the truth or reality which is constructed by each individual, may not be the same as that of the next person (p. 11). In the context of this study, the views and perceptions of the participants regarding the implementation of EE in Vosloorus township differed. According to Scales (2013), epistemology describes how we know and what we know about truth or reality. Here, the quest for the truth involved engaging closely with the study participants by means of face-to-face interviews, as well as observation, with a view to gathering in-depth information on how the sampled township primary school teachers implement EE in their teaching, and how learners learn about EE.

3.4 RESEARCH DESIGN

According to McMillan and Schumacher (2014, p. 6), a research design is a “plan that describes the conditions and procedures for collecting data for a specific purpose”. The research design applied in this study, is AR or participatory research (Mapotse, 2012, p. 14). Mertler (2016, p. 6) states that AR involves an inquiry which is conducted systematically, by educational stakeholders such as teachers, policy makers, administrators, guidance officers or counsellors, or any other parties for whom improving students’ learning is a priority. McMillan and Schumacher (2014, p. 22) view AR more widely as a study which allows educators to address an identified problem in their school. Ferrance (2000, p. 1) states that AR enables educators to evaluate their own practice, and to undertake research into current problems or issues which manifest themselves in society either on a daily basis, or with some regularity. McMillan and Schumacher (2014, p. 480) also point out that AR is conducted in four phases, which involve choosing a topic to investigate, collecting data on the phenomenon in question, analysing those data, and then taking action based on the results. Figure 3.1 indicates the cyclical nature of AR.

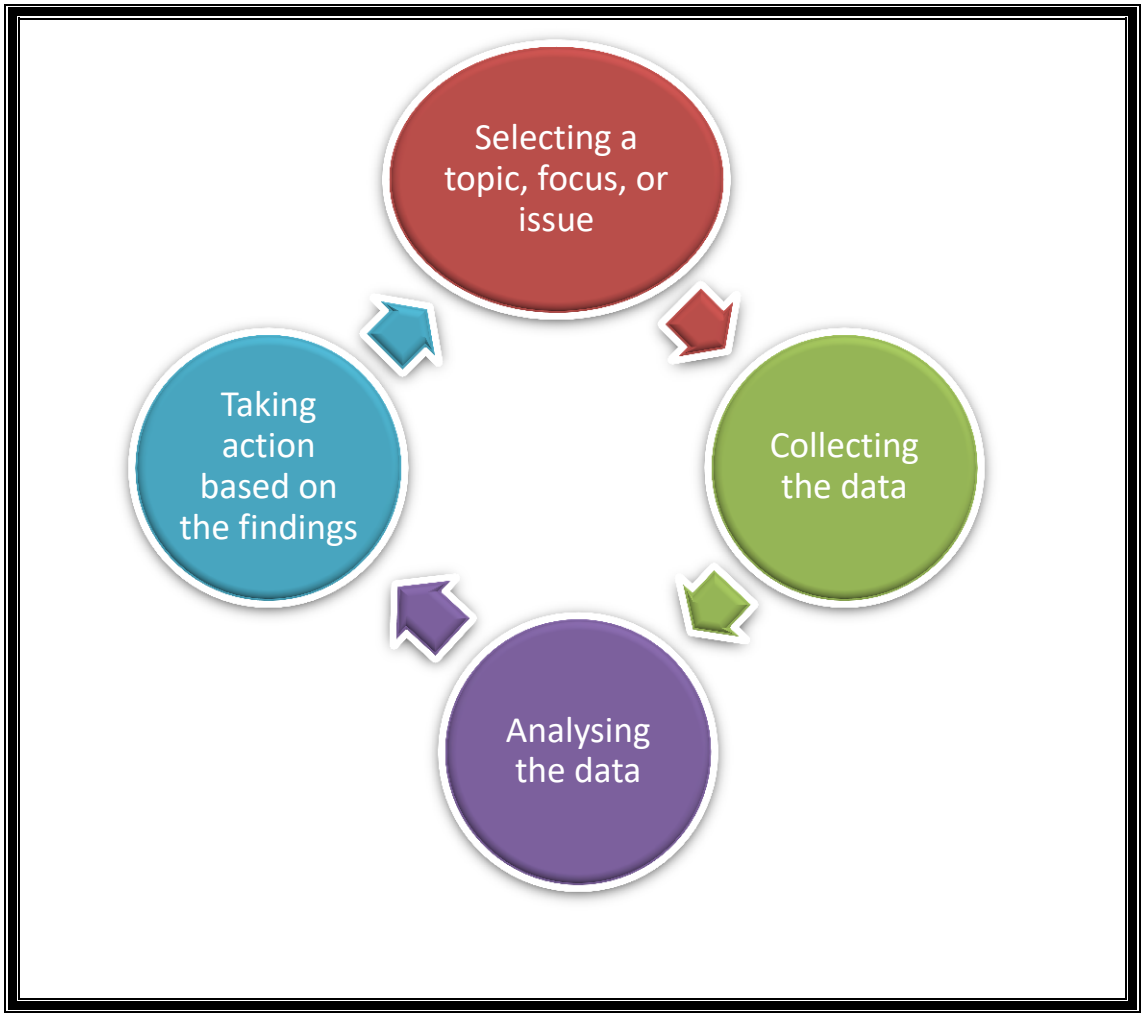


Figure 3.1: The Four Phases of Action Research
Source: McMillan and Schumacher (2014)

Dick (2010, p. 4) defines AR as a method which seeks to combine research and action, with a view to spurring change or bringing about some kind of community transformation. This researcher chose to do AR into how EE is implemented in township schools, given evidence of poor environmental management in the greater Vosloorus. To that end, the researcher worked with teachers, learners and parents, to mitigate existing environmental problems in the immediate vicinity of the schools and surrounding areas. Action took on the form of campaigns that included cleaning the terrain, fixing dripping taps, and conserving water by using rainwater collected in buckets or drums, to irrigate crops.

3.5 RESEARCH SETTING

This study, which sought to assess the implementation of EE across three schools, was conducted in Gauteng province – the province in which the researcher is currently employed by the Gauteng DoE (GDE) as a primary school teacher.

Figure 3.2: Aerial View of Vosloorus Township

3.5.1 Study Area

The study took place in Vosloorus, which is situated east of Katlehong and Alberton. Most people living in Vosloorus previously lived in Stirtonville, which is now known as Reiger Park. In 1963, the apartheid government moved people away from Stirtonville to Vosloorus, because the former development was located too close to the (then predominantly white) town of Boksburg. Vosloorus township has a population of 162 216, of whom black Africans form the majority (162 132, or 99.34%) of the inhabitants. IsiZulu is the language most spoken in the township, followed by Sesotho (Khumalo, 2016).

The three primary schools where the study was conducted, are considered to be Quintile 3 schools, also known as “no-fee schools”. These schools cater for three phases, namely the Foundation, Intermediate and Senior phases. Enrolment at each of the schools is just more than 1 000 learners. The home languages (HLs) taught in these schools include Sesotho, IsiZulu and Northern Sotho.

3.5.2 Sampling and Participants

According to McMillan and Schumacher (2014, p. 5), a population is a group of individuals who are sampled for the purpose of obtaining data from them. The population for the current study comprised three Grade 7 teachers, who teach Natural or Social Sciences, and learners from that same grade. As Latham (2007, p. 2) specifies, sampling, as a method, sees a representative selection being taken from the study population, and the data thus collected, being used as research information. The researcher opted to refer to the individuals who participated in the study as “participants” as they actively shared their own problems, views, and opinions, rather than serving as informants, who might merely be regarded as responding passively to questions. The participants were selected purposively. As Etikan et al. (2016) state, purposive sampling enables a researcher to choose a small number of participants based on their qualities and their lived experience. McMillan and Schumacher (2014, p. 2) point out that convenience sampling involves using non-probability as a method, to select individuals who are willing to make themselves available to participate in an academic study. Convenience sampling was chosen, as it was easier for the researcher to reach the teachers and learners participating in this investigation. As Cohen et al. (2007) mention, convenience sampling is also known as accidental or opportunity sampling.

Instead of approaching all five schools located in the designated area, the researcher decided to limit the sample to three schools, because of time limitations and travelling costs. Furthermore, the three primary schools in Vosloorus township were selected because there is sufficient proof of air and water pollution, littering, inadequate sanitation and deforestation in that area. One teacher was purposively sampled from each school, on the basis of his/her vast experience in teaching grades 4–7 Natural Sciences or Social Sciences. The sampled teachers were observed while delivering lesson content aligned to EE. In addition to the three teachers, three groups of Grade 7 learners (six from each school) were also interviewed.

3.6 DATA COLLECTION PROCEDURES/TECHNIQUES

In the opinion of McMillan and Schumacher (2014, p. 369), appropriate methods for gathering evidence in qualitative research are interviews, observations, and document review. To assess the implementation of EE in the schools under study, the researcher employed face-to-face interviews, focus group interviews, and observation. These methods ensured triangulation, meaning the results or findings of a single method needed to either confirm or refute the findings emerging from the other methods. McMillan and Schumacher (2014) view triangulation as "cross validation among multiple data sources, data-collection strategies, time periods and theoretical schemes".

3.6.1 Face-to-face Interviews

For Salkind (2010, p. 2), interviewing is essential in different types of research, with an interview allowing for interaction between the interviewer (researcher) and interviewees (study participants). According to Lavrakas (2008), face-to-face interviews are also known as in-person interviews, and are preferred by qualitative researchers, in addition to being one of the oldest forms of data collection. Face-to-face interviews were conducted using an interview guide consisting of in-depth semi-structured questions (see Appendix O). McMillan and Schumacher (2014, p. 6) view semi-structured interviews as consisting of a series of open-ended questions to which participants respond, and state that topics are to be selected in advance, with the researcher deciding on the sequencing of the questions (p. 381). Face-to-face interviews were deemed appropriate, as the researcher sought to gather deep, thick information from the participants about the implementation of EE across Grade 7 Social Science and Natural Science lessons.

Lavrakas (2008), outlines the advantages as well as the limitations of face-to-face interviews, as follows:

Advantages:

- If the interviewer is present, participants have the advantage of being able to ask for clarification, where a question might not be clear
- Visual aids may also be used to guide the participants when answering questions about the topic being researched

- Probing enables the interviewer to access supplementary information from a participant, to clarify a statement made.

Disadvantages:

- Participants are not always given ample time to provide answers
- Some participants may provide answers immediately, which may not be accurate or require clarification
- Issues of privacy are a notable concern
- Such interviews can be costly, depending on the number of participants sampled.

To overcome the disadvantages of face-to-face interviews, the researcher handed each participant a consent letter to complete, confirming that s/he consented to take part in the study (see Appendix I). The participants were granted ample time to provide answers, to ensure that the data would be accurate, rich and thick. For the sake of privacy, letters and numbers were allocated, rather than naming and identifying the participants, and the same applied to the three sampled schools. The researcher ensured that the interview transcripts would remain private and confidential, by storing them in a secure place.

3.6.2 Focus Group Interviews

Parker and Tritter (2006) consider a focus group to enable a structured yet informal discussion among study participants. As such, it permits participants to share their own experiences in a sociable environment (Parker & Tritter, 2006). McMillan and Schumacher (2014, p. 3) explain that a focus group interview is ideal when sampling a small group. In this study, that total came to only three teachers and 18 learners, who were interviewed using an interview guide (see Appendix Q). Focus group interviews were also deemed appropriate, as the researcher sought to understand how the participating learners experienced their teachers' implementation of EE.

Jarvis and Barberena (2008) outline the advantages and disadvantages of focus group interviews as follows:

Advantages:

- The researcher (and, subsequently the readership) gets to know or learn more about individuals and subjects who are poorly understood
- S/he gains knowledge when listening and learning from the conversation of different members of the group
- Participants are able to share information with others in their group.

Disadvantages:

- Focus groups only look at small samples
- It may prove difficult to assemble all the participants in the same place at the same time.

As Breen (2006) warns, the group might lose focus and start discussing other issues, which means the researcher or interviewee needs to be alert to such a possibility.

To overcome the abovementioned disadvantages of focus group interviews, the researcher communicated frequently with the participating teachers, so that they could help to ensure that all the participating learners were at the same place, at the same time.

3.6.3 Observation

In this study, observation was used as another means of collecting data on how the sampled teachers implemented EE in teaching and learning. Observations were also conducted to understand the behaviour of learners towards the environment.

McMillan and Schumacher (2014, p. 376) state that observation is a process in which a researcher views and listens to what is happening naturally, in a research site. According to Salkind (2010), researchers may use various methods when recording their observations, depending on the research setting and other circumstances. In that regard, as Salkind (2010) points out, the preferred method would be one which allows the observer to observe simple behaviours as they occur or unfold in a real-world context. Here, the researcher opted to fulfil the role of non-participant observer.

McMillan and Schumacher (2014, p. 376) recommend following specific stages, in conducting qualitative observation. The researcher adhered to their proposed sequence, by selecting the sites where data would be collected, then identifying his initial role to guide the first set of observations. Next, entry was gained to the three selected primary schools in the Vosloorus township, thanks to permission received from the GDE (see Appendix B). Thereafter, the researcher made a brief, initial and general observation, followed by more intensive observations, during and after which a record was kept of what was seen and heard, and he reflected on what had occurred.

The sampled Grade 7 teachers, who taught content aligned to EE, were observed while teaching. The learners' attitudes and behaviour towards the environment were also observed, and, using an observation guide, the researcher wrote field notes to record and reflect on, this process (see Appendix N). As a method, observation is popular amongst qualitative researchers, despite its limitations. Burton and Bartlett (2009) identify the advantages and limitations of observation as a method, as follows:

Advantages:

- Researchers are able to observe how people behave in their natural setting
- Evidence can be collected within a short period of time.

Disadvantages

- Some situations are difficult to observe, for example, bullying might take place in isolated areas, where no one can witness it happening
- It is difficult to observe and record simultaneously, and as a consequence minor details might be missed
- The observer might affect the situation, for example, learners may change their behaviour if they know that someone is observing them.

To overcome the abovementioned disadvantages, as non-participatory observer, the researcher observed and then recorded data after the observation sessions,

because if learners knew they were being observed, they might have modified their behaviour.

The table below contains details of the schools under study, the data-collection methods, and the interviewees.

Table 3.
Data-collection Schedule

Date	School	Data-collection method	Interviewer/ Observer	Interviewee(s)
01/08/2019	School C	Face-to-face interviews	Researcher	1 teacher
01/08/2019	School C	Focus group interviews	Researcher	6 learners
02/08/2019	School C	Observation	Researcher	Teacher and learners
05/08/2019	School A	Face-to-face interviews	Researcher	Teacher
05/08/2019	School A	Focus group interviews	Researcher	6 learners
06/08/2019	School A	Observation	Researcher	Teacher and learners
07/08/2019	School B	Face-to-face interviews	Researcher	Teacher
07/08/2019	School B	Focus group interviews	Researcher	6 learners
08/08/2019	School B	Observation	Researcher	Teacher and learners

3.7 DATA ANALYSIS AND INTERPRETATION

According to Zhang and Wildemuth (2009, p. 2), a researcher is involved in data analysis, when raw data are processed into themes or categories emerging from the gathered data. Merriam (2001) states that “data analysis provides ways of discerning, examining, comparing, and contrasting, meaningful patterns or themes”. The researcher employed conventional content analysis in analysing the data, using predefined themes and categories that emerged from the content analysis. Thereafter, the transcribed data were read carefully, line by line, before being divided into meaningful analytical units (i.e., segmenting the data). Following the line-by-line coding, a label was assigned to each code, for example, “knowledge and understanding of EE”. McMillan and Schumacher (2014, p. 1) define the word “code” as a label which describes a topic pertaining to data segments.

3.8 ETHICAL COMPLIANCE

Johnson and Christensen (2008) view research ethics as a set of principles that are meant to guide researchers in conducting ethical studies. According to Blaikie (2000), research can have a negative effect on participants, as it may harm them emotionally and/or psychologically. To ensure that this does not happen, ethical guidelines need to be considered and adhered to. As le Roux (2011, p. 35) indicates, the following ethical principles apply when dealing or working with participants: they have to give informed consent, their confidentiality and anonymity must be guaranteed, there must be respect for the participants, and the researcher must actively work to avoid misrepresenting the data. In this study, the participating teachers were informed about the purpose of the investigation, and they were assured that if they wished to withhold their participation, they would not be penalised in any way. The researcher emphasised that their taking part in the study had to be voluntary, meaning that they would not be compensated, and could not be forced to participate (see Appendix I). A letter requesting consent from the primary school learners’ parents, allowing their child(ren) to participate in a research project, was handed to the learners for their parents/caregivers to sign (see Appendix M).

The researcher ensured that the names of the participants and selected schools remained anonymous – those names do not appear in the research report or any other publication. The researcher also undertook to store the collected data in a

secure location for five years, so that it does not fall into the hands of other researchers/individuals who might misuse it. In compliance with the university's ethical standards, the researcher applied for, and was granted, an ethical clearance certificate from the College of Education Ethical Committee of the University of South Africa (see Appendix A).

3.9 RIGOUR

3.9.1 Trustworthiness, Transferability, Triangulation, Credibility

According to Loh (2013, p. 1), a study is considered to be a work of quality, if it (amongst others) meets the requirement of trustworthiness. To ensure that the findings were trustworthy, three primary schools in Vosloorus were used as data-collection sites; and teacher and learner participants from each school (site) took part in the study. Cohen et al. (2007, p. 133) point out that validity plays an important role in determining both the efficacity of the research, and the validity of the data. Validity in qualitative research can be achieved if the collected data are deemed rich and honest. According to McMillan and Schumacher (2014, p. 354), the researcher can enhance validity by using different strategies – in this instance, that was achieved by employing the following two strategies:

- **Doing Member Checking**

To do member checking, transcripts of the interviews were returned to all the participants, to determine the accuracy thereof.

- **Using Multiple Strategies** (Triangulation)

Multiple strategies were indeed used to gather data, including observation, face-to-face interviews, and focus group interviews.

3.10 SUMMARY

The main focus of this chapter on research methodology, was to explain how the study was conducted, by focusing on a number of aspects: the research approach, design, paradigm, and setting; the sampling strategies used and the actual sample; adherence to requirements related to rigour; the chosen data-collection techniques; the data-analysis and interpretation process; and ethical compliance. Chapter 4 takes a closer look at the data presentation, analysis and interpretation.

CHAPTER 4
DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

This chapter addresses the presentation, analysis and interpretation of the data collected through the face-to-face and focus group interviews, as well as observation on the part of the researcher. As mentioned before, conventional content analysis was used in analysing the collected data – a process which Hsieh and Shannon (2005) define as ensuring that coding categories emerge directly from the data. The findings from the data were used to answer the main research question: How do teachers implement EE in teaching and learning?

The researcher used predefined themes, guided by the research question. The data were interpreted for a thorough, deep understanding of the emerging findings.

4.2 DATA PRESENTATION AND ANALYSIS OF FACE-TO-FACE INTERVIEWS

Data obtained from the face-to-face interviews were analysed for meaning, and to arrive at an understanding thereof. Those data were analysed using the following three predefined themes: implementation of EE, methods of teaching EE, and the challenges which teachers experienced in implementing EE.

Table 4.1

Predetermined Themes and Categories Emerging From the Face-to-Face Interviews

THEME	CATEGORY
THEME 1 Implementation of EE	(a) Understanding the concept of EE
	(b) Partnerships between parents, learners and teachers, in implementing EE
	(c) Integrating EE into subjects
THEME 2	(a) Teaching methods used for EE

Teaching methodology for EE	(b) Teachers' professional development for EE
	(c) Educational programmes for EE
THEME 3 Challenges experienced by teachers in teaching EE	(a) Challenges in teaching topics related to EE
	(b)Benefits of teaching EE

Table 4.2

Participant Codes – Teachers

Participant	Code
Teacher A	TA
Teacher B	TB
Teacher C	TC

4.2.1 Theme 1: Implementation of Environmental Education

Theme 1 assessed how the participating teachers in the selected schools implemented EE in their classrooms. Any teacher would need a clear understanding of what EE is, before attempting to teach it. Under this theme, the following categories emerged: understanding the concept of EE, the teachers' opinions about implementing EE in the classroom, and integrating EE in certain subjects.

- **Category: Understanding the Concept of EE**

The ability to implement EE is dependent on a teacher's understanding of the concept. The Linear Model (see Chapter 2) highlights the importance of knowledge and attitude, when it comes to EE. Yeshalem (2013, p. 27) states that early linear models which originated in the United States assumed that environmental knowledge was vital in empowering learners to become more conscious, and deeply concerned, about their environment, which would ultimately help them develop pro-environmental behaviour (the ultimate goal of EE).

When the participating teachers were asked about their understanding of the concept EE, the following responses were forthcoming:

> *TA: "My understanding of the word 'Environmental Education' is that of education that teaches people about […] caring [for] the environment."*
>
> *TB: "To share expertise about nature."*
>
> *TC: "A process that allows individuals to explore environmental issues, engage in problem solving and [in] taking actions to improve the environment. As a result, individuals develop[ ] a deeper understanding of environmental issues, and have the skills to make informed decisions."*

These responses show the participants' diverse perceptions and understandings of what EE entails. Importantly, all three had some conception thereof. This is supported by Dobrinski and Upitis (2008, p. 15), who found that a diversity of views obtain about EE as a concept. Whereas TA felt educating people to care about their environment was important, TB felt it emphasised sharing expertise about nature.

- **Category: Partnerships between parents, learners and teachers in implementing EE**

This category sought to assess what collaboration there was (or could be) between teachers, learners, and their parents. It is deemed advisable that schools enter into partnerships with parents and learners, to ensure the effective implementation of EE (Uzzell, 1999, pp. 409–411). When the teacher participants were asked about such partnerships, they responded as follows:

> *TA: "Yes, parents come and clean the school once a year. School vendors pick [up] all the papers lying around after school breaks."*
>
> *TB: "Yes, every year we coordinate Environmental Health Week in June, for environmental awareness. The purpose is to educate*

the community about the environment and do [a] greening campaign."

TC: "No, our school does not form partnership[s] with the community."

These responses clearly show that schools A and B welcomed the interventions of parents and other stakeholders, and their willingness to discuss environmental problems, in addition to taking action. The participating teacher from School C, however, mentioned that their school did not involve the parents when implementing EE. TC's comment aligns with that of Uzzell (1999), whose Model 1 depicts the school as an isolated island which is distanced from the surrounding community, as there is no engagement or partnership with the parents or other stakeholders. It would be fair to conclude that schools A and B were concerned about the environmental problems that are evident in the community and the surroundings of the school, and therefore sought to involve the community in efforts to mitigate such issues. Model 1 of Uzzell (1999, pp. 409–411) therefore does not apply to them.

- **Category: Integrating EE into Subjects**

EE content in South African schools is integrated across the curriculum, in all subjects. It is therefore essential for teachers to have the skills needed to seamlessly introduce EE into their subject content. This category sought to assess how teachers do this. According to Westover (2001, p. 10), in an integrated curriculum, skills, attitudes, and concepts need to come together. When asked whether EE should be taught as a separate subject, or integrated into all learning subjects, the teacher participants had the following to say:

TA: "Yes, it will help learners to look after their environment, if Environmental Education is integrated into all the subjects."

TB: "It should be integrated in most learning areas, such as Economic Management Sciences, as it affects the economy, Life Orientation for environmental integrity, Geography, and Social Sciences."

TC: "It is important to integrate EE into all subjects, so that learners can have enough knowledge with regard to EE."

These responses clearly show a commonality in opinions concerning the need to integrate EE into all subjects taught in schools in this country. These views align with the notion that learning can be holistic and connected to real-life situations, since all subjects can conceivably be linked to our natural environment (Kimaryo, 2011, p. 104).

4.2.2 Theme 2: Teaching Methods for EE

This theme examined the methods used, in teaching EE. The recommendation is that teachers apply a variety of teaching methods as part of their lesson planning, and in working to encourage learners to help mitigate environmental problems. Under this theme, the categories that emerged were: teaching methods used for EE, teacher professional development for EE, and educational programmes for EE.

- **Category: Teaching Methods Used for EE**

According to Dreyer and Loubser (2014, p. 168), teachers should use different methods of teaching, to allow their learners, in turn, to demonstrate EE-related knowledge, skills, values, and attitudes, since learners differ in terms of how they acquire knowledge. This category examined what teaching methods the participants used, and they responded by saying:

TA: "Lecturing, question-and-answer method, class discussion and role-play."

TB: "I usually use outdoor education as a method to teach EE, however, lecturing methods [and the] question-and-answer method are the dominant methods that I use to teach content that is aligned to EE."

TC: "Most of the time, [the] methods that I apply are lecturing, [the] question-and-answer method, group discussions, and class discussions."

All three teacher participants admitted to employing lecturing and the question-and-answer method. It emerged from the statements that the learners do not often go outside as part of their learning, and only TB admitted to using outdoor education, bringing the learners into direct contact with nature. These findings match those reported by McCarty et al. (2018), who found that learners from low-income schools spend most of their time in the classroom, passively listening to their teachers, rather than actively engaging with nature. Clearly, the participants' actions do not conform to Kolb's (1984) recommendation to use experiential learning, thus there was only limited evidence of learners learning through experience, or by doing.

- **Category: Teachers' Professional Development for EE**

According to Villegas-Reimers (2003), professional teachers drive quality education in schools. This category sought to explore the ways in which the participating teachers expanded their knowledge regarding effective ways of implementing EE. When asked about their professional development in respect of EE (e.g., workshop attendance), this is what they had to say:

> *TA: "Yes, we have attended many workshops concerning Environmental Education, and another workshop is coming on Saturday, 3 August 2019, at Abinala Primary School from 8h00 to 15h00."*
>
> *TB: "Yes, most days workshops are organised by the Department of Education, in collaboration with [the] Department of Water and Sanitation."*
>
> *TC: "No, teachers do not attend workshops."*

As TA and TB clearly indicated, they and their colleagues undergo professional development related to EE. By contrast, TC claimed that they, as teachers, did not attend workshops in this regard. What emerged from the data is that most teachers attend EE-related workshops on those components that appear in the Natural and Social Science curricula. This brings to mind Gordon's (2009, p. 36) warning that even though teachers may undergo professional development related to EE, that does not guarantee they will be able to effectively implement what they have learnt.

4.2.3 Theme 3: Challenges and Benefits Experienced by Teachers in Teaching EE

Theme 3 sought to determine what challenges and benefits the participating teachers experienced in teaching EE. When teaching content aligned to EE, several challenges will inevitably arise. Under this theme, two categories emerged from the data, namely challenges in teaching EE, and the benefits of teaching EE.

- **Category: Challenges in Teaching EE**

When encouraged to speak about the challenges or obstacles they encountered when teaching EE, the respective study participants responded as follows:

> *TA: "Our school does not have enough teaching aids, which are meant to enhance teaching and learning for EE."*
>
> *TB: "I am unable to apply other teaching methods such as role-play and action projects, because they waste a lot time, since the curriculum is too demanding."*
>
> *TC: "Our school does not have enough teaching and learning support materials, to [be able to] integrate EE into all subjects."*

From the above responses it is evident that TA and TC encountered common challenges in teaching EE. A lack of teaching support materials, to enhance the teaching and learning process, is one such hindrance. As TB noted, other teaching methods such as role-play and action projects could not be used, because of time constraints and a packed curriculum. This finding supports that of Killen (2007), who argues that role-play, albeit potentially maximising learner participation, wastes valuable teaching time. TC admitted to battling to integrate EE across subjects – a statement which echoes the findings of Dreyer and Loubser (2014), who noted that most teachers found this onerous to do. Although, as noted in the preceding comments, one participant reported taking the learners outside for EE lessons, as Ko and Lee (2003) found, many educators are daunted by the prospect of learners running wild outside the confines of the classroom, especially when there are too many children in one class who cannot all be adequately supervised.

- **Category: Benefits of Teaching EE**

Apart from obstacles and hindrances, there are also benefits to be derived from teaching EE-related content. This category investigated how the participants optimised their teaching. These are some of the benefits which the participants highlighted:

> *TA: "We are able to go outside and interact with nature."*
> *TB: "… benefits of EE, is to [ ]solve environmental problems."*
> *TC: "The benefit of EE is to engage with nature."*

Interacting with nature, and helping to solve environmental problems, emerged as two of the noted benefits of teaching EE. These views support the findings of Blanchard and Buchanan (2011), who maintain that children who respect nature and are knowledgeable about the natural world, are more likely to take care of their environment. By engaging with nature, as TC stated, learners have a chance to learn in different ways, in accordance with Gardner's (2006) theory of learning preferences. To expand their "natural intelligence", learners might hone their ability to identify plants and animals, and to discover the interrelationship which all living things have with other natural phenomena (Gardner, 2006).

4.3 DATA PRESENTATION AND ANALYSIS OF FOCUS GROUP INTERVIEWS

To answer the research question, this section focuses on an analysis of the learners' focus group interviews, outlining the themes and categories that emerged from the collected data. The predefined themes employed, include the implementation of EE, learning styles for EE, and challenges in learning EE. The categories which emerged, include understanding the concept of EE and its content, the methods of learning EE and the learning constraints experienced in respect of EE.

Table 4.3 shows the predetermined themes and the categories emerging from the focus group interviews.

Table 4.3

Themes and Categories Emerging From the Focus Group Interviews

Themes	Categories
THEME 1 Implementation of EE	Understanding the concept of EE and its content
THEME 2 Learning styles for EE	Methods and approaches for learning EE
THEME 3 Challenges in learning EE	Learning constraints regarding EE

Table 4.4

Participant Codes – Learners

Participants	Codes
School A	SA 1, 2, 3, 4, 5, 6
School B	SB 1, 2, 3, 4, 5, 6
School C	SC 1, 2, 3, 4, 5,6

4.3.1 Theme 1: Implementation of Environmental Education

Theme 1 assesses how EE is implemented in schools. It was deemed appropriate to determine what learners understood EE to be, before the process of determining how they understood its implementation. Under this theme, the category that emerged, related to the participating learners' understanding of the concept of EE, and its content.

- **Category: Understanding the Concept of EE and its Content**

As the literature review indicated, across the world there is a desire to help learners develop an understanding of the concept of EE, in order to foster a greater sense of appreciation in them, for nature. According to Yeshalem (2013, p. 27), early linear models assumed that environmental knowledge would be vital in empowering learners to be conscious and deeply concerned about (as indicated by their attitudes

towards) their environment. The ultimate goal is to develop in them pro-environmental behaviour, as inhabitants of planet Earth.

When the learner participants were asked about their understanding of the concept of EE, they gave the following responses:

> *SA 4: "… [t]eaching others about how to care about the environment."*
>
> *SB 3: "When you are taught about the environment, and how to keep it clean."*
>
> *SC 2: "… [e]ducation about the environment."*

As this sampling of responses shows, although the learners had different understandings of what EE deals with, they all had a solid grasp on what the concept involves.

4.3.2 Theme 2: Learning Styles for EE

Theme 2 examined how learners learnt content related to EE. It was deemed important to hear the learners' perspective on how they can learn EE-related content. Under this theme, the category that emerged pertained to the methods and approaches used, in teaching and learning EE.

- **Category: Methods of, and Approaches to, Learning EE**

Learners learn in different ways. According to Strauss (2013), it is important for teachers to know and understand the different learning styles which their learners use. This category looked at how learners learn content related to EE. When asked about their learning preferences when it comes to EE, the young participants had this to say:

> *SA 2: "To go outside the classroom, and learn about nature."*
>
> *SB 3: "I learn much better by doing, unlike listening to a teacher lecturing […], which makes most us to be bored in class, and end [ ] up sleeping."*

SC 4: "I prefer learning through games, because I do not forget what I have learned."

As one of the responses gleaned from the focus group interviews indicates, where the dominant method of teaching was lecturing, learners grew bored. The young participants admitted to learning much better when involved in an activity or a hands-on experience. These statements are supported by Palmberg and Kuru (2000), who view EE as revolving around experiential learning activities in which teachers employ diverse learning approaches that offer their charges participatory learning opportunities. Fieldwork and project-based learning, for instance, would enable learners to get close to nature. As Genc (2015, p. 107) states, project-based learning or experiential learning is essential for learners, as it enhances their critical thinking and problem-solving skills, which they can and will use in a variety of real-world situations.

4.3.3 Theme 3: Challenges in Learning EE

Theme 3 focused on the challenges which learners experienced when learning EE-related content. This is what they had to say:

SA 5: "I don't like to learn in a group, because there are learners who are not willing [to] work. They depend on others."

SB 6: "I encounter challenges when learning without using pictures."

SC 3: "I encounter challenges when learning without concrete objects."

Group work appeared to pose a problem for one young learner participant, who indicated that some learners are uncooperative. Killen (2007) also found that some learners prefer not to work in teams or groups, which supports the verbatim quote. Some learners prefer to work alone, and as two of the participants' responses indicated, they had their own learning preferences. The use of pictures was indicated as a preferred means of learning, which supports Gardner's (2006) theory on learning preferences: discussed under "special intelligences", Gardner (2006) states that teaching and learning should be supported by visual aids, colours, and art.

Having expressed a preference for learning by using concrete objects, that participant's statement is supported by the research of Monyai (2006), who found that using objects is essential for enhancing teaching and learning. The above responses suggest that the teaching and learning of EE is not always effective – it appears from the evidence presented, that teachers do not adopt an integrative approach to teaching related content.

4.4 DATA PRESENTATION AND ANALYSIS IN RESPECT OF OBSERVATIONS

This section presents an analysis of the researcher's observations, outlining themes and categories that emerged from the collected data (in the form of field notes) and predefined themes, to answer the research question: How do township primary schools implement EE in teaching and learning? The predefined themes included the teaching and learning methods used for EE, and an observation of the school grounds. Categories that emerged included the methods of teaching EE, the learning approaches employed, parental involvement, water conservation and waste management efforts, and food gardening.

After completing the face-to-face interviews with the teachers, regarding the implementation of EE, the researcher observed one lesson, presented at each of the three schools, to assess how related content is presented as part of a lesson. Other observations took place outside of the classroom, where the teachers' and learners' attitudes towards the environment were observed, and recorded in notes.

Table 4.5

Themes and Categories Stemming from the Researcher's Observations

Themes	Categories
Teaching and learning methods for EE	(a) Teaching and learning approaches in EE
Learners' behaviour towards the environment	(a) Water conservation
	(b) Waste management

Table 4.6

Coding of Participating Schools

Settings	Codes
School A	SA
School B	SB
School C	SC

Table 4.7

Classroom Observation Notes

CA: Teaching and learning approaches to EE					
School code	**Teacher code**	**School code**	**Teacher code**	**School code**	**Teacher code**
SA	**TA**	**SB**	**TB**	**SC**	**TC**
• Classes are overcrowded • Method used to teach EE-related content, is lecturing		• Classes are overcrowded • Method used to teach EE-related content, is question-and-answer		• Classes are overcrowded • Methods used to teach EE-related content, is lecturing (and some problem solving)	

4.4.1 Theme 4: Teaching and Learning Methods for EE

The teaching methods employed when delivering or sharing EE content are important when educating learners for sustainable development. Theme 4 examined these methods. The recommendation which stemmed from the literature review, was that teachers need to employ diverse teaching methods, if the goal is to motivate their learners to mitigate environmental problems. Here, the category which emerged from observation, pertained to the participating teachers' teaching and learning approaches.

- **Category: Teaching and Learning Approaches in EE**

Tilbury (2003, p. 111) states that for ESD to be included in a school curriculum, teachers must be well informed as to which methods of teaching are suitable. When teaching about topics related to ESD, teachers should not employ a teacher-centred approach, but rather one that centres on the learner, to allow each learner a chance to learn how to analyse, critique, and make good decisions on his/her own (Tilbury, 2003). During the observation, the researcher noted that the participating teachers had to teach classes that were overcrowded, making it difficult for them to implement a variety of teaching approaches. As Ko and Lee (2003) found, many teachers are not confident in teaching EE outside of the classroom, if classes are overcrowded and learners can potentially become unruly. Teachers SA and SC were observed employing the lecturing method which, as McCarty et al. (2018) claim, is the way in which most learners in low-income schools are taught: classroom-bound, with the teacher imparting knowledge, and not engaging with the learners. SB, however, employed the question-and-answer method, which contradicts the statement by McCarty et al. (2018) about a lack of classroom interaction between teachers and learners. If lecturing and question-and-answer are the only methods which teachers employ they are disadvantaging their learners, who should be going outside to discover and interact with nature. Palmberg and Kuru (2000) advise that the teaching and learning of EE should be experiential, therefore teachers need to take a more hands-on approach to teaching this subject.

4.4.2 Theme 5: Learners' Behaviour Towards the Environment

- **Category: Water Conservation**

As Rosenberg (2009) points out, South Africa is a water-scarce country, therefore its citizens have to protect this valuable resource for current and future generations. Woodhouse and Knapp (2000) agree that place-based education enables learners to take care of the natural resources found in their local area, including water sources and trees, amongst others. At all the participating schools, taps were found not to close properly, as they were broken. In the literature study, Rosenberg (2009) states

that many schools take action to conserve resources by fixing leaking taps, but this was not the case here. SC was observed to use a water tank to water crops in the food garden, but SA and SB did not use this solution to conserve water. This behaviour does not conform to that advocated by Rijsberman (2006), who suggests that schools need to conserve water by storing it in water tanks, and using it to irrigate food gardens, clean the ablution facilities, and (possibly) for cooking. Learners from SA and SB were observed saving water, by using plastic bottles rather than drinking from a tap. This was not observed to be the case at SC. At all three schools, learners were observed using buckets to wash their hands, as a strategy to save water. This behaviour is in line with what is recommended by Jensen (1995) and Schnack (1994), who state that EE should be based on action – however minor such solutions may seem.

Table 4.8

Observation Notes Regarding the School Grounds

CA: Waste management		
School code		
SA	**SB**	**SC**
• Learners discard papers and other litter on the school grounds • The school recycles waste material (white paper) • No waste materials visible outside the schoolyard	• Learners discard papers and other litter on the school grounds • The school recycles waste material (white paper) • No waste materials visible outside the schoolyard	• Learners discard papers and other litter on the school grounds • The school does not recycle waste material • Waste materials are visible outside the schoolyard

- **Category: Waste Management**

According to Taylor et al. (2009, p. 180), increased levels of waste have a negative impact on the environment of any country, and presents a problem when it comes to disposing of such waste. For that reason, EE should ideally take the lead in mitigating related problems. In the United States, the Transportation Research Board (2009) views littering as solid waste that has been “misplaced”.

The researcher observed that SC did not recycle waste material, while SA and SB recycled white paper. Such incentives are supported by Rosenberg (2009), who proposes recycling as a solution to littering. Even though two of the participating schools recycled materials, learners at all three schools were observed discarding papers or other litter on the school terrain. The Transportation Research Board (2009) refers to this type of behaviour, stating that young people are prone to littering. One of the participating schools disposed of waste material outside the schoolyard. This behaviour correlates with what Dreyer and Loubser (2014) report in their study, namely that communities tend to discard papers and plastic bags anywhere, rather than in specially designated receptacles. South Africa’s highways and countryside bear evidence of a disregard for how litter should be disposed of.

Figure 4.1: Discarded Waste at School A

4.5 SYNTHESIS OF THIS CHAPTER

Theme 1: Implementation of Environmental Education

The findings presented under Theme 1, answered the following research sub-questions:

- What is teachers' understanding of the concept of EE?
- How do teachers form partnerships with parents, to ensure the effective implementation of EE?

The findings revealed that although the participating teachers had an understanding of the concept of EE, their perceptions differed. These findings are supported by the work of Dobrinski and Upitis (2008), who also found that teachers have different views as to what exactly EE entails. The same applied to the participating learners, who nonetheless showed some understanding of what EE is.

As regards the partnership between teachers and parents, the findings of this study suggest that most teachers did meet with their learners' parents to discuss environmental problems, and that the parents did in fact take action by cleaning the surroundings of the school, once a year. Building a strong relationship with the community is vital for mitigating environmental problems. Thus, the findings reported on here, did not match Model 1 of Uzzell (1999), of the school as an isolated island, where there is no engagement or collaboration with parents or community members, in an attempt to address environmental issues.

Theme 2: Learning Styles in EE

The findings presented under Theme 2, answer the following research sub-questions:

- Which teaching methods do teachers use, when delivering content aligned to EE?
- How do schools form partnerships with the community, to ensure the effective implementation of EE?

The findings of this study revealed that the participating teachers mostly employed the talk-and-chalk and question-and-answer methods, and kept their learners

classroom-bound. The researcher's recommendation is that, when teaching content related to EE, teachers need to allow learners to go outdoors and interact directly with nature. Such a scenario would align with Kolb's (1984) theory of experiential learning, which suggests that learners learn through experiencing and doing. Genc (2015) concurs, highlighting that project-based learning, or experiential learning, is essential for enhancing learners' critical thinking and problem-solving skills, which can subsequently be applied in real-world contexts.

Furthermore, the findings suggest that when learning EE-related content, learners are disadvantaged when only teacher-centred methods are employed. Different methods of teaching should be employed, to keep lessons fresh and exciting, and to accommodate learners' unique learning styles. According to Strauss (2013), it is important for teachers to know and master the different learning styles, so that their lesson presentations remain gripping and interesting.

The observations conducted, revealed that teachers either lectured or posed questions for their learners to answer. The researcher is of the opinion that teachers prefer to use these methods, due to the large number of written activities that need to be completed each week. The aforementioned methods are not that time consuming, which may explain their appeal. This is supported by Killen (2007), who states that some methods, such as role-play, waste much of a teacher's teaching time.

As regards teachers' professional development, two of the participating teachers reported attending workshops related to those EE components that are incorporated in the Natural and Social Sciences. Despite teachers receiving training, challenges in implementing EE remain. This finding is supported by that of Gordon (2009), who indicates that training teachers in EE does not guarantee the effective implementation thereof. Schools will continue to face a variety of obstacles, unless the DoE prioritises training. This statement is supported by Mudaly and Ismail (2016, p. 75), who concede that not all teachers benefit from professional development initiatives, with workshops not starting on time; facilitators only reading the CAPS policy document and not advising them how to teach EE-related concepts to learners; teachers not feeling they have gained much from such sessions; and newly

appointed teachers feeling their opinions are largely dismissed by their mentors or seniors.

Theme 3: Challenges in Learning EE

The findings outlined below, answer the following research sub-question:

- What are the challenges facing teachers when teaching EE in schools?

The findings revealed that most teachers encountered challenges when teaching EE, one of which pertains to the CAPS curriculum, which is deemed too demanding. The participating teachers lamented not having enough time to go outside the classroom to allow learners to interact with their natural environment, since they are more concerned about completing the content stipulated for each term (which they are pressured by the GDE facilitators to do). Dillon et al. (2006) confirm that teachers tend to adhere to strict curriculum requirements. Overcrowding is another challenge which prevented teachers from offering learners experiential learning opportunities outside of the four walls of the classroom, as it is difficult to control large numbers in an open space. In addition, teachers were concerned about the health and safety of the learners. This aligns with the findings of Dillon et al. (2006).

Theme 4: Teaching and Learning Methods in EE

The finding presented under Theme 4, pertain to the following research sub-question:

- Which teaching methods do teachers use, when delivering content aligned to EE?

The observations conducted, revealed that the participating teachers lectured to their learners, or posed questions requiring an answer from them. This freed up time to complete the syllabus, and the requisite number of weekly written activities. As Killen (2007) notes, while methods such as role-play may be exciting, they are time-consuming.

Theme 5: Learners' Behaviour Towards the Environment

During his observations, the researcher noted that the learners at all three schools were trying their best to act responsibly towards their environment by saving water,

drinking from bottles, and using buckets to wash their hands. This finding conforms to the recommendations of Jensen (1995) and Schnack (1994), who propose action-based EE. However, while the learners played their part, maintenance on leaking taps was not done, despite Rosenberg (2009) having reported the contrary following that study. Not all of the sampled schools used a water tank to store water, and a hosepipe connected to a tap, was in evidence. Rijsberman's (2006) advice, to conserve water by storing it in water tanks, and using it to irrigate food gardens and wash facilities, was not being heeded.

The researcher observed learners littering the school premises, which aligns with the findings of the Transportation Research Board (2009) in the United States, that youths are prone to litter. Recycling, as an activity to combat littering, is supported by Rosenberg (2009), as is recycling tin cans and boxes – a proposal which this researcher strongly supports.

4.6 CHAPTER SUMMARY

In this chapter, data were analysed and interpreted using conventional content analysis. The findings emerging from the face-to-face and focus group interviews, as well as the researcher's observations, were addressed. The following themes, guided by the research question, were addressed here: teachers' teaching styles and learners' learning styles, the challenges in learning about EE, and learners' behaviour towards the environment. These findings gave rise to a number of recommendations, which are discussed in Chapter 5.

CHAPTER 5
SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION

This chapter summarises the researcher's findings regarding the way in which the participating teachers implemented EE in their respective schools. Several recommendations are made, and conclusions drawn, based on the findings discussed in the preceding chapter.

5.2 STUDY OVERVIEW

Chapter 1 gave a motivation for this study, based on the assumption that the poor implementation of EE in schools contributes to a community's environmental problems. The size of the population sampled was a limitation, in that it is not representative of the entire population, while time constraints also played a role. The chapter focused on the delimitations of the study, the research problem statement and research question (and sub-questions), as well as the aims and objectives of this investigation. The researcher sought to assess how teachers from selected Vosloorus township primary schools implemented EE, and in doing so, both the objectives and aims of the study were achieved.

The literature on the implementation of EE in primary schools was reviewed in Chapter 2. As Dreyer and Loubser (2014, p. 168) recommend, teachers should employ a variety of teaching methods when teaching EE-related content, but Killen (2007, p. 211) warns of associated advantages and disadvantages. Jensen (1995) and Schnack (1994) maintain that learners learn much better by being actively involved and taking action, while the Tbilisi Declaration (Unesco, 1978) advocates implementing EE in schools, to allow learners to develop skills and knowledge which will enable them to help mitigate local and global environmental problems. Paul and Volk (2002) favour continuous professional development to upskill EE teachers, but the literature revealed that workshops may be largely ineffective in delivering lasting or concrete results, as they did not deliver much value to attendees (Gordon, 2009, p. 36). Villegas-Reimers (2003) suggests an alternative approach, which is to form cohesive partnerships with learners' parents.

Chapter 3 focused on the qualitative research and the action research design, both of which were employed for the purposes of this study. Data-collection methods were also outlined, and they included face-to-face interviews, focus group interviews and observation. Three primary schools in Vosloorus township were sampled, with participants being purposively selected using convenience sampling. Three teachers per school participated in face-to-face interviews, while six Grade 7 learners per school participated in the focus group interviews. The observation method enabled the researcher to observe learners' behaviour and attitudes towards their environment, and how teachers taught EE-related content in class. Action research was used: as Dick (2010, p. 4) notes, it combines research and action, to effect transformation/change in a community.

The comments from the interviews were transcribed and analysed, in keeping with avowed ethical considerations.

Chapter 4 addressed the data presentation and analysis. In doing the content analysis, predefined themes were used, guided by the main research question: How do township primary schools implement EE in teaching and learning?

Chapter 5 offers a summary of the preceding chapters, then discusses the findings, recommendations, and the envisaged contribution towards the existing body of knowledge, mindful of the limitations of the work, before concluding the study.

5.3 SUMMARY OF RESEARCH SUB-QUESTIONS, FINDINGS AND RECOMMENDATIONS

The study answered the following main question: How do township primary schools implement EE in teaching and learning? The sequence followed in addressing each sub-question, is:

Research sub-question ⟶ Finding ⟶ Recommendation

5.3.1 Research Sub-question 1

- What is teachers' understanding of the concept of EE?

Findings:

The findings revealed that the participants had diverse opinions on what EE entails, but in the main they stated that it is about educating people to care about their environment, and about sharing expertise about nature. These findings are supported by Dobrinski and Upitis (2008), who acknowledge the existence of a multitude of views on the concept of EE. The participants associated EE with the biophysical environment, albeit that it is embodied in other dimensions (see figure 2.1), including the political, economic and social (O'Donoghue & Janse van Rensburg, 1995).

Recommendations:

Teachers should be encouraged and incentivised to enrol for EE courses and workshops, which should be held at least once a term. That will expand their understanding of the concept, and raise awareness of all four dimensions (the biophysical, economic, political, and social).

5.3.2 Research Sub-question 2

- Which teaching methods do teachers use, when delivering content aligned to EE?

Findings:

The study found that the participants, in teaching content aligned to EE, predominantly used lecturing and question-and-answer as methods. Learners were not often allowed outdoors as part of lessons dealing with the environment, which aligns with the findings of McCarty et al. (2018), that disadvantaged learners are mostly subjected to chalk-and-talk desk-bound lessons, which do not engage them. Clearly, Kolb's (1984) theory of experiential learning was not in evidence, therefore learners had no scope to learn through experience, or by actually doing.

Recommendation:

When teaching EE-related content, teachers need to employ various methods to engage and excite learners, and capture their interest. Given the amount of work stipulated by the curriculum, the suggestion is that teachers take their learners out of

the classroom once or twice a week, to engage with nature and raise awareness of, and find possible solutions to, environmental problems at the school and in the surrounding areas.

5.3.3 Research Sub-question 3

- What are the challenges facing teachers when teaching EE in schools?

Findings:

The findings revealed that most of the participants encountered challenges when teaching EE, including a very full CAPS curriculum, which left them with little time for lessons outside of the classroom. The sampled teachers were more concerned about completing the curriculum content, as the GDE facilitators monitored their progress. As Dillon et al. (2006, p. 108) concede, often curriculum requirements prevent teachers from making their EE lessons more interactive in nature. Ko and Lee (2003) concede that too-full classes make experiential learning a challenge, with so many learners becoming difficult to control. The safety of the learners, when not in controlled situations, was identified as another limiting factor (Dillon et al., 2006).

Recommendations:

The teaching and learning of EE should be based on action. Given how many written activities are required of learners (by the DBE), once-weekly action-based activities would not greatly affect their output. This correlates with the views of Lee and Williams (2001), that EE enables learning through action, raises awareness in learners (and their families and peers), and persuades them to act responsibly towards their own environment.

5.3.4 Research Sub-question 4

- How do teachers form partnerships with parents, to ensure the effective implementation of EE?

Findings:

The findings revealed that the participating schools indeed formed partnerships with parents to discuss environmental problems, by meeting once a year to take action by

cleaning the terrain and surroundings. However, annual meetings did not bring about significant change in terms of resolving the environmental problems that were visible on the school terrain and in the neighbouring area. The sampled schools were thus not “isolated islands” (Uzzell, 1999). These findings align with the ideas outlined by Uzzell (1999) in his second model, where the local community is invited into the school. Such engagement on the part of the community can only benefit a school.

Recommendation:

While partnerships were formed with the learners’ parents in an attempt to eradicate environmental problems through clean-up campaigns, such initiatives and meetings should not be conducted only once a year, but rather every quarter.

5.3.5 Research Sub-question 5

- How do learners behave towards their environment?

Findings:

According to the findings of this study, at the schools in question, the learners were unable to close leaking taps, as they were broken. Not all schools were found to use water tanks to conserve water, but used hosepipes connected to taps to irrigate. At all three schools, learners caused land pollution by littering, which poses a health hazard. According to Dreyer and Loubser (2014, p. 7), in South Africa pollution is a challenge, with paper and plastic items being discarded without consideration for the environment. The serious consequences of pollution include land degradation, and a loss of biodiversity.

Recommendations:

- Teachers, groundsmen or community members can be called on to fix broken taps, while learners should be taught to report such instances.
- Schools should store water, by using buckets and water-storage tanks.
- In this era of the Fourth Industrial Revolution, schools should use aerators to save water. These devices can be fitted to taps, to control the flow of water.

- Learners should be encouraged to pick up any waste papers after break and after school. This should be done under the supervision of a teacher, and prefects can be assigned to assist teachers in monitoring the learners. The teachers and prefects can set an example, by also helping out.
- Learners should not only recycle white paper, but also other recyclable materials such as tin cans, bottles and boxes.

5.3.6 Research Sub-question 6

- How do teachers acquire knowledge regarding the implementation of EE?

Findings:

The findings suggest that most teachers attend related workshops, where components are incorporated in the Natural and Social Science syllabi. Despite this, challenges persist. As Gordon (2009, p. 36) points out, undergoing professional development related to EE does not guarantee the effective implementation thereof. This can be attributed to the fact that workshops aim to capacitate teachers in all the content of the curriculum, rather than EE specifically.

Recommendations:

Teachers should not only depend on DoE workshops, but should enrol for short courses offered by other institutions, to upskill themselves. Universities and colleges should form partnerships with NGOs which offer EE programmes, such as the Delta Environmental Centre, Wessa, and World-Wide Fund for Nature (WWF).

5.4 CONTRIBUTION TO THE BODY OF KNOWLEDGE

This study contributed to the existing body of knowledge in the field of EE, in respect of the teaching methods used, the challenges facing teachers in implementing EE, and the need to strengthen partnerships between schools and the community. Teachers' professional development and learners' behaviour towards the environment, were also addressed. Hence, this study was successful in answering

the main research question: How do teachers implement EE in teaching and learning?

In this study, the literature on EE was reviewed and a gap was identified, which led to knowledge being generated in the course of assessing the implementation of EE in selected Vosloorus township schools. The researcher identified gaps in respect of teachers' professional development, and the value of school–parent partnerships in combatting or minimising, and even eradicating, environmental problems. As Uzzell's (1999) second model advocates, the local community must be invited into the school, so that all stakeholders take ownership of the schooling which South African learners receive.

5.5 LIMITATIONS

The identified limitations of the study, included the following:

- Time and financial constraints had an impact on the data-generation process, meaning the findings cannot be generalised across the country.
- The study only focused on qualitative research, whereas if a mixed-method approach had been employed, additional data may have emerged.

5.6 RECOMMENDATIONS FOR FURTHER RESEARCH

Recommendations for further studies are as follows:

- Further research in connection with the implementation of EE should include primary (grades 1–7) and high (grades 8–12) school learners and teachers, because EE-related content can also be taught to more senior learners.
- Further research on the implementation of EE may include the views of curriculum advisers and community members, or other stakeholders of the schools in question.
- The focus need not only be on townships schools, but must ideally include so-called former Model C schools, because environmental problems occur in both township and suburban areas.
- Further research may investigate how lecturers at tertiary institutions train student teachers, as they prepare them to implement EE in their lessons.

5.7 CONCLUSION

This study, which assessed the implementation of EE in selected Vosloorus township schools, answered the main research question. Prior to that, the aims and objectives were clearly formulated; data were collected by means of face-to-face interviews, focus group interviews and observation which allowed for data triangulation; and the presentation, analysis and interpretation of the data allowed the researcher to structure the findings of the study. Although the findings revealed that township primary schools in Vosloorus implemented EE in teaching and learning, schools need to improve the teaching methods used by introducing more variety, and by taking a more hands-on approach to waste management and water conservation on their own premises.

For future research purposes, AR may be conducted to determine how schools can employ effective methods of teaching/learning content aligned to EE, specifically in the context of South Africa. Also, schools should manage waste and conserve water effectively, using up-to-date technology, where feasible. Thus, bringing change or improvement to a society, is where action research is most useful. As Mertler (2016, p. 6) states, AR is a systematic inquiry, undertaken by educational stakeholders whose goal is to enhance learners' learning.

Some of the recommendations made here, emphasise the importance of using AR when implementing EE, as a hands-on approach can help to mitigate environmental problems even if they are very limited in scope. This aligns with Kolb's (1984) theory of experiential learning, which encourages learners to learn through experience, and by doing. By facilitating direct engagement with nature, teachers can raise awareness amongst their learners about environmental matters, and teach them to take responsibility for the natural environment, so that future generations may also reap the benefits.

REFERENCES

Balmer, M. (2017). Household coal use in an urban township in South Africa. *Journal of Energy in Southern Africa, 18*(3), 27–32.

Best, J. W., & Kahn, J. V. (2006). *Research in education* (10th ed.). Pearson.

Bjorklund, S. A. (2015). *Eleven Eastern Cape teachers' perceptions of the implementation of the Curriculum Assessment Policy Statement* [MEd dissertation]. University of Umea, Sweden.

Blaikie, N. (2000). *Designing social research.* Polity Press.

Blanchard, P. B., & Buchanan, T. K. (2011). Environmental stewardship in early childhood. *Childhood Education, 87*(4), 232–238.

Bohn, D. (1997). Environmental education in Germany: An overview. In P. J. Thompson (Ed.), *Environmental Education for the 21st century: International and interdisciplinary perspectives* (pp. 23–31). https://eric.ed.gov/?id= ED415117

Bosah, V. O. (2013). Environmental Education in Nigeria: Issues, challenges and prospects. *Mediterranean Journal of Social Sciences, 4*(15).

Bozman, B., & Feeney, M. (2007). Toward a useful theory of mentoring: A conceptual analysis and critique. *Administration and Society, 39*(6), 719–739. https://www.doi.org/ 10.1177/0095399707304119

Brandt, C. (2010). Themes in South African education for the comparative educationist: Curriculum futures in South Africa. In E. M. Lemmer, & J. N. van Wyk (eds.), *Curriculum futures in South Africa* (pp. 142–162). Pearson.

Breen, R. L. (2006). A practical guide to focus group research. *Journal of Geography in Higher Education*, *30*(3), 463–475.

Bronfenbrenner, U. (1979). Who needs parent education? In H. Jenson (Ed.), *Families and communities as educators* (pp. 199–221). Teachers' College Press.

Burton, D., & Bartlett, S. (2009). *Key issues for education researchers*. Sage.

Calitz, L. P., du Plessis, S. J. P., & Steyn, I. N. (1982). *Die kurrikulum: 'n Handleiding vir dosente en onderwysers*. Butterworths.

Centre for Educational Research and Innovation (Ceri). (1999). *Environment, schools and active learning.* OECD.

Chisholm, L. (2003). The state of curriculum reform in South Africa: The issue of Curriculum 2005. In J. Daniel, A. Habib, & R. Southall (Eds.), *State of the nation: South Africa*, *2004* (pp. 268–289). HSRC Press.

Christie, P. (2008). *Opening doors of learning*. Heinemann.

Cohen, L., Manion, L., & Morrison, K. (2007). Observation. *Research Methods in Education, 6*, 396–412.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed-methods approaches*. Sage.

Department of Basic Education (DBE) (2011). *National curriculum statement: Curriculum and Assessment Policy Statement (CAPS). Social Science Intermediate Phase, grades 4–7.* DBE.

Department of Education (DoE) (1995). *White Paper on Education and Training.* Government Printer.

Department of Education (1997). *Curriculum 2005: Lifelong learning for the 21st century*. https://www.voced.edu.au/content/ngv%3A7990

Department of Education (1999). *Guidelines for developing learning programmes for Grade R.* DoE.

Dick, B. (2010). Action research theses. *Thesis resource paper: You want to do an action research thesis?* http://www.scu.edu.au/schools/gcm/ar/art/athesis.html

Dillon, J., Rickinson, M., Teamey, K., Morris, M., Choi, M. Y., Sanders, D., & Benefield, P. (2006). The value of outdoor learning: Evidence from research in the UK and elsewhere. *School Science Review, 87*(320), 107.

Dobrinski, L., & Upitis, R. (2008). *Views of environmental educators on teaching Environmental Education.* https://www.collectionscanada.gc.ca/obj/thesescanada/vol2/OKQ/TC-OKQ-1594.pdf

Dreyer, J. M. (2014). *The educator as assessor* (2nd ed.). Van Schaik.

Dreyer, J. M., & Loubser, C. P. (2005). Curriculum development, teaching and learning for the environment. In C. P. Loubser (Ed.), *Environmental Education: Some South African perspectives*. Van Schaik.

Dreyer, J. M., & Loubser, C. P. (2014). *Environmental Education and education for sustainability: Some South African perspectives*. Van Schaik.

Dreyer, J. M., & van Schalkwyk, H. (2015). *Outcomes-based assessment* [Study guide for Environmental Education Programme]. University of South Africa, Pretoria.

Ernst, C. M., Buddle, C. M., & Soluk, L. (2014). The value of introducing natural history field research into undergraduate curricula: A case study. *Bioscience Education*. https://www.tandfonline.com/doi/full/10.11120/beej.2014.00023

Ernst, J., & Erikson, D. M. (2018). Environmental Education professional development for teachers. *Journal of Environmental Education.* https://www.doi.org/ 10.1080/00958964

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1–4. https://www.doi.org/10.11648/j.ajtas.20160501.11

Evans, C., Abrams, E., Reitsma, R., Roux, K., Salmonsen, L., & Marra, P. P. (2005). The neighborhood Nestwatch program: Participant outcomes of a citizen science ecological research project. *Conservation Biology, 19*, 589–594.

Fauville, G., Lantz-Andersson, A., & Säljö, R. (2014). ICT tools in environmental education: Reviewing two newcomers to schools. *Environmental Education Research*, *20*(2), 248–283.

Ferrance, E. (2000). *Themes in education action research.* Northeast and Islands Regional Educational Laboratory at Brown University.

Fien, J. (1993). Education for the environment: Critical curriculum, theorizing and Environmental Education. *South African Journal of Environmental Education, 13*, 7–20.

Flogaitis, E., & Agelidou, E. (2003). Kindergarten teachers' conceptions about nature and the environment. *Environmental Education Research, 9*(4), 461–478.

Gardner, H. (2006). *The development and education of the mind: The selected works of Howard Gardner*. Routledge.

Genc, M. (2015). The project-based learning approach in Environmental Education. *International Research in Geographical and Environmental Education*, *24*(2), 105–117.

Given, L. M. (2008). *The Sage encyclopedia of qualitative research methods*. Sage. https://www.doi.org/10.4135/9781412963909

Gordon, A. (2009). Restructuring teacher education. *Issues in Education Policy, 6*. CEPD.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research*, *2* (pp.

105–117). Sage. https://eclass.uoa.gr/modules/document/file.php/PPP356/Guba%20%26%20Lincoln%201994.pdf

Gultig, J., Hoadley, U., & Jansen, J. (Eds). (2002). *Curriculum: From plants to practices*. Saide & Oxford University Press.

Harmse, T. (2008). Sustainable energy. *Discourse, 36*(1), 28–34.

Hebe, H. N. (2009). *An evaluation of the environmental literacy of educators: A case study* [Unpublished MEd dissertation]. University of South Africa, Pretoria.

Hewitt, P. (1997). Games in instruction leading to environmentally responsible behavior. *Journal of Environmental Education, 28*(3), 35–37.

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277–1288.

Hugo, W., Jack, M., Wedekind, V., & Wilson, D. (2010). *The state of education in KwaZulu-Natal: A report to the provincial treasury*. KZN Provincial Treasury.

International Development Research Centre (IDRC) (1997). *Assessment tools*. https://www.idrc.ca/en

International Union for the Conservation of Nature (IUCN) (1971). *Environmental conservation education around population of rural and woodland areas.* Papers and proceedings of 11th technical meetings, New Delhi, 1969. IUCN.

International Union for the Conservation of Nature, United Nations Environmental Programme, World-wide Fund for Nature, and United Nations Educational, Scientific and Cultural Organization (IUCN/UNEP/WWF/Unesco) (1991). *Caring for the earth: A strategy for sustainability.* IUCN.

Irwin, P., & Lotz-Sisitka, H. (2005). A history of Environmental Education in South Africa. In C. P. Loubser (Ed.), *Environmental Education: Some South African perspectives* (2nd ed.) (pp. 35–56). Van Schaik.

Jacobs, M., Gawe, N., & Vakalisa, N. C. G. (2000). *Teaching–learning dynamics: A participation approach for OBE* (2nd ed.). Heinemann.

Jarvis, S., & Barberena, L. (2008). Focus group. In P. J. Lavrakas (Ed.), *Encyclopedia of Survey Research Methods* (pp. 287–290). Sage.

Jensen, B. B. (1995). *Concepts and models in a democratic health education: Research in environmental health education*. Royal Danish School of Educational Studies.

Johnson, B., & Christensen, L. (2008). *Educational research: Quantitative, qualitative and mixed approaches*. Sage.

Kanyimba, A. T. (2009). *The incorporation of Environmental Education for sustainability in Namibian colleges of education* [Doctoral dissertation]. University of South Africa, Pretoria.

Kassas, M. (2002). Environmental Education: Biodiversity. *Environmentalist*, *22*(4), 345–351.

Kate, R. W., Parries, T. M., & Leiserowitz, A. A. (2005). Issue of environment. *Science and Policy for Sustainable Development, 47*(3), 8–21.

Keiner, M. (2004). Sustainable development and urban management in developing countries: The case of Africa. In M. Koll-Schretzenmayr, M. Keiner & G. Nussbaumer (Eds.), *The real and virtual worlds of spatial planning* (pp. 43–59). Springer.

Ketlhoilwe, M. J. (2003). Environmental Education policy implementation in Botswana: The role of secondary education officers and school heads. *Southern African Journal of Environmental Education, 20*, 75–83.

Khumalo, Z. (2016). Tracing the origins of Vosloorus on its 54th anniversary, *Khathorus Mail*, 3 October, p. 9.

Killen, R. (2007). *Teaching strategies for Outcomes-based Education*. Juta & Co.

Kimaryo, L. (2011). *Integrating Environmental Education in primary school education in Tanzania: Teachers' perceptions and teaching practices*. https://www.doria.fi/bitstream/handle/10024/67481/kimaryo_lydia.pdf?

Ko, A. C. C., & Lee, J. C. K. (2003). Teachers' perceptions of teaching environmental issues within the Science curriculum: A Hong Kong perspective. *Journal of Science Education and Technology*, *12*(3), 187–204.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* Prentice-Hall.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239–260.

Latham, B. (2007). Sampling: What is it? Quantitative research methods. *International Journal of Technology Enhancements and Emerging Engineering Research*, *3*(5), 44–55.

Laurie, R., Nonoyama-Tarumi, Y., McKeown, R., & Hopkins, C. (2016). Contributions of Education for Sustainable Development (ESD) to quality education: A

synthesis of research. *Journal of Education for Sustainable Development, 10*(2), 226–242.

Lavrakas, P. J. (2008). *Encyclopedia of survey research methods*. Sage.

Lee, J. C. K., & Williams, M. (2001). Researching Environmental Education in the school curriculum: An introduction for students and teacher researchers. *International Research in Geographical and Environmental Education, 10*, 218–244.

le Grange, L. (2011). Sustainability and higher education: From arborescent to rhizomatic thinking. *Educational Philosophy and Theory*, *43*(7), 742–754.

le Grange, L. (2013). The politics of needs and sustainability education in South Africa. In R. Stevenson, M. Brody, J. Dillon, & A. E. J. Wals (Eds.), *International handbook of research on Environmental Education* (pp. 126–132). Taylor & Francis.

Lemmer, E. M., & van Wyk, J. N. (Eds.). (2010). *Themes in South African education for the comparative educationist*. Pearson.

le Roux, C. S. (2011). History of education research. In J. J. Booyse, C. S. le Roux, J. Seroto, & C. C. Wolhuter (Eds.), *A search for meaning* (pp. 17–36). Van Schaik.

Lesotho Environmental Education Support Project (Leesp) (2004). *Reference note for Environmental Education in Lesotho*. National Curriculum Development Centre (NCDC).

Loh, J. (2013). Inquiry into issues of trustworthiness and quality in narrative studies: A perspective. *Qualitative Report, 18*(65), 1–15.

Lotz-Sisitka, H. (2004). *Positioning southern African Environmental Education in a changing context*. Share-net.

Loubser, C. P. (2008). *Whole school development through Environmental Education* [Study guide]. University of South Africa, Pretoria.

Maama, M. (2016). Dustbins to curb illegal dumping. *Khathorus Mail*, 15 March, p. 10.

McMillan, J. H., & Schumacher, S. (2010). *Research in education: Evidence-based inquiry.* My Education Lab Series. *Pearson*.

McMillan, J. H., & Schumacher, S. (2014). *Research in education: Evidence-based inquiry* (7th international edition). Pearson.

Madikizela-Madiya, N. (2012). Looking back to see forward: A review of postgraduate Environmental Education research from a decade before the DESD. *BOB,* 71–86.

Madiya, N. (2009). *A critical review of postgraduate Environmental Education research from selected South African universities, 1995–2004* [Unpublished Master's dissertation]. University of KwaZulu-Natal, South Africa.

Makhoba, A. J. (2009). *Implementation of Environmental Education in senior phase: A survey of cluster schools* [Unpublished Master's dissertation]. University of South Africa, Pretoria.

Mapotse, T. A. (2012). *The teaching practice of senior phase Technology Education teachers in selected schools of Limpopo province: An action research study* [Unpublished doctoral thesis]. University of South Africa, Pretoria.

McCarty, J., Ford, V., & Ludes, J. (2018). Growing experiential learning for the future: Real school gardens. *Childhood Education, 94*(2), 47–55.

McKeown, R., & Hopkins, C. (2005). EE and ESD: Two paradigms, one crucial goal. *Applied Environmental Education and Communication, 4*, 221–224.

Meichtry, Y., & Smith, J. (2007). The impact of a place-based professional development program on teachers' confidence, attitudes, and classroom practices. *Journal of Environmental Education, 38*(2), 15–31.

Merriam, S. B. (2001). Case studies as qualitative research. *Qualitative Research in Higher Education: Expanding Perspectives, 2*, 191–201.

Mertler, C. A. (2016). *Action research: Improving schools and empowering educators*. Sage.

Mind.org. (2007). *Ecotherapy: The green agenda for mental health*. http://www.mind. org.uk/assets/0000/2138/ecotheraphyreport.pdf

Mohammed, I. I. S. (2016). *The implementation of Environmental Education at Muslim schools in Gauteng: A case study* [Unpublished doctoral thesis]. University of South Africa, Pretoria.

Monyai, R. B. (2006). Teaching strategies. In M. M. Nieman, & R. B. Monyai (Eds.), *The educator as mediator of learning* (pp. 104–135). IIE.

Msezane, S. B. (2014). *An exploration of the impact of Environmental Education innovation on students in sustaining land resources: A case of Mkhondo village* [Unpublished Master's dissertation]. University of South Africa, Pretoria.

Mudaly, R., & Ismail, R. (2016). Professional development in Environmental and Sustainability Education: Voices, practices and reflections of Science teachers. *Southern African Journal of Environmental Education, 32*, 66–86.

North Central Regional Educational Laboratory (NCREL) (2006). *Select or design assessments that elicit establishment outcomes*. http://www.ncrel.org

Obol, C., Allen, I., & Bach, H. S. (2003). Environmental Education policy processes in the southern African region. *Southern African Journal of Environmental Education, 20*, 22–38.

O'Donoghue, R. (1993). Clarifying Environmental Education: A search for clear action in southern Africa. *Southern African Journal of Environmental Education, 13*, 28–38.

*O'Donoghue, R., & Russo, V. (2004). Emerging patterns of abstraction in Environmental Education: A review of materials, methods and professional development perspectives. *Environmental Education Research*, *10*(3), 331–351.

O'Donoghue, R. B., & Janse van Rensburg, E. (1995). *Environmental methods*. Share-net.

Palmberg, I. E., & Kuru, J. (2000). Outdoor activities as a basis for environmental responsibility. *Journal of Environmental Education, 31*(4), 32–36.

Palmer, J. (2002). *Environmental Education in the 21st century: Theory, practice, progress and promise*. Routledge.

Parker, A., & Tritter, J. (2006). Focus group method and methodology: Current practice and recent debate. *International Journal of Research and Method in Education, 29*, 23–37. https://www.doi.org/10.1080/01406720500537304

Paul, G., & Volk, T. L. (2002). Ten years of teacher workshops in an environmental problem-solving model: Teacher implementation and perceptions. *Journal of Environmental Education*, *33*(3), 10–20.

Pretorius, S. G. F. (2010). Themes in South African education for the comparative educationist. In E. M. Lemmer, & J. N. van Wyk (Eds.), *The South African education system* (pp. 117–138). Pearson.

Pretty, J., Angus, C., Bain, M., Barton, J., Gladwell, V., Hine, R., & Sellens, M. (2009). *Nature, childhood, health and life pathways.* Interdisciplinary Centre for Environment and Society Occasional Paper, 2. University of Essex.

Pulkkinen, K. (2006). Teacher thinking and practice in Environmental Education. In S. Tani (Ed.), *Sustainable development through education* (pp. 143–154). Proceedings of the International Conference on Environmental Education, Helsinki, 14 June.

Quezada, R. L. (2014). Family, school and community partnerships: Working with culturally diverse families. *Multicultural Education, 21*(3/4).

Ramsaroop, S., & van Rooyen, H. (2013). Exploring educator competence in teaching Environmental Education in schools in Gauteng. *Africa Education Review, 10*(3), 595–613.

Republic of South Africa (RSA) (1996a). *Constitution of the Republic of South Africa, Act 108 of 1996.* Government Printers.

Republic of South Africa (1996b). *National Education Policy Act, 27 of 1996.* Government Printer.

Republic of South Africa (2007). The Higher Education Qualifications Framework. *Government Gazette no. 30353.* Government Printer.

Rijsberman, F. R. (2006). Water scarcity: Fact or fiction? *Agricultural Water Management, 80*(1–3), 5–22.

Robitaille, J., Dupré, F., & Lafleur, M. (2013). *Towards a national strategy on education, awareness and training related to the environment and sustainability.* http://www.ec.gc.ca/education/ee-ere-.html

Rosenberg, E. (2009). *Teacher education workbook for Environment and Sustainability Education.* Rhodes University Environmental Education and Sustainability Unit, distributed through Share-net.

Sachs, W. (Ed.). (2002). *The Joburg Memo: Fairness in fragile world* [Memorandum for the Summit on Sustainable Development]. Heinrich Boll Foundation.

Salim, E. (2002). *The journey of hope: From Rio to Johannesburg – words into action*. For the UN World Summit on Sustainable Development, Johannesburg, 26 August – 4 September. International Institute for Environment and Development (IIED).

Salkind, N. J. (2010). *Encyclopedia of research design*. Sage. https://www.doi.org/10.4135/9781412961288

Sauvé, L. (1996). Environmental Education and sustainable development: A further appraisal. *Canadian Journal of Environmental Education, 1*, 7–34.

Scales, P. (2013). *An introduction to ontology and epistemology for undergraduate*

students. https://www.peter.scales.org.uk

Schnack, K. (1994). Some further comments on the action competence debate. In B. Jensen, & K. Schnack (Eds.), *Action and action competence as key concepts in critical pedagogy* (pp. 185–190). Royal Danish School of Educational Studies.

Schudel, I., Roux, C. L., Lotz-Sisitka, H., Loubser, C., O'Donoghue, R., & Shallcross, T. (2008). Contextualising learning in Advanced Certificate in Education (Environmental Education) courses: Synthesising contexts and experiences. *South African Journal of Education, 28*(4), 543–559.

Schulze, S. (2014). Environmental Education. In C. P. Loubser (Ed.), *Environmental Education and Education for Sustainability: Some South African perspectives*. Van Schaik.

Scotland, J. (2012). Exploring the philosophical underpinning of research: Relating ontology and epistemology to the methodologies and methods of the scientific, interpretative, and critical research paradigm. *English Language Teaching, 5*(9), 9–16. https://www.doi.org/10.5539/elt.v5n9p9

Share-net (1999). Pollution. *Envirofacts, 11*. [No further information available.]

Shava, S. (2000). *The use of indigenous plants as food by a rural community in the Eastern Cape: An educational exploration* [Unpublished doctoral thesis]. Rhodes University, Grahamstown.

Simon, M. K., & Goes, J. (2013). *Scope, limitations, and delimitations, and scope of study.* https://www.ders.es/limitationscopedelimitation1.pdf

Simovska, V. (2000). Exploring student participation within Health Education and health-promoting schools. In B. B. Jensen, K. Schnack, & V. Simovska (Eds.), *Critical Environmental and Health Education: Research issues and challenges* (pp. 29–45). Research Centre for Environmental and Health Education, the Danish University of Education.

Strauss, V. (2013). Howard Gardner: "Multiple intelligences" are not "learning styles". *Washington Post*, p. 16. https://www.washingtonpost.com/news/answer-sheet/wp/2013/10/16/howard-gardner-multiple-intelligences-are-not-learning-styles/

Taylor, N., Littledyke, M., Eames, C., & Coll, R. K. (Eds). (2009). *Environmental education in context*. Sense.

Tbilisi+35 (2012). *Educate today for a sustainable future* [Communiqué]. Tbilisi, September. http://www.aaee.org.au/wp-content/uploads2/2009/07/Tbilisi-Communique.pdf

Tilbury, D. (1995). Environmental education for sustainability: Defining the new focus of Environmental Education in the 1990s. *Environmental Education Research*, *1*(2), 195–212.

Tilbury, D. (2003). The world summit, sustainable development and Environmental Education. *Australian Journal of Environmental Education, 19*, 109–113. http://www.jstor.org/stable/44656369

Transportation Research Board (2009). *National Cooperation Highway Research Program*. Library of Congress.

United Nations Conference on Environment and Development (UNCED) (1992). *Agenda 21* [chapter 36, para 3]. http://www.un-documents.net/a21-36.htm

United Nations Educational, Scientific and Cultural Organization (Unesco) (1978). *Tbilisi Declaration* [Final report of the Intergovernmental Conference on Environmental Education]. Tbilisi (USSR), 11–26 October 1977.

United Nations Educational, Scientific and Cultural Organization (2005). *Promoting a global partnership for the UN Decade of Education for Sustainable Development (2005–2014)*. http://portal.unesco.org/education/en/ev.php-ml

United Republic of Tanzania (URT) (2004). *National Environmental Education and communication (2005–2009)*. URT.

Uzzell, D. (1999). Education for environmental action in the community: New roles and relationships. *Cambridge Journal of Education, 29*(3), 397–413.

van Petegem, P., Blieck, A., & van Ongevalle, J. (2007). Conceptions and awareness concerning Environmental Education: A Zimbabwean case study in three secondary teacher education colleges. *Environmental Education Research, 13*(3), 287–306.

Villegas-Reimers, E. (2003). *Teacher professional development: An international review of the literature*. International Institute for Educational Planning (IIEP).

Wals, A., & Jickling, B. (2002). “Sustainability” in higher education: From doublethink and newspeak to critical thinking and meaningful learning. *Higher Education Policy*, *15*, 121–131.

West, P. (2002). 21st-century professional development: The job-embedded, continual learning model. *American Secondary Education, 30*(2), 72–86.

Westover, J. A. (2001). *Integrating Environmental Education into the curriculum through environmental community service learning* [Unpublished dissertation]. California State University, California.

Wheeler, K. (1985). International Environmental Education: A historical perspective. *Environmental Education and Information*, *4*(2), 144–160.

Whitaker, S. D. (2000). Mentoring beginning special education teachers and the relationship to attrition. *Exceptional Children, 66*(4), 546–566. https://www.doi.org/10.1177/0014402900066600407

Willis, K. (2011). *Theories and practice of development* (2nd ed.). Routledge.

Winther, A. (2005). Research related to staff development in Environmental Education. In B. Simmons (Ed.), *Preparing effective environmental educators* (pp. 59–72). North American Association for Environmental Education.

Woodhouse, J., & Knapp, C. (2000). Place-based curriculum and instruction: Outdoor and Environmental Education. *ERIC Digests*. http://www.ericdigests.org/2001-3/place.htm

Woolfolk, A. (2014). *Educational psychology* (12th ed.) (Unisa custom edition). Pearson.

World Commission on Environment and Development (WCED) (1987). *Our common future.* [The Brundtland Report]. Oxford University Press.

World Health Organization (WHO) (2009). *World health statistics, 2009*. WHO.

Yeshalem, A. D. (2013). Environmental Education about, in and for the environment: The case of two secondary schools in Ethiopia [Unpublished Master's dissertation]. University of Oslo, Norway.

Zhang, Y., & Wildemuth, B. M. (2009). Qualitative analysis of content. In B. M. Wildemuth (Ed.), *Applications of social research methods to questions in Information and Library Science* (pp. 1–12). Libraries Unlimited.

APPENDICES
APPENDIX A: ETHICAL CLEARANCE CERTIFICATE

UNISA university of south africa

UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2019/07/24

Ref: **2019/07/24/54789613/06/MC**
Name: Mr N Tsotetsi
Student No.: 54789613

Dear Mr Tsotetsi

Decision: Ethics Approval from 2019/07/24to 2022/07/24

Researcher(s): Name: Mr N Tsotetsi
E-mail address: 54789613@mylife.unisa.ac.za
Telephone: +27 82 268 6700

Supervisor(s): Name: Mr SB Msezane
E-mail address: msezasb@unisa.ac.za
Telephone: +27 12 484 2888

Title of research:

Assessing the implementation of environmental education in selected Vosloorus township primary schools

Qualification: M. Ed in Science and Technology Education

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2019/07/24to 2022/07/24.

*The **medium risk** application was reviewed by the Ethics Review Committee on 2019/07/24 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.

Open Rubric

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

APPENDIX B:
GDE RESEARCH APPROVAL LETTER

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	**06 July 2019**
Validity of Research Approval:	**04 February 2019 – 30 September 2019** **2019/184**
Name of Researcher:	**Tsotetsi N**
Address of Researcher:	**10018 Makeneng Crescent**
	Tokoza Extension 5
	1426
Telephone Number:	**082 268 6700**
Email address:	**tsotetsi.neo471@gmail.com**
Research Topic:	**Assessing the implementation of environmental education in selected Vosloorus township primary school.**
Type of qualification	**M.ED Environmental Education**
Number and type of schools:	**Three Primary Schools**
District/s/HO	**Ekurhuleni South**

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

07/08/2019

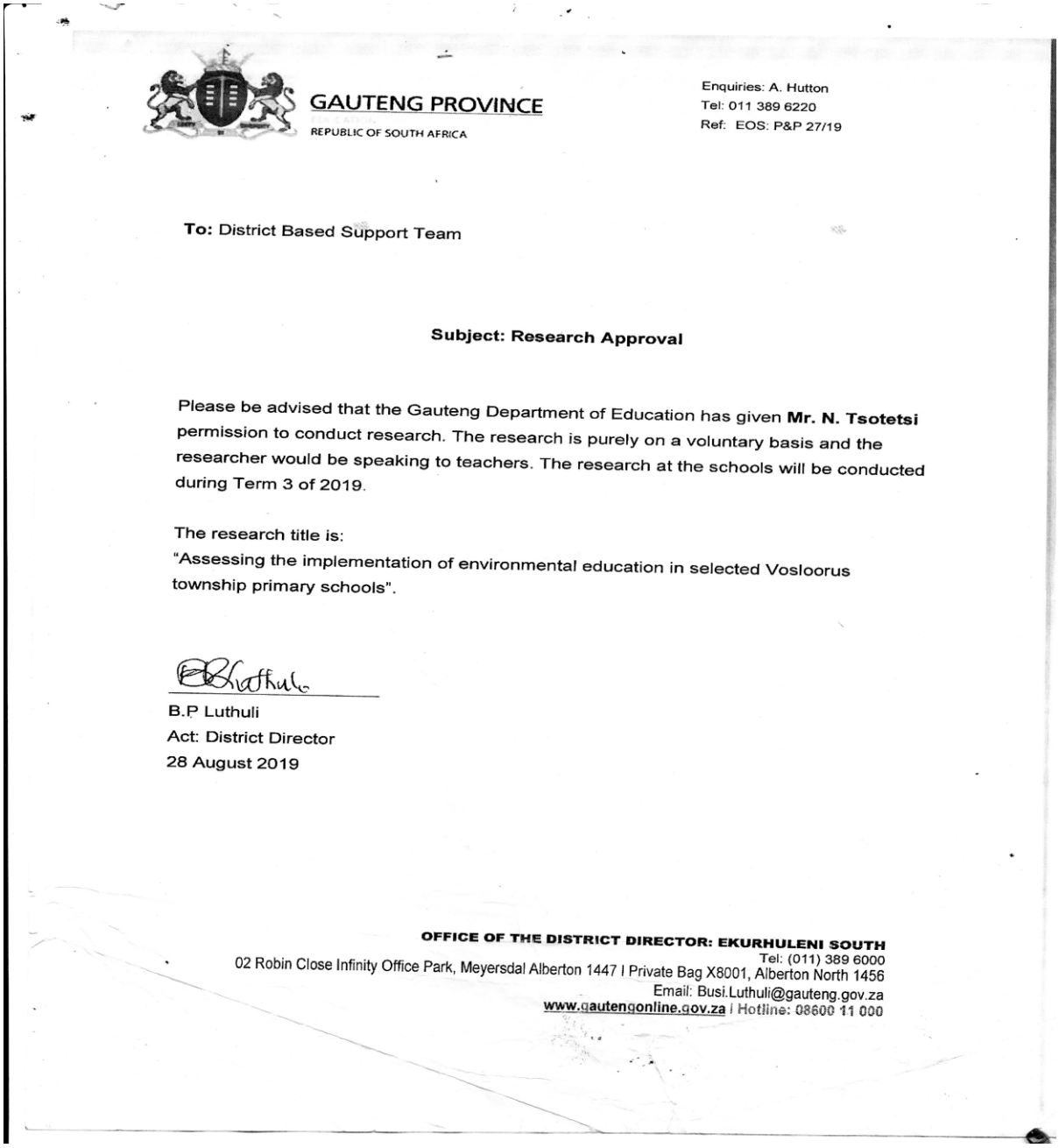
The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

1

Making education a societal priority

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

APPENDIX C:
DISTRICT RESEARCH APPROVAL LETTER



GAUTENG PROVINCE
REPUBLIC OF SOUTH AFRICA

Enquiries: A. Hutton
Tel: 011 389 6220
Ref: EOS: P&P 27/19

To: District Based Support Team

Subject: Research Approval

Please be advised that the Gauteng Department of Education has given **Mr. N. Tsotetsi** permission to conduct research. The research is purely on a voluntary basis and the researcher would be speaking to teachers. The research at the schools will be conducted during Term 3 of 2019.

The research title is:
"Assessing the implementation of environmental education in selected Vosloorus township primary schools".

B.P Luthuli
Act: District Director
28 August 2019

OFFICE OF THE DISTRICT DIRECTOR: EKURHULENI SOUTH
Tel: (011) 389 6000
02 Robin Close Infinity Office Park, Meyersdal Alberton 1447 I Private Bag X8001, Alberton North 1456
Email: Busi.Luthuli@gauteng.gov.za
www.gautengonline.gov.za I Hotline: 08600 11 000

APPENDIX: D

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN THE PROVINCE OF GAUTENG PRIMARY SCHOOLS (ABINALA PRIMARY SCHOOL, KAYELIHLE PRIMARY SCHOOL AND NAGENG PRIMARY SCHOOL)

The study is entitled, "Assessing the implementation of environmental education in selected Vosloorus township schools"

Date 25/07/2019

To: GAUTENG DEPARTMENT OF EDUCATION

Tel: (011) 3550488

My name is Neo Tsotetsi. I am currently enrolled for MEd at the University of South Africa. My supervisor for the study is Mr. Msezane Sikhulile B., a lecturer in the Department of ABET and Youth Development. We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township primary schools". We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township schools".

The purpose of the study is to assess the implementation of environmental education in selected Vosloorus township schools because it is assumed that implementation of environmental education in schools has an impact in environmental problems that are visible in township areas. The aim of the study is to find out, competency of teachers from Vosloorus schools in implementing environmental education. Your department has been selected because it has a huge role in ensuring that teachers, learners and parents work cohesively to ensure that they do not live in an environment that is characterised by littering, water pollution, inadequate sanitation, and deforestation and participating in activities which are associated with air pollution. In this study three teachers from the above-mentioned schools that are sampled, are going to be interviewed whereas 24 learners from grade seven are going to participate in a focus group interviews. I will also observe how the teachers deliver the content,

which is aligned to environmental education and how learners are behaving towards their environment during process of teaching and learning. Teachers and Learners attitudes and behaviour towards the environment will be observed outside the classroom.

Findings that will emerge will lead to recommendations that will enable the schools to know their strengths and weaknesses with regard to the implementation of environmental education. The weaknesses deriving from the recommendation will encourage the teachers, parents and learners to act responsible towards their environment by not destroying the environment through cutting trees, burning of fossil fuels and polluting the water. The study will also assist curriculum developers in coming up with suitable methods that can used by teachers in integrating environmental education effectively in a school curriculum.

The study is not subjected to any kind of risk. Participation of the participants is voluntary therefore, participants are not entitled to receive any incentives or reimbursement. The findings of the study or the results of the study will be communicated through a follow up telephonic calls and the results will be send to the school address or school email address.

If you need any clarifications in connection to your decision to participate in this study, please do not hesitate to contact me through this numbers +27 822686700 or my email address tsotetsi.neo471@gmail.com . If you want to any information pertaining this study you are highly welcomed to contact my supervisor on this numbers +27 12 481 2888 or you may communicate to him through the following email address msezanesb@unisa.ac.za at University of South Africa (UNISA).

Yours sincerely

Neo Tsotetsi (Researcher)

APPENDIX E:

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN THE PROVINCE OF GAUTENG PRIMARY SCHOOLS (ABINALA PRIMARY SCHOOL, KAYELIHLE PRIMARY SCHOOL AND NAGENG PRIMARY SCHOOL)

The study is entitled, "Assessing the implementation of environmental education in selected Vosloorus township schools"

Date16/08/2019
To: Mrs B.P Luthuli (Ekurhuleni South District Manager)
Tel: (011) 389- 6000

Dear Mrs. B. Luthuli

My name is Neo Tsotetsi. I am currently enrolled for M Ed at the University of South Africa. My supervisor for the study is Mr. Msezane Sikhulile B., a lecturer in the Department of ABET and Youth Development. We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township schools". We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township schools"

The purpose of the study is to assess the implementation of environmental education in selected Vosloorus township schools because it is assumed that implementation of environmental education in schools has an impact in environmental problems that are visible in township areas. The aim of the study is to find out, competency of teachers from Vosloorus schools in implementing environmental education. Your department has been selected because it has a huge role in ensuring that teachers, learners and parents work cohesively to ensure that they do not live in an environment that is characterised by littering, water pollution, inadequate sanitation, and deforestation and participating in activities which are associated with air pollution. In this study three teachers from the above-mentioned schools that are

sampled, are going to be interviewed whereas 24 learners from grade seven are going to participate in a focus group interviews. I will also observe how the teachers deliver the content, which is aligned to environmental education and how learners are behaving towards their environment during process of teaching and learning. Teachers and Learners attitudes and behavior towards the environment will be observed outside the classroom. Findings that will emerge will lead to recommendations that will enable the schools to know their strengths and weaknesses with regard to the implementation of environmental education. The weaknesses deriving from the recommendation will encourage the teachers, parents and learners to act responsible towards their environment by not destroying the environment through cutting trees, burning of fossil fuels and polluting the water. The study will also assist curriculum developers in coming up with suitable methods that can used by teachers in integrating environmental education effectively in a school curriculum. The study is not subjected to any kind of risk. Participation of the participants is voluntary therefore, participants are not entitled to receive any incentives or reimbursement. The findings of the study or the results of the study will be communicated through a follow up telephonic calls and the results will be send to the school address or school email address.

If you need any clarifications in connection to your decision to participate in this study, please do not hesitate to contact me through this numbers +27 822686700 or my email address tsotetsi.neo471@gmail.com . If you want to any information pertaining this study you are highly welcomed to contact my supervisor on this numbers +27 12 481 2888 or you may communicate to him through the following email address msezanesb@unisa.ac.za at University of South Africa (UNISA).

Yours sincerely

Neo Tsotetsi (Researcher)

APPENDIX F

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT NAGENG PRIMARY SCHOOL

The study is entitled, "assessing the implementation of environmental education in selected Vosloorus township schools"

Date_____
To: Mr. P.E Mnobe (The Principal)
School: Nageng Primary School
Tel: (011) 906 6891 email address nagengprimary@webmail.co.za

Dear Mr. Mnobe

My name is Neo Tsotetsi. I am currently enrolled for M Ed at the University of South Africa. My supervisor for the study is Mr. Msezane Sikhulile B., a lecturer in the Department of ABET and Youth Development. We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township schools". We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township schools"

The purpose of the study is to assess the implementation of environmental education in selected Vosloorus schools because It is assumed that implementation of environmental education has an impact in environmental problems that are visible township areas. The aim of the study is to find out, competency of teachers from Vosloorus schools in implementing environmental education. Your school has been selected because it has a huge role in ensuring that teachers, learners and parents work cohesively to ensure that they do not live in an environment that is characterised by littering, water pollution, inadequate sanitation, and deforestation and participating in activities which are associated with air pollution. In this study three teachers from the above-mentioned schools that are sampled, are going to be interviewed whereas 24 learners from grade seven are going to participate in a focus

group interviews. I will also observe how the teachers deliver the content, which is aligned to environmental education and how learners are behaving towards their environment during process of teaching and learning. Teachers and Learners attitudes and behavior towards the environment will be observed outside the classroom.

Findings that will emerge will lead to recommendations that will enable the schools to know their strengths and weaknesses with regard to the implementation of environmental education. The weaknesses deriving from the recommendation will encourage the teachers, parents and learners to act responsible towards their environment by not destroying the environment through cutting trees, burning of fossil fuels and polluting the water. The study will also assist curriculum developers in coming up with suitable methods that can used by teachers in integrating environmental education effectively in a school curriculum.

The study is not subjected to any kind of risk. Participation of the participants is voluntary therefore, participants are not entitled to receive any incentives or reimbursement. The findings of the study or the results of the study will be communicated through a follow up telephonic calls and the results will be send to the school address or school email address.

If you need any clarifications in connection to your decision to participate in this study, please do not hesitate to contact me through this numbers +27 822686700 or my email address tsotetsi.neo471@gmail.com . If you want to any information pertaining this study you are highly welcomed to contact my supervisor on this numbers +27 12 481 2888 or you may communicate to him through the following email address msezanesb@unisa.ac.za at University of South Africa (UNISA).

Yours sincerely

Neo Tsotetsi (Researcher)

APPENDIX G

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT ABINALA PRIMARY SCHOOL

Date_____

To: Mr. R.N Sibuyi (The Principal)

School: Abinala Primary School

Tel: (011) 863 1819 Email address abinalaprimary 1@gmail.com

The study is entitled, "Assessing the implementation of environmental education in selected Vosloorus township schools"

Dear Mr. Sibuyi

My name is Neo Tsotetsi. I am currently enrolled for M Ed at the University of South Africa. My supervisor for the study is Mr. Msezane Sikhulile B., a lecturer in the Department of ABET and Youth Development. We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township primary schools". We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township schools"

The purpose of the study is to assess the implementation of environmental education in selected Vosloorus township schools because it is assumed that implementation of environmental education in schools has an impact in environmental problems that are visible in township areas. The aim of the study is to find out, competency of teachers from Vosloorus schools in implementing environmental education. Your department has been selected because it has a huge role in ensuring that teachers, learners and parents work cohesively to ensure that they do not live in an environment that is characterised by littering, water pollution, inadequate sanitation, and deforestation and participating in activities which are associated with air pollution. In this study three teachers from the above-mentioned schools that are sampled, are going to be interviewed whereas 24 learners from grade seven are

going to participate in a focus group interviews. I will also observe how the teachers deliver the content, which is aligned to environmental education and how learners are behaving towards their environment during process of teaching and learning. Teachers and Learners attitudes and behavior towards the environment will be observed outside the classroom.

Findings that will emerge will lead to recommendations that will enable the schools to know their strengths and weaknesses with regard to the implementation of environmental education. The weaknesses deriving from the recommendation will encourage the teachers, parents and learners to act responsible towards their environment by not destroying the environment through cutting trees, burning of fossil fuels and polluting the water. The study will also assist curriculum developers in coming up with suitable methods that can used by teachers in integrating environmental education effectively in a school curriculum.

The study is not subjected to any kind of risk. Participation of the participants is voluntary therefore, participants are not entitled to receive any incentives or reimbursement. The findings of the study or the results of the study will be communicated through a follow up telephonic calls and the results will be send to the school address or school email address.

If you need any clarifications in connection to your decision to participate in this study, please do not hesitate to contact me through this numbers +27 822686700 or my email address tsotetsi.neo471@gmail.com . If you want to any information pertaining this study you are highly welcomed to contact my supervisor on this numbers +27 12 481 2888 or you may communicate to him through the following email address msezanesb@unisa.ac.za at University of South Africa (UNISA).

Yours sincerely

Neo Tsotetsi (Researcher)

APPENDIX H:

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT KUTLOANONG PRIMARY SCHOOL

Date_____
To: Mr Twala (The Principal)
School: Kutloanong Primary School
Tel: (011) 9063301- or email address:

The study is entitled, "Assessing the implementation of environmental education in selected Vosloorus township schools"

My name is Neo Tsotetsi. I am currently enrolled for M Ed at the University of South Africa. My supervisor for the study is Mr. Msezane Sikhulile B., a lecturer in the Department of ABET and Youth Development. We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township schools". We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township schools"

The purpose of the study is to assess the implementation of environmental education in selected Vosloorus township schools because it is assumed that implementation of environmental education in schools has an impact in environmental problems that are visible in township areas. The aim of the study is to find out, competency of teachers from Vosloorus schools in implementing environmental education. Your department has been selected because it has a huge role in ensuring that teachers, learners and parents work cohesively to ensure that they do not live in an environment that is characterised by littering, water pollution, inadequate sanitation, and deforestation and participating in activities which are associated with air pollution. In this study three teachers from the above-mentioned schools that are sampled, are going to be interviewed whereas 24 learners from grade seven are going to participate in a focus group interviews. I will also observe how the teachers deliver the content, which is aligned to environmental education and how learners

are behaving towards their environment during process of teaching and learning. Teachers and Learners attitudes and behavior towards the environment will be observed outside the classroom.

Findings that will emerge will lead to recommendations that will enable the schools to know their strengths and weaknesses with regard to the implementation of environmental education. The weaknesses deriving from the recommendation will encourage the teachers, parents and learners to act responsible towards their environment by not destroying the environment through cutting trees, burning of fossil fuels and polluting the water. The study will also assist curriculum developers in coming up with suitable methods that can used by teachers in integrating environmental education effectively in a school curriculum.

The study is not subjected to any kind of risk. Participation of the participants is voluntary therefore, participants are not entitled to receive any incentives or reimbursement. The findings of the study or the results of the study will be communicated through a follow up telephonic calls and the results will be send to the school address or school email address.

If you need any clarifications in connection to your decision to participate in this study, please do not hesitate to contact me through this numbers +27 822686700 or my email address tsotetsi.neo471@gmail.com . If you want to any information pertaining this study you are highly welcomed to contact my supervisor on this numbers +27 12 481 2888 or you may communicate to him through the following email address msezanesb@unisa.ac.za at University of South Africa (UNISA).

Yours sincerely

Neo Tsotetsi (Researcher)

APPENDIX I:

A LETTER REQUESTING CONSENT OF TEACHERS TO PARTICIPATE IN SEMI-STRUCTURED INTERVIEWS

Dear prospective participant

My name is Neo Tsotetsi. I am currently enrolled for M Ed at the University of South Africa. My supervisor for the study is Mr. Msezane Sikhulile B., a lecturer in the Department of ABET and Youth Development. We are inviting you to participate in a study entitled “Assessing the implementation of environmental education in selected Vosloorus township schools”.

This study is expected to collect important information that could contribute to how teachers can effectively implement environmental education in schools. Three participants for semi structured interviews are selected for this study, you are one of the participants who are selected to be interviewed. I invited you because of your abilities and experience in teaching the content that is aligned to environmental education. I obtained your contact details from your school principal. The study will assess the implementation of environmental education in selected Vosloorus township schools and the study will strive to come up with the solutions to the environmental problems that are visible in Vosloorus township. Thus, I would like to hear your own views and opinions through participating in a semi –structured interviews. You will benefit from the study as you will learn about how environmental education can be implemented in schools.

The duration of the interview will be approximately one and half hours and the will be agreement between the researcher and the participants based on the date of the interview, place where the interview will take place and the time that the interviews will commence. Your participation in this study is voluntary, you may withdraw from this study at any time. During the process of the interview I will use an audio recorder to record data upon the agreement between the researcher and the participant and I

will ensure that your name will remain anonymous by using pseudonyms unless you give me a permission to disclose your name.

If you need clarification in connection to your decision to participate in the interview, please, do not hesitate to contact me through this number numbers +27 822686700 or my email address tsotetsi.neo471@gmail.com . If you want to any information pertaining this study you are highly welcomed to contact my supervisor on this numbers +27 12 481 2888 or you may communicate to him through the following email address msezanesb@unisa.ac.za at University of South Africa (UNISA).

Thank you for taking your precious time to read this information sheet and your participation in this study will be highly appreciated.

Thank you.

Yours sincerely

Neo Tsotetsi (Researcher)

APPENDIX J

A LETTER REQUESTING CONSENT OF TEACHERS TO PARTICIPATE IN COMPLETE OBSERVER OBSERVATIONS

Dear prospective participant

My name is Neo Tsotetsi. I am currently enrolled for M Ed at the University of South Africa. My supervisor for the study is Mr. Msezane Sikhulile B., a lecturer in the Department of ABET and Youth Development. We are inviting you to participate in a study entitled “Assessing the implementation of environmental education in selected Vosloorus schools”.

This study is expected to collect important information that could contribute to how teachers can effectively implement environmental education in schools. Learners are selected from your school and you are invited because of the abilities and experience that you possess in teaching the content that is aligned to environmental education

The study will assess the implementation of environmental education in selected Vosloorus schools and the study will strive to come up with the solutions to the environmental problems that are visible in Vosloorus township. Thus, I would like to observe you while you are teaching to find out how environmental education is taught during the process of teaching and learning.

The duration of the observation will be approximately one and half hours and there will be an agreement between the researcher and the participants based on the date of the observation, time of the observation and the place where observation will take place. Your participation in this study is voluntary, you may withdraw from this study at any time. Your name will never be disclosed to anyone unless you insist your name to be disclosed. Therefore, it is my responsibility to ensure that your name does not appear on the research report or any publications. I will use pseudonyms when naming you in an aggregate form where results are going to be reported.

If you need clarification in connection to your decision to participate in the observation, please, do not hesitate to contact me through this number numbers +27 822686700 or my email address tsotetsi.neo471@gmail.com . If you want to any information pertaining this study you are highly welcomed to contact my supervisor on this numbers +27 12 481 2888 or you may communicate to him through the following email address msezanesb@unisa.ac.za at University of South Africa (UNISA).

Thank you for taking your precious time to read this information sheet and your participation in this study will be highly appreciated.

Thank you.

Yours sincerely

Neo Tsotetsi (Researcher)

APPENDIX K

A LETTER REQUESTING CONSENT OF LEARNERS TO PARTICIPATE IN FOCUS GROUP INTERVIEWS

Date: _____

Title: "Assessing the implementation of environmental education in selected Vosloorus schools".

Dear prospective participant

My name is Neo Tsotetsi. I am currently enrolled for M Ed at the University of South Africa. My supervisor for the study is Mr. Msezane Sikhulile B., a lecturer in the Department of ABET and Youth Development. We are inviting you to participate in a study entitled "Assessing the implementation of environmental education in selected Vosloorus township schools".

Twenty four participants (learners) are selected to participate in the study for the focus group interviews. You are one of the participants who are selected to be interviewed in a group. I obtained your contact details from your school principal. The study will assess the implementation of environmental education in selected Vosloorus schools and the study will strive to come up with the solutions to the environmental problems that are visible in Vosloorus township. Thus, I would like to hear your own views and opinions through participating in a focus group interviews. You will benefit from the study as you will learn about how environmental education can be implemented in schools.

The duration of the focus group interviews will be approximately one and half hours and there will be an agreement between the researcher and the participant based on the date of the interviews, time of the interviews and the place where interview will take place. Your participation in this study is voluntary, you may withdraw from this study at any time. Your name will never be disclosed to anyone unless you insist your name to be disclosed. Therefore, it is my responsibility to ensure that your name does not appear on the research report or any publications. I will use

pseudonyms when naming you in an aggregate form, where results are going to be reported.

If you need clarification in connection to your decision to participate in the focus group interviews, please, do not hesitate to contact me through this number numbers +27 822686700 or my email address tsotetsi.neo471@gmail.com . If you want to any information pertaining this study you are highly welcomed to contact my supervisor on this numbers +27 12 481 2888 or you may communicate to him through the following email address msezanesb@unisa.ac.za at University of South Africa (UNISA).

Thank you for taking your precious time to read this information sheet and your participation will be highly appreciated

Thank you.

Yours sincerely

Neo Tsotetsi (Researcher)

APPENDIX L

A LETTER REQUESTING PARENTAL CONSENT FOR MINORS TO PARTICIPATE IN A RESEARCH PROJECT

Dear Parent

Your _____child is invited to participate in a study entitled "Perceptions of Teachers and Learners towards the Integration of Environmental Education in the classroom.

I am undertaking this study as part of my master's research at the University of South Africa. The purpose of the study is to assess the implementation of environmental education in selected Vosloorus schools. The aim of the study is to finding out, competency of teachers from Vosloorus township schools in implementing environmental education. Your school has been selected because it has a huge role in ensuring that teachers, learners and parents work cohesively to ensure that they do not live in an environment that is characterised by littering, water pollution, inadequate sanitation, and deforestation and participating in activities which are associated with air pollution.

Findings that will emerge will lead to recommendations that will enable the schools to know their strengths and weaknesses with regard to the implementation of environmental education. The weaknesses deriving from the recommendation will encourage the teachers, parents and learners to act responsible towards their environment by not destroying the environment through cutting trees, burning of fossil fuels and polluting the water. The study will also assist curriculum developers in coming up with suitable methods that can used by teachers in integrating environmental education effectively in a school curriculum.

Your permission to allow your child to participate will enable me to request him/her to participate in a focus group interview. The group will comprise of 6-8 learners who will be expected to answer questions related to the implementation of environmental

education in schools to the implementation of environmental education in schools .The study will take place during the period of teaching and learning with the approval of the principal and the class teacher. During the focus group I will record data using audio recording and I humbly request you to allow me to use audio recording to record data produced by your child.

The study is not subjected to any kind of risk. Participation of the participants is voluntary therefore, participants are not entitled to receive any incentives or reimbursement. The findings of the study or the results of the study will be communicated through a follow up telephonic calls and the results will be send to the school address or school email address.

The study is not subjected to any kind of risk. Participation of the participants is voluntary therefore; participants are not entitled to receive any incentives or reimbursement. The findings of the study or the results of the study will be communicated through a follow up telephonic calls and the results will be send to the school address or school email address. Your child will benefit from the as he/she will interact with other learners by sharing views and opinions with regard to the implementation of environmental education during the process of focus group interviews. It is essential to understand that your child will not receive any incentives for participating in this study because the study is considered as voluntary participation.

Any data or information produced by your child will remain confidential and it can be disclosed through your permission. Responses from your child will never be linked to his/her name or your or schools name in any written or verbal report. Your child may decide not to participate in the study at any time. Your child unwillingness to participate in the study will never bring harm to him/her. Your decision based on allowing your child to participate in the study it can be changed anytime without any penalty against you or your child.

You child must agree to participate in the study through your permission and you and your child you will be requested to sign the assent form, which will be accompanied by this letter. However, if your child decide not to participate he/she will not receive any penalty. Data collected from your child will be stored safely for five years so that no one can have access to the information produced by your child.

Findings that will emerge will lead to recommendations that will enable the schools to know their strengths and weaknesses with regard to the implementation of

environmental education. The weaknesses deriving from the recommendation will encourage the teachers, parents and learners to act responsible towards their environment by not destroying the environment through cutting trees, burning of fossil fuels and polluting the water. The study will also assist curriculum developers in coming up with suitable methods that can used by teachers in integrating environmental education effectively in a school curriculum.

If you have questions regarding your child's participation in the study you are highly welcomed to communicate with me or my supervisor, Lecturer Mr. Msezane Sikhulile B, Department of Science and Technology, College of Education, University of South Africa contact no You may contact me in this number +27822686700 or communicate with me through this email address tsotetsi.neo471@gmail.com and you may contact my supervisor through this number+27 12 481 2888 or you may communicate to him through the following email address msezanesb@unisa.ac.za at University of South Africa (UNISA).

Your decision in allowing your child to participate in the study can be finalised if you append your signature in the spaces provided below also appending your signature it will be an indication that you have read the above information.

Name of the child: _____

Sincerely

_____	_____	_____
Parent/guardian's name (print)	Parent/guardian's signature:	Date:
NEO TSOTETSI____	_____	_____
Researchers name (print)	Researcher's signature	Date:

APPENDIX M

LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH PROJECT

Dear learner,

Date_____

My name is Neo Tsotetsi and I would like to ask you if I can come to your school to interview you with other learners in connection to environmental education as I am trying to learn more about the implementation of environmental education in schools. If you allow me to interview you with other learners, I will come to your school for the interviews so that I can gain knowledge with regard to the implementation of environmental education. Through your permission I will record you using a tape recorder so that I cannot misquote you. During the interviews I will never ask you about something that might harm you or that you don't want to do. I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you don't want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you didn't think of now, ask me next time I visit your school.

If your parents or guardian agrees to allow you to take part in the study and you are willing to take part in the study use a cross in the box to indicate whether you agree or not to take part in the study in the table below

Please speak to your parents or guardian about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards.

Teacher NEO TSOTETSI

Your Name	Yes I will take part 	No I don't want to take part 
Name of the researcher NEO TSOTETSI	**If you agree you will place a cross in this box x**	**If you don't agree you will place a cross in this box x**
Date		
Witness Parent or guardian name _____		

_____ _____ _____
Parent/guardian's name (print) Parent/guardian's signature: Date:

NEO TSOTETSI_____ _____ _____
Researchers name (print) Researcher's signature Date:

APPENDIX N:

OBSERVATION GUIDE

Name of the school: School A, School B, School C

Name of the observer: Neo Tsotetsi

Date of observation: 2/6/8 August 2019

OBSERVATION GUIDE					
School code	**Teacher code**	**School code**	**Teacher code**	**School code**	**Teacher code**
SA	**TA**	**SB**	**TB**	**SC**	**TC**
• Classes are overcrowded. • Method of teaching content of EE is lecturing.		• Classes are overcrowded. • Method of teaching content of EE is question-and- answer method		• Classes are overcrowded. • Method of teaching for EE is lecturing and problem solving method	

OBSERVATION GUIDE		
School code	**School code**	**School code**
SA	**SB**	**SC**
• Learners throw papers in the school ground. • The school does recycle waste material (white paper) • Waste materials not visible outside the school yard	• Learners throw papers around the school ground. • The school does recycle waste material.(white paper) • Waste materials is not visible outside the school yard	• Learners throw papers in the school ground. • The school does not recycle waste material. • Waste materials is visible outside the school yard

APPENDIX O

OF FACE-TO-FACE INTERVIEW GUIDE

Name of the school: School A

Name of the interviewer: Neo Tsotetsi

Date of the interview: 1/5/7 August 2019

INTERVIEW GUIDE FOR FACE-TO-FACE INTERVIEWS
Q1. What is your own understanding of the word environmental education?
Q2. What is your own understanding of the word sustainable education?
Q3. Do you think environmental education should be implemented in schools?
Q4. Do you have any interest in teaching the content that is aligned to environmental education? Support your answer?
Q5. As someone who has taught the content aligned to environmental education for several years what are the challenges that you have encountered?
Q6. Do you think environmental education should be taught as a subject or it must be integrated into all learning subjects? Support your answer.
Q 7 Which methods to you apply when teaching the content aligned to EE?
Q 8 What are the benefits of teaching EE?
Q 9 Do you arrange excursions where learners will learn about the environmental education? If yes tell us about name of the place that you once visited and what the learners were learning in that place.
Q 10 Does your school form partnership with the parents to ensure that your school and the surrounding areas are not exposed to environmental problems. Support your answer.
Q 11 Does the schools have an environment committee, if yes how often does committee meet?
Q 12 Does the school have an environmental school policy? If yes to what extend does your school implement the policy.
Q 13 To what extent do the teachers, parents and the learners honour Environmental days/week?

Q 14.Does your school belongs to eco-schools programme? If not do have any interest in becoming part of eco school programme?
Q 15 Do the teachers in your school attend workshops related to (EE)?
Q 16 Does the school inter competitions that promote environmental awareness to environmental? If not do you intend to enter competitions that promote environmental education?
Q 17 Does the school have an environmental club? If yes what activities do the learners do?
Q 18. Do you see any necessity for your school to have an environmental club?
Q 19. If you were given a chance to be a curriculum developer for EE what changes where you going to bring in this field?
Q 20 How does the school motivate the learners to act responsible towards the environment by not destroying it?

APPENDIX P:

FACE-TO-FACE INTERVIEW TRANSCRIPTS (Teacher A/B/C)

Q- QUESTION

Teacher A	Teacher B	Teacher C
Q 1 What is your own understanding of the word environmental education?	**Q 1 What is your own understanding of the word environmental education?**	**Q 1 What is your own understanding of the word environmental education?**
A*- Understanding of the word environmental education is that of education that teaches people about the caring of the environment.*	***A*** *To share expertise about nature.*	***A*** *A process that allows individuals to explore environmental issues, engage in problem solving and taking actions to improve the environment. As a results individuals. As a results individuals develops a deeper understanding of environmental issues and have the skills to make informed decisions*
Q 2 What is your own understanding of the word sustainable education?	**Q 2 What is your own understanding of the word sustainable education?**	**Q 2 What is your own understanding of the word sustainable education?**
A *Sustainable education is the education that stay for good.*	***A*** *To preserve, conserve and restoring the dignity of the environment.*	***A*** *It is an education system that is aimed at developing and preparing learners for the future developments which is integrated with all other industrial developments in technology*

		as well as the world at large
Q3 Do you think environmental education should be implemented in schools?	**Q3 Do you think environmental education should be implemented in schools?**	**Q3 Do you think environmental education should be implemented in schools?**
A*yes, environmental education should be implemented at school so that it can teach learners about taking care of their schools by planting trees, picking up papers and tins for recycling.*	***A*** *Yes because the environment is our home and we need to grow responsible citizens for true benefits of future generations.*	***A*** *Yes, it should be implemented in schools.*
Q 4 Do you have any interest in teaching the content that is aligned to environmental education? Support your answer.	**Q 4 Do you have any interest in teaching the content that is aligned to environmental education? Support your answer.**	**Q 4 Do you have any interest in teaching the content that is aligned to environmental education? Support your answer.**
A *Yes, if the environmental education is not taught at school people will live in the polluted areas where risk of diseases will be high.*	***A*** *Yes, because the quality of the environment affects all of us.*	***A*** *Yes, because most of our people don't protect and look after the environment. Most people or don't realise the damage they cause to the environment or ozone until too late.*
Q5 As someone who has taught the	**Q5 As someone who has**	**Q5 As someone who has taught the**

content aligned to environmental education for several years what are the challenges that you have encountered?	**taught the content aligned to environmental education for several years what are the challenges that you have encountered?**	**content aligned to environmental education for several years what are the challenges that you have encountered?**
A *Our school does not have enough teaching aids which meant to enhance teaching and learning for EE*	***A*** *I am unable to apply other teaching methods such as roleplays and action projects because they waste a lot time since the curriculum is too demanding.*	***A*** *Our school does not have enough teaching and learning support materials (LTSM).*
Q6 Do you think environmental education should be taught as a subject or it must be integrated into all learning subjects? Support your answer.	**Q6 Do you think environmental education should be taught as a subject or it must be integrated into all learning subjects? Support your answer.**	**Q6 Do you think environmental education should be taught as a subject or it must be integrated into all learning subjects? Support your answer.**
A *Yes, it will help learners, to look after their environment if environmental education is integrated into all the subjects.*	***A*** *It should be integrated in most learning areas such as economic management sciences as it affects the economy, life orientation for environmental integrity, Geography and Social Sciences.*	***A*** *it is important to intergrade EE into all subject so that learners can have enough knowledge, with regard to EE.*

Q7 Which methods to you apply when teaching the content aligned to EE?	**Q7 Which methods to you apply when teaching the content aligned to EE?**	**Q7 Which methods to you apply when teaching the content aligned to EE?**
A *Lecturing, question-and-answer method, class discussion and role plays.*	***A*** *I usually use outdoor education as a method to teach EE, However, lecturing methods question-and-answer method are the dominant method that I use to teach content that is alight to EE.*	***A*** *Most of the time methods that I apply are lecturing, question-and-answer method, group discussion and class discussions.*
Q8 What are the benefits of teaching EE?	**Q8 What are the benefits of teaching EE?**	**Q8 What are the benefits of teaching EE?**
A *We are able to go outside and interact with nature.*	***A*** *Benefits of EE is to resolve environmental problems.*	***A*** *Benefits of EE is to engage with nature.*
Q 9 Do you arrange excursions where learners will learn about the environmental education? If yes tell us about name of the place that you once visited and what the learners were learning in that place.	**Q 9 Do you arrange excursions where learners will learn about the environmental education? If yes tell us about name of the place that you once visited**	**Q 9 Do you arrange excursions where learners will learn about the environmental education? If yes tell us about name of the place that you once visited and what the learners were learning in that place.**

	and what the learners were learning in that place.	
A *Yes, we once took our learners to Isiphosethu Elsen School to learn more about growing crops*	***A*** *Yes (zoo) learners were educated about various animals and impacts them*	*A No, we don't undergo executions related to EE.*
Q 10 Does your school form partnership with the parents to ensure that your school and the surrounding areas are not exposed to environmental problems. Support your answer.	**Q 10 Does your school form partnership with the parents to ensure that your school and the**	**Q 10 Does your school form partnership with the parents to ensure that your school and the**
A *Yes, parents come and clean the school once per term. School vendors pick all the papers lying around after school breaks.*	***A*** *Yes, every year we coordinate environmental health week in June for environmental awareness. The purpose is to educate the community about the environment and do greening campaign.*	***A*** *No, our school does not form partnership with the community.*
Q 11 Does the schools have an environment committee, if yes how often does committee meet?	**Q 11 Does the schools have an environment committee, if yes how often does committee meet?**	**Q 11 Does the schools have an environment committee, if yes how often does committee meet?**
A *Yes, it is formed by 10 learners, 4 teachers, 3 community members and 2 gardeners*	***A*** *Yes Eco committee and I am the coordinator/chair person*	***A*** *No, our school does not have environment committee.*

Q 12 Does the school have an environmental school policy? If yes to what extend does your school implement the policy.	**Q 12 Does the school have an environmental school policy? If yes to what extend does your school implement the policy.**	**Q 12 Does the school have an environmental school policy? If yes to what extend does your school implement the policy.**
A*Yes the policy is reviewed after 3 years.*	***A*** *Yes we implemented it last year were we engaged various stakeholders from government departments such as water and sanitation, Ekurhuleni waste management, environment health and health department*	***A*** *Yes the policy is outdated it was supposed to be reviewed in 2019.*
Q 13 To what extent do the teachers, parents and the learners honour Environmental days/week?	**Q 13 To what extent does the teachers, parents and the learners honour Environmental days/week?**	**Q 13 To what extent do the teachers, parents and the learners honour Environmental days/week?**
A *They arrange a special day where both parties make drawings about the environment and plant trees at school garden.*	***A*** *We save water by using a cup when drinking water, we have a school garden which is monitored by the community on daily basis.*	***A*** *Teachers who stand at the gate and ensuring that the late comers pick up the papers around school.*
Q 14. Does your school belongs to eco-	**Q 14. Does your school**	**Q 14. Does your school belongs to eco-**

schools programme? If not do have any interest in becoming part of eco school programme?	**belongs to eco-schools programme? If not do have any interest in becoming part of eco school programme?**	**schools programme? If not do have any interest in becoming part of eco school programme?**
A *Yes, our school belongs to the eco-school programme because we do have people who come to teach about topics that are aligned to EE.*	***A*** *Yes and this year in September I will be representing Gauteng provinces in Eco-competition and I stand a chance of winning R50000.*	***A*** *No. however, it would be a good thing to introduce eco school to our school* *Learners will be able to play part in eradicating environmental problems.*
Q15 Do the teachers in your school attend workshops related to (EE)?	**Q15 Do the teachers in your school attend workshops related to (EE)?**	**Q15 Do the teachers in your school attend workshops related to (EE)?**
A *Yes, we have attended many workshops concerning environmental education and another workshops is coming on Saturday 03 August 2019 at Abinala primary school from 8h00 to 15h00.*	***A*** *Yes in most days workshops are organised by the Department of Education in collaboration with Department of Water and Sanitation.*	***A*** *No, teachers do not attend workshops.*
Q 16 Does the school inter competitions that promote environmental awareness to environmental? If not do you intend to enter competitions that promote	**Q 16 Does the school inter competitions that promote environmental awareness to environmental? If not do you intend to enter competitions that promote environmental**	**Q 16 Does the school inter competitions that promote environmental awareness to environmental? If not do you intend to enter competitions that promote environmental education?**

environmental education?	**education?**	
A *Yes, we inter competitions and we won once sponsored by Peermont in 2014.*	***A*** *Yes, 2018 we participated in Youth Citizen Action Programme (ycap) and our topic was sustainable environment*	***A*** *No our school does not enter competitions related to EE.*
Q 17 Does the school have an environmental club? If yes what activities do the learners do?	**Q 17 Does the school have an environmental club? If yes what activities do the learners do?**	**Q 17 Does the school have an environmental club? If yes what activities do the learners do?**
A Yes, we have soul buddies who look after the school yard and the school garden.	*A school does not have environmental club.*	*A No, our school does not have environmental club.*
Q 18. Do you see any necessity for your school to have an environmental club?	**Q 18. Do you see any necessity for your school to have an environmental club?**	**Q 18. Do you see any necessity for your school to have an environmental club?**
A *Yes, the play a vital role in ensuring that other learners do not litter papers around school premises.*	***A*** *Yes, the quality of the environmental affect all of us.*	*A Yes it help in exposing our learners at large to environmental issues and they would know how to look after the environment and the importance of the environment.*
Q 19. If you were given a chance to be a	**Q 19. If you were given a**	**Q 19. If you were given a chance to be a**

curriculum developer for EE what changes where you going to bring in this field?	**chance to be a curriculum developer for EE what changes where you going to bring in this field.**	**curriculum developer for EE what changes where you going to bring in this field.**
A *I would love to see more trees being planted at schools and more garden being implemented for learners' nutrition.*	***A*** *I would intergrade Environmental education in most of the subjects like economic management sciences, social sciences, life orientation, Natural Sciences, technology and languages.*	***A*** *To introduce the environment projects that would be compulsory and everyone would be involved including the parents.*
Q 20 How does the school motivate the learners to act responsible towards the environment by not destroying it?	**Q 20 How does the school motivate the learners to act responsible towards the environment by not destroying it?**	**Q 20 How does the school motivate the learners to act responsible towards the environment by not destroying it?**
A Learners are given certificates sometimes we by them goodies to encourage them	***A*** *We have 2 posters at Centre of the school with variety of messages about environmental integrity e.g. do not litter, save water.*	***A*** *Our teachers do not motivate the learners to act responsible towards their environment.*

APPENDIX Q:

FOCUS GROUP INTERVIW GUIDE

Name of the school: School A/B/C

Name of the observer: Neo Tsotetsi

Date of interview: 1/5/7 August 2019

INTERVIEW GUIDE FOR FOCUS GROUP INTERVIEW
Q1. Do you understand the word environmental education? If yes how would you explain it to your classmates?
Q.2 Which way do you prefer to learn?
Q3. What challenges you encountered when learning EE?
Q4. What action can you take as learners to save water from your school?
Q5. Do you think lights should be switched off during the day? Support your answer?
Q6. Do you think littering is healthy for your health? Support your answer.
Q7. Do you think your school must have environmental club, a club that is going to ensure that the school is not exposed to environmental problems?
Q8. Do you think littering is healthy for your health? Support your answer.

APPENDIX R:
FOCUS GROUP INTERVIEW TRANSCRIPT

Q- QUESTION

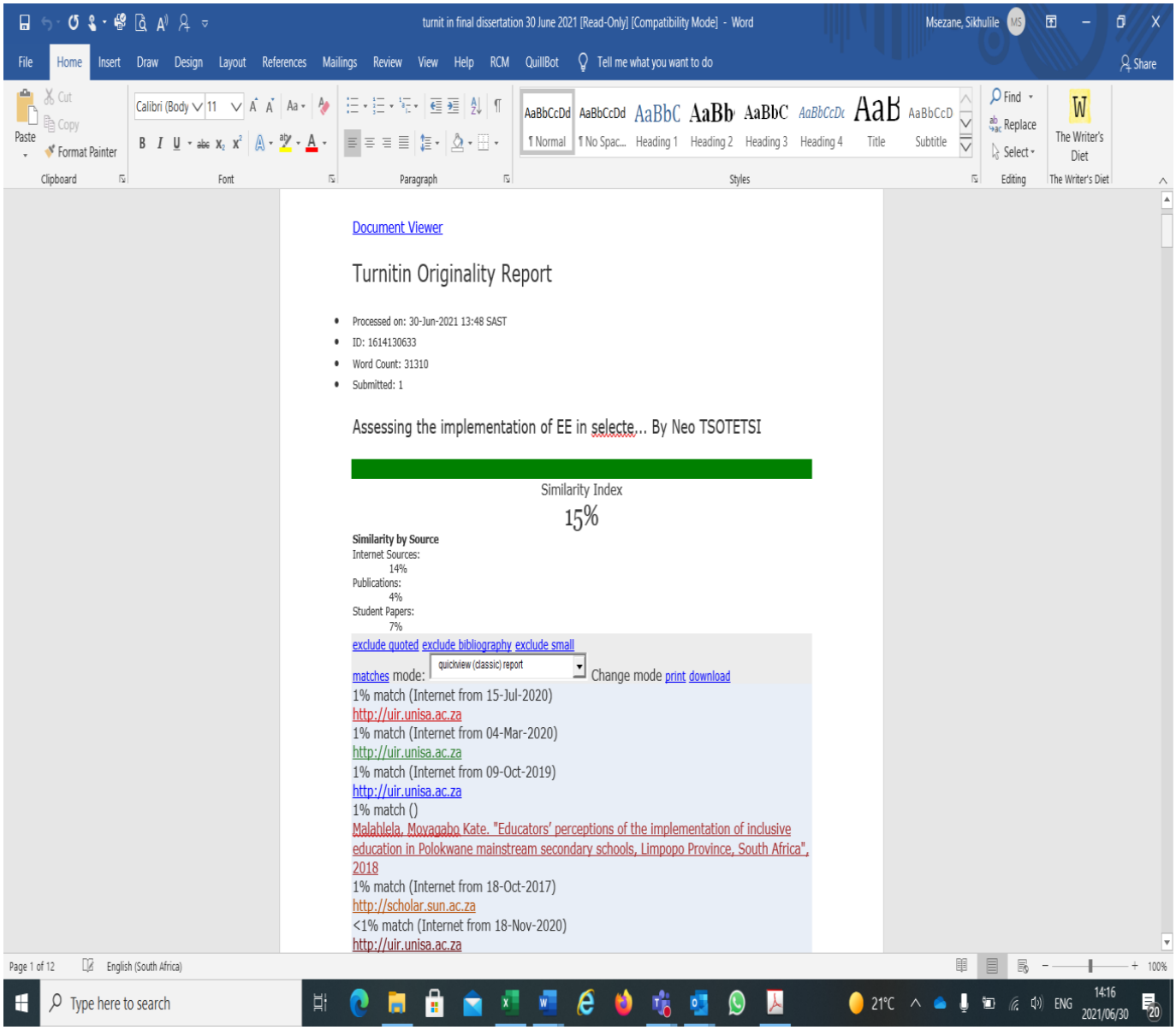
A – ANSWER

GROUP A (SCHOOL A)	**GROUP B (SCHOOL B)**	**GROUP C (SCHOOL C)**
Q Do you understand the word environmental education? If yes how would you explain it to your classmates?	**Q Do you understand the word environmental education? If yes how would you explain it to your classmates?**	**Q Do you understand the word environmental education? If yes how would you explain it to your classmates?**
A *Teaching others about how to care about the environment.*	**A** *When you are taught about the environment and how to keep it clean.*	**A** *Education about the environment.*
Q Which way do you prefer to learn?	**Q Which way do you prefer to learn?**	**Q Which way do you prefer to learn?**
A *To go outside the classroom and learn about nature.*	**A** *I learn much better by doing unlike listening to a teacher lecturing from the beginning of the lesson until the end which makes most us to be bored in class ending up sleeping*	**A** *I prefer learning through games because I do not forget what I have learned*

Q what challenges you encountered when learning EE?	**Q what challenges you encountered when learning EE?**	**Q what challenges you encountered when learning EE?**
A *I don't like to learn in a group because there are learners who are not willing work they depend on others.*	**A** *I encounter challenges when leaning without using pictures.*	**A** *I come across the challenges when learning without concrete objects.*
Q What action can you take as learners to save water from your school?	**Q What action can you take as learners to save water from your school?**	**Q What action can you take as learners to save water from your school?**
A . Buckets can be placed under the licking tap, then water from the bucket can be used to water the crops from the food gardening	*A. We can use bottles to save water*	*A. We can use buckets when washing our hands.*
Q Do you think lights should be switched off during the day? Support your answer?	**Q Do you think lights should be switched off during the day? Support your answer?**	**Q Do you think lights should be switched off during the day? Support your answer?**
A. lights may not be switched off because there are learners who really need lights so that they can be able to see on the board	*A. lights need to be switched on because there are learners who are heavily depending on lights to see*	*A. lights must be switched off to save energy. Therefore. Solar energy should be used.*
Q Do you think littering is healthy for your health? Support your answer.	**Do you think littering is healthy for your health? Support your**	**Do you think littering is healthy for your**

	answer.	**health? Support your answer.**
A. littering invites illnesses. Therefore we need to make sure that our environment is free from littering.	*A. polluted environment can lead to lung disease*	*A. littering is not healthy it invites rats in our communities*
Q Do you think your school must have environmental club, a club that is going to ensure that the school is not exposed to environmental problems?	**Do you think your school must have environmental club, a club that is going to ensure that the school is not exposed to environmental problems?**	**Do you think your school must have environmental club, a club that is going to ensure that the school is not exposed to environmental problems?**
A *Yes our school must have environmental club to ensure that water is not wasted.*	*Our school must have environmental club to preserve the earth resources*	*Yes our school must have environmental club to ensure that the environment is not exposed to littering*

APPENDIX S:
TURNITIN REPORT



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APPENDIX T:
LANGUAGE EDITOR'S AND TECHNICAL EDITING CERTIFICATE

TO WHOM IT MAY CONCERN

25 June 2021

This is to certify that I, Ilze Holtzhausen de Beer, language edited the dissertation "Assessing the implementation of environmental education in selected Vosloorus township primary schools by" by NeoTsotetsi submitted in accordance with the requirements for the degree of Med in the subject Environmental Education at the University of South Africa.

The onus is, however, on the student to make the suggested changes and to attend to the queries. Please note that I do not accept responsibility for content errors, plagiarism or formatting.

Signed:

IC Holtzhausen de Beer
dbeeric@gmail.com

Member of Professional Editors' Group (PEG) and Prolingua.

APPENDIX U:
LANGUAGE EDITOR'S AND TECHNICAL EDITING CERTIFICATE

Academic consultancy
"Perfection is our DNA"

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29 June 2021

To whom it may concern

This letter is to confirm that I, Zandile Ngcetane, Have technical edited Neo Tsotetsi's dissertation entitled: A**ssessing the implementation of environmental education in selected Vosloorus township schools.**

I have not changed any presentation of the dissertation however made changes to alignments, font, and size

This is to confirm that I have edited the document to a level I deem satisfactory.

Ms Z Ngcetane
Academic Consultancy