GREENING THE SCHOOL FOR SUSTAINABLE DEVELOPMENT: A CASE OF TSHWANE NORTH DISTRICT

BY

JOHANNAH BOPAPE

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SUPERVISOR: PROF AWELANI. V. MUDAU
&
CO – SUPERVISOR: DR S. B. MSEZANE

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DECLARATIONS

Name: Johannah Bopape
Student number: 06498116
Degree: Doctor of Philosophy

Greening the School for Sustainable Development: A Case of Three Tshwane North district Primary Schools, in Gauteng Province

I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.
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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.

Signature

January 2021
Date

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DEDICATION

I dedicate this study to my students, past and present who participate in greening their school environments through sustainable development activities.

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ACRONYMS

BPoA	Barbados Programme of Action
BRT	Bus Rapid Transit
CAPS	Curriculum Policy Assessment Statements
CFL	Compact fluorescent lights
DAFF	Department of Agriculture, Forestry and Fisheries
DoBE	Department of Basic Education
DEA	Department of Environmental Affairs
DHET	Department of Higher Education and Training
DME	Department of Mineral Energy
DWA	Department of Water Affairs
EE	Environmental Education
EEA	Employment of Educators Act
EEFSD	Environmental Education for Sustainable Development
EfS	Environment for Sustainability
EfSD	Education for Sustainable Development
ESD	Education for Sustainable Development
eSTEM	Environment, Science, Technology, Engineering and Math
EMSs	Environmental Management Systems
FEE	Foundation for Environmental Education
FET	Further Education and Training
GBCSA	Green Building Council of South Africa
GBA	Green Building Africa
GDE	Gauteng Department of Education
GDP	Gross Domestic Product
GET	General Education and Training
HE	Higher Education
HOD	Head of Department
IK	Indigenous Knowledge
IMF	International Monetary Fund
IUCN	International Union for the Conservation of Nature/World Conservation Union
LEDET	Limpopo Economic Development, Environment and Tourism
LED	Light Emitting Diobe
LEED	Leadership in Energy and Environmental Design
LTSM	Learner Teacher Support Materials
MDGs	Millennium Development Goals
MEC	Minister of the Executive Council
NCS	National Curriculum Statement
NDP	National Development Plan
NEPA	National Environmental Policy Act
NEMA	National Environmental Managements Act
NGOs	Non-governmental Organisations
NNSSF	National Norms and Standards for School Funding

NQF	National Qualification Framework
NSNP	National School Nutrition Programme
PED	Provincial Education Department
PEDs	Provincial Education Departments
PFMA	Public Finance Management Act
NPO	Non-Profit Organisation
RERC	Research Ethics Review Committee
SA	South Africa
SACE	South African Council of Educators
SAGSP	South African Green School Programme
SANEDI	South African National Energy Development Institute
SASA	South African Schools Act
SB	School Board
SD	Sustainable Development
SGB	School Governing Body
SGBs	School Governing Bodies
SMT	School Management Team
SMTs	School Management Teams
STEEM	Science, Technology, Engineering, Environment and Mathematics
SWOT	Strengths, Weaknesses, Opportunities and Threats
TND	Tshwane North District
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDESD	United Nations Decade of Education Sustainable Development
UNESCO-UNEP	United Nations Educational, Scientific and Cultural Organisation-United Nations Environment Programme
UNDP	United Nations Development Programme
UNGAS	United Nations General Assembly Summit
UNIDO	United Nations Industrial Development Organisation
UNISA	University of South Africa
US	United States
USGBC	United States Green Building Council
VAT	Value Added Tax
WASD	World Association of Sustainable Development
WCED	World Commission on Environment and Development
WESSA	Wildlife Environmental Society of South Africa
WSSD	World Summit on Sustainable Development
WWF	World Wide Fund for Nature

APPENDICES

ABSTRACT

This study is environmental in nature, occurring within a series of nested frameworks, namely school role players, sustainable development and greening schools. From a South African context, the day-to-day operations of the school activities and programmes are not solely the principal's responsibility. It is a shared responsibility among every person involved in an educational school context. The principal has the overall responsibility of leading and professionally managing the school through the school management team (SMT) and is accountable to the employer, which is the provincial Head of the Department of Education. The principal is also accountable to the community through the school governing body (SGB), which consists of elected representatives from the school community. This study was guided by these research questions: (1) What is the nature of the knowledge of the role players in the Tshwane North District schools about greening the school? (2) How do the contextual factors in the Tshwane North District schools shape the greening of the school? The SMT and SGB are key role players and gatekeepers at the school level. They were purposefully and conveniently sampled at three Tshwane North District (TND) primary schools in Gauteng Province of South Africa according to their locations (rural, township, urban). They participated in focus group interviews, observations and document analysis. The study, qualitative in nature, explored strengths, weaknesses, opportunities and threats in greening the school for sustainable development. The two role players might not be knowledgeable about green and sustainable development, however given the opportunity to explore their knowledge, provided insight about greening schools and how to possibly change to more sustainable practices. Data collected was subjected to thematic content analysis. The results revealed that schools' funds are swiftly depleted on resources such as water, energy, transportation, paper, stationary, maintenance and equipment, to name but a few. The results also revealed limited green culture across institutions, due to little knowledge of greening and sustainability practices by school role players. This was attributed to a lack of policy framework by schools which was exacerbated by a lack of capacity building from expertise in greening schools for sustainable development.

Keywords: Environmental education; sustainable development; education for sustainable development; sustainability; green schools; school role players; greening the school; sustainable schools; Eco-schools; sustainable resources; sustainable development goals

ABSTRAK

Hierdie studie is omgewings van aard wat plaasvind binne 'n reeks nes raamwerke, naamlik skoolrolspelers, volhoubare ontwikkeling en vergroening van skole. Uit 'n Suid-Afrikaanse konteks is die dag-tot-dag-bedrywighede van die skoolaktiwiteite en -programme nie net die skoolhoof se verantwoordelikheid nie. Dit is 'n gedeelde verantwoordelikheid onder elke persoon wat in 'n opvoedkundige skoolverband betrokke is.Die skoolhoof het die oorhoofse verantwoordelikheid om die skool deur die skoolbestuurspan (SUT) te lei en professioneel te bestuur en is verantwoordbaar teenoor die werkgewer, wat die provinsiale hoof van die departement van onderwys is.Die skoolhoof is ook deur die skoolbeheerliggaam (SGB) aan die gemeenskap verantwoordbaar, wat uit verkose verteenwoordigers uit die skoolgemeenskap bestaan.Die SMT en SGB is sleutelrolspelers en hekwagters op skoolvlak.Hulle is volgens hul plekke (landelike, township, stedelike) doelgerigte en gerieflik by drie Tshwane-Noord-distrikskole (TND) in Gautengprovinsie van Suid-Afrika gemonster.Hulle het deelgeneem aan fokusgroeponderhoude, waarnemings en dokumentanalise.Die studie, kwalitatiewe van aard wat daarop gemik is om sterk punte, swakhede, geleenthede en bedreigings te ondersoek om die skool vir volhoubare ontwikkeling te verging Die twee rolspelers is dalk nie kundig oor groen en volhoubare ontwikkeling nie, maar gegewe die geleentheid om hul kennis te ondersoek, het hulle 'n insig gegee oor groen skole en moontlik verandering aan volhoubare gedrag.Data wat ingesamel is, is aan tematiese inhoudsanalise onderwerp. Die bevindinge het aan die lig gebring dat skole se fondse vinnig uitgeput is op hulpbronne soos water, energie, vervoer, papier, stilstaande, instandhouding en toerusting om maar net 'n paar te noem.Die bevindinge het ook min kennis van vergroenings- en volhoubaarheidspraktyke deur skoolrolspelers geopenbaar.Dit is toegeskryf deur 'n gebrek aan beleidsraamwerke deur skole wat vererger is deur 'n gebrek aan kapasiteitsbou van kundigheid in die vergroening van skole vir volhoubare ontwikkeling.

Sleutelwoorde: Omgewingsopvoeding; volhoubare ontwikkeling; Onderwys vir volhoubare ontwikkeling; volhoubaarheid; groen skole; skoolrolspelers; vergroening van die skool; volhoubare skole; Eko-skole; volhoubare hulpbronne; volhoubare ontwikkelingsdoelwitte;

TLHOKOMELISO

Thutong ena ke ea tikoloho e hlahang ka hara letoto la meralo, e leng, ba nkang karolo ea sekolo, ntshwetsopele ea nako e telele le likolo tse tala.Ho tsoa maemong a Afrika Boroa, tshebetso ea letsatsi le letsatsi ea mesebetsi ea sekolo le mananeo ha se feela boikarabello ba mosuoe-hlooho.Ke boikarabello bo arolelanoeng hara motho e mong le e mong ea amehang molemong oa sekolo sa thuto.Hlooho ea sekolo e na le boikarabello ka kakaretso ba ho etella pele le ho tsamaisa sekolo ka sehlopha sa botsamaisi ba sekolo (SMT) mme o ikarabella ho mohiri, e leng Hlooho ea profinse ea Lefapha la Thuto.Hlooho ea sekolo e boetse e ikarabella ho sechaba ka sehlopha se busang sa sekolo (SGB), se nang le baemeli ba khethiloeng ba tsoang sechabeng sa sekolo.SMT le SGB ke karolo ea bohlokoa le balebeli ba liheke boemong ba sekolo.Li ile tsa etsoa sampole ka morero le ka mokhoa o bonolo likolong tse tharo tsa mathomo tsa Tshwane North (TND) tse Profinseng ea Gauteng ea Afrika Boroa ho latela libaka tsa bona (mahaeng, metse-literopong, le toropong).Maloko a SMT le SGB ba nkile karolo lipuisanong tsa sehlopha se tsepamisitseng maikutlo, maikutlo le tlhahlobo ea litokomane.Boithuto bona, bo nang le boleng ba tlhaho bo ikemiselitse ho lekola matla, bofokoli, menyetla le litšokelo ho silafatsa sekolo bakeng sa ntshetsopele e tsitsitseng. Baetsi ba karolo ba babeli ba kanna ba se be le tsebo mabapi le ntshetsopele ea botala le bo tsitsitseng, empa ba fuoe monyetla oa ho lekola tsebo ea bona, ba fane ka leseli mabapi le likolo tse talafatsang mme mohlomong li fetohela mekhoeng e tsitsitseng.Boitsebiso bo bokelletsoeng bo ile ba hlahlojoa ka litaba tsa bona, mme liphuputso li senotse hore lichelete tsa likolo li felloa kapele ho lisebelisoa tse kang metsi, motlakase, lipalangoang, pampiri, tse emeng, tlhokomelo le lisebelisoa ho bolela tse maloa feela.Liphuputso li boetse li senotse tsebo e nyane ea tshebetso ea tikoloho le botsitso ke bankakarolo ba sekolo.Sena se bakiloe ke ho haelloa ke moralo oa leano ke likolo tse ileng tsa mpefatsoa ke khaello ea matlafatso ho tsoa boitseaning ba likolo tsa botala bakeng sa ntshetsopele e tsitsitseng.

Mantsoe a bohlokoa: Thuto ea Tikoloho; nts'etsopele e tšoarellang; Thuto bakeng sa Nts'etsopele e Tsitsitseng; botsitso; likolo tse tala; bankakarolo ba sekolo; ho tala sekolong; likolo tse tšoarellang; likolo tsa likolo; lisebelisoa tse tšoarellang; lipheo tsa nts'etsopele ea nako e telele

CHAPTER 1: ORIENTATION

1.1 INTRODUCTION

This study focuses on environmental education (EE) and explored the knowledge and contextual factors key role players at schools hold regarding their understanding of greening schools to achieve sustainable development in their institutions. This study provided an orientation and background surrounding the topic under study in order to explain more about the genesis of sustainable development (SD) and green schools. In addition, it provided the rationale of the study. Subsequent to that, it stated the problem statement in an attempt to clarify the constraints experienced by schools in overcoming resource depletion in their respective schools**.** Thereafter, this study also stated the research questions, aim and objectives, research methods and theoretical frameworks that it employs. Furthermore, it also provided clarification of frequently used terms and references based on global and local South African contexts. Finally, the chapter divisions of this thesis are outlined to build up towards answering the research questions.

1.2. BACKGROUND OF THE STUDY

The South African Constitution emphasises sustainable development and enshrines the right to a healthy environment for all citizens (Act 108, 1996) by stipulating that:

> *Everyone has a right to have the environment protected, for the benefit of the present and future generations, through reasonable 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* (Bill of Rights, p.11).

The Department of Environmental Affairs (DEA) was given mandate to ensure that South Africa (SA) effectively manages the environmental and natural resources of the country in a manner that ensures economic and social sustainability for current and future generations (2010, p. 4). In this regard, environmental management and resource protection is a cross-cutting issue, requiring action by many sectors and all spheres of government, business and civil society (DEA, 2010, p. 4). The Department of Basic Education (DoBE) ensured that every learning area in the school curriculum has an environmental focus embedded within it (DEA, n.d).

In order to meet the needs of both conservation and development, the term “sustainable development” was first pioneered by the World Environmental Conference held in Stockholm in 1972 (le Grange, Loubser & le Roux as reported in Loubser, 2014 p. 127; Jenkins, 2009; Kensler, 2012; Spooner, 2012). Tilbury stated that the concept of sustainability first emerged in the 1980’s and became part of vocabulary in the 1990’s (1995, p. 197). Thereafter the following conferences later highlighted sustainable development: The Brundtland Commission Report: *Our Common Future* (1987); World Conservation Strategy (1980); Rio de Janeiro Earth Summit (1992); the South African Reconstruction and Development Plan (1994) and the World Summit on Sustainable Development (WSSD) (2002) held in Johannesburg, SA; and United Nations Decade on Education for Sustainable Development (UNDESD, 2005-2014) (Loubser, 2014, p.127). The Rio + 20 Conference (2012) member states decided to launch a process to develop a set of Sustainable Development Goals (SDGs) which were built upon the Millennium Development goals (MDGs) and converge with the post-2015 development agenda.

Thereafter, SA’s National Planning Committee (NPC) released the National Development Plan (NDP): vision 2030, identifying nine challenges the country faces. Among them is the slow progress on sustainable resources and intensive economy (NPC, 2013, p. 15). The NDP acknowledged the fact that SA should be preserved for future generations, which focused on critical action plans on institutional capability and the accountability of leadership on building environmental sustainability and resilience (NPC, 2013, p. 27). With these sustainability plans emerging, the current emphasis was on moving towards a green economy for the efficient delivery of services (DEA, 2011, p. 4). Furthermore, the public experienced the DEA’s green leadership in developing the head office with the Green Building Council of South Africa (GBCSA) on the 4th of March 2015 (gbcsa.org.za para. 1). The GBCSA stated that “the DEA is leading by example with the R653m head office in Pretoria that underscores the department’s mandate to create healthy and sustainable development.”

The “green” concept was conceptualised globally by the following organisations; The UN Environment’s report titled *Towards a Green Economy* (2011); Organisation for Economic Cooperation and Development’s report *Towards Green Growth*; World Bank’s report *Inclusive Green Growth* (Diab, 2015: 7); and United States Green Building Council (USGBC)’s Leadership in Environmental Education Design (LEED) (Earthman, 2009, p.

285; Kerlin, Santos & Bennett, 2015, p. 1). The idea of going green (Strife, 2010) was conceptualised locally in SA by: New Growth Path; the NDP; Green Economy Accord (Diab, 2015, 7); and GBCSA (Green Building Council News, 2018).

Dr Joseph Allen and fellow researchers of the Harvard T. H. Chan School of Public Health in the US conducted review studies that focused on green buildings and summarised the health benefits of the people who work in them (Medical and Health Report, 2015). They reported that occupants of green buildings have less exposure to allergens, pollutants and environmental contaminants, which lowers absenteeism because of asthma and allergies.

This study noted that the concept of *green schools* is polysemous (has different meanings) and is inextricably intertwined with Education for Sustainable Development (ESD), sustainability and EE. Jobo (2013) reported that ESD should also be referred to as EE or environment and sustainability education. Dr Cathy from Dzerefos (personal communication from North West Wildlife Environment Society of South Africa (WESSA), (2018) argued that “green school is a very loose label, is confusing” and may have different foci to Eco-Schools such as eSTEM (Environment, Science, Technology, Engineering and Math) or sustainable infrastructure. She emphasised that “green schools” as defined in China (citing John et al., 2013), Ireland and the USA could be synonymous with “Eco-Schools” or loose labels for other environmental initiatives managed by various non-profit organisations (NPO) and government departments.

Most studies view new green schools as healthy (Earthman, 2009; Strife, 2010; Chapman, 2012; Kensler, 2012; Kerlin et. al., 2015; US Health Report, 2015) and which support curriculums, teacher morale and cost-effectiveness (Kerlin, et al., 2015). Some organisations prioritised green schools by flagging them in order of greenest schools from bronze and silver to gold (WESSA/WWF; Ringdahl, 2008). The term “green” encompasses issues such as depletion of water and ecosystems (Elliot, (n.d), p. 252). Only 853 schools in SA are registered as Eco-schools in nine provinces (WESSA News, 2018).

This study focused on the conceptualisation of greening schools to promote sustainable development. This new knowledge area can significantly improve the quality and relevance of learning and teaching in SA. This is because EE is a cross-cutting principle and content area in the curriculum (DEA, 2010). The DoBE has, through the Curriculum and Assessment Policy Statement (CAPS), included environmental and sustainability related

content references across a number of phases and grades (DEA, 2012, p. 1). Hence, “green schools” have a common focus on the environment and call for school role players to address economic, social, health, environmental and ecological issues in their institutions.

The literature of green schools drawn from other countries revealed that every green assessment has its own assessment systems and features. For example, Japan gives more attention to the development of equipment and school infrastructure with green architecture and facilities, whereas in Iran green schools complete a verification process given by the World Green Star organisation and receive their licenses (Meiboudi, Lahijanian, Shoberi, Jozi, & Azizinezhad, 2016, p. 237). In South Africa, similar further quantitative studies need to be undertaken country-wide to be able to generalise whether there are green schools in the country. Green Building Africa stated that there are no green schools in South Africa (greenbuildingafrica.org).

1.3. AIMS AND OBJECTIVES OF THE STUDY

The aim and objectives of this study endeavour to clarify how minimal resources may be used sustainably. To answer the research questions, it was necessary to identify the following aims to:

1. Examine the nature of knowledge of the role players in the Tshwane North District schools about greening the school.
2. Establish how contextual factors in the Tshwane North District schools shape the greening of the school.

1.4. RESEARCH PROBLEM STATEMENT

This research inquiry was built on the researcher’s anecdotal teaching experience at a rural primary school in the North-West province of SA. This school was categorised as quintile one and on social wage. The former implies that the school is 100% dependent on government funding for operational and infrastructural services. The latter implies amenities to the school are provided by the state through public funds, namely: social grants, free basic electricity, water and no-fee schooling (NPC, 2013, p. 51). The researcher, while teaching and procuring Learner Teacher Support Material (LTSM) as Head of Department, witnessed and observed the swift depletion of school resources

(electricity, water, paper, stationary machines, internet data, etc.). This was due to members of the school management team (SMT) including the researcher, and the school governing body (SGB), as school role players, lack of understanding of how the school' s resources could be sustained. Both the SGB and SMT members are allocated powers to effectively manage school resources (South African Schools Act (SASA, 1996). Green schools' initiatives in SA are still pilot projects between the DEA and LEDET (Bizcommunity. 2017). Literature nationally in SA on green schools for SD is scarce, fragmented and limited to Eco-schools. The Wildlife Environmental Society of South Africa (WESSA) has implemented green schools as Eco-schools in SA since 2003 and encouraged schools to register (Carvello, 2009). WESSA prioritised green schools by flagging them in order of greenest schools from bronze and silver to gold aimed at creating awareness and action around environmental sustainability in schools (WESSA/WWF; Ringdahl, 2008). On the other hand, the government allocates funds to schools through the National Norms and Standards for School Funding (NNSSF, 2018) in advance to enable schools to budget for the next academic year. The problem experienced by the researcher was that this funding was not consistent. Some outstanding funds are sometimes deposited into the school bank account towards the end of the last term. By this time, resources have already been depleted and constraints on resources are experienced, especially during examinations.

Having witnessed these problems, the researcher recognised that the problems faced in the cost of schooling are not only economical, but ecological, social and environmental too. The idea of greening schools was conceptualised from Wu (2002, p. 21-25), who researched green schools in China. A similar study was conducted in SA with developed Environmental Management Systems (EMSs) in 39 primary schools in the northern Gauteng and southern Limpopo provinces by Hens, Wiedemann, Raath, Stone, Renders, Craenhals and Rochter in 2010 (Meiboudi, et al., 2016, p. 237). Similar activities to assess green schools have also taken place in Iran (Meiboudi et al. 2016; Meiboudi et al. 2017). Kerlin et al., (2015) also studied the teachers' perceptions in a new green middle school in the central Ohio River Valley of the Midwest United States. Therefore, the conceptual understanding of green schools became the point of focus of this study.

The main problem in SA is that most schools consume a lot of energy and waste resources by not following the world ethic of "going green" as conceptualised locally in SA by: New

Growth Path; the NDP; Green Economy Accord (Diab, 2015, 7). Future generations are at risk if the present generation does not take action and efforts to ensure that better environmental learning and actions are sustained and become part of how schools are managed (Ringdahl, 2008, p. 36). Adams (2009, p. 379) commented that green development is not about the way the environment is managed, but about who has the power to decide how it is managed. In this regard, the focus of this research is on greening the school initiated by the SGB and the SMT. Kensler (2012, p. 794) argued that (citing, Ferreira, Ryan and Tilbury, 2006, p.8) leadership skills cannot be ignored by emphasising the consequence of omitting school leaders in sustainability-related efforts since:

> *In their initial training, teachers may learn about sustainability in science, geography, or studies of society and environmental curricula. However, sustainability does not feature in educational leadership, management, psychology or sociology classes, thereby limiting the potential for whole school approaches*.

Gaps identified by the researcher are limited literature on sustainable behaviour for schools in SA; limited environmental and sustainable culture implementation for South African schools; and limited engagement in schools by voluntary Eco-school projects.

1.5. RATIONALE

The rationale of the study initially arose from the researcher's observation of schools consuming a lot of resources such as electricity. For this reason, the future generation of learners is threatened by overconsumption and the depletion of school resources. School funds and government subsidies will continue increasing yearly due to cost constraints. Although the UNDESD deadline (2005-2014) has passed, it is imperative that this study remind all stakeholders of their responsibilities to protect the environment we all share. Over many years there has been an increased demand for green schools, both locally and globally (WESSA News, 2018).

The fact that the Gauteng Department of Education (GDE) opened two green schools in the North of Johannesburg that use solar energy for power (Zikhona, 2014) increased the researcher's curiosity. The solar farms are made up of 300 panels at each school and generate 9 000 kilowatts of electricity a month, an amount enough to light up 72 households for an entire year (Zikhona, 2014). On the other hand, some green schools have been

piloted in Limpopo and the Western Cape (DEA Director General, 2018, personal communication) provinces of SA. The inaugural South African Green School Programme (SAGPS) was launched in Polokwane on the 25th of April 2017 as a pilot project between the DEA and Limpopo Economic Development Environment and Tourism (LEDET) and learners from 105 schools in and around Limpopo displayed their projects on environmental conservation (Bizcommunity.com).

In 2017 a Member of the Executive Council (MEC) in GDE, Mr Panyaza Lesufi, opened a green school named Soshanguve East Secondary School (iAfrikan News, March 07). He emphasised that the GDE aims to open a new green school every month until 2019. Other green schools opened by the GDE are Garankuwa Primary school, Nelmaphius Secondary school, Bophelong Secondary school and Nomzamo Madikizela-Mandela Primary School. These modern technology-ready facility school designs boast the following green features: two Science laboratories, a computer library, an IT control room and a plant room (iAfrikan News). Literature revealed that WESSA has implemented green schools through Eco-schools and encouraged new schools to register (Dzerefos, personal and email communication, 2018, April, 18). President Jacob Zuma made a proclamation in 2014 that school teachers should be provided with laptops (eNCA, 2014), which are green technology machines that are paperless and could reduce pollution as less waste is produced. This proclamation complies with the South African Constitution (Act 108, 1996) that enshrines the right to a healthy environment for all citizens. Irwin and LotzSisitka report that the National Environmental Management Act (NEMA) of 1998 also emphasised the need for EE in all walks of life (in Loubser, 2014, p. 60).

The reasons for going green by most local governments in SA, namely Tshwane, Cape Town and Johannesburg, and thus implementing green buildings and transportation in their action plans, aroused the researcher's interest in green school ideology. Tshwane and Johannesburg local governments implemented the "A Re Yeng" and "Rea Vaya" Bus Rapid Transit (BRT) systems respectively. The BRT runs on compressed natural gas, the first in Sub-Saharan Africa to minimise its common carbon foot print (Pretoria North Rekord, 2017, October 6, p.1). Tshwane local government mayor, Mr Solly Msimanga said that:

> "*The city has two solar powered electric vehicle charging stations and was entering into partnership with the United Nations Industrial Development Organisation (Unido) and the South African National Energy Development*

Institute (Sanedi) to expedite the implementation of electric vehicle infrastructure in Tshwane" (Pretoria North Rekord, 2017).

In addition, Africa's greenest hotel, Cape Town's Hotel Verde in the Western Cape, practices green technologies (City Press trending, 2017, September, 17 p. 5) and this innovation intensified the researcher's curiosity. The hotel has its own wetlands, where birdlife flourishes and saves enough electricity a year to power 217 middle-income households by generating its own electricity through the use of wind turbines (City Press trending, 2017, September 17, p. 5). Furthermore, Nissan pioneered "travelling in an environmentally friendly fashion" by introducing Nissan Leaf vehicles, which are committed to taking climate change seriously and reducing greenhouse gas emissions (Pretoria North Rekord, September 8, 2017, p. 5).

The Soshanguve East Secondary school has the following green features: roof insulation, which reduces energy loss from the building; glazing that maximises natural light into the building and reduces energy loss; energy saving lighting with LED light fittings; rainwater harvesting; landscaping; insulated walls for heat conservation and soundproofing and a 120m^3 underground rainwater harvesting tank (iAfrikon.com). These modern technologies encourage sustainable resource use by the institution. Sustainable consumption does not necessarily mean the reduction of consumption, but involves the changing of patterns of consuming goods and services so as to minimise the use of natural toxic materials, emissions of waste and pollutants (Robbins, 2011, p. 361).

School role players need to follow these green directives and sustain their limited resources for future school generations to benefit too. The 2002 WSSD held in Johannesburg adopted concrete measures and targets for better implementation of Agenda 21 and the more recent MDGs that are all guidelines and measures to ensure sustainable development (United Nations, 2002). UNGAS (2015) formally adopted the universal, integrated and transformative 2030 agenda on SD along with a set of 17 goals and 169 targets.

Briefly, Education is at the heart of sustainable development (Loubser, 2014, p. 133). Green schools are high-performance schools or sustainable schools and reduce incidents of illness and absenteeism (Earthman, 2009, p. 264; US Health Report, 2015). Since the fruits of education ripen slowly, the leaders of tomorrow must be educated today by

tirelessly reminding all people that they share the same destiny and must unite to protect the planet Earth, whose resources have sometimes been overestimated, and that is the task of education (Unesco/Unep, 1978, p. 77).

1.6. RESEARCH QUESTIONS

Based on the above background of the study, the rationale and the problem statement underpinning this study, this research inquiry is guided by the need to explore issues related to schools in promoting SD and the consumption of resources at hand. Taking into consideration the need for green schools, this study is guided by the main research question: “What are the strengths, weaknesses, opportunities and threats to greening schools for sustainable development?” and research sub-questions guiding the study are as follows:

1. What is the nature of the knowledge of the role players in the Tshwane North District schools about greening the school?
2. How do the contextual factors in the Tshwane North District schools school shape the greening of the school?

1.7. RESEARCH APPROACH AND METHODS

This study viewed sustainable development and green schools as the central phenomena requiring exploration and understanding. Based on the aims and objectives outlined above, it was therefore appropriate that the approach of this study is qualitative and exploratory in nature. The qualitative and exploratory research approaches provide significant contributions to both theory and practice (McMillan & Schumacher, 2014, p. 344). The first phase of this study was carried out through focus group interview and observations (by means of field notes and an observation schedule). Document analysis was employed in phase two.

1.8. CLARIFICATION OF KEY CONCEPTS

The present study focused on EE occurring within a series of nested frameworks, namely sustainable development, green schools and school key role players. For the purpose of this study, it was appropriate to clarify the key terms of this investigation because these concepts appear throughout this study and are mostly used.

1.8.1. Environmental Education

The conceptions of environmental education can be summarised as education's response to environmental issues and risks (Le Grange, 2002, p. 83). According to Barratt and Hacking, Scott and Lee (2010), EE should not be just a theme in the classroom but should be the bricks and mortar (building blocks), the way that the classroom curriculum uses and generates its power. SD cannot be achieved without environmental sustainability. EE should be the first and foremost initiative towards SD, and then only can we move to sustainability.

1.8.2. Sustainable development

Kensler (citing UNESCO, 2005) defined sustainable development as “the will to improve everyone’s quality of life ... including that of future generations” (2012, p. 791-792). Sustainable development has to consider social, environmental and economic issues (Loubser, 2014, p. 132). Sustainability is the idea that humans can use and manage resources so that those resources can provide for human needs for as long as possible (potentially forever) (Spooner, 2012, p. 398). Sustainability is also the notion of using, without using up (Peacock, 2004, p.114).

1.8.3 Green school concept

A green school is a zero-waste-tolerant school building (Kensler, 2012, p. 794) that creates a healthy environment conducive to learning while saving energy and money and has a small carbon footprint on the environment. Green schools are wireless, fuel-less buildings, which utilise solar energy power, rainwater catchment, vegetative roofing, geothermal heating and cooling systems to name but a few (Kerlin et al, 2015). Schools’ labels such as Eco-schools, enviro-schools, green schools and sustainable schools should collectively be referred to as green schools (Kensler, 2012, p. 794).

1.8.4 School role players

The school role players, as one of the key terms in this study, is not solely the responsibility of the school principal. The DoBE has emphasised role players as shared responsibility (DoBE, 2016, p. 3). The school principal has the overall responsibility of leading and

managing the school and is accountable to the employer (DoBE, 2016, p. 8). The SMT consists of the principal, deputy principal and school-based heads of departments. The SGB consists of democratically elected member representatives from learners, teachers, nonteaching staff, parents as well as co-opted members from the community where the school is located (South African Schools Act (SASA), 1996). Together, the SGB and the SMT ensure that the school' s operational budget is managed carefully and responsibly so that the school has money for all of the programmes and activities it offers, communicating regularly and efficiently with all stakeholders and their constituencies (DoBE, 2016, p. 10).

1.9. PLANNING OF THE STUDY AND CHAPTER OUTLINE

Each of the chapters share a common structure which highlights the main points and makes clear what each chapter targets. Each chapter articulated the key concepts covered and displayed integrated thinking across the entire study. It also provided definitions of concepts throughout and selected further studies that might come out.

CHAPTER 1: ORIENTATION

This chapter provided a general overview of the study, which gives an introduction, the rationale, aims, objectives and research questions of the study. Background exploration regarding green SD in SA and globally is discussed from the past to the current state of knowledge around the area of research topic.

CHAPTER 2: LITERATURE REVIEW

This chapter provides literature exploration regarding green schools and education for sustainable development. It provides an overview of the existing literature including current knowledge on environmental education (EE), sustainable development (SD) and green school field globally and locally from South African contexts. It also examines global conferences and agreements, to gain as wide a perspective as possible of the research context including their impact in South African policies, to provide green, sustainable practices.

CHAPTER 3: THEORETICAL AND CONCEPTUAL FRAMEWORKS

This chapter unpacked core organising theories and concepts by outlining the conceptual frameworks of the study, which are the ecological democracy theory, the sustainability theory and the leadership complexity theory. This broadened the concept of green schools

in a wider ranging discussion and evidence-based practices. It framed the context of the research and also provided the theoretical perspectives guiding this study.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

This chapter introduced the readers to the research process and implementation in detail, which included the research design, approaches, paradigms, data gathering techniques used, ethical procedures, as well as rigour. It reported on the experiences of key role players at schools regarding sustainable development and greening schools' initiatives to answer the research question.

CHAPTER 5: RESEARCH RESULTS AND DATA ANALYSIS

This chapter presented the research results, data analysis and findings in order to derive meaningful findings from them and to answer the research. The chapter provided the analysis approaches employed. This included what is perceived as content, what data to analyse, the nature of levels, units of analysis and coding frames. Data was subjected to thematic content analysis followed by an interpretation of the analysed results.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

This final chapter interpreted the results and provided further discussion on how to foster and maintain green schools. It dealt with transitions within and beyond schools and lifelong learning journeys of those who are in management and governance positions in schools. It also suggested recommendations on transformation, action plans for the school organisation and orientation practices during capacity building.

1.10. CONCLUSION

The purpose of this study was to explore schools' experiences regarding green school resource management towards sustainable consumption. This study acknowledges the fact that sustainability is not easily achievable due to escalating price hikes on basic commodities. That is why sustainable development conferences are usually future-directed, namely vision 2030. The next chapter intends to explore literature corpus related to green schools' status in an attempt to explain the latest development and policy directives in SA and globally.

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

Literature review is a critical evaluation of what has been published by scholars. The literature review undertaken for this study was meant to explore the global and local contexts on the topic under study. The literature review helped this study to:

1. Provide the background to the proposed study and critically examine global conferences and agreements, including their impact in South African policies, to provide green, sustainable practices.
2. Establish the context of the topic, including current knowledge.
3. Evaluate reports in the literature related to the proposed study in order to effectively select and evaluate selected documents from primary and secondary sources of previous and current research articles on the topic.
4. Provide focus and discard irrelevant studies that did not cover the research topic.
5. Establish what knowledge and ideas has been established on the topic, guided by the research aim, objectives, research problem and research questions of the study.
6. Review similar studies on the nature of knowledge held by other role players in other contexts on contextual factors that shape the greening of the schools.

2.2. OVERVIEW

This chapter provides an overview of the existing literature on environmental education (EE), sustainable development (SD) and green school field globally and locally from South African contexts. Literature review has been undertaken in the following areas in order to gain as wide a perspective as possible of the research context: sustainable development and education for sustainable development; whole-school sustainability; high-performance schools; Eco schools; sustainable schools; green schools; green buildings; sustainability and sustainable resources.

"Green" is the term most used recently, and not all people understand why it is prefixed in most programmes and media trending outlets. For example, green schools, green machines, green hotels, green buildings, green houses, green movement, green economy, green growth and going green. The idea of "going green" has become

increasingly popular for industries, governments, communities and individuals, all of whom are behaving in more sustainable ways. This word has brought environmental issues and their potential solutions to the forefront of the global public eye (Strife, 2010). Most institutions of learning and government entities are now embracing the idea of going green.

Sustainability is a term that has gained popularity recently, meaning that a resource is used in such a way that it continues to be available (Botkin & Keller, 2012). Recent articles within media outlets have brought environmental issues embracing sustainable development and their potential solutions to the public eye (Strife, 2010, p. 2). In this chapter, the focus was on literature regarding green schools embracing the principle of sustainable development locally and globally. Literature review of primary and secondary sources, content analysis of relevant literature in terms of guidelines from different departments, legislations, conferences and the National Development Plan (NPC, 2013) provided an overview of the literature relevant to this study.

The concept “sustainability” appears throughout this study because sustainability is arguably the most important concept that human nature embraces in their everyday lifestyles. Spooner (2012, p. 396) maintains that sustainability is the idea that humans can use and manage natural resources so that those resources can provide for human needs for as long as possible (potentially forever). Factors found to be influencing sustainability from previous studies reported to be environmental, economic, social (le Roux, 2014, p. 10; Loubser, 2014, p. 130; Spooner, 2012) and ecological in nature (Kensler, 2012).

Researchers agree that sustainability must be achieved, but it is unclear how to achieve this, in part because the word is used to mean different things, often leading to confusion that causes people to work in contradictions. Previous studies state that sustainability is twofold, namely sustainability of resources and sustainability of the ecosystem (Foo, 2013, p. 7; Kensler, 2012). Economists and politicians use the term sustainability in reference to types of developments that are economically viable, do not harm the environment and are socially just (Botkin & Keller, 2012, p. 8).

Greening schools focus on sustainability (Kensler, 2012, p. 791). This is the rationale for sustainability to be used in this study because green is a pathway to sustainability (Ramsarup & Ward, 2017), promotes SD and provides opportunities for policy directives

that steers development towards a sustainable path. On the other hand, the UN conference on SD (Rio+20, 2012) emphasised green economies internationally due to their capability to reduce environmental risks and threats through its low carbon footprint. In this regard, school communities and its management need to respond positively towards international environmental change behaviour by planning proactive intervention strategies to support their respective school's immediate environment. The education system of SA needs to provide capacity-building workshops on greening the school's operational services to key role players to enhance green teaching and learning environments. Therefore, greening the school cannot take place in the absence of SD and vice versa and sustainability emanates from SD. Green school will be discussed as whole school approaches to address sustainability and sustainability will be discussed as SD (Kensler, 2012, p. 792).

It would be most appropriate in this chapter to also focus on the most important concepts of greening schools and sustainable development. The origin, significance, benefits and opportunities in implementation of green schools will also be discussed. In addition, the features of a green school are significant in order to promote sustainable development of both renewable and nonrenewable resources at school level. These discussions will mainly be on sustainable development and the latest technologies moving towards sustainability through green school focus.

2.3. THE HISTORICAL BACKGROUND OF SUSTAINABLE DEVELOPMENT

The concept of sustainable development (SD) and its implications to globalisation and recent international trends in political, economic and environmental systems will be discussed. This study deems it fit to explore the background around SD to later explain how it is intertwined with the "green" concept.

2.3.1 International sustainable development initiatives

The impact of SD and its implications of globalisation and international trends on political, economic and environmental systems will be discussed. Firstly, the series of the historical background of SD will be summarised as follows before discussions:

- Education for sustainable development Movement in 1900 (Gough in Stevenson, Brody, Dillon & Wals, 2013, p. 9).

- International Union for the Conservation Nature and Natural resources (IUCN, 1970).
- Stockholm Conference (UNESCO-UNEP, 1972).
- Belgrade Charter (UNESCO-UNEP, 1976).
- Tbilisi Declaration (UNESCO-UNEP, 1977)
- World Conservation Strategy (IUCN, 1980)
- Brundtland Report (UNESCO-UNEP, 1987)
- Moscow Environmental Conference (1987)
- Caring for the Earth (IUCN, 1991)
- Agenda 21, Rio de Janeiro (1992)
- Thessaloniki Conference (1997)
- Earth Summit + 5 in Rome (1997)
- Millennium year meeting (2000)
- World Summit on Sustainable Development in Johannesburg (WSSD, 2002)
- Barbados Programme of Action (BPoA, 2005)
- The Bonn Declaration (UNESCO, 2009)
- BPoA + 5 (2010)
- Summit on Millennium Development Goals (MDGs, 2010)
- United Nations General Assembly event (UNGAS, 2013)
- SAMOA Pathway (2014)
- United Nations Development Programme (UNDP, 2016)
- The World Association for Sustainable Development (WASD), Ocean Conference and the SDGs (2015)

The original work in the field of EE embracing SD was pioneered in the later part of the twentieth century by the Stockholm conference (1972). “The term *sustainability* was first used in the 18th century by the German forestry management practices” (le Grange in Stevenson, Brody, Dillon & Wals, 2013, p. 126). This term was then introduced into popular discourse by the Brundtland Report, which endorsed it through the document termed “*Our common future*,” of the World Commission on Environment and Development (WCED, 1987). The Brundtland Commission describes SD as “development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs” (Kensler, 2012, p. 792; Oghenokokwo, 2017; Foo, 2013). This definition contains two key concepts of *needs*, namely *needs* of the present generation and *needs* of future generations. This definition is still appropriate today in the governance and management of schools, to sustain the meeting of needs of these institutions for future generations who are not yet born. “Needs” includes essential needs of the world’s poor, to

which overriding priority should be given (SDG number 1: No poverty) to meet present and future needs. Basic needs like air, water, sanitation, energy and food, must be met, otherwise future school generations will suffer (Le Grange, 2013, p. 128). Future generations should not pay the price caused by the present generation.

In contrast, Le Grange (2013, p. 139) argues that the Brundtland Report is often mistakenly presented as the origin of SD. However, it should be noted that the Brundtland Report used the term SD broadly and ambiguously (Oghenekokwo, 2017) and as a central goal of EE in the 1990's (Tilbury, 1995, p. 198). This simply implies that sustainability is concerned about the present and future generations‟ survival. As Sauve' (1999) points out, for some people SD is the ultimate goal of EE, hence the term environmental education for sustainable development (EEFSD) (Gough, 2013, p. 9).

The United Nations Conference on Environment and Development (UNCED), Agenda 21 Earth Summit (1992) was adopted as a basis of measuring progress in SD (Oghenekokwo, 2017, p. 128). Later the conference on sustainable development (CSD, 1993); BPoA, (1994); United Nations General Assembly Special Session (UNGASS-19 Summit, termed Earth Summit + 5 of 1997); and the BPoA + 5 (1999) were held.

In the twenty-first century most conferences advanced on SD policies, namely the United Nation's (UN) community commitment to the achievement of eight Millennium Development Goals (MDGs) and embracing SD concerns (2000); World Summit on Sustainable Development (WSSD, 2002), held in Johannesburg, South Africa. The WSSD reaffirmed the educational objectives of the MDGs (Kariaga P, Kariaga, V, Nyando & Muliro, 2013, p. 246). The WSSD proposed the UN decade on education for sustainable development (UNDESD, 2005 – 2014) as a way of signalling that education and learning lie at the heart of approaches to SD (Kariaga, et al., 2013). The following series of conferences within the UNDESD were held: BPoA + 10 at Mauritius (2005); five-year review of the Mauritius (MSI +5) (2010); Rio + 20: *the future we want* (UNCSD, 2012); the high-level political forum on SD (2013) and SAMOA Pathway (2014). These conferences were held to advance lifelong learning (Oghenekokwo, 2017, p. 128).

After the UNDESD, the Addis Ababa Action Agenda (2015) was held, focussing on "our world: the 2030 Agenda on SD" by the UNDP. Within the 2030 Agenda, the World

Association for Sustainable Development (WASD, 2017) and Ocean Conferences were held. The ocean conference was named “our ocean, our future”. All of these conferences embraced sustainable lifestyles that do not harm the environment through economic, social and political activities or programmes.

SD has captured the attention of many experts around the world and today it is a widely known term (le Roux, 2014, p. 10). There are possibly hundreds of definitions of SD and many divergent interpretations as well as thousands of variations applied in practice (*Elliot*, 2013, p. 16 citing Gibson, 2005). The terms ‘*education for sustainable development*’ (ESD) and ‘*education for sustainability*’ (EfS) are often used interchangeably by different scholars and organisations. It is acknowledged that the terminology around sustainability is highly contested, with definitions varying according to contexts and perspectives (Ryan, 2011). Debates on EfS, ESD and sustainability will continue, and to minimise confusion, this study used these terminologies interchangeably to embrace SD, sustainability or living towards sustainable lifestyles.

This study appreciates the diversity of definitions and acknowledges that those views were explored in relation to their different contexts. This study aligned itself with the definition by Foo (2013, p. 7), who emphasing that “SD are those factors that enhance the health and knowledge of ecosystems, as well as address ecological and social challenges that humanity face now and in the future”. This study also defines SD as a holistic approach that addresses and promotes the minimisation of negative environmental, economic, societal, ecological and health effects in the school environment to enable the school to fulfil its obligation and functions of teaching and learning.

2.3.2 Sustainable Development Goals

The UN member states adopted the MDGs in 2000 and the current SDGs in 2015.

2.3.2.1 Millennium Development Goals

The millennium year meeting in 2000 by the UN General Assembly conference adopted the MDGs, which could be used by member states as indicators to monitor and assess progress and achievement towards SD (le Roux, 2014, p. 24) and commit to integrate the principles of sustainable development into country policies (Oghenekokwo, 2017, p. 128).

The aim of the MDGs was to achieve these goals by the year 2015. The MDGs are summarised in Table 2.1 below:

TABLE 2.1 8-Point Millennium Development Goals

Millennium Development Goals	**Target**	**Selected Environmental links**
1. To eradicate extreme poverty and hunger	To halve the proportion of people who suffer from hunger between 1990-2015	Livelihood strategies and food security of the poor often depend on healthy ecosystems and diversity of goods and ecological services they provide.
2. To achieve universal primary education	To ensure that by 2015, children everywhere will be able to complete a full course of primary schooling.	Cleaner air will decrease illnesses due to exposure to harmful pollutants. As a result, they will miss fewer days of schools
3.To promote gender equity and empower women	Eliminate gender disparity	
4.To reduce child mortality	To reduce two-thirds, the under-five mortality rate	Environmental factors such as poor indoor air pollution may increase the children's susceptibility to pneumonia
5.To improve maternal health	To reduce three quarters of maternal mortality ratio	Indoor air pollution and carrying heavy loads of water and firewood adversely affect women's health
6. To combat HIV/AIDS, malaria and other diseases	Reverse the spread of these diseases	Preventive environmental health measures are cost-effective than treatments
7. Ensure environmental sustainability	Integrate the principles of SD into country policies and programmes	Current trends of environmental degradation must be reversed in order to sustain the health and the world's ecosystems

8. To develop a global partnership for development	Cooperation with developing countries	Unfair globalisation practices export their harmful side-effects to countries that do not have effective governance

(Adapted from Elliot, 2013, p. 11)

Many countries developed national as well as local strategies and action plans as part of their commitment to SD processes. However, the limitations of the MDGs were its targets, which focused only on developing countries and were over-ridden by the 17-point SDGs with its 169 targets without prejudice to developing and developed countries (Oghenekokwo, 2017). The expansion of the 8-point MDGs by the 17-point SDGs was due to the failure of most targeted countries to achieve their set MDGs targets by 2015 (Oghenokokwo, 2017). Le Grange (2013, p. 33 citing Saith, 2006 and Easterly, 2009) also indicated that some limitations arose from the lack of achievement targets of some of the MDGs.

2.3.2.2 Sustainable Development Goals

UN General Assembly Conference in 2015 formally adopted the universal, integrated and transformative 2030 Agenda on SD along with a set of 17 SD goals, 169 associated targets and indicators. With this new, universal set of goals, targets and indicators, the UN member states are expected to use them to frame their agendas and political policies over the next 15 years (2015-2030). The 17 goals are summarised in Table 2.2 below:

TABLE 2.2 Sustainable Development Goals

Goal number	Short title	Relevant provisions
1	No poverty	End poverty and all its forms.
2	Zero hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
3	Good health and wellbeing	Ensure healthy lives and promote well-being for all at all ages.
4	Quality education	Ensure inclusive and equitable education and promote lifelong learning.
5	Gender equity	Empower all women and girls.
6	Clean water and sanitation	Sustainable management of water and sanitation for all.
7	Affordable clean energy	Access to reliable, sustainable and modern energy for all.
8	Decent work and economic growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
9	Industry, innovation and infrastructure	Build resilient infrastructure inclusive and sustainable and foster innovation.
10	Reduced inequalities	Among countries.
11	Sustainable cities and communities	Make cities and human settlement inclusive, safe, resilient and sustainable.
12	Responsible consumption and production	Ensure sustainable consumption and production patterns.
13	Climate action	Take urgent action to combat climate change and its impacts.
14	Life below water	Conserve oceans or seas and marine resources for sustainable development.
15	Life on land	Protect, restore and promote sustainable use of terrestrial ecosystems, manage forests, combat desertification, halt and reserve land degradation and biodiversity loss.

16	Peace, justice and strong institutions	Build effective, accountable and inclusive institutions at all levels and strengthen the means of implementation
17	Partnership for the goals	Revitalise the global partnership for sustainable development.

http://sustainabledevelopment.un.org

SDGs, as reported by the UN, indicate that a green school is central to decrease the vulnerability of SDGs 1, 2, 3, 4, 6, 7, 10, 16 and increase the effectiveness of SDGs 8, 9, 11, 12, 13, 15, 17 (Oghenekokwo, 2017). SDGs 1, 2, 3, 6, 7, 12, 13 and 15 are directly influencing the green sustainable school context on which this study focuses. Reducing over-consumption of fossil fuels and pollution in schools is green health driven and embraces SDG 3. Greening school yards with trees, grass, food and flower gardens embraces SDGs 1, 2, 3, 12, 13 and 15.

2.3.3 Sustainable Development Goals initiatives in South Africa

In SA, "the political power exceeds all forms of power and its elements of politics (e.g. laws and regulations) and controls different processes in the country to maintain order" (le Roux, 2014, p. 58). Legislations pre-1994 by British colonisers and apartheid systems will not be included in this history since they were not inclusive, but oppressive to humanity. The legislations and policies mentioned below underpin the South African history post 1994 democratic elections.

2.3.3.1 South African Constitution (1996)

The Constitution is the supreme law of the country (Constitutional Court of South Africa, 2009). "It provides the legal foundation for the existence of the republic, sets out the rights and duties of its citizens and defines the structure of the government" (le Roux, 2014, p. 62). According to the Constitution of the Republic of SA, the Department of Environmental Affairs (DEA) is mandated to ensure that SA effectively manages the environment for the benefit of current and future generations, according to the Bill of Rights in section 24 (DEA, 2010, p. 5). This mandate endorses the Brundtland Report (1987). The DEA is mandated to:

"*implement international agreements on the environment, and to provide leadership, policy and institutional frameworks to facilitate effective service delivery in the environmental sector in relation to national environmental mandates as outlined by the National Environmental Management Act, 102 of 1998 and associated legislation*" (2010, p. 5).

The DEA "covers environmental factors of air quality; waste and chemical management; pollution incident management; environmental impact management; conservation and sustainable use of biodiversity; marine and coastal management; as well as cross-cutting support functions such as environmental law compliance, EE, training and community empowerment" (2010, p. 6). It excludes water, which is regulated by the Department of Water Affairs (DWA), the Department of Agriculture, Forestry and Fisheries (DAFF) and the Department of Minerals and Energy (DME). These departments embrace sustainable development of the national resources of the entire country.

2.3.3.2 The National Environmental Management Act (NEMA, 1998)

Development must be socially, environmentally and economically sustainable (NEMA, 1998). According to NEMA (1998), attempts to integrate three facets (pillars of sustainable development) into decision making are extended through the following programs:

- environmental protection
- economic development
- social upliftment
- need to ensure that environmental considerations are incorporated into economic and other development plans, projects.

The National Environmental Management Act (NEMA, 1998) defines SD as:

1. *integration of social, economic and environmental factors into planning, implementation and decision making.*
2. *to ensure development serves present and future generations.*

According to NEMA (1998), SD requires consideration of all relevant factors:

1. *Disturbance of ecosystems and loss of biological diversity are avoided; where cannot be avoided, minimised and remedied.*

2. *Pollution and degradation of environment are avoided.*
3. *Disturbance of landscapes and sites that constitutes the nation's cultural heritage is avoided.*
4. *Waste is avoided.*
5. *Use and exploitation of non-renewable natural resources is responsible and equitable.*
6. *Development use and exploitation of renewable resources and ecosystems do not exceed levels beyond which integrity is jeopardised.*
7. *Risk averse and cautious approach is applied.*
8. *Negative impacts on environment and on people's environmental rights be anticipated and prevented.*

2.3.3.3 The National Environmental Management Biodiversity Act 10 of 2004

The National Environmental Management Biodiversity Act 10 of 2004 defines "sustainable" in relation to the use of a biological resource as the use of such resource in a way and at a rate that it:

1. *would not lead to its long-term decline;*
2. *would not disrupt ecological integrity of ecosystems in which it occurs; and*
3. *Would ensure its continued use to meet needs and aspirations of present and future generations of people.*

2.3.3.4 The Local Government Municipal Systems Act 32 of 2000

The Local Government Municipal Systems Act 32 of 2000, refers to environmentally sustainable as the provision of a municipal service in a manner aimed at ensuring that:

1. *Risk of harm to environment and human health is minimised to an extent reasonably possible under the given circumstances;*
2. *Potential benefits to environment and to human health and to safety are maximised to an extent reasonably possible under the given circumstances;*
3. *Legislation intended to protect environment and human health and safety is complied with*.

2.3.4 Sustainable Development Goals implementation in South Africa

The South African NDP is based on these goals to solve the country's problems. The NDP identified the following problems: "economic, environmental sustainability, improving education and training, fighting corruption by accountability, building a capable and developmental state" (NPC, 2013, p. 11). It aims to eliminate poverty and reduce inequity by 2030. These aims can be achieved by engaging schools and their leadership on how these goals might be achieved.

Eradicating poverty might eliminate depletion of resources, especially in South Africa, where most communities in cities and rural areas are on social wage. The country cannot afford the current level of overconsumption of resources with the high rate of unemployment. Schools also need financial resources to offer equitable, compulsory, quality and free education for all. That is why Value Added Tax (VAT) was increased from 14% to 15%. This indicates that the country is living unsustainably and experiencing constraints towards quality service delivery.

To embrace sustainable development, the government needs to engage all community members, old and young, to be active participants in working towards sustainable development goals. Schools, as hubs or vendors of communities, might help to transform and prepare the society to act in new creative ways of today, so that future school generations can thrive. Schools need to engage and incorporate sustainability solutions into their physical infrastructure, social, economic, educational and technological programmes. These sustainability solutions need to be the school's organisational culture on its policies and day-to-day operations.

Policy makers at school level, the SMT and SGB need to be inducted on these sustainable goals, since they are part of the global world, and all of the planet's resources are shared. The ESD goals, as embraced in the NDP, need to empower schools to lead in the transformation to a sustainable future. The whole-school approach should give the directive to pursue sustainability. "There is no magic formula to SD, despite the enthusiastic rhetoric, technical guidelines and the celebrated greening of development agencies, corporations, governments at a local and global level" (Adams, 2009, p. 37). Sustainability challenges

cannot be solved solely through school leadership, which should engage all stakeholders through legislation, policies and bylaws guided by the future of the institutions.

SA is located within the context of a number of international (UN and Brics in 2010) and regional initiatives (African Union and Southern African Development Community) which aim to improve the quality of education, environment, economy and health of its citizens. The South African NDP is grounded by MDGs and SDGs to solve the country's problems. The NDP identified the following problems: economic, environmental sustainability, improving education and training, fighting corruption by accountability and building a capable and developmental state (NPC, 2013, p. 11). It aims to eliminate poverty (cross reference to SDG 1) and reduce inequity (cross reference SDG 5) by 2030. These aims can be achieved by engaging schools and their leadership on how these goals might be achieved.

Eradicating poverty might eliminate depletion of resources, especially in SA, where most communities in cities and rural areas are on social wage. The country cannot afford the current level of overconsumption of resources with the high rate of unemployment. Schools also need financial resources to offer equitable, compulsory and free quality education for all (SASA, 1996); (NNSSF, 2018). Recently, value added tax (VAT) was increased from 14% to 15% due to the fact that SA, as a developing country (Society for the Study of Reproduction, 2017) which is the second richest country in Africa (itnewsafrica.com), has become a borrower from the International Monetary Fund (IMF) along with the Word Bank since 1944 (Carley & Christie, 1992, p. 100). This indicates that the country is living unsustainably with its main gross domestic products (GDP) emanating mainly from personal taxes (wages and salaries) and VAT. To make matters worse, a proclamation was made by the president for free tertiary education to be initiated in 2018 without proper planning (ENCA, 2018).

To embrace SD, the government needs to engage all community members, including the youngest, to be active participants in working towards the 17 SDGs. Schools, as hubs and vendors of communities, can help transform and prepare society to act in new creative ways of today, so that future school generations can continue to benefit from natural resources. Schools need to engage and incorporate sustainability solutions into their physical infrastructure, social, economic, educational and technological programmes.

These sustainability solutions need to be the school's organisational culture on its policies and day-to-day operations. This is because schools are allocated funds by the state through the NNSSF and SASA legislation.

Policy makers at school level, (SMT and SGB) need to be inducted on these SDGs, since they are part of the global world vision, and planet's resources are finite and shared. The SDGs, as embraced in the NDP, need to empower schools to lead in the transformation to a sustainable future. The whole-school approach should give the directive to sustainability. There is no magic formula to SD, despite the enthusiastic rhetoric, technical guidelines and the celebrated greening of development agencies, corporations and governments at a local and global level (Adams, 2009, p. 37). Sustainability challenges cannot be solved solely through school leadership, as the latter needs to be capacitated by relevant legislated state departments, namely the Department of Environmental Affairs (DEA), Department of Water Affairs (DWA), Department of Agriculture, Forestry and Fisheries (DAFF) and the Department of Minerals and Energy (DME). These departments should engage school leadership through legislation, policies and bylaws towards sustainable consumption of the school resources for future institutional survival.

Sustainable consumption within the school environment, without harming all living species in the school's ecosystem and the environment, embraces SD. In the context of the school environment, all resources present in the school, including the knowledge, experiences and expertise of staff and students, as well as material resources, need to be used sustainably to ensure future availability rather than depletion (Graham, Berman & Bennett, 2015, p. 60). The disturbance of ecosystems and loss of biological diversity should be avoided or, where they cannot be altogether avoided, minimised and remedied (NEMA, 1998).

2.4. SUSTAINABILITY SPHERES

Most literature often describes sustainability as having three spheres or areas of influence (Spooner, 2012, p. 398; Kensler, 2012, p.793; Elliot, 2013, p. 20; le Roux, 2014, p. 18; Loubser, 2014, p. 130), namely social (people), economic (prosperity) and environmental (planet Earth) concerns (Kensler, 2012, p.792). The state must respect, protect, promote

and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities (NEMA, 1998).

2.4.1 Social sphere

Social factors such as equity must be pursued, political participation by societies, gender equity and decent provision of social services such as education, health (le Roux, 2014), sanitation and affordable houses. The social sphere of sustainable development, also referred to as human capital (Le Grange et al., 2014) of sustainability includes educating, community building and providing equal opportunity for everyone to live in a clean and healthy environment (Spooner, 2012). The social pillar is vital for sustainable development. If societies are not living sustainably, the possibility of fighting for survival becomes eminent.

2.4.2. Economic sphere

The economic sphere, also referred to as human-made capital (Le Grange et al., 2014) of sustainability includes the economics of sustainable growth, production and consumption of goods and services as well as the findings of research into sustainable methods of production and technology (Spooner, 2012, p. 398). Goods and services must be produced on a constant basis and sectoral imbalances should be avoided to stop damages to agricultural and industrial production (le Roux, 2012, p. 10).

2.4.3. Environmental sphere

The environmental sphere of sustainability, also referred to as natural capital (Le Grange et al., 2014) includes natural resource management, environmental protection and conservation (Spooner, 2012). According to NEMA (1998), the environment means:

> "*the surrounding within which humans exist and made up of the land, water and atmosphere of the Earth; micro-organisms, plants and animal life; the interrelations among living and non-living things; and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.*"

Resources should be stable and available, but should not be overused or exploited and be protected for atmospheric stability (le Roux, 2014). These spheres can be summarised in Figure 2.1 below:

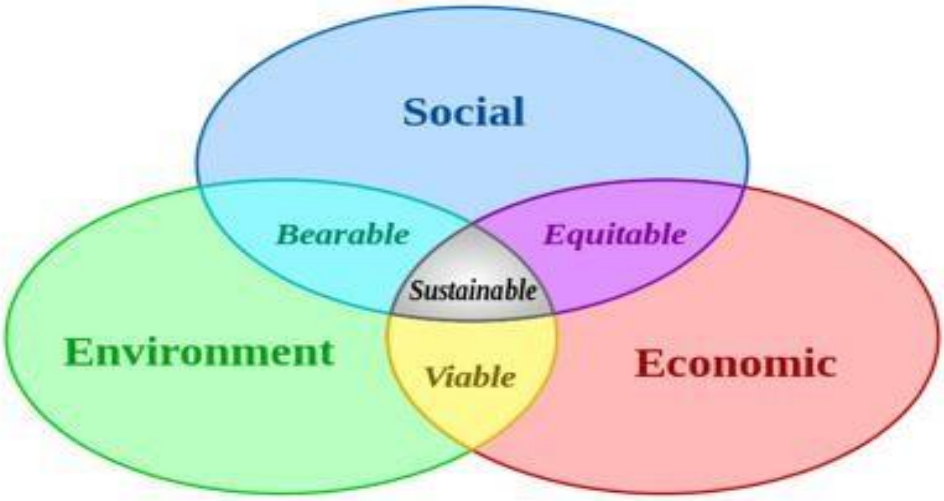


Figure 2.1: Nested model of sustainability (DEA, 2012)

The SDGs are grounded on these three pillars of SD. These goals are aimed specifically at improving sustainability in all parts of the world. The SDGs address problems currently being experienced by communities. If these goals are pursued by all global countries which adopted the UNDP, a change would likely be evident by the end of 2030. All 17 SDGs are crucial, and if countries can achieve them there is a probability that these countries will improve dramatically.

The 17-point SDGs are all built on three pillars of sustainability in this way:

- goals 1, 2, 3, 4, 5, 6, 7, 10, 11, 16 and 17 fall under the social pillar;
- goals 13, 14 and 15 fall under the environmental pillar; and goals 8, 9 and 12 fall under the economic pillar.

SA has adopted the systems approach to sustainability (Figure 2.1), which indicates the interdependence of all three spheres. This implies that “the economic system, socio-political and the ecosystems are embedded within each other, and then integrated through the governance system that holds all other systems together in a legitimate regulatory framework” (DEA, 2016, p. 20). This indicates that “if the environmental sphere (air, water and food) collapses, then the society and the country’s economy will collapse due to the co-existent nature of these spheres. “Environmental sustainability provides services to the economic and social spheres” (DEA, 2016, p. 20).

2.5. GREEN SCHOOLS FOR SUSTAINABLE DEVELOPMENT

2.5.1 International context

"Most studies acknowledge the fact that 'green school' has different meanings to different people, but all hold a genuine commitment to sustainability (Loubser, 2014, p. 133). In a six-year longitudinal study of a newly constructed green middle school in the central Ohio River Valley of the Midwest United States (US), Santos and Bennett (2018, p. 3), characterised a green school as:

1. *A school building including at least one, but preferably many, types of environmentally sustainable infrastructures and/or and practices.*
2. *Teachers are using the infrastructure and/or practices to enhance instruction.*

According to the Centre for Green Schools in the US, the Green Building Council, "a green school" is a building or facility that creates a healthy environment conducive to learning as well as saving energy (Meiboudi, Lahijanian, Shobeiri, Jozi & Azizinezhad, 2016, p. 237). On the other hand, Earthman defines a green school as a building that is designed to conserve energy and water and is constructed from environmentally friendly building materials (2009, p. 259). The Green School Alliance (n.d) maintains that going green is transformation to a sustainable future, to nurture and fortify sustainable school communities. Some scholars refer to green schools as high-performance schools (Earthman, 2009, p. 260; Kensler, 2012, p. 794), sustainable schools (Earthman, 2009, p. 160; Peacock, 2004, p. 96) or Eco-schools (John, Mei & Guang, 2013, p.184; Kensler, 2012; Meiboudi et al., 2016, p. 237; Peacock, 2004). Most studies on green schools do not lack sustainability or sustainable development in their literature. "Sustainable schools are not just about the design, they are also about how people live in their houses" (Peacock, 2004, p. 96) and schools. In a nutshell, a green school is a building whose occupants embrace zero-waste through sustainable development.

2.5.2 South African context in Environmental Education

EE first reached South Africa (SA) in the 1970s stimulated by the Stockholm Conference (1972), Belgrade Charter (1975) and the Tbilisi Declaration (1977) (Irwin, 1992). The

milestone in the development of EE in Southern Africa was the first international conference on EE in SA in 1982, which led to the formation of the Environmental Education Association of Southern Africa (EEASA) (Janse van Rensburg & Jenkin, 1999, p. 7). The White Paper of EE formulated EE objectives at all government levels, including formal education (Department of Environmental Affair and Tourism, 1989). Then teacher education incorporated EE in the teacher training curricular (Loubser & Ferreira, 1992, p. 33). When SA became a democratic state in 1994, drastic changes were made whereby environmental concerns were emphasised in many policy documents, namely, the Reconstruction and Development Programme in 1994; the White Paper of Education and Training (Department of Education, 1995); the Constitution (Act 108 0f 1996). EE was first introduced in school curriculum in 1997 by Curriculum 2005 (C2005). EE content was included in the National Curriculum Statement (NCS) (Department of Education, 1997), the Revised National Curriculum Statement (RNCS, 2001) and the current Curriculum Assessment Policy Statement (CAPS, 2012). The National Environmental Education Programme (NEEP) and the Environmental Education Curriculum Initiative (EECI) conducted a project on community development for EE in new learning areas (Bornman, 1997) of the curriculum. SA further acknowledged the Stockholm agreements and Rio de Janeiro of 1992 during the WSSD in 2002, regarding the need of humankind to act together to protect the global environment (United Nations, 2002, p. 159).

SA has adopted different labels for green schools. Firstly, the international Eco- schools programme by the Foundations for Environmental Education (FEE) are examples of green schools in SA. In SA, Eco-schools are supplemented with localised competitions in which the state runs green school competitions where schools are rated according to their improved environmental performance. Eco-schools do not boast modern technologies but register under the FEE programme developed to support environmental learning. Secondly, STEEM (Science, Technology, and Engineering, the Environment and Mathematics (Dierking, Falk & Storkdieck, in Stevenson, et al., 2013, p. 34) are also regarded as green schools. Thirdly, schools exposed to modern technology and with sustainable infrastructure are also termed green schools. Green schools' initiatives in SA are still pilot projects between the DEA and LEDET (Bizcommunity. 2017). The design of these schools needs to be radically transformed (greenbuildingafrica) and rolled out to meet international standards.

2.6. HISTORICAL BACKGROUND OF GREEN SCHOOLS

The history of green ideology and green schools is discussed from indigenous or traditional knowledge to international and local contexts.

2.6.1 Indigenous knowledge

Knowledge of indigenous people (that is indigenous ways of knowing and doing things) have been variably termed indigenous knowledge (IK), indigenous knowledge systems (IKS), endogenous knowledge, local knowledge, traditional knowledge, traditional knowledge systems, traditional ecological knowledge and traditional environmental knowledge (Shava, in Stevenson, et al., 2013). IK has been passed on from generation to generation. The early caretakers of the environment in America were the indigenous people (Gay, 2015, p. 9). During the 1950's, people lived *green* because that was the way things were done (Gay, 2015, p. 1) especially from the IK. Glass bottles from milk, cold-drinks and beers were returned to a store, sterilised and reused. Some parents today continue to wash baby cotton cloth nappies or diapers, hanging them in the sun to dry for reuse. Disposable nappies are a large contributor to landfill waste sites, thus eco-nappies are recommended. When these babies outgrow their nappies and clothes, their younger siblings in the family reuse them. These practices are cost-effective and reduces overconsumption and energy use (Gay, 2015). The colour green is associated with plant leaves that manufacture their own food through photosynthesis. Planting a food garden is a common activity in many villages. As such, green is associated with environmentally friendly goods and services. Shava (in Stevenson, et al., 2013,) further states that:

> "*One of the key concerns rising among indigenous people is the unequal and unjust representation of indigenous or local knowledge systems. This concern is directly stated to the processes and impact of colonisation. Concern with representation include invalidation, devaluation, subjugation, appropriation, misappropriation, misrepresentation, marginalisation, primitisation, decontextualization, exclusion and rejection of IK that has been perpetuated primarily by modern Western knowledge institutions.*"

Scientists have an important role to play in conducting research about a problem, for example, how potatoes grow. But for solving a problem such as how to grow potatoes, it is

thought that farmers have a lot to teach scientists. It has become clear that there are differences between rural people in terms of their knowledge and power. “This issue is not just about whose knowledge counts, but who has access to what knowledge? Who can generate new knowledge and how” (Elliot, 2013, p. 228-229). Odora Hoppers (2014) has a controversial view about IKS, stating that:

“*From IKS perspective, research as we know it is intricately linked to European imperialism and colonialism. It is a history that galls indigenous communities that Western researchers and intellectuals can so glibly assume to know all that it is possible to know of local people and systems on the basis of shallow altruism or brief encounters with some individuals; seek to deny them further opportunities to be creators of their own culture …; (and) deny them the validity of their knowledge (citing Smith, 1991, p. 1)*.”

The 1992 Earth summit signified the entry of IK into the mainstream international environmental and developmental discourse (Shava in Stevenson, et al., 2013). According to FitzGerald, Mc Lennon and Munslow, (1997, p. 4) SD is a concept in harmony with deep-seated African cultural values concerning the continuity of the dead (ancestors), the living and the yet to come. That is why most African embedded names originate from environmental contexts, for example Pule (rain), MMapule (mother of rain), sefako (hail), khumo (wealth). IK appears to be the most widely used internationally, as it is knowledge embedded in culture, practices, language and dynamism, and is reflective to change over time in the lived environment and through eternal influences (Shava, in Stevenson, et al., 2013, p. 36).

To work solely with the Western ideology of greening is too narrow. The embodiment of South African culture and lifestyles influences role players on how they do what they do in their schools. Since schools are made up of people, their cultures transcend to their schools’ cultures and policies whereby Africanism philosophy is embraced. Africanism embraces the philosophy of “*Ubuntu*” which means that each individual ‘s humanity is ideally expressed in a relationship with others (Lefa, 2015, p. 5). It is *Ubuntu* to respect the environment which we all depend on to survive and no learning can take place in a chaotic environment. Hence, the holistic view of “*Ubuntu*”. CAPS revealed understanding of *Ubuntu* by including the values of *Ubuntu* in its principles, purposes and aims (Lefa, 2015, p. 9).

Credo Mutwa stated in his “African environmental tradition” study that there was once a time in Africa when the protection of living things was part and parcel of the religion of the people (The Enviropaedia, 2004, p. 8). He opposed the Christian Bible, which says man (humankind) was given mastership over the Earth and every living thing that was upon it. Africans were not taught this principle prior to the era of colonialism. He further said that “when Europeans came to SA, the land was teeming with all kinds of animals and indigenous plants, which the local people protected by providing punishment to those who killed them, polluted water sources and cut down endangered plants like the large acacia tree” (The Enviropaedia, 2004).

2.6.2. The origin of green education internationally

The field of green education and SD dates back almost four and a half decades ago to the Stockholm Conference of the human environment (1972). This was the first intergovernmental conference to collectively address people and the environment. The recognition that consumption is a necessary component of SD emerges from the UN conference on environment and development (UNCED) and the publication of Agenda 21 (Robbinson, 2011, p. 361; Adams, 2009, p. ix). Agenda 21 is an internationally agreed action plan for the worldwide implementation of SD held in Rio de Janeiro, Brazil, in 1992 (Robbinson, 2011, p. 10).

The green school concept was introduced in Europe in the 1990’s and has rapidly spread from country to country worldwide, sometimes referred to as Eco-schools (John, Mei & Guang, 2013, p. 184). International green school efforts have been initiated worldwide. For instance, the International Eco-Schools programme was started by the International Foundation for Environmental Education (FEE) in 1994 (Meiboudi, et al., 2016). The programme offers a flexible approach for schools to implement an Environmental Management System (EMS), called seven steps, which is based on EMAS/ISO14001 standards.

2.6.2.1 Green schools’ initiatives in Chinese communities

In Taiwan, the Peoples’ Republic of China and Hong Kong, evidence of EE can be found in government environmental policy documents, government educational reform

documents, publications of non-governmental organisations academic papers, books and schools (John et al., 2013). The number of green schools, sometimes referred to as Eco-schools, increased from 3 200 in 2000 to 35 800 schools in 2006 in China (John et al., 2013).

2.6.3 The origin of green education in South Africa

Green school efforts have been initiated worldwide by the International Eco-schools' programme started by the FEE in 1994 (Meiboudi et al., 2016, p. 236-237). The programme offers a flexible approach for schools to implement an Environmental Management System (EMS). A similar study was conducted by Hens, Wiedemann, Raath, Stone, Renders, Graenhals and Rochter (2010) in SA with the aid of universities in 39 primary schools in northern Gauteng and southern Limpopo provinces (Meiboudi et al., 2016; Kanyiba, Richter & Raata, 2014). The Wildlife Environmental Society of South Africa (WESSA) has implemented green schools as Eco-schools in SA since 2003 and encouraged schools to register (Carvello, 2009). This programme by WESSA is aimed at creating awareness and action around environmental sustainability in schools and their surrounding communities as well as supporting EfSD in the national curriculum. Carvello (2009) states that:

> "*The Eco-Schools Programme is currently being implemented in more than 27 countries around the world by non-government organisations and incorporates the 'whole school approach' in its programme. In South Africa, this programme started in 2003. The Eco-Schools Programme is not part of the formal education system. This is a serious flaw as participation by schools is voluntary and not compulsory. Hence the low level of registration by schools to participate in the Eco-Schools Programme and the evident lack of support by teachers for the programme. The success of the aims and objectives of the Eco- Schools Programme is left in the hands of the few dedicated teachers who are faced with the arduous task of convincing the entire school community to get involved.*"

According to WESSA, Eco-schools consist of nine thematic areas, namely community and heritage; biodiversity and nature; health and wellbeing; marine and coastal; climate change; waste; school grounds; eco-tourism and water transport.

The inaugural SA Green Schools Programme (SAGSP) was launched in Polokwane on 25 April 2017 as a pilot project between the DEA and Limpopo Economic Development Environment and Tourism (LEDET) and learners out of 105 schools participated

(Bizcommunity, 2017). The initiatives consisted of six thematic areas, namely waste management; energy efficiency; water management; landscaping, tree planting and beautification; public participation and community empowerment and leadership and institutional management.

Contrary to these initiatives, Green Building Africa (GBA) argues that there are no green schools in SA (http://greenbuildingafrica). GBA states that SA is hopelessly ill-prepared when it comes to the everyday consequences of climate change, with four million people in Cape Town running out of tap water in 2017. The GBA propose a massive shift from conventional teaching methods and that schools' designs need to be radically transformed to be net carbon zero with green features.

2.7. GREEN FEATURES OF A SCHOOL

Green features are embedded in infrastructure, products and services that consumers adopt to save and protect the vulnerable environment in which we need to survive. Many people believe that sustainable practices are the responsibility of the government and the local municipality. However, each of us, young and old, from all social categories, play a role in sustainable green living. In a study by Santos and Bennett (2015), the following green features were identified: natural daylight harvesting; advanced geothermal HVAC; insulated concrete forms; solar light tubes for CO2 monitoring systems; energy efficient kitchen design and appliances; LED parking lot lights and task lamps; energy efficient hot water; security lighting; water bottle refill stations; electric meters for multiple zones; rain water catchment systems used for toilet flushing; vegetative roofs; rain barrels; rain gardens; system vital screen display of data; low energy drinking fountains as well as the reduction of energy construction methods and materials.

In South Africa, the Gauteng Department of Education opened a new green school, Soshanguve East Secondary School, which has the following green features: roof insulation to reduce energy loss from the building; glazing that maximises natural light; LED light fitting; underground rainwater harvesting; landscaping and insulated walls for heat conservation (iAfrikan.com).

2.7.1 Green sustainable infrastructure

Physical resource material of the school includes infrastructure, such as green school building (outdoor and indoor facilities), playgrounds, equipment, uniforms, water and school furniture. Examples of green sustainable infrastructure are: geothermal heating and cooling systems; solar energy generation; rainwater catchment; vegetative roofing; high performance designs and energy conservation practices (Kerlin, Santos & Bennett, 2015).

2.7.2 Green energy

Green energy refers to hydropower, solar power, wave power from oceans, wind power, bio energy, geothermal, methane gas (generated from cow manure, chicken waste and landfills) and nuclear power energy, all of which are renewable. These energy sources are newer, cleaner technologies which are eco-friendly and reduce greenhouse gas emissions. However, nuclear power plants are not regarded as safe enough for widespread implementation (Gay, 2015). Schools could install solar panels on their school roofs; change to compact fluorescent bulbs or LED bulbs; replace 40-watt lightbulbs to 3-way LED bulbs; use smart meter devices to monitor their energy use or buy local goods that reduce transportation and fuel costs.

Peters states that President Barrack Obama, in his address on the US economy at Georgetown University (April 14, 2009), emphasised the promotion of and investment in clean green energy technologies designed to utilise renewable resources and promote energy efficiencies while reducing the dependency on Middle Eastern oil (2013, p. 498).

2.7.3 Green health

Green health refers to the absence of pollutants in buildings, playgrounds, food or kitchens, both indoors and outdoors. This is ecological due to the fact that pollutants are a major cause of allergens that cause allergic reactions in the public. It should be noted that atmospheric gases from pollutants cause global warming, leading to skin diseases, cancer and cataracts to name but a few, and is detrimental to public health and of flora on the school premises (Robbinson, 2011, p. 78). If ventilation is poor at schools, learners will suffer from headaches, drowsiness and loss of concentration (Meibuodi, 2016, p. 238).

This is a concern regarding environmental pollution and conserving natural resources. Healthy schools will ultimately reduce absenteeism among learners and personnel. Walking to school should be encouraged where possible since it is a climate change, obesity, diabetes and safety intervention (Strife, 2010, citing Boerenstein, 2007).

President Barrack Obama's White House also engaged in gardening on site. On the other hand, the first lady, Michelle Obama, began overseeing school children as they planted and harvested vegetables, berries and herbs in her effort to promote locally grown food and more healthful eating in 2009 (Gay, 2015).

2.7.4 Green sustainable IT equipment

Technology infrastructure is technological equipment used to improve technology systems and structures in a school. E-participation by schools through mobile phones, laptops, e-banking, e-books etc. improves service delivery and teaching and learning effectiveness at school. Rolling out webportals to schools facilitates e-participation by schools. SA does not have policies in education to facilitate green lifestyles in the right direction (le Roux, 2014, p. 110). Since SA is the leader in ICT developments in Africa (le Roux, 2014, p.111 citing Mulula & Mostert, 2010, p. 4), e-books should be introduced in schools. Schools should recycle old and unused electronic items such as computers, laptops, tablets, cell phones, copiers, calculators etc. since toxic waste, especially e-waste, contaminates both ground and water supplies (Robbinson, 2011). Today, there is progress on online registration of learners used by the GDE to reduce paper use.

2.7.5 Green transport

Schools should try to use personal transport which is cheap and efficient such as bicycles, lift clubs, public transport and solar powered vehicles, which reduce global warming and the greenhouse effect. Walking and riding bicycles to school saves energy, is cost-effective, cuts down on pollutants from vehicles that contribute to global warming and promotes healthy standards of living. President Cyril Ramaphosa indicated in a parliamentary debate about "land reform in South Africa" that land in urban areas should be released by municipalities to the people, to enable people to be closer to the economic centres of the country and their places of work (EncaNews, 2018, August). This move is green because it will limit the greenhouse effect by lowering carbon footprints in the cities.

2.7.6 Green school waste management

Schools should embark on recycling, reusing, reducing and rethinking about waste to raise funds as much as possible through these projects. LTSM in terms of paper, stationary, bottles, cans, furniture, plastic, textbooks and equipment should be recycled to recycling companies like Nampak for fund raising purposes. Recycling is good for the environment and brings money back to the school coffers, rather than relying on fossil fuel which is non-renewable. What is the whole world going to do when it runs out of fossil fuels? That is the question which humanity need to resolve. Other common green school waste management practices are: buying green products; participating in green projects; conserving and planting trees and gardens; living a low carbon footprint; recycling, reducing and reusing resources.

2.8. GREEN SCHOOLS TOWARDS SUSTAINABLE DEVELOPMENT

The phrase “towards sustainable development” implies that the researcher acknowledges the fact that the present practices are not sustainable in schools and communities. UN agreements encourage member states to move towards SD in all levels of governments, since it is difficult to achieve sustainability. Continuation with our present paths of overconsumption, pollution, depletion, deforestation, desertification and degradation of ecosystems and resources will not lead to sustainability. UNDESD (2005-2014) and UNDP (2030) are future directed for a decade and 15 years respectively. Both these visions provide goals to be achieved within those time frames. UNDESD proposed eight MDGs and UNDP proposed 17 SDGs.

However, Botkin and Keller (2012, p.9) introduced this SD model:

- Evolutionary rather than revolutionary;
- Inclusive not exclusive;
- Proactive not reactive;
- Attracting not attacking;
- Assisting the disadvantaged, not taking advantage.

Everyday school leadership around the globe makes significant decisions as consumers with respect to the use and acquisition of school resource materials for operational purposes. These material acquisitions influence the school’s annual, monthly and weekly budgets. The school management teams (SMTs) and school governing bodies (SGBs) or

school boards (SBs), as role players of the school, are expected to use these resource materials sustainably. School resource materials include learner teacher support materials (LTSM), heating and cooling the school building and offices, travelling as drivers or commuters etc. These decisions tend to be driven by economic constraints due to the escalating prices of goods, fuel, taxes and transport. Ultimately, green school's ideology tends to seek out sustainable consumption methods. Sustainable consumption cannot be separated from how consumption is practiced and experienced by the school community from social, economic and environmental contexts. The complexities that arise from this demand concern not only the physical resource consumption, but also on how accountability and responsibility is taken by leadership.

Studies acknowledge the fact that green schools mean so many things to different people (Loubser, 2014). but share a genuine commitment to environmental friendliness, Eco-friendliness and sustainability lifestyles. The Green School Alliance (UnitedNations.org) maintain that going green is transformation to a sustainable future, to nurture and fortify sustainable school communities. Most studies on green schools do not lack sustainability or sustainable development in their literature (Kensler, 2012; Santos & Bennett, 2015; Meiboudi et al., 2016, Meiboudi, et al., 2017; John, et al., 2013).

The word *sustainability* appears throughout this study because sustainability is arguably the most important concept that human nature embraces in their everyday life. Spooner (2012, p. 396) maintains that sustainability is the idea that humans can use and manage natural resources so that those resources can provide for human needs for as long as possible (potentially forever). Factors found to be influencing sustainability from previous studies are reported to be environmental, economic, social (Loubser, 2014, p. 130) and ecological in nature (Kensler, 2012).

Researchers agree that sustainability must be achieved, but it is unclear how to achieve this, in part because the word is used to mean different things, often leading to confusion which causes people to work in contradictions. Previous studies stated that sustainability is twofold, namely sustainability of resources and sustainability of the ecosystem (Kensler, 2012). Economists and politicians use the term *sustainability* in reference to types of developments that are economically viable, do not harm the environment and are socially just (Botkin & Keller, 2012: 8).

2.9. BENEFITS AND SIGNIFICANCE OF A GREEN SCHOOL

Santos and Bennett (2015) stated that the driving force of new and green renovated schools' infrastructure is economics, due to the fact that the school building saves money throughout their lifetime because they provide these benefits:

- Reduced energy use;
- Lower operational costs and provide operational savings;
- Positive influence on teachers and instructional practices;
- Promote children's health and performance;
- Are learning laboratories because of the use of infrastructure to enhance instruction?

Chapman (2012), in his case study of green environmentally sustainable schools around America, identified the most important "triple bottom line" benefits of green schools as: saving money; strengthening achievement and improving health.

2.10. TEN SIMPLE WAYS TO LIVE GREEN (SUSTAINABLY)

To shift to more green sustainable methods, school leadership should embrace the following ten simple green (sustainable) lifestyles (adapted from Spooner, 2012, p. 325):

1. Reducing the school energy use;
2. Eating and buying locally;
3. Disposing of disposables - Plastic utensils like spoons or forks that you can throw away after use come in bulk, at low prices. However, the real price is paid by the environment and human health. Large landfills, trash on roadsides and toxins from disposable products are found almost everywhere. Reduce, reuse, recycle but rethink dependence on disposable products. Consider reusable products for the items most often thrown away such as coffee mugs. Use either paper or bioplastics that are recyclable;
4. Planting seeds: try growing own food;
5. Recycling;
6. Reselling and donating items;
7. Drinking from a tap using a glass of reusable material: bottled water adds more than a million tons of plastic to the waste stream every year;

8. Saving water - Water efficient toilets or dual flush toilets that let you choose whether to use a full flush (for solid waste) or half flush (for liquid waste). Take short showers, wait until you have a full load to run dishwasher or washing machine;
9. Relying less on your car - look for alternatives to using your car;
10. Buying fair-trade products - the fair-trade designation certificate tells you that the items were grown using sustainable methods of agriculture and that local people are receiving fair prices for the goods.

2.11. MOVING TOWARDS SUSTAINABILITY

Most environmental declarations (UNDESD, 2005-2014; MDGs, 2000-2015; SDGs (UNDP), 2015-2030) have their sights set on the future, highlighting and thinking long term about conserving environmental resources so that they last. Schools are enlightened to shift from unnecessary overconsumption of resources to value the services and resources the environment provides. They are assisted in relation to the most important and effective laws for protecting their immediate environments, including international agreements. These global agreements are meant to sustain humanity, the Earth we live on, since there is only one planet where humanity can survive. In this regard, school leadership needs to understand what is at stake by providing schools with the capacity to survive. This study acknowledges the fact that sustainability is not easily achieved, but schools need to strive towards sustainable green cultures.

2.12. THE ROLE OF SCHOOL ROLE PLAYERS IN SUSTAINABLE CONSUMPTION

It is appropriate for this study to outline the role of school key role players as underpinned by legislation.

2.12.1 Overview of the South African legislative framework

International sustainability problems have local implications and therefore offer directives from a local South African perspective. Democracy in South Africa gives the inhabitants the authority to involve everyone in their local environmental problems to resolve issues and sustain their environment. Several pieces of legislation have relevance to this study. The national legislations in South Africa are underpinned by the Constitution (1996).

2.12.1.1 The Constitutional setting

The relatively new South African Democratic Constitution is relevant from two points of view. Firstly, the environmental right contained in chapter two of the Constitution puts environmental issues firmly on the political and legal agenda.

It provides that 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 benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

It has provided legislation to takes place in different levels from national (central government) to provincial, local governments (municipalities) to schools and homes (decentralised). National and provincial legislations and policies within different state departments, including the Department of Basic Education (DoBE), are geared towards providing a healthier and more enabling environment and intersect with many of the sentiments embodied in health and environmental programmes and initiatives. The South African hierarchy of legislation can be represented by the diagram below:

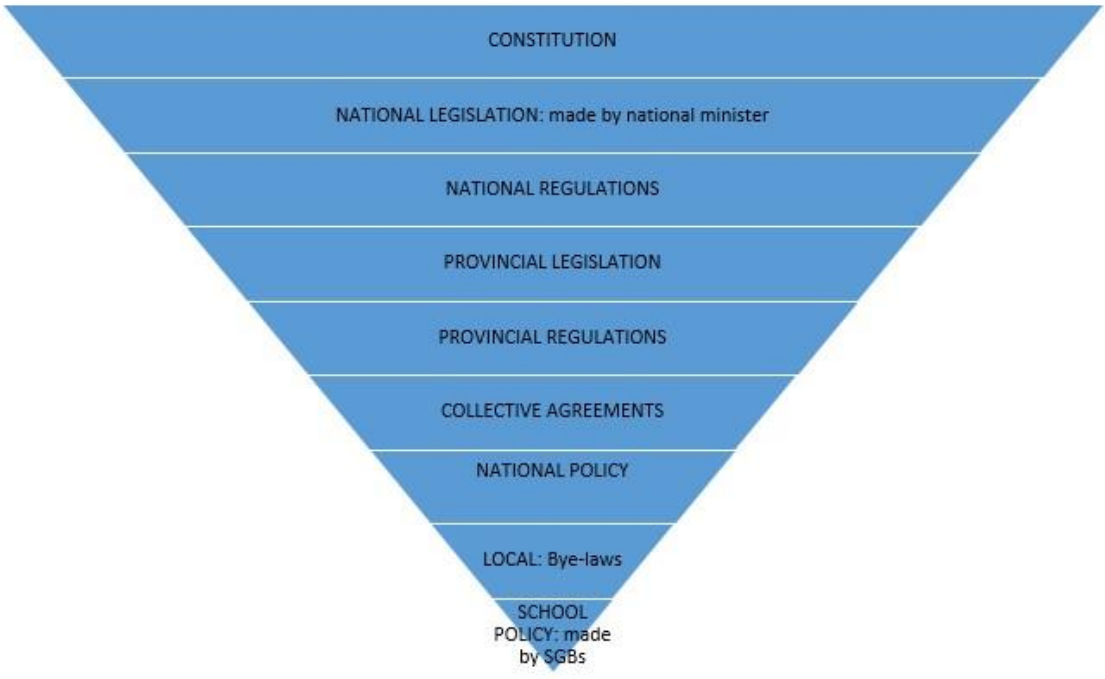


Figure 2.2: South African hierarchy of legislation

Post 1994, the state moved from previous laws, which were discriminatory and not appropriate to South African conditions, consisting of unrestrained and environmentally insensitive development, to green SD by imposing the following legislations aiming at achieving environmentally sustainable practices that are protective to the environment in balance with ecological processes:

- The Constitution of South Africa (Act No. 108 of 1996).
- Public Security Act (1994)
- White paper on environment education (1995)
- National Environmental Management Act (NEMA, 1998)
- South African Schools Act (SASA) 84 of 1999 as amended in 2007
- Employment of Educators Act (EEA) of 1998 as amended in 2007
- Public Finance Management Act of 1999
- Educators Employment Act, 55 of 1998
- South African Council of Educators Act
- Schooling 2025 and Action plan to 2014
- National School Nutrition Policy (presidential initiative as part of the RDP).
- The children's Act 38 of 2005
- Environmental management Act 107 0f 1998 as amended Act No 25 of 2014
- Curriculum Assessment Policy Statements (CAPS)

The legislations outlined above are at national level and it should be noted that implementation does not take place at national level (Makokotlela, 2016, p. 55). Legislation at national level is mainly meant for environmental justice for organs of the state and institutions such as schools. Schools are capacitated about the implementation of these laws by the DoBE, especially on resource budget, accountability with regard to state funds and consumption to understand the NNSSF Act and the Public Finance Management Act (PFMA, 1999). The government and non-governmental organisations are the key drivers of the NDP and going green agenda. To perform this task, the government requires more structured policies and regulations that will support the NDP in the pursuit of green economy in the form of grants that are beyond the present status quo (Nkosi, 2015).

It should further be noted that natural resources such as water, energy and waste are regulated as follows:

- Water–related legislation is entrusted to the Department of Water Affairs (DWA) comprised of the Water Services Act 108 of 1997 and the National Water Act 36 of 1998 (South African Law Reform Commission, 2016); Waste-related matters are legislated by the Waste Act 59 of 2008; and Energy by the Department of Minerals and Energy, 2004.

Chris Brunton and Associates (2009) provided brief explanations of legislation, regulations and policy as presented below:

- *Legislation*

  From the South African context, legislation is law made through a democratic process at a national or provincial level. Legislation usually deals with issues in broad principles. It is published in either the national or provincial gazette and becomes binding from the date stipulated in that gazette.

- *Regulations*

  Regulations are a form of subordinate legislation. It is made either by the National Minister regarding national matters or by the Provincial Minister of the Executive Council (MEC) in regard to provincial competency. Regulations normally deal with details necessary for the implementation of legislation. They are subordinate to legislation but are as binding as legislation to the public eye. They are published in the National or Provincial Gazettes and their date of coming into operation is stipulated in said gazettes.

- *Policy*

  Policy may be made at a National or Provincial level and consists of guidelines to parties affected by the policy. Policy is not considered to be law in terms of the constitution and accordingly is not binding to the public at large. Policy is however binding on departmental officials (including principals) as it effectively constitutes a managerial instruction to such officials. Policy is therefore binding in public schools.

- *School Policy*

  School policies are policies made by SGBs where authorised to do so by the National or Provincial legislation. For example, SGBs are authorised to make a language,

religious or admission policy at a school, subject to National and Provincial Legislation, regulations and policy. School policies usually deal with the detailed implementation at school level of the broader laws. This hierarchy can be summarised in Table 2.3 below:

Table 2.3: The line of authority in the DoBE

Ministry of Education
Provincial MEC of Education
Head of the Provincial Education Department (HOD)
District offices and circuits/clusters
School Governing Body
Principal (Site manager)
SMTs (Principal, Deputy principal, Heads of departments)
Teachers

National Policy Act, 27 (1996)

In terms of Section 18 of SASA (2007), the SGB must function in terms of the constitution and certain minimum requirements of said constitution. The governance of the public school is vested in the SGB. The broad composition of the SGB is set out below:

- Parents' representatives
- Educators' representatives
- Non-teaching staff representatives
- Co-opted members
- Learners' representatives
- Principal as ex-officio (official capacity)

The SGB consists of democratically elected members from the parents, teachers, non-teaching staff, learners and co-opted members. The principal is the only member of the SGB who is not voted into the committee but becomes a member by his or her official capacity, termed the ex-officio (SASA, 1998). Parents comprise of the majority of voting members in the SGB and hold the chairmanship and the treasurer positions in the SGB.

2.12.2 The roles of school role players

School leadership comprises of shared leadership by the SGBs (governance administration) and SMTs (professional administration) under the leadership of the district within the Provincial Education Departments (PEDs) of the DoBE.

2.12.2.1 Roles of the institutional district support officers

According to the DoBE (2012, p. 10), district offices are local hubs of the PEDs and provide vital lines of communications between the provincial head office and education institution in their care. District offices are the first level of administration within a province. The district can be sub-divided into circuits or area offices. They have these main roles:

1. Support (DoBE, 2012)

- Providing and enabling an environment for education institutions within a district area to do their work in line with education law and policy;
- Assisting principals and educators to improve the quality of teaching and learning in their institutions;
- Serving as an information node for education institutions and facilitating ICT connectivity in all institutions within the district; and
- Providing and enabling an environment for the professional development of educators and administrative staff members in line with the OSD.

2. Accountability

- Holding education institutions in a district area account for their performance;
- Accounting to the provincial department for the performance of education institutions in a district area; and
- Accounting to the provincial department in terms of performance agreements that stipulate the roles, functions and responsibilities of district officials in line with relevant policies.

3. Public information.

- Informing and consulting with the public in an open and transparent manner; and

- Upholding *Batho Pele* principles in all dealing with the public.

2.12.2.2 Roles of school governing bodies according to SASA (as amended in 2007)

The roles of school governing bodies according to SASA are listed below:

- Policy making powers where educators, learners, parents and SMT come together to create it (section 20(1)(b); 20(1)(c); 5(5);6(2);7;8(1) and (d).
- General powers and functions including physical resources; finances of the school; maintain and improve school property, buildings and grounds (land where ecosystems exist); purchase LTSM; pay for services rendered; administer stock and stocktaking; charge school fund; storage, custody and care; disposal and letting assets; safety and security of equipment (furniture, office machines, photocopiers, printers) according to the Public Security Act (1994); and transportation of learners and educators on behalf of the school for educational purposes.
- Staffing functions including educators and their promotions (Labour Relations Act, 1995).
- Allocated financial powers and functions (SASA, 1996).

2.12.2.3 Roles of school management teams according to EEA (as amended in 2007)

According to the national guidelines by the DoBE, the roles of SMTs are as follows, in order to ensure that quality teaching and learning takes place (with the exception of financial records):

- Management of professional records;
- Administration of records;
- Administration of learner records;
- Ensuring the principles underpinning the curriculum, namely social justice, a healthy environment, human rights and inclusivity, CAPS policy documents are maintained.

The administration of these records includes LTSM organisation, storage, retention, exams, curriculum matters, personnel records, extra-curricular staff and resources. Resource records are filed in a physical resource register (asset register and inventory), for every classroom, office, laboratory, furniture, workshop and extra-curricular equipment

and library materials. Due to these roles, the SMTs advise the SGBs on professional resource depletion and constraints endured.

2.12.2.4. Roles of the school principal

According to the DoBE with the PEDs, the role of the principal as the leading professional in a school is to manage the school, professionally grounded by the principles of *Batho Pele* and *Ubuntu* (2015, p. 15). The key leadership and management roles of the principal stipulated by the DoBE (2015) are to ensure that:

1. All learners have the right to have access to relevant and meaningful learning experiences and opportunities.
2. The school community has the right to active participation in the life of the school.
3. All members of the school community must be treated with respect and dignity and with recognition of their diverse natures.
4. The school community has a right to a safe and secure learning environment.
5. The well-being of all learners must be fostered within the school and the wider community.

Embedded within the principal's leadership and management roles, the DoBE (2015) identified the following 12 core societal, educational and professional purposes:

1. Commitment to the core values and vision of schooling in SA.
2. Commitment to the pursuit of excellence in all aspects of school life and to the building of a safe, secure and healthy learning environment.
3. Strategic, creative and insightful thinking and effective communication.
4. Commitment to the development, empowerment and support of everyone in the school community.
5. Participative decision-making, teamwork and team-building.
6. Integrity and fairness in all dealings with people and in the management and deployment of financial and other resources.
7. Adherence to the departmental SGB-developed policies in the management and deployment of financial and other resources.
8. Fair-mindedness, patience, empathy, compassion, respect and humility in all dealings with others and in the promotion and protection of the interest of educators and learners.

9. Adaptability and responsiveness to change and political astuteness in situations of ambiguity, adversity or opposition.
10. Professional management in decision-making and action of decisions based on informed judgements and resulting in appropriate action.
11. Self-confidence, maturity and courage as well as demonstrating resourcefulness, initiative and determination in seeking solutions to problems.
12. Self-reflection and a commitment to ongoing personal and professional self-development.

A subsequent Draft Document of the South African Standard for Principalship (DoBE, 2015) identified principals as responsible for:

- Leading and managing the learning school;
- Shaping the direction and development of the school;
- Assuring quality and securing accountability;
- Developing and empowering self and others;
- Managing the school as an organisation; and
- Working with and for the community (Sullivan & Associates)

- Managing human resource (staff) in the school
- Managing and advocating extramural activities.

The GDE (Sullivan & Associates, 2013) summarised the differentiated competencies of members of the SMT in Table 2.4 below:

Table 2.4: Differentiated competencies for school management team

Principal	**Deputy**	**HoD**
Love of children	More management than leadership	Curriculum understanding
Transformational leadership	Skilled at resource allocation	Demonstrable expertise in the practice
Champion of change and Transformation	Ability to do budgets, HR, governance	Master specialist and deep subject knowledge and enthusiasm and love for teaching
Systems thinking	Good people management skills	Focus on balancing accountability and support and capacity building
Setting vision, animating vision	Detail-focused	Ability to earn trust of staff
Leading strategy	Disciplined	Soft interpersonal skills
Leading curriculum delivery, with a focus on the instructional core and teaching and learning		
Buffering the school from the district and outside demands		
Decisiveness and decision-making ability		
More leadership than management, although must be able to: 1. Manage human resources 2. Manage LTSM 3. Manage learning and instructional time		

“Green” is a new era in the South African school system. However, no strong structures exist for dealing with the environment as a cross cutting concern in the education and training landscape (Ramsarup & Ward, 2017). “Greenery formed by treed schools, grass and gardens are necessary for ecological systems that conserve air, water, energy resources and enriches learners’ quality of life at schools” (Foo, 2013, p. 8). Schools should rate their buildings’ greenness by using the GBCSA website rating tools as well as utilising the wealth of advice available on building and maintaining eco-friendly office buildings (www.gbcsa.org.za; Gear, 2009).

Key role players at schools should form a green policy by which a school policy on paper budgeting, recycling, reusing, reducing and rethinking would be noted. School managers should get the school to be audited on their environmental footprint. The green policy should include areas where signs to change behaviour should be put to direct the entire school on green policy, e.g. *save water, use both sides of paper, unplug computers* or *use water sparingly*. School key role players should ensure that in their timetable, they have one day per week on litter awareness by picking up litter on the school premises. Every year end there should be a recycling campaign for writing books, exam papers, worksheets, school uniforms and dilapidated equipment. To save vast amounts of energy, school personnel should consider installing solar panels or making use of other renewable energy sources.

2.13. SOURCES OF FUNDING TO SCHOOLS

The main source of funding is from the National Treasury, according to PFMA (1999). The GDP of SA to be used in 2018 was $42 billion US dollars (R5 384 224 522, 00 as of 05 September 2018) accumulated in 2017. According to the NNSSF in terms of funding, schools are categorised into quintiles and the state allocates funds according to their affordability (NNSSF, 2018 January). Some schools are no-fee paying schools due to their economic background and thus inability to do so. Schools also charge school fees and practice fundraising from donors. In terms of the NNSSF, the National table of targets is in Table 2.5 below:

Table 2.5 National targets table for the school allocation (2018-2020)

National Quintile (NQ)	2018	2019	2020
NQ1	R1,316	R1,390	R1,458
NQ2	R1,316	R1,390	R1,458
NQ3	R1,316	R1,390	R1,458
NQ4	R600	R697	R736
NQ5	R228	R241	R254
Small schools: National fixed	R30,490	R32,197	R34,000

2018 - 2020 figures inflation adjusted – CPI projected rate adjusted (2018)

According to the Amended NNSSF (2018) the ministry of basic education determines all learners in quintiles 1 to 3 (60% of the public' school learners nationally) to be on no fee schools for 2018 according to section 39(7) of SASA, and if funds are available from the Treasury, the Provincial Education Departments (PEDs) may offer Q4 and Q5 no fee status at the threshold level of R1, 316 voluntarily. In declaring these fee charging schools as no fee schools, PEDs need to ensure that schools are informed that they will be declared no fee schools from January 2018. The PEDs need to ensure that these schools have informed parents of the change. If these recommendations can be achieved, then SA has accomplished the free education for all status. To ensure sustainability of the finances accumulated by the school, schools should buy South African products; buy materials in bulk because it is cheaper; use e-bay (jumble sales) instead of buying new products; grow their own food garden using organic fertiliser (manure or compost) to minimise their nutrition fund. Schools should also consider using rainwater to water their food garden. Schools should be encouraged to use e-banking rather than travelling to banks to withdraw large sums of money. E-banking will save more of the school's finances for other services. Green is a paradigm of hope, the DoBE should capacitate members of the SGB and SMT to respond to global environmental changes by greening the school's economy to address sustainability. The green agenda needs radical and open-minded leadership.

2.14. THE SOUTH AFRICAN EDUCATION SYSTEM

The Constitution of SA (1996) made specific provisions for education in section 29 of the Bill of Rights and guaranteed the right to a basic education for every citizen. Formal education in SA is divided into three bands, namely General Education and Training (GET, Grades R-9), Further Education and Training (FET, Grades 10-11) and Higher Education (HE). The South African education structure is organised according to the National Qualification Framework (NQF) established in terms of the South African Qualification Authority (SAQA, 1995), which provides development and maintenance of the NQF and integrates learning at all levels.

Prior to 2009, there was one Department of Education (DoE) overseeing all bands of education. In 2009, the former DoE was divided into two departments, namely the Department of Basic Education (DoBE, Grades R-12), on which this inquiry focuses, and the Department of Higher Education and Training (DHET), as legislated by the Basic Education Laws Amendment Act (2011). The Ministry of the DoBE determine the national educational policy in accordance with the Constitution and on par with international developments. The Ministry is responsible, according to the NNSSF, for funding education, educational programmes, monitoring, evaluation and well-being of the education system (National Education Policy Act (NEPA), 1996). The Minister of education also determines the national policy in respect to curriculum frameworks, syllabuses, learning standards, examinations and certification of qualifications.

At provincial level, the provincial DoBE oversees the general administration and management of schools in the province in accordance with the policy determined by the Minister of the Executive Council (MEC) for education. Educational provisions at provincial level are administered by means of the offices at the following levels in descending order: provincial head office, district, circuits or cluster to school offices. Teachers are drivers of the curriculum, according to NEPA, SASA, EEA and the South African Council of Educators (SACE, 2000). SACE is responsible for maintaining and protecting ethical standards of practicing teachers. The DoBE consists of four phases, namely Foundation phase (Grades R-3), Intermediate phase (Grades 4-6), Senior phase (Grades 7-9) and FET phase (Grades 10-12). The DoBE spans 12 grades in total.

2.14.1 South African curriculum policy and practice

Education delivery in SA is under the authority of the national Minister of Education (macro level), to the provincial MEC and Head of Department (HOD) (meso level) and schools (micro level). At the micro level, the authority is of the SGBs and SMTs. The National Curriculum Statement (NCS, 2012) stipulates policy on curriculum and assessment in the schooling sector by using the following documents:

- Curriculum and Assessment Policy Statements (CAPS) for each subject;
- National policy pertaining to the programme and promotion requirements of the NCS Grades R-12; and
- National Protocol for Assessment Grades R-12 (2012)

Teachers are drivers of curriculum at this level. They utilise resources to facilitate learning in their respective subjects. Since environmental issues are enshrined by the Constitution of SA, CAPS has included environmental and sustainability related subjects across all phases and subjects. This entails that EE and SD are integrated into the school curriculum. Since EE is not a school subject but rather a field of study, environmental and sustainable development content are new content to most teachers since they did not specialise in this field of study. Capacity building is needed for them to improve their knowledge on EE and SD for effective green practices at schools.

The DEA, through the Fundisa for Change partnership programme, has continued to support transformative environmental learning to introduce teachers to relevant environment and sustainability content knowledge, teaching methods and assessment practices that will enable teachers to teach existing environmental content in the CAPS curriculum more confidently and effectively (Songqwaru, 2012). The DEA has provided guidance for teachers to understand how environmental content has been organised in the CAPS curriculum across various subjects of the Intermediate and Senior phases (DEA, n,d) in Table 2.6 below:

Table 2.6 Environmental and sustainability content in the curriculum (CAPS)

SUBJECT	THEME	CONTENT
Natural Science	Water	Water cycle (Grade 5), water, role of water in ecosystems, wetlands (grade 6)
	Energy	Renewable and non-renewable sources, (G5) energy, renewable and non-renewable energy impact (G6)
	Biodiversity/Ecology	Plant and animal rights, IK in relation to biodiversity (G4), food chains, lifestyles (G5), extinct spaces in SA (G7)
	Natural resources	Earthworms, animals and soil (G4), soil erosion (G5).
	Waste and pollution	Extraction and use of materials, including pollution (G7)
	Values, ethics and action competence	Caring for plants and animals (G4), animals used by man-value and responsibility to care for them (G4), healthy environment important for the healthy planet (G6)
Social Sciences	Water	Water in SA: sources, access, storage, pollution, quality (G4), rivers, activities, dams (G5), rainfall in SA (G5), water: need, supply and catchments (G7)
	Food and security	Food and farming in SA (G4)
	Biodiversity/ecology	Marine reserves (G7)
	Natural resources	People and resources (G4), mining and minerals, deforestation (G5), natural resources and conservation in SA (G7)
	Waste and pollution	Waste disposal (G5)
Life Orientation and Life Skills	Health	Personal health and hygiene (G4), health and safety (G7),

	Values, ethics and action competence	Caring for the environment, caring for animals (G4), beliefs about purpose of life, people, and animals, role of religion: opportunities for volunteering, moral obligations (G6)
	Careers	Careers
Economic and Management Sciences	Natural resources	Sustainable use of resources (G7)
	Waste and pollution	How to recycle and use goods to satisfy needs and wants, use of recycled material (G7)
Technology	Natural resources	Use of natural resources for shelter, food, etc. (G7)
	Waste and pollution	Recycling scrap metals and design recycling scheme (G7)

Adapted from Department of Environmental Affairs (n.d)

2.15. OUTCOMES FROM SOUTH AFRICAN STUDIES

Most studies in SA have focused on Eco-schools (le Roux, 2014; Carvello, 2009; Hens et al). Literature nationally in SA on green schools for SD is scarce, fragmented and limited to Eco-schools. Eco-schools are limited to seven steps on how a school can become an Eco-school. These studies emphasised EE and SD or sustainability and did not study key role players at schools whose responsibility is based on resource management. It should be noted that the Eco-schools programme encouraged schools to register and commit to improving environmental learning and action through the curriculum (Ringdahl, 2008). Schools participated in a form of competition to ultimately receive a green flag. The green flag did not necessarily qualify the school to acquire green school status.

Green schools' initiatives in SA are still pilot projects conducted by the DEA and LEDET (Bizcommunity, 2017). According to Green Building Africa, the design of a green school needs to be radically transformed to meet international green standards. Green School Alliance (UN.org) maintain that going green is a transformation to environmentally friendly lifestyles and to a sustainable future. Factors to be embracing greening schools are reported to be environmental and sustainable in nature. Greening schools is a new era in the South African education system. Most of the current school buildings are rectangular in shape and free-standing with no solar heating systems or external shading systems.

Ventilation is controlled by the opening and closing of windows. In practice, a green school is the physical result of a consensus process of planning, design and construction that takes into account a building's performance over its 50 to 60 year life cycle (Gordon, 2010). Gordon states that the team of stakeholders involved in greening schools need to include administrators, school board members (SGBs), other community leaders, maintenance staff, planners, designers as well as students (2010). Furthermore, a green school needs to create a cleaner and more environmentally conscious society in which biodiversity is utilised and protected in a sustainable manner (Somwaru, 2016, p. 2). Green buildings are designed to meet certain objectives such as protecting occupants' health, improving employee productivity and using energy, water and other resources more efficiently, thus reducing the overall impact on the environment (Ramli, et al., 2012 p 463-464). In SA the government builds a school and declares it a green school without a rating system (www. iAfrikan.com). There is no rating system to date to verify its status. This study aims to explore greening schools for SD, emphasising strengths, areas that need improvement and those that impose threats to green cultures.

2.16. RELATIONSHIP BETWEEN ENVIRONMENTAL EDUCATION, SUSTAINABLE DEVELOPMENT AND GREEN SCHOOLS

Sustainability is a subset of EE, as it emanates from environmental knowledge and content. Sustainability entails development of the society, economy and environmental aspects with the aim of maintaining current resources for future school generations for survivability. In order to enhance sustainability, it is necessary for schools to create "green" environments which are principles of sustainability. Greening the school entails applying environmentally sustainable ethics like recycling materials, reusing resources, reducing waste and rethinking the way resources are used for sustainable consumption. Sustainable consumption in this regard implies enduring limited resources done within limited budgets for a long period, over a 50 to 60 year life cycle (Gordon, 2010, p. 7).

In the school context, reusing paper, recycling furniture and equipment and reducing waste of water and electricity is crucial for greening institutions. Water has to be used in a sustainable way and spillage needs to be prevented (Somwaru, 2016) at all costs since water is a precious and lifesaving resource. In this regard, water needs to be protected against pollution and any sort of contamination. Recycling paper from examination sheets or using both sides of a piece of paper during printing promotes greening, which supports

resilience to zero-waste. Many efforts directed towards saving the environment are green and sustainable and also save a lot of money (Gordon, 2010, p. 1; Ramli, Masri, Mohd, Mohd, Taib & Hamid, 2012, p. 464) in operational costs. For example, if a city school can institute recycling of paper, this programme could reduce garbage collection fees by reducing waste going to landfill sites. Simultaneously, recycled materials including textbooks, paper and metals can be sold and cover other costly school projects. Typical projects that are cost saving in schools are green initiatives. These include energy efficiency, renewable energy, water conservation through rain water catchments and others.

Greening the school is a sustainable approach towards EE executed to control the biodiversity of the school environment in a sustainable manner (Somwaru, 2016). Greening the school also lays the foundation for sustainable changes in behaviour towards EE. Biodiversity, waste, sustainable water and energy utilisation are EE topics which create cleaner and environmentally conscious school communities that behave in a more sustainable way. Occupants of a green school approach the environment in a responsible and sustainable manner. That is why a green school is also known as a sustainable or environmentally friendly building that is designed, built, operated, reused or renovated in an ecological and resource-efficient manner (Ramli, et al., 2012, p.
463).

The best way to incorporate green and sustainable lifestyles in schools is to get the right people for initiation. This entails finding people who are motivated and resilient in ensuring that an effective structure exists at the school. This initiative also requires good governance and strong leadership, which would ensure that SDGs implementation is initiated so that their schools could achieve these goals by 2030. The *going green* ideology enables the entire school community to become agents of change towards realising SDGs and targets. Green buildings are designed to meet EE objectives such as using energy, water and other resources more efficiently by reducing the overall impact on the environment (Ramli, et al., 2012, p. 463-464). School community resilience could be expanded through education, where teachers are role models and leaders towards a more sustainable direction. In this case, learners can play a significant role since they will be able to share their knowledge with their friends and families to create a social belt of effective EE for green and

sustainable livelihoods. Greening the school is a comprehensive concept emanating from EE faculty and SDGs.

2.17. CONCLUDING REMARKS

The literature on green schools drawn from other countries revealed that each of the green school practices has its own thematic and assessment system and different green features. For example, Eco-schools in SA are assessed through Eco-school's nine thematic areas or the SME generated by the FEE. Japan for example, has given more attention to development of equipment and school infrastructure in accordance with green architecture and facilities (Matsumoto & Daudey, 2014). In Iran, the integrative assessment system is formulated to verify if schools are really green (Meiboudi et al., 2016). In order to cope with environmental problems, attempts have been made globally in terms of declarations, agreements, legislations, policies and regulations. Green school projects and pilot studies have been initiated to promote sustainability of economic, social and environmental green resources to preserve school survival.

The chapter attempted to explore green practices from IK, curricula and legislation in SA and other countries. The literature explored indicated that there are actually no green schools in SA This study aims to aid schools, green and non-green, not merely to be consumers of knowledge, but rather to use the knowledge consumed from the curriculum for the betterment of their communities. This research also explored CAPS curriculum document to understand whether it promoted practical SD implementation for role players, or the curriculum was merely for examinations and progressing learners to the next level. Finally, this study sought to engage EE research in the field of sustainability and greening to communicate the findings to a variety of different school settings in urban, township and rural schools. The next chapter unpacked core organising concepts by outlining the conceptual and theoretical frameworks of the study.

CHAPTER 3
THEORETICAL AND CONCEPTUAL FRAMEWORKS OF THE STUDY

3.1. INTRODUCTION

The previous chapter discussed the literature review by reviewing existing scholarship and the available body of knowledge related to the research problem. The aim for conducting the literature review was to learn from other scholars on how they theorised and conceptualised on issues of green schools and sustainable development; what they have discovered; what instrumentations they have used and to what effect. Furthermore, this study conducted a literature review to familiarise the researcher with the current state of knowledge regarding the research problem and how other scholars have delineated similar problems (de Vos, Strydom, Fouche & Delport, 2009, p. 263).

The terms theoretical and conceptual frameworks appear mostly in social and educational studies. Sometimes these studies use one or both frameworks depending on the paradigms, views or lenses they undertake. When theoretical and conceptual frameworks are used, researchers have different directives, but it is necessary for the researcher of this study to indicate the intended research design, process and how they fit to the research problem. The following section explores the theoretical and conceptual frameworks in this qualitative case study as well as the role that both these frameworks play. The researcher will apply these frameworks' ideas to practice, presenting them within this qualitative case study.

3.2. THEORETICAL FRAMEWORK

A theory is an organised body of concepts and principles used by the researcher to explain, predict and master a particular phenomenon or phenomena (Leedy & Ormrod, 2015, p. 39; Kensler, 2012, p. 806; Saunders, Gray, Tosey & Sadler-Smith, 2015). It employs the use of concepts, systems and structures in an attempt to construct models that describe and explain reality. According to Mitchell (2009, p. 11), a theory also provides a rich and well-developed list of variables that may help explain any empirical case or a set of cases. Savin-Baden and Major (2013, p. 133) state that "qualitative researchers often see theory as something that researchers do during data collection and analysis and for the qualitative researcher theory does not predict relationship between variables".

Qualitative researchers use theoretical frameworks to test theories, guide data analysis or generate new theories. This study will use theoretical frameworks to guide data collection and data analysis. The theoretical framework will be viewed as a structure that is intended as a guide of thinking about the research subject and as a constructive and interpretive lens through which to view data (Creswell, 2014). The theoretical framework will provide the explanatory and exploratory power to the research in order to assist the researcher to think about the lenses to analyse data. Ultimately, relevant and appropriate theories form the theoretical framework of this study and the literature review will be organised around these theories. As Grant and Osanloo (2014, p.13) explain, “a theoretical framework consists of selected theory or theories that undergirds the researcher’s thinking with regard to how he or she understands and plans to research the topic at hand, as well as the concepts and definitions from those theories that are relevant to the topic under study”. The ecological democracy, sustainability and school leadership complexity theories will help the researcher to make sense of her perceptions of the world, namely constructivism or interpretivism from collected data using relevant and appropriate theories.

3.3. THEORETICAL FRAMEWORKS UNDERPINNING THIS STUDY

In order to refine the research focus area, a theoretical framework upon which to base this study is critical. Grant and Osanloo (2014) argue that the theoretical framework is the blueprint for the entire inquiry. It serves as a guide to build and support the study and provides the structure to define how the researcher philosophically, epistemologically, methodologically and analytically approach the thesis as a whole (Grant & Osanloo, 2014, p. 13). As Kawulich (2012, p. 4) puts it, “a theoretical framework implies theories that inform the choice of the research topic, research questions, the literature reviewed, data collection methods, data analysis and interpretation”.

Aligned to the researcher’s emphasis on greening schools and sustainable development, the first level of the theoretical framework adopts the ecological democracy theory, which integrated ecology, democracy and greening school phenomena. Secondly, this study then proceeds to utilise the sustainability theory to understand how green schools seek to find sustainable consumption patterns regarding the schools’ ever-growing demands for LTSM, energy, transport and others. In addition, the focus is on how greening schools and SD are

also located in the sustainability theory. This study attempted to understand how economic, social, environmental and religious aspects are considered when responsibility about the school is taken. This was finalised with the leadership complexity theory since the complexities that arise in the educational endeavour concern not only the physical (attributes or resource use depletion and consumption), but also the normative questions of how leaders' responsibility is taken and assigned at schools. Figure 3.1 below is the schematic illustration of the three integrated named theories that inform the discussion of this study.

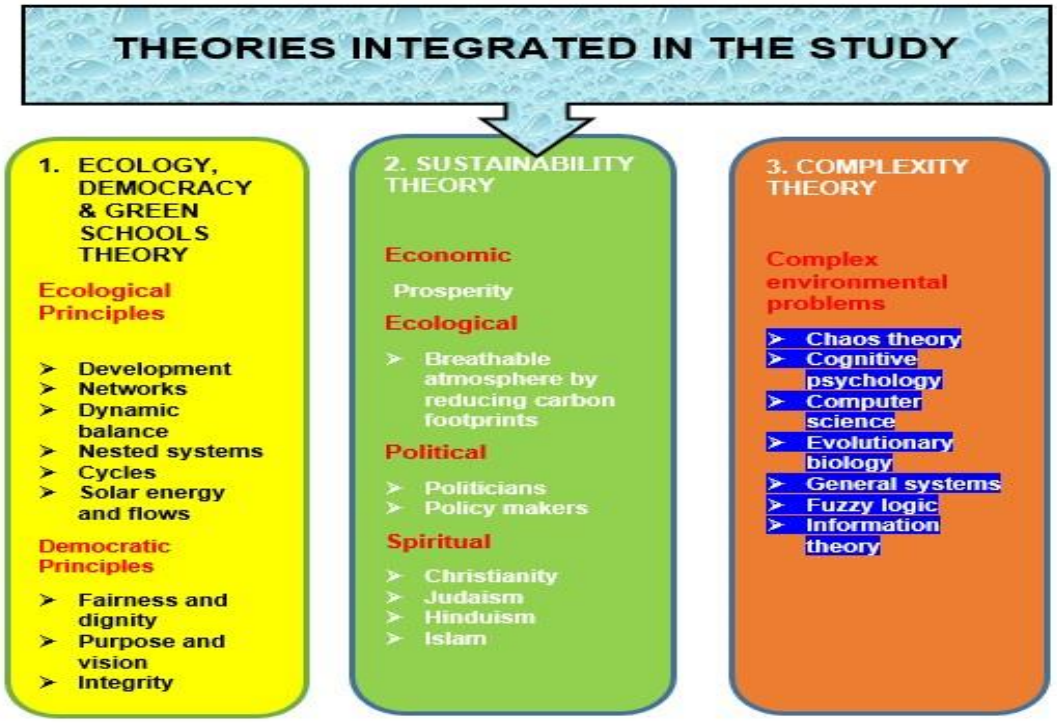


Figure 3.1 Schematic diagram of the three integrated theories which guide the study

3.3.1. Ecology, democracy and green schools' theory

This study began with the ecological democratic theory, with economic, social, environmental and ecological lenses, as it is pertinent to this study. Ecology and democracy theory should be understood through at least two lenses, namely ecological and democratic lenses. The theory originated from Kensler's proposal of a theoretical framework which integrates democratic and ecological principles for describing, explaining and predicting a continuum of development from more traditional schools to green schools (2012, p. 790). Kensler's (2012) study from sustainability scholarly journals during 2011 revealed articles calling for educational leaders to address issues related to ecological,

social and economic sustainability (citing Bottery, 2008, 2009). This insight and the findings of the cited studies (Birney & Reed, 2009; Edwards, 2006; Levy, Dickerson, Weston & Woods, 2011) suggested that designing and leading schools with an integration of ecological and democratic principles may lead to schools with improved student learning and smaller ecological footprints (Kensler, 2012, p. 791).

This study provided a brief discussion of how green and sustainable development (SD) concepts might be located in the ecological democracy theory as a new framework for organisations such as schools. The rationale of doing so is that the concepts “green schools” and “sustainable development” are informed by the ecological democracy theory, which underpins the anthropocentric, democratic and eco-centric worldviews, which this study focuses on. An anthropocentric view holds that humans are separate from nature (Kensler, 2012, p. 796) whereas an ecocentric view considers humans to be an integral part of the natural world where all beings, humans and non-humans alike, share intrinsic value (Kensler, 2012 citing Merchant, 1992). There is an urgent need for school communities to learn to live in harmony with the environment. Since this theory integrates two worldviews of democratic (anthropocentrism) and ecological principles, this study is underpinned by the ecocentric view because anthropocentrism limits the capacity of school leaders to see an engage in the urgent work of addressing local and global issues such as climate change (Kensler, 2012, p. 796). Democracy is a system whereby a governing body is elected by the people to serve the people (The World Book Encyclopaedia, 2007). The SGB and the SMT are key role players in schools which participated in focus group interviews in this study since their own school constituencies have democratically elected them so that they could represent them on matters related to their school. Since a school is a public asset of the community, this study chose the term “democracy” for that reason.

Kensler’s ecological democracy theory (2012) added value to the understanding of ecology and democracy concepts. The researcher used the ecological democracy theory due to its ability to integrate ecology and democracy. From a South African context, when introducing new conceptualisation on green schools, everybody has to be on board with the process, including teachers, learners, parents and civil organisations. Collection of data took place from schools where people network on different levels to ensure that they put their institutions first. Democratic principles are highly recognised as enshrined by the Bill of Rights (Constitution of South Africa, (SA), 1996) and South African Schools Act (SASA,

1996). Whatever information the researcher took from the participants did not violate their privacy and human rights. Epistemologically, by engaging school role players' human sustainable experiences from within the schools' contexts address their "nature of knowledge" (research sub-question 1) and the "contextual factors that shape greening of the school" (research sub-question 2).

The ecological democracy theory is also eco-centric since it gives concern to ecological and green issues affecting the environment. Hatting (Loubser, 2014, p. 81) states that in an eco-centric framework, the natural environment as a whole (or parts of it) is regarded as something with a value on its own, regardless of whether humans benefit from it or not. Kensler (2012, p. 800) contends that green bureaucracies include those organisations that demand green, more ecologically friendly practices through command-and-control-style leadership, excessive policy and little opportunity for broad engagement or organisational learning. From a South African context, this green bureaucracy would be legally bound to engage everyone. The ecological perspective of this theory gives way to the understanding of school systems through holistic, environmental, economic and social perspectives. Therefore, this theory assists this study to explore issues regarding sustainability.

Early descriptions of green schools suggested that the practice of both democratic and ecological principles was integral to their design and development (Kensler, 2012, p. 788-789). Designing and leading schools with an integration of ecological and democratic principles led schools to improved student learning and smaller ecological footprints. Kensler (2012) reported that:

"*This theory integrates the three pillars of sustainability, which are nested nature of ecological and human systems, whereby economic systems are nested within social systems, both [of] which are nested within ecological systems and thus subject to their laws, limits and processes; human well-being depends on our ability to understand and live in accord with these laws, limits and processes. Human organisations, such as schools, affect the health (of the land) of local and global ecological communities and vice versa, although such has not been a primary concern of organisational or educational leaders or schools.*"

We are well into the timeframe of the UN 2030 vision of sustainability, an international effort to use education as a driving force to sustainable living. The present study focuses on

primary school education and school key role players, although secondary schools have no record of engagement with sustainability related issues (WESSA; Bizcommunity, (2017); Meiboudi, et al., (2016) and teacher development (Department of Higher Education, 2015).

This theory shifts from the anthropocentric worldview to the eco-centric view, which considers humans to be an integral part of the natural world where all beings, humans and non-humans alike, share intrinsic value (Kensler, 2012, p. 796). Wu (2002) argued against city schools having no trees. Trees around the school buildings contribute to a positive carbon footprint since their waste product is oxygen, which all life depends on, and one of the waste products of humans is carbon dioxide, which plants also depend on for survival and the manufacture energy or food through the process of photosynthesis in surrounding ecosystems. Anthropocentrism limits the capacity of people in the school community to engage in addressing local and global environmental issues such as climate changes that are causing extreme weather events like tornados, horrifying whirlwinds, wildfires, coastal flooding and drought, to name but a few.

Through the eco-centric worldview, school role players include ecological concerns in their anthropocentrism, and in this way could cut global carbon emissions, reduce carbon and the ecological footprint of human activity, thereby living in harmony with laws, limits and processes of nature (ecology). Therefore, school community leaders need to integrate social (anthropocentric) and ecological systems (eco-centric) in their practices and this is what ecological democracy theory is all about: integrating ecological concerns into the collective work of democracy at schools. This theory presents an integrated framework of ecological principles that govern healthy and sustainable life systems; the systems in which our social systems exist and upon which these systems depend and democratic principles which are socially just. The nested anthropocentric and eco-centric systems of this theory are presented in figure 3.2 below:

Figure 3.2 Theoretical framework integrating ecology and democracy (Adapted from Kensler, 2012, p. 799). The dotted lines emphasise the nature of four categories of schools: machine bureaucracy, democratic administration, green bureaucracy, and ecological democracy.

Kensler's framework (Figure 3.2) crosses the practice of ecological principles with democratic principles and creates four general categories of green schools whereby machine bureaucracies and democratic administration (community) reflect anthropocentric paradigms (p. 799). The ecological democracy and green bureaucracies reflect more ecocentric paradigms (p. 800).

3.3.1.1. Ecological principles

The term "ecology" is characterised as a branch of Biology dealing with the relationships and interaction between organisms and their natural environment (Khalili, 2011, p. 2). The framework suggested an expansion from anthropocentric thinking toward eco-centric

thinking, where human concerns are integrated with ecological systems for holistic sustainability. Kensler (2012) summarised six ecological principles that could be adopted and adhered to by school leadership as follows:

1. Development: all life changes evolve over time.
2. Networks, partnership and diversity: all living and non-living things are connected directly or indirectly to provide resilience.
3. Dynamic balance: feedback helps to maintain a relatively steady state, with continuous fluctuations between upper and lower boundaries.
4. Nested systems: every learning system is itself an integrated whole and at the same time part of a larger system; change at one level affects the other levels.
5. Cycles: one's waste is another's food, e.g. bees produce honey as food and are responsible for pollination; plants produce oxygen as waste that humanity needs for survival and humans produce carbon dioxide for plant species to survive; waste from school lunches might support the school's gardens.
6. Solar energy and flows: the sun fuels most ecological systems on Earth, every transfer of energy results in some energy loss, thus energy needs are on-going.

Stone (2012) included two ecological principles that could be summarised as follows:

1. Smart by nature: Nature is our teacher; sustainability is a community practice; the real world is the optimal learning environment; and sustainability is rooted in a deeper knowledge of a place.
2. System thinking: Shifts into perception – From parts to the whole; from objects to relationships; from objective knowledge to contextual knowledge; from quantity to quality; from structure to process; and from contents to patterns.

Orr (2012) identified the principle of:

1. A sense of wonder for young minds: The revolutionaries are not professional educators from famous universities, rather they are elementary school students from widely diverse backgrounds. A curriculum that enables young people to discover their own homes, not an add-on to the conventional curriculum.

School role players who understand these principles will rethink, reduce, reuse and recycle resources throughout the school, rather than leaving those efforts to enthusiastic individuals and

non-governmental organisations which come and go. The ecological principle of *solar energy and flows* highlights the value of using solar and renewable energy sources.

3.3.1.2 Democratic principles

Democracy is as much a theory of learning as a theory of governance which schools in South Africa have adopted in their schools' governance. Democratic organisations such as schools reflect the practice of democratic principles in the day-to-day operations of their schools as follows:

1. Fairness and dignity: each person treated justly as in the Constitution of SA.
2. Purpose and vision: every school leadership is guided by its mission and vision for direction they need to pursue the education of their children.
3. Integrity: each school should steadfastly adhere to high moral standards by adopting a code of conduct of all members of the school community.
4. Reflection and evaluation: of previous actions and decisions taken at different school forums.
5. Accountability: to the school community is regarding budgets, results and utilisation of resources.
6. Individual and collective: every individual given opportunity to express their views in different forums which leadership present collectively to different stakeholders.
7. Dialogue and listening: when each member of the school community is given an opportunity to listen and share opinions with others in different forums.
8. Decentralisation: when power is shared among all school community members from all levels identified at their schools.
9. Transparency: when information is shared freely and openly among all school community members.
10. Choice: when each person is given the right to choose the language, religion or subjects to be offered at their respective schools.

3.3.2 Sustainability theory

The need for sustaining school resources by ensuring all stakeholders participate is embedded on the sustainability theory, which is a concern of sustaining the present school generation resources for future school generations to thrive too. The sustainability theory (DEA, 2012) asks the question, "What must we sustain?" This theory answered this

question by indicating that economic, ecological, political and spiritual resources should be sustained. It supported the ecological democratic theoretic framework due to its eco-centric (ecologically centred) and anthropocentric (human-centred) stances. Above all it extends to spiritual sustainability. It should be noted that the SGBs are also responsible for policy design in their schools, among those policies is the religious policy (SASA, 1996).

This theory consists of four models under which sustainability can be achieved, namely economic, ecological, political and religious models. The religious component regarding sustainability is also highlighted by Schulze (Loubser, 2014, p. 106), indicating that people's faith can have a powerful influence on their attitudes towards the environment and the way they treat it. TND consists of different ethnic groups, cultures and faiths and it is appropriate for this study to respect different participants' faith during the study, as enshrined by the Constitution of SA. All mainstream religions (Christianity, Judaism, Hinduism and Islam) clearly provide their believers with guidelines on how to treat the environment; as such, they are all environmentally friendly (Hatting in Loubser, 2014, p. 117). Every school adopt its own religious policy according to SASA (1996).

For a school, sustainability is a green concept which regulates how its energy, budget and resources might be used sustainably, not exhausting the material resources which the school depends upon to survive. The term "sustainable development" achieved international public prominence through the Brundtland Report (1987), which presented the famous definition that "sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (Kensler, 2012, p. 381). The needs referred in this model are not only for human needs, but also of ecological processes such as maintaining a breathable atmosphere by reducing carbon footprints. Since the Brundtland Report initiated "sustainable development", this theory focused on "sustainability" which included other related terms such sustainable societies, sustainable living, sustainable resource management for green schooling and sustainability.

3.3.3 School leadership complexity theory

Questions about consumption, as the problem statement of this study, cannot be separated from how consumption is practiced, experienced, understood and manifested by individuals, in particular social, environmental and complex contexts. Schools are complex,

non-linear, unpredictable systems and this significantly impacts school key role players, relationships and communication within them (Morison, 2007). One might argue that the term “sustainable development” (the Brundtland Report definition of it, 1987; 2.3.1) is informed by aspects of ecological democracy and sustainability theories. The present environment needs to be conserved and the needs of both present and future school generations need to be sustained through democratic principles of integrity, fairness and accountability (Kensler, 2012).

Pragmatically and philosophically, outside positivism - those that inspire your thinking - can provide theoretical lenses to analyse data. The following theories, namely ecological democracy theory, sustainability theory and school leadership complexity theory helped this study to make sense of the researcher’s perceptions of the world. The theoretical framework, utilised to understand the power of knowledge and social materiality, became the analytical tools for analysis.

According to Peters (in Stevenson, et al., 2013, p. 501), the planet Earth faces multiple environmental crises, including those of climate change, dwindling carbon based energy resources, food security, water and air pollution. In this chaotic environment, policymakers and politicians are launching programmes that emphasise sustainability in an attempt to build the prospect of a green economy (Peters in Stevenson et al., 2013, p. 501). There is a widely recognised fact that the practice of managing human-environment interactions is complex (Robbins, 2011, p. 332). Robbins (2011) commended that the Complexity Science theories became increasingly influential in environmental management in the last decade or so following in the footsteps of broader systems and ecosystem concepts that became influential in the 1960’s and 1970’s. He further states that:

> “*The earlier incorporation of systems and ecosystems approaches into environmental planning and management brought home the connected and hierarchical nature of human-environmental systems: connections between ecosystems, economies and societies, and between levels of ecological or government systems, for example. It also underscored basic thermodynamic implications: every activity uses or transforms energy and matter and produces waste, which in turn must go somewhere, being transformed again and again but never actually going away*” (Robbins, 2011).

This theory was used in this study since it encompasses many parts which make it complicated and interconnected. If there are many parts involved, ranging from paradigms

to theoretical frameworks related to school leadership, then complexity theory cannot be ignored. There are connections between biophysical, social, economic, complex environmental problems, school organisation (SGB and SMT), ecological structures and processes as well as between individuals and school organisations. A new social mind-set began to emerge which recognises that social practices are too complex, "messy" (Lichtenstein, Uhl-Bien, Marion, Seers, Orton & Schreiber, 2006) or "*chaotic",* never repeating or showing any noticeable pattern at all (Robbins, 2011). As Morrison (2007) puts it, "it integrates ideas derived from chaos theory, cognitive psychology, computer science, evolutionary biology, general systems, fuzzy logic, information theory, and other related fields to deal with natural and artificial systems as they are, not by simplifying them (breaking them down into their constituent parts)."

Although theories are generally used to describe and explain phenomena in individual case studies, the three case studies under investigation explained the issues and challenges experienced by TND schools through sustainability practices. In addition, this study believed that these three theories contributed to the grounding of educational policy in what is taking place in schools as far as school-based sustainable development and greening schools' implementation are concerned. The theories and paradigms indicated above were employed in this research inquiry to create themes that were explored from the participants' experiences and points of view. The study explored economic, social, political, ecological, technological and religious perspectives of the schools under study. It interpreted and constructed how these schools strategised and implemented their sustainability consumption practices.

The collective use of all these three theories served as a guide about how the researcher philosophically, epistemologically, methodologically and analytically approached the thesis as a whole (Grant & Osanloo, 2014, p. 13). These theories assisted the researcher to help explain the empirical case study accurately by reflecting on both theoretical claims and empirical realities of cases being studied (Mitchel, 2009, p. 10). These theories also helped the researcher to provide a well-developed list of pre-determined environmental themes that helped to provide answers to the research questions.

3.4. CONCEPTUAL FRAMEWORK

Conceptual framework is the research map of the territory being investigated (Regoniel, 2015). According to Maree (2012, p. 71) conceptual studies should not be confused with the definitions of terms as part of the introductory chapter. It is largely based on secondary sources (from literature) that it critically engages with the understanding of concepts and it aims to add to the existing body of knowledge. As Regoniel (2015) puts it, it serves as a "map" or "rudder" that guides the researcher towards realising the objectives of the study. Concepts were therefore centred on the quest for knowledge since they are the building blocks from which theories are constructed.

Concepts are a general idea generated from specific instances, which are frequently part of a theory or model (green school is a model school). A concept is a label used to describe a phenomenon (green school, SD) and give meaning to enable an individual to categorise and interpret said phenomenon. Concepts derive from experiences with which they can be compared to other concepts (green schools compared to SD, Eco-schools, enviro-schools, sustainable schools). It is a relationship between a word or symbol and an idea that enables the researcher to impose some sort of meaning in the world through them and reality is given sense, order and coherence. As Babbie (2010, p. 4) puts it, "conceptualisation is the process through which the researcher's interest is narrowed down to specify what is meant by the use of particular terms". Therefore, a conceptual framework is a collection of general but related concepts from the literature that serve as a partial background for the study and support the need for investigation of the research question (Regoniel, 2015). As mentioned, the challenges regarding greening of schools through SD by school key role players, particularly about constraints endured, are the main line of thought throughout this study. It was therefore necessary to employ concepts such as green schools, sustainability and SD in South African schools.

3.5. CONCEPTUAL FRAMEWORKS UNDERPINNING THIS STUDY

Theories are formed by concepts that ultimately constitute the conceptual framework of the research inquiry. The concepts from the existing literature served as the researcher's conceptual framework to ground the study. The conceptual framework was developed by summarising the mental image of the themes and patterns that emerge from the data (Regoniel, 2015). Key concepts integral to the study are EE (which this study focused on),

sustainable development, sustainability, ecology, democracy, green schools and nature of knowledge on greening schools. These concepts required clarification as defined in chapter one of this study.

3.6. RELATIONSHIPS BETWEEN THEORETICAL AND CONCEPTUAL FRAMEWORKS

A theoretical framework is sometimes referred to as conceptual framework, however these terms are neither interchangeable nor synonymous (Grant & Osanloo, 2014, p. 16). Theory is used to understand empirical cases that require operationalising abstract terms and concepts such as green school, sustainable development and sustainability, in ways that accurately reflect both theoretical claims and empirical realities of cases being studied (Mitchel, 2009, p. 10). In short, theory provides a rich and well-developed list of variables that help to explain a particular empirical case or set of cases (Mitchel. 2009, p. 11). A theoretical framework is derived from existing theories that have been tested and validated by others and is generally considered to be an acceptable theory in scholastic literature (Grant & Osanloo, 2014, p. 16). The theories mentioned above assisted the researcher to make sense of the generated data and to guide the processes of analysis and discussion. Theoretical and conceptual frameworks share some similar features since they both serve as tools for the researcher to help guide the study, particularly in the interpretation of data (Savin-Baden & Major, 2013, p. 140). Yet there are clear differences between theoretical frameworks and conceptual frameworks, namely a theory helps to structure an explanation of phenomena and so a theoretical framework is used largely as a path in mind, on findings and to help drive the interpretation (Savin-Baden & Major, 2013, p.140). Theoretical frameworks provide the conceptual grounding of a study. In a qualitative study such as this, a theoretical framework is a structure that is intended to guide the thinking about the research topic and as an interpretive lens through which to view data. There are multiple ways in which theory can be utilised to frame the study, since theory provides explanatory power to the research in order to provide lenses to analyse data.

3.7. HOW THIS STUDY USED THE THEORETICAL AND CONCEPTUAL FRAMEWORKS

The use of theoretical and conceptual frameworks is not limited to a problem formulation and literature review, it is included in this research inquiry to guide the study throughout. The theoretical framework is not only limited to the problem statement and literature review,

it is intended to guide the study and offer the reader an understanding of how the researcher has assembled the study. It indicates data collection plan that is used to structure the themes and categories of collecting data and analysis plan in data collection instruments. Since this study is related to greening schools and sustainable development, the observational and interview protocols are constructed, applied and organised around principles of ecology, democracy, sustainability and complexity. This study uses concepts from the three theories mentioned above to create themes for interview questions and observations.

The ecology and democracy theories provide this study with two themes, namely ecological and democratic themes. Secondly, the sustainability theory provides this study with the following four themes, namely economic, social, environmental and religious themes. Lastly, the complexity school leadership theory provides this study with any relevant themes not identified by the two theories that are complex but environmental in nature and provide answers to the research questions. Therefore, these themes are pre-determined themes in this study.

From the mentioned research questions and the conceptual framework, it is clear that the essence of this research is the integration of economic, political, social, ecological and religious factors which prevent schools from living green and sustainably. With this in mind, the ecological democracy, sustainability and school leadership complexity theories were used to guide this study.

3.8. CONCLUDING REMARKS

Qualitative research methods have theoretical and conceptual underpinnings that guide the study, prior to deciding on a blueprint from which to build the study. This chapter firstly provided the ontological and epistemological beliefs embedded in the study. Then it provided the research problem associated with the topic. Thereafter some of the key components of the literature review were highlighted. Lastly, a theoretical framework that is aligned to the study was offered, providing the conceptualisation components of the study. In the next chapter, this study provided the methodological plan (research design) of the proposed study.

CHAPTER 4
RESEARCH METHODOLOGY AND DESIGN

4.1. INTRODUCTION

This chapter focuses on the research methods and design, whereby it is discussed in detail the major types of data gathering techniques and research paradigms to be used as well as techniques and processes for collecting data. In addition, it is intended to report on the conceptions and experiences of key role players at schools (being the school governing bodies (SGBs) and the school management teams (SMTs)) being gatekeepers regarding sustainable development and greening schools' initiatives, to better reflect the objective of research sub-question 1. This study attempts to answer the main research question: **"What are the strengths, weaknesses, opportunities and threats in greening the school for sustainable development?"** and the two sub-questions to (1) What is the nature of knowledge of the role players in the school about greening the school? (2) How do the contextual in the school shape the greening of the school?

4.2. RESEARCH APPROACHES

Research approaches are either quantitative, qualitative or mixed method approaches. All of these approaches are used to identify different modes of inquiry to research. This study opted to employ the qualitative and exploratory research approaches to gain insight into the experiences of key role players at schools regarding their (a) nature of knowledge about greening the school; and the contextual in the school that shape the greening of the schools. Research methodology implies the use of appropriate approaches to systematic inquiry, that is how researchers study the world (Chilisa & Kawulich 2015, Selecting a Research Approach section, para. 2). It directly reflects the researcher's ontological and epistemological stances (Ramenyi, 2014) or paradigms (worldviews) broadly conceived as research methodologies (Creswell, 2014).

4.2.1 Qualitative research methodology

In this qualitative study, the researcher entered and spent considerable time at three Tshwane North District (TND) schools exploring the meaning of the experiences that the participants held about "green" and "sustainability" phenomena occurring in natural settings (Leedy & Ormond, 2015, p. 269). Data were collected using focus group interviews, site

observations and school documents. Data was then transcribed verbatim and analysed both deductively and inductively.

The study intended to explore sustainable development in schools through greening school initiatives and zero waste lifestyles. A qualitative approach is subjective in nature and allowed the researcher to be the primary instrument of data collection, implying that the researcher gathered information and did not rely on questionnaires, experiments or measuring instruments (Creswell, 2014, p. 342) because of their quantitative nature. The qualitative approach was preferred for this study because of its ability to explore a social or human problem; build a complex, holistic picture; analyse words; report detailed views of participants and conduct the study in a natural setting (Creswell, 2013, p. 300; Creswell, 2014, p. 342).

Disadvantages of qualitative approaches include, among others, subjectivity; the researchers" bias in the design; observations and analysis of the study; sources or participants may not be equally credible and may affect the outcome of the study; the study group does not represent the larger population; or the population studied could be altered by the presence of the researcher (Merriam, 1998, p. 68). Although the qualitative approach has some shortcomings, the researcher will overcome them in the study by:

- Ensuring that the study group does not represent the larger population, but will consist of three schools and six to ten participants in each school sampled; and
- Using triangulation (multiple techniques and cases) to provide for variety of data collection, which will enable credibility and validity of the study.

4.2.2 The research paradigms underpinning the study

Qualitative researchers approach their studies with a certain paradigm which reflects a basic set of beliefs, assumptions or world view that guide the inquiry (Creswell, 2012, Creswell, 2014). Considering the nature of the target phenomena (sustainable development and greening schools), the researcher followed the advice of Chilisa and Kawulich (2015, Selecting a Research Approach section, para. 3) who explain that the constructivist or interpretative paradigm utilises a qualitative methodology. Epistemologically, interpretivism is intricately linked to constructivism and these paradigms are often used in a combined form (Creswell**,** 2014, p. 37)**.** According to Chilisa (Chilisa &

Kawulich, 2015, p. 5), the constructivist or interpretive paradigms help to understand and describe human nature. Interpretivism argues that scientific methods (positivism) are not often used for the study of organisations (such as schools) and not often appropriate for study of human behaviour, actions (Creswell, 2014) and experiences. It holds that perfect objectivity cannot be achieved scientifically, but is approachable (Chilisa & Kawulich, 2015, p. 9). As Crotty (in Chilisa & Kawulich, 2015, p. 7) puts it, “no matter how faithfully the scientist adheres to scientific method research, research outcomes are neither totally objective, nor unquestionably certain.” The researcher employed interpretivism to report the meaning of each case studied in the final interpretive phase.

Secondly, a relativist paradigm was also employed since it is a philosophical stance which argues that there is no objective way of knowing or understanding the world, as people have different ways of perceiving reality (Ramenyi, 2014). Ramenyi (2014) posits that each individual has his/her own reality or personal lens through which the world is understood because of the different perspectives they hold. The researcher in this study addressed the world as SMTs and SGBs perceive and experience it. As Maree (2012, p. 60) puts it, “human life can be understood from within, in a social life which does not exist independently.”

This study is underpinned by the interpretative paradigm because this paradigm utilise a qualitative methodology (Chilisa & Kawulich, 2015, p. 2). The researcher posits that by using this paradigm, she will be in a better position to understand more about the views and experiences of key role players in schools regarding sustainability of schools’ resources. Therefore, the ontology, epistemology along with theoretical perspective, the value system (axiology) and the literature review that exist on the subject under study work together to answer the research questions.

The shape that this research design took was dependent on interpretive views about two important matters, first is the ontological, and second the epistemological. The epistemological refers to how the researcher can know and understand what she knows (Chilisa & Kawulich, 2015, p. 1). These epistemologies were discovered through exploratory and qualitative research methods. The paradigm in this study reflect on the different views of how the researcher knows reality and sees the world through a particular lens, formed and developed in society (Scott in Ann, Briggs, Coleman & Morrison, 2012,

p. 107). It should be noted that paradigms do not necessarily answer research questions but are used to inform the researchers as to where to search for the answers they seek. The ontological stance of interpretivists is relativism, with the view that reality is subjective and differs from person to person, and is individually constructed from persons with rich meaning of the phenomenon under study (Scotland, 2012, p. 11).

4.3. RESEARCH DESIGN

Research design is a logical plan that describes how the study will be conducted (Ramenyi, 2014), also called a procedure of enquiry (Creswell, 2014). It includes the where, when (setting), from whom (participants), and under what conditions the data was obtained (McMillan & Schumacher, 2014, p. 28). It is the strategy which moves from underlying philosophical assumptions to specifying the selection of the participants, the data gathering techniques used and the analysis done (Maree, 2012, p. 70). It also describes how the researcher carries out the investigation (Morris, 1993, p. 19). The research design used in this study is a qualitative case study design.

4.3.1 Qualitative case study design

Informed by the literature review, the researcher preferred to employ the qualitative case study design, sometimes called idiographic research (Leedy & Ormond, 2015, p. 271) to collect data in a case of TND schools. A case study is a design of inquiry in which the researcher develops an in-depth analysis of a case or multiple cases (Creswell, 2014). Yin (2014, p. 16) asserts that a case study is an empirical inquiry that:

- Investigates a contemporary phenomenon (the case) in-depth and within real-world context, especially when the boundaries between phenomena and context may not be clearly evident; and
- Desires to cover a broad range of contextual and other complex conditions… which are likely to come from multiple and not singular sources of evidence (Yin, 2012, p. 4).

The case study methodology was chosen due to its ability to involve issues explored through one (single) or more cases within a bounded system, meaning, setting or similar context (Creswell, 2007, p. 73). As Yin (2009, p. 18) puts it, “cases are set within [a] real-world context”. Creswell (2014) highlights that “cases are bounded by time, activity and

researcher's collected detailed information using a variety of data collection procedures in the form of interviews, documentation of observations over a sustained period of time." The researcher took guidance from Gillham (2008, p. 102), who asserts that organisations such as schools can be "illuminated" by case studies. In this regard, the school's green status can be illuminated by a case study.

It has been highlighted in the problem statement (Section 1.1) that causes of resource depletion emanate from economic, social and environmental factors. The focus in this study is to explore whether schools implement sustainable practices and lifestyles, because this case study will search on participants' meaning and understanding. The settings and context to be studied in this inquiry are TND primary schools in an environmental and educational context over the same period of time. The researcher preferred the qualitative multiple case study method whereby she explored multiple similar cases (being three TND schools) over time through detailed data collection involving multiple sources of information (Creswell, 2007, p. 73; Leedy and Ormond, 2015, p. 271) by using interviews and document data of observations sites. By doing so, the researcher understood each case in greater depth.

A case study can be a single instrumental case, collective or multiple case studies or an intrinsic case study (Creswell, 2007, p. 74). The researcher opted for utilising multiple case studies because she preferred to study two phenomena, "greening" and "sustainable development" (using interviews and observations) from three research sites in TND schools. By doing so, the researcher opines that the contexts of cases differ with regard to locations, quintiles or funding and did not intend to generalise the findings according to the general rule of qualitative researchers, but rather provide an in-depth understanding of the presented cases (Creswell, 2007, p. 74). In addition, the use of multiple case studies assisted the researcher with credibility and reliability of the data collected. Therefore, this explorative case study provided the researcher with an in-depth knowledge and understanding of participants' ways of living sustainably in their school environments to promote green initiatives.

Case A consists of participants and settings from TND city school, while cases B and C are selected from township and village schools respectively. The township area represents the socio-economic context of the Apartheid era in SA (1948-1994) where mainly non-white

citizens (Blacks, Indians and Coloureds) were removed from cities to live in remote areas (le Roux, 2014, p.132) and city schools originally served the needs of Whites communities (Dube, 2012, p. 171). In this regard, informant triangulation was used to obtain primary data from multiple informants to enable the empirical study to obtain a richer picture and increase the credibility of the research. In this study, the case studies are used to produce a detailed description of the phenomena under study, develop possible explanations of it, evaluate greening and sustainable strengths, weaknesses, opportunities and threats in TND schools (the case being studied). The shortcomings of case studies, among others, are that they are unscientific, lengthily, costly, lack generalisability and are time consuming (Yin, 2009, p. 14).

4.3.2 Population and sampling

The larger group the researcher intends to learn about is the population, whereas the smaller group that is actually being studied is the sample (Borg & Gall, 1989, p. 213). The population studied in this case study emanated from TND public primary schools in the Gauteng province of South Africa. TND was selected for the study because it has a pool or population of different quintiles and settings as well as being in a better position to give a full account of sustainable and green practices from different school contexts. TND consists of a population of 146 schools, of which 86 are public primary schools clustered in four circuits. The population for the case study will be drawn from a total population of 86 public primary schools, of which 21 are city schools, 32 are township schools and 33 are schools located in villages.

Sampling refers to the process used to select the population for the study (Maree, 2012, p. 79). The sample was drawn from the population of TND public primary schools where three public primary schools from different locations were conveniently selected due to their geographical proximity to the researcher's home and were cost effective in terms of travelling. Pseudonyms were used for schools as case A, B and C followed by the location of the school for anonymity and confidentiality. Case A is a city school in quintile 4 or 5 category; case B is a township school in quintile 2 or 3 and case C is a village school in quintile 1. The schools were categorised according to quintiles based on the affordability to pay school funds. Participants' learners in city (suburban) schools pay school fees of between R5 000 and R8 000 per annum; township schools pay fees of between R350 and

R500 per annum; and village schools are non-fee paying schools (Ramaligela, Gaigher & Hattingh, 2014). The results obtained from these schools are not meant for generalisation purposes, but for understanding the topic under study from different contexts.

Purposive sampling was employed by selection of the SMT and SGB members from each school to participate in focus group interviews, to allow this study to study each case intensively (McMillan & Schumacher, 2014, p. 429). Purposive sampling implies that the researcher selected those individuals who would yield the most information about the topic under investigation (Leedy & Ormond, 2015. P. 279), namely, SMTs and SGBs. The school key role players sampled consisted of three groups each from city, township and village schools, on the basis that TND schools consist of different types of schools. The researcher opines that, although this study is qualitative in nature, this sampling is not employed for generalisation purposes as expected from quantitative approaches, but for comparison of results and interpretation of findings from different cases.

The SMT and SGB members from each school were purposively sampled for the study due to key positions they hold at school level, according to the Educators Employment Act (EEA, 1998) and South African Schools Act (SASA, 1996). In this regard, SMT and the SGB members were the identified population to undergo purposeful sampling. Purposeful sampling implies that participants are a small, targeted sampling group (McMillan & Schumacher, 2014, p. 5; Maree, 2012, p. 90) selected because they are the holders of data needed for the study (Maree, 2012, p. 79; Creswell, 2013, p. 156). According to SASA (1996): (a) the SGBs (elected parents of learners registered at a school, teacher and learner representatives, co-opted members of the community, non-teaching staff and the principal) are allocated financial powers, staffing including educators' promotions into management positions (SMT); and (b) SMTs (principal, deputy principal, heads of departments and senior teachers) manage professional matters of the school and advise the SGB on resources needed to provide quality teaching and learning. It should be noted that schools where participants were sampled, were conveniently sampled based on their locations

The size of the participants consisted of fifteen participants of which four were from city school, six from township school and five from village school. The focus group in the city school consisted of the principal, two SMT members (deputy principal and head of

department) and one teacher component member from the SGB. The township school group consisted of the principal, deputy principal, head of department, two teacher representative from the SGB and one parent representative. The village school group consisted of the principal, deputy principal, head of department, two parent representatives from the SGB and one teacher representative from the SGB.

Criterion sampling was also considered for this study since it implies selecting participants who closely match the criterion of the study (Rudestam & Newton, 2001, p. 92). Teachers, non-teaching staff and learners at a school may participate in this research because they too partake in school activities. Contrary to that, SMT and SGB closely match the criteria since they are mandated through employment status and democratic processes to take final decisions on these matters (SASA, 1996; EEA, 1998). Furthermore, Maree (2012, p. 79) highlights the fact that the researcher decides at the design stage of the study the typical characteristics and number of participants to be included to meet the needed criteria. Maree further highlights that “the criteria chosen should assist in selecting those participants most likely to possess the experience, or know about, or have insights into the research topic” (2012, p. 79). Based on the above argument, the administrative staff, teachers, learners, school gardeners, cleaners and kitchen staff were observed with regard to using computers, photocopiers, printers, printing paper; water, energy and waste management related matters. They were mainly observed on how their behaviour on resource use promoted sustainability of those schools’ resources.

4.4. DATA COLLECTION INSTRUMENTS

The data collection instruments consisted of focus group interviews, observations of sites and document analysis. Having interpretive or constructivist and relativist lenses in mind, the researcher have, through these lenses, an opportunity to discover perceptions from informants who hold experiences and knowledge in interviews. An interview in qualitative research refers to a conversation between two individuals in which the interviewer asks questions and the interviewee responds (Savin-Banden & Major, 2013, p. 357). The interviewer asks questions to learn about the ideas, beliefs, views, opinions, to see the world and behaviour through the eyes of the participants (Maree, 2012, p. 87). There are different types of interviews, namely face-to-face individual interviews, group interviews (such as focus group interviews) or web-based interviews using e-mail or internet

(Bolderston, 2013, p. 71). This study employed focus group interviews in phase one of this inquiry, triangulated by observations of sites and participants in interviews as well as document analysis in phase two.

4.4.1 Focus group interviews

As indicated in the preceding paragraphs, key stakeholders, the SMTs and the SGBs took part in phase one of this inquiry through a series of semi-structured focus group interviews. Focus group interviews imply a conversation between the interviewer and interviewees assembled in a group. Four participants in a city school, six in a township school and five in a village were each interviewed in a group to provide interactions between realities as defined in a group context and on interpretations of events that reflect the group input (Frey & Fontana, 1991, p. 175). The participants were a qualitatively sampled group of people who were interviewed as a group, rather than each person individually (McMillan & Schumacher, 2014, p. 389) to debate and argue their responses. They might not be knowledgeable about green and sustainable development concepts, but given the opportunity to explore them, may provide much insight about greening schools in South Africa. For rigour purposes, same questions were asked in each group such as “What processes does the school use to generate funds?” followed by probing to increase dependability of the study (Elo, Kaariainen, Kante, Polki, Utriainen & Kyngas, 2014) (see appendix D). The participants have best experience regarding resource use (SASA, 1996; EEA, 198) and this experience increased trustworthiness in this study (Elo, et al., 2014). Briefing and debriefing the participants before and after the interviews increased confirmability.

4.4.1.1 Conducting the focus group interviews

The following steps were taken when the interviews were conducted:

First and foremost, entry into research sites resumed when all gatekeepers (Gauteng provincial department of education (GDE) (Appendix B) and district office, SGBs and SMTs of sampled schools, as well as the university’s ethical office had given the researcher consent to conduct research. The request to do research from the GDE was conducted by enclosing the researcher’s proposal, interview and observation guides and ethical clearance from the researcher’s university (Appendix A) in the application. The setting was

at the participants' respective schools, in a room that was clean, well-ventilated and free from outside distractions. The room prepared was easily located and at the participants' workplace. The room had chairs and tables arranged in a round-table manner, so that the participants are able to face each other and have eye contact. The researcher placed name-tags or name tents before each participant for recognition.

Secondly, the researcher set a meeting with both members of the SMTs and the SGBs through the principal's office prior to the interview to minimise members feeling threatened and to encourage attendance participation. Thereafter, the researcher provided the participants with personalised invitation letters prior to the interview through the contact the schools provided. This was to ensure that each member should feel that he or she is needed at the interview. The invitation highlighted that the potential participant has special experiences or insights that would be of value to the study. The researcher also sent the online and text-based interview questions in advance for the participants to complete them and resend it back to her after the session.

The researcher summarised the main points of view to pull together or wrap-up the group discussion and verify the information with the respondents. Then the researcher invited final comments from the respondents. The researcher ended with a final note whereby participants were thanked for their participation.

Three focus groups were assembled, one from each school, sampled in three interview sessions that depended on the saturation of the information discussed. The researcher sampled homogeneous groups who share similar knowledge about the same school, but from heterogeneous backgrounds. The power differentials of SMTs and SGBs in the same focus group interview with diverse responsibilities and backgrounds enabled the participants to tap into implicit and shared Knowledge (Bolderston, 2013, p. 71).

There would be respondent triangulation, asking the same questions from three different groups of interview sessions and different data sets were collected at different times (data triangulation). There was theoretical triangulation where more than one theoretical position was used in interpreting data (Briggs, Coleman & Morrison, 2012, p. 85). This was meant for analysing and interpreting the green phenomena at selected case study schools.

The interview guide consisted of five themes of questions aligned to two research sub-question which aimed at exploring to answer the main research question as follows:

Theme 1: Sources of funding

Question: What processes do you follow in generating money into the school's coffers?

Theme 2: Experience when resources are depleted.

Question: Tell me about cause of depletion at your school.

Theme 3: Experience of using school resources

Question: How do you deplete resources?

Theme 4: Educational experience on resource use

Question: What lessons did you learn on resource depletion, and how do you rate your capabilities with regard to sustaining school resources in a scale of 1-10?

Theme 5: Sustainable development

Question: Which goods must be protected? Why so? How?

Theme 1 and 2 covered research sub-question 1 where participants gave information about their school's finances and how those finances are used. Theme 3 covered their nature of knowledge with regard to the areas that deplete school resources, with probing on equipment, infrastructure, awareness and attitudes used by the school to promote positive behaviour in handling school resources. It should be noted that contextual factors emerged from probing question from these themes Theme 4 and 5 covered research sub-question 2 regarding lessons learned on their capability of using school resources, and sustaining them. This is the area where contextual factors are revealed.

4.4.2 Conducting observations

The structured observations were also used to support the research questions further for clarity and exploratory purposes. Observation is a systematic method of data collection that relies on a researcher's ability to gather data through his or her senses (O'Leary, 2014, p. 230; Maree, 2012, p. 84). Observations made up phase two of this study in order to achieve triangulation and hence increase trustworthiness (Brundrett & Rhodes, 2014, p. 30). Triangulation through observations implies comparing many sources of evidence in order to determine the accuracy of information, as a means of cross-checking data to establish its credibility (Briggs et al., 2012, p. 84)**.** Cohen and Manion (1994**,** p. 233) stated that triangular techniques in the social sciences attempt to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one

standpoint, called methodological triangulation or multi-methods (in Briggs et al., 2012, p. 85). Observations were used to triangulate focus group interviews and increase credibility of the study (Graneheim & Landman, 2004, p. 109). The researcher observed schools' infrastructures and campus by using the observation schedule and field notes (Appendix E) to observe commitment to greening and SD. During observations, the researcher focused on implementation, which means schools implemented what they know and understood that it will bring positive results, and these activities answered research sub-question 1. What was not implemented was unknown, as these responses are contextual and answered research question 2. A checklist drafted by the researcher in a form of an environmental audit tool was used by participants to report their observations regarding SD practices and implementations in their respective schools (see section 4.4.2.2). The observations discussed below outline how data was gathered by observing participants and places at the research sites.

4.4.2.1 Field notes and note taking

The researcher wrote down the participants' sustainability related experiences, observations of participants, research site and school occupants' environmental behaviour, which is a process that produces textual artifacts known as field notes (Lindlof & Taylor, 2011, p. 155). Field notes provided primary data used to verify information collected in the participants' interviews (Hancock & Algozzine, 2011, p. 57). In this process, the researcher wrote scratch notes about actions, statements, dialogues, objects or impressions which she will later elaborate or record as soon after a fieldwork session as possible in chronological order (Lindlof & Taylor, 2011, p. 156).

Notetaking involved jotting down interpretive ideas during or after the interview session, which later served as a preliminary form of analysis (O'Leary, 2014, p. 227). The researcher also intended to capture non-verbal cues and ensured that notetaking did not interfere with the spontaneous nature of the group discussion. Notetaking also allows the interviewees in the interview to see that the researcher is busy writing and that what the participants are saying is relevant to the interview (Briggs et al., 2012, p. 262).

4.4.2.2 Environmental audit tool

Semi-structured observation, in the form of an environmental audit tool was drafted comprising of three columns where the participants tick a “yes” or “no” checkbox, with statements and comments in the last column. This semi-structured audit tool allowed the researcher to make text records while taking field notes on the context of the work at the same time. The questions were formulated in such a way that the best practice for an environmentally friendly answer was ticked the “yes” answer. The items included in the audit tool included green features reported in the study of Kerlin, Santos and Bennett (2015) about learners and teachers’ perceptions of a newly constructed green middle school in the central Ohio River Valley of the Midwest United States. Kerlin et al. (2015, p. 3) characterises a school to be green if it includes at least one, but preferably many, types of environmentally sustainable infrastructure and/or practices and that teachers in those schools are using the infrastructure and/or practices to enhance instruction.

This study chose items from Leadership in Energy and Environmental Design (LEED) because the school newly constructed green middle school met LEED the certification standards. LEED certifies green building standards in 150 countries (Medicine & Health Report, 2015). Green schools are built to LEED standards, which is the environmentally conscious criterion of the US Green Building Council which was developed as a set of guidelines for judging buildings that are classified as green or high performance (Kerlin, et al., 2015). Since the assessment of green schools is varied (Meiboudi, Lahijanian, Shoberi, Jozi & Azizinezhad, 2016, p. 237), this study also drew audit criteria from the International Foundation for Environmental Education (FEE) programme for schools to implement, termed the Environmental Management System (EMS), which consists of seven steps (Meiboudi et al, 2016). For the purpose of this study, six steps were integrated into an architectural and engineering audit for the Tshwane North District schools sampled. A similar study by Hens, Wiedemann, Raath, Stone, Renders, Graenhals and Rochter (2010) has taken place in South Africa where EMSs were developed and implemented in 39 primary schools in Northern Gauteng and Southern Limpopo provinces (Meiboudi et al. 2016). Through the EMS this study integrated six categories which provided credits for which a school is judged as green in the audit observation tool, summarised as follows:

- Sustainable sites;
- Water efficiency;

- Energy and atmosphere;
- Materials and resources;
- Indoor environmental quality; and
- Innovation and design process

This study also drew criteria for green schools from the South African Green Schools Programme (SAGSP) launched in Limpopo in 2017 as a pilot programme between the Department of Environmental Affairs (DEA) and Limpopo Economic Development Environment and Tourism (LEDET) (Bizcommunity.com, 2017). The SAGSP comprised of the following six thematic areas:

- Waste management: waste management projects of reduce, reuse and recycle.
- Energy efficiency and conservation: audits and saving criteria.
- Water management and conservation: rain water harvesting, irrigation methods.
- Landscaping and tree planting: beautification to contribute to carbon offsetting.
- Public participation and community empowerment: instil knowledge and skills like tree planting and water awareness week.
- Leadership and institutional arrangement: developing a school environmental policy, vision, mission, strategies and plans to achieve greening projects and awareness.

The literature of green schools drawn from other countries reveals that every green assessment has its own assessment systems and features. For example, Japan gives more attention to the development of equipment and school infrastructure with green architecture and facilities, whereas in Iran, green schools complete a verification process with the World Green Star organisation and receive their licenses (Meiboudi, et al., 2017). In South Africa, similar further quantitative studies need to be undertaken country wide to be able to generalise whether there are green schools in the country. The green building Africa has stated that there are no green schools in South Africa (www.greenbuildingafrica.co.za). This instrument tested research question 1 (nature of knowledge) regarding their knowledge on water, energy, waste use.

4.4.3 Document analysis

Document analysis was employed to analyse the environmental management related documents and policies that address the two research questions (nature of knowledge and

contextual factors). Document analysis was used to find out if SD issues were addressed and shed light on the phenomena under study. These documents were requested from the office of the principal. These were drawn from the environmental management policies and Curriculum and Assessment Policy Statement (CAPS) document the schools had at hand. These documents provided evidence on ontological and epistemological positions. The researcher commented on the meaning and understanding of how school resource management practices were guided and implemented. Document analysis further assisted the researcher to corroborate the interview results and site observations.

The ecological and democracy theory is interconnected with ecological and democratic lenses which underpinned anthropocentric, democratic and ecocentric stances. The participants group interviews were able to relate their anthropocentric view in understanding how the ecological and human systems are interconnected within social systems such as laws and policies which are interconnected with sustainability theory. Through ecocentric view, participants included concerns in their anthropocentrism. In this regard, instruments drafted for data collection, ran across all theories, since they are nested social, economic, ecological and complex environmental contexts

4.5. THE PRE-PLANNED ROLE OF RESEARCHER

The researcher collected and analysed data (Maree, 2012, p. 60). The interview sessions were online and text-based conducted by the researcher, who also took key notes in addition to texts as these not only acted as insurance against technical mishaps but also formed the basis of the transcription, which could then be augmented from the texts (Briggs et al.,2012, p. 262). The researcher also transcribed the interview texts verbatim as soon as possible after the interviews were conducted. The researcher read and reread focus group interview texts to remember other areas which needed to be explored.

The researcher played the role of the moderator during all interviews. The researcher's major role was to ask questions related to the topic, listen to the participants' viewpoints, observe, take notes, audio-taping, prompting and probing where necessary for clarity issues and comments difficult for the respondents to figure out (Savin-Baden, 2013). Probing helped the researcher to understand respondents' feelings, experiences and perceptions regarding the phenomenon being discussed. The researcher was primarily the

reader and remembered what had been said and clarified to the participants what would happen next. She clarified ethical issues, for example the anonymity of the respondents; confidentiality of data; the participants' willingness to participate; to send transcripts back to the interviewee for verification (member checking) (Burnard, Gill, Stewart, Treasure & Chadwick, 2008, p. 431) and the intentions with regard to publication.

The researcher-moderator used semi-structured focus group interview questions to allow a natural flow of conservation with prompts and probes where necessary. This enabled the interviewer to come up with data she intended to receive and interesting and unexpected data that emerged (O'Leary, 2014, p. 218). She also guided the group discussion and answer questions in a non-biased way. The researcher-moderator followed the directive approach style to allow greater coverage of topics in the interview guide with group synergy and spontaneity. The researcher did not share her personal anecdotes and examples relevant to the topic with the participants although she has been in these roles before. This was meant to relax the participants and increase trustworthiness of the research. This also allowed the participants to overcome their embarrassment and sensitivity. The moderator guarded against participants giving responses they thought the moderator may want.

In observations, the researcher was a non-participant observer looking at an environmental situation at the sites, jotting down notes, auditing and asking questions where necessary. The researcher's role was also of an outsider, meaning someone who is not known at the site due to the fact that the researcher is not part of the school community. On the other hand, the researcher was also a non-participant observer when conducting interviews. The researcher did not obstruct nor disturb the normal day-to-day activities at the sites. She also disregarded occurrences in the schools that were not part of the research. She identified the predetermined categories of practices and behaviour that she will observe which she developed from the literature to form checklists or ratings to record, score and interpret as data emerged. The participants were also debriefed after interviews and observations to ensure that no physical, mental or psychological injuries had occurred (Hancock & Algozzine, 2011, p. 52).

4.6. PILOTING THE RESEARCH INSTRUMENTS

Pilot testing is an important and necessary factor in any research project. Fouche (in de Vos, et. al., 2009, p. 205) asserts that a pilot study is one way in which a prospective

researcher can orientate himself to the project they have in mind to prevent errors before starting the main inquiry.

4.6.1 Piloting the interview guide

The first step in pilot testing the interview guide involved the researcher asking two experts in the field of EE at Mamelodi Environmental centre to read and evaluate the quality of the interview guide. In addition, the researcher asked two colleagues in the field of EE to evaluate the quality of the interview guide for validity of the research instrument. Furthermore, the researcher also presented the research instrument to her academic supervisors for comments. The instrument was pilot tested to people who are similar to the targeted population of the study. After the pilot study, minor changes were made to the focus group interview guide by including biographies of participants to allow the researcher to identify their experiences they had on SMT and SGB duties.

4.6.2. Piloting the observation guide

The observation guide was piloted at a primary school in Atteridgeville, Tshwane South District, Gauteng Province of South Africa. The researcher was informed that this primary school is an Eco-school that was rated highly regarding environmental competitions the previous year. This made a good pilot test as the school closely matches the criteria of the main study.

4.6.3. Lessons learnt from the pilot study

After the pilot study, the researcher learnt the following:

1. After an agreement was reached between the researcher and the deputy principal (through the approval of the principal who was on site and busy with administrative duties), the deputy principal did not respond regarding time schedules for more than two weeks. After two weeks, the researcher made a follow up and ensured that a proper rapport was established with the principal, SMT and SGB by sending another email where each member of the role players received the researcher's intention to conduct a pilot study at their school. The researcher learnt that the time frame was an issue because the intention to do a pilot study was scheduled during the last quarter of the year, whereby the SMT was busy with wrapping up outstanding continuous assessment learner activities for

promotional purposes. The principal also indicated that this was not an appropriate time to schedule meetings with NGOs. After the scheduled times were set, the researcher learnt the reason why the GDE did not allow researchers to conduct research in schools during the last quarter of the year.

2. The researcher also learnt that there were some minor changes that needed to be done on the research instruments. This allowed modifications of confusing questions to allow the validity of the main process to be undertaken. The researcher was, in this case, able to improve the quality of the research instruments until she was confident that the instruments would address the aims and objectives of the study.
3. In addition, the data collected from interviews, observations and document analysis was too large. This gave the researcher an insight to ensure that this large amount of data be collected by spending enough time at the research sites.
4. The researcher further learnt that it was necessary to mark each piece of data according to its identifying characteristics, indicating when, where, how and why it was collected.
5. The researcher learnt that it would be to her advantage if the data received is organised according to the kind of qualitative data collected. Data needs information, namely, interviews, observations and documentation.
6. With regard to focus group interviews, the researcher learnt that it would be to her advantage if the responses to the research question could be done using a matrix of responses from participants. Therefore, the researcher resorted to identifying participants using pseudonyms, *Respondent 1* to *Respondent 8*.
7. The researcher also learnt that memoing was also vital. Memoing implies writing memos or notes to yourself, (de Vos, et al., 2009, p. 402), writing any impression you have by obtaining your own reflective notes as you go through the data (Maree, 2012, p. 104).
8. Finally, the researcher learnt that data needs to be typed, sorted and saved in separate files and print-outs of each data made so that a hard copy is always available to work on. This process was necessary for backup purposes should the laptop be lost or damaged for whatever reason.

4.7. DATA ANALYSIS

Jotting down interpretive ideas during or after the interview session served as a preliminary form of data analysis (O'Leary, 2014, p. 227), since data analysis in a case study is on-going, unlike some research in which data are examined at the end of the research period (Hancock & Algozzine, 2011, p. 62). To begin the process of analysing the large volume of

data generated in the form of interview transcripts, observations and field notes, the researcher engaged in the activity of coding. Data collected from the focus group interviews and observations were coded as school S1 (Case A), S2 (Case B) and S3 (Case C) followed by the location of the school. Data collected from the focus group interviewees were coded as participant 1 to 8 (P1), representing the pseudonym given to each of the participants. The codes for the open- ended questions with interviews were numbered 1 to 12, reduced and organised to five main categories (or themes), namely sources of funding; experience when resources are depleted; experience of using school resources; educational experience on overall resource use and experience on sustainability of resources. This was the procedure that disaggregated the data, breaking it down into manageable segments and identifying and naming those segments (Schwandt, 1997, p. 16). Coding employed comparing and contrasting various segments of data and categorising them into a priori of content specific schemes, a priori of noncontent schemes, and a grounded posteriori inductive context-sensitive scheme (Schwandt, 1997, p. 16). Where the allocated codes exercise did not produce the required granularity, new codes were established and items which were originally coded under one heading underwent code splitting whereby new codes were created (Ramenyi, 2014).

Data were also analysed through thematic content analysis by identifying major concepts or issues discussed during interviews. Lastly, strengths, weaknesses, opportunities and threats (SWOT) analysis was employed to enable the researcher to answer the research question. Data sorting and analysis were done through word processing systems to cut and paste the interview text into relevant categories without using a computer software program for qualitative data (ATLAS.ti8). Document analysis of schools' environmental policies, official records or schools' participation in environmental days, for example, water week or Arbor day, was undertaken to triangulate data collected through interviews and observations.

4.8. QUALITATIVE RESEARCH ETHICS

Research ethics refers to the policy of doing things the right way, not to harm anyone and minimise possible risks (beneficence) (Ruane, 2005, p. 16). The privacy and dignity of the participants was not invaded by the researcher. Ethics is a moral principle guiding conduct against exploitation of the participants. The participants' voluntary participation and

confidentiality was protected. It was important for the researcher to conduct fair and ethical research in order not to overstep the rules laid down by the researcher's university (UNISA, 2019) Policy on Research Ethics, which would result in violation of the protection of the participants.

For human subjects such as members of the SGB and SMT, the researcher required ethical approval from the university (UNISA). These ethical issues were attended to before the actual research commenced. The researcher's university needed to approve the ethical dimensions of the study by issuing an ethical clearance certificate. Therefore, the moral principles of privacy, confidentiality, beneficence, informed consent and respect of participants was highly adhered to. It involved a process of applying to the UNISA Research Ethics Review Committee (RERC) and the Gauteng Department of Education (GDE) to gain permission before entering the schools to collect data and to fulfil the requirements of obtaining ethical clearance. These processes ensured that the researcher understood the research ethics processes and did not transgress behavioural norms as established by the University and GDE in conducting the research.

Key ethical issues considered in this research included confidentiality, the voluntary nature of participation, obtaining consent from participants and the conduct of the researcher before, during and after the research. The researcher viewed oneself as a "guest" at the place of study, thus tried to disturb the site as little as possible (Creswell, 2012, p. 24). Once the RERC and the GDE had granted ethical approval for this study and clearance letters were issued (which appear in Annexure A and B of the final thesis), the actual research could commence.

4.8.1. Confidentiality, privacy and anonymity

Ethical issues are important in any research study, and participants were assured that the information provided by them would be handled with confidentially. For confidentiality, privacy and anonymity, the participants were requested if the audio-recorder could be used for interviews which would be later transcribed for analysis. They were informed that they would be assigned pseudonyms to guarantee their anonymity and confidentiality in data transcripts and analysis. The researcher also ensured confidentiality for the purpose of honesty during the group discussion. Confidentiality was enforced by ensuring that all members of the group and the researcher signed the informed and confidentiality form. If

the participant feels that he/she would not be able to keep material confidential, he/she was given the opportunity to withdraw. The members were informed that they would be audio-taped and assigned false names for the purpose of transcripts and data analysis, so that the participants remain anonymous. After these processes, the audio-tape will be destroyed after five years. A consent form to participate was signed based on confidentiality, privacy and anonymity. Data collected throughout the research was filed and kept in a manner that prevented the identification of names or any other identifying details. Ethical procedures were followed as outlined in the statement of informed consent and invitation letter so that each person associated with this research would not receive any complaints about researcher's conduct during this study.

Thereafter, when all protocols were observed, the interview texting resumed to ensure that every participant's input was recorded and allowed the researcher to preserve raw data to review at a later stage (O' Leary, 2014, p. 227). On the other hand, the online text-based interviews were user-friendly, although they did not capture non-verbal cues (Coleman & Briggs, 2003, p. 182) because they were sent back by emails or hand-written reponses. The interviews were transcribed so that all nuances of the answers could be retained and the richness of individual statements would not be lost (Briggs et al., 2012, p. 262).

4.9. RIGOUR

Rigour implies validity, reliability (Seale & Silverman, 1997, p. 380) and trustworthiness in qualitative studies (Elo, Kaariainen, Kante, Polki, Utriainen & Kyngas, 2014). Lincoln and Guba (1985) proposed four alternatives for assessing the trustworthiness of qualitative research, which are credibility, dependability, conformability and transferability (Elo et al., 2014, p. 2). Even though the aspects of trustworthiness are separated, they should be viewed as intertwined and interrelated (Graneheim & Lundman, 2004, p. 109).

4.9.1 Credibility

Credibility deals with the focus of the research and refers to confidence in how well the data and processes of analysis address the intended focus (Graneheim & Lundman, 2004, p. 109 citing Polit and Hungler, 1999). Credibility was enhanced through the following procedures:

- The researcher's prolonged stay in the field until data saturation;

- Persistent observations;
- Triangulating focus group interviews with observations to corroborate what was said by the participants and what the researcher observed;
- Texting interview sessions and using transcripts from text-based interviews to assist in providing an accurate record of naturally occurring interactions and accounts of everyday life;
- Peer debriefing, whereby the researcher's colleagues in the field of Environmental Education were requested to solicit their opinions on the accuracy of the research instruments;
- Member checks, where participants were given the opportunity to respond to the accuracy of the data and the interpretation;
- Obtaining primary data from multiple informants, which enabled the empirical study to obtain a richer picture and increase the credibility of the research;
- Different sampling methods inclusive of convenience, purposive and purposeful sampling;
- Pilot-testing the research instruments to determine whether the interview questions and observation tools were appropriate for obtaining rich data to answer the research questions;
- Ensuring confidentiality and anonymity of the participants; and
- By starting preliminary data collection and analysis simultaneously after the first interview to ensure that data items are linked together to guide the researcher when data saturation is achieved.

4.9.2. Transferability

Transferability implies the extent to which the findings of the study can be applied to other contexts or groups of participants (Babbie & Mouton, 2011, p. 277). The researcher enhanced transferability by:

- Making use of dense descriptions of findings to enhance transferability of information acquired;
- Providing detailed information on the research procedures; and

- Employing purposive sampling to allow the researcher to sample those participants who have the best knowledge regarding the research topic, namely SMTs and SGBs.

4.9.3. Dependability

Dependability refers to the stability of data over time and under different conditions (Elo, et al., 2014, p. 4). Dependability was achieved by:

- Outlining and discussing in detail the processes of data collection;
- Asking the same questions for all sampled sites and participants in interviews and observations;
- Asking follow-up questions and probing during interviews to provide clarity to questions posed;
- Establishing a rapport with the participants, by spending considerable time at the settings;
- Leaving a clear audit trail to ensure that the researcher has attended to consistency concerns (Krathwohl, 2007, p. 346); and
- Using consistency in coding and categorising themes.

4.9.4 Confirmability

Confirmability involves neutrality of the research interpretation, which requires confirming findings or data with other people (Ramaligela, et al., 2014 citing de Vos, 2012). It implies that the data collected accurately represents the information that the participants provided and is not invented by the researcher (Elo et al., citing Polit and Beck, 2012). Confirmability was enhanced by the following processes:

- The researcher presented verbal data in the form of quotations from transcribed data to link the relationship between the data and the research results;
- Ensuring that the research findings emanate from raw data collected without changing the findings to satisfy greening and sustainability theories;
- By methodological triangulation, where three data sources were employed through interviews, observations and document analysis;
- Self-reflection (reflexivity) on the observations and interviews;

- Allowing field notes on observational data to offer a reliable record which corroborates text interviews and transcripts;
- Transcribing the interviews verbatim with latent content;
- Taking notes and keeping records on which the fieldwork was conducted; and
- Using the rigorous Atlasti.18 computer programme.

4.10 CONCLUDING REMARKS

This chapter attempted to describe the research approach followed based on the qualitative approach and how it was triangulated. It initially explained the differences between the qualitative and quantitative approaches to research and why this study chose the qualitative approach as appropriate for the study. From this qualitative approach, the researcher opted for the use of focus group interviews, observations through an audit tool and note-taking and document analysis. The detailed discussion on how data collection procedures were employed was also outlined, that is, the where (setting), how (method, styles and ethics), who or what (participants who hold the information), why (choice of respondents) and the what (data) were needed. The analysis of this data is shown in the next chapter.

CHAPTER 5
REPORTING AND DATA ANALYSIS

5.1. INTRODUCTION

In the preceding chapter, the research design was explained with limited analytic procedures mentioned. Analysis of data has not yet been extensively discussed. In this chapter, data collected from focus group interviews, observations (sites observation and field notes) and document analysis is undertaken. The data is analysed in order to derive meaningful results from them and to answer the main research question and sub-questions as stated in section below. This chapter begins with the profiles of three conveniently sampled schools. Following this is a brief discussion of the analysis approaches employed. Subsequently, some general discussion on concerns and debates on thematic analysis are presented. Then a number of procedures for analysing content are examined. This includes what is perceived as content, what data to analyse, the nature of levels, units of analysis and coding frames. Lastly, the deduction is examined in relation to thematic content analysis. The information in these analysis is followed by an interpretation of the analysed results.

5.1.1 Profile of school

Each case studied is corroborated under each theme to ensure that each school's green practices are clearly captured and understood. The participating schools are referred to as case A for city school; case B for township school; and case C for village school. Each individual school provided an informative insight into the greening practices within the same topic. Only the elements leading to the answering of the research questions are presented, discussed and results made in this chapter. Quotations emanating directly from participants were integrated into the results where necessary.

Case A school is a quintile four school consisting of the following members of the SMT, namely one principal (post level 4), two deputy principals and four heads of department. The SGB consists of four teacher representatives, two non-teaching staff and nine parent representatives. The main sources of funding for this school are school fees, paid by parents or legal guardians, and government contributions emanating from the NNSSF to disadvantaged learners due to parents' lack of income or being orphaned. Case B is a quintile two school consisting of the following SMT members, namely principal (post level

4), one deputy principal, and three heads of department. The SGB consists of three teacher representatives, eight parent members and one non-teaching staff representative. Source of funding is government contributions from the NNSSF. Case C is a quintile one school situated in a village north of the city of Tshwane. It consists of 606 learners and 13 teachers. The SMT consists of a principal (post level 3), a deputy principal and two heads of department. The SGB consists of eight members, two of which are teacher representatives, one non-teaching staff and five parent representatives. The school building was constructed by the apartheid government in 1959 before the democratic era in SA, which this government later ceded to the then Bophuthatswana homeland. After the implementation of democracy in SA, the school fell under the North West provincial education department. After the 1999 election, the school was incorporated into the GDE in TND. It is a no-fee paying school.

5.2. PROCEDURE OF DATA ANALYSIS

The results presented are analysed in threefold, namely: focus group interviews, observations and document analysis for each school. The researcher did not start the analysis process with data because the methodological choices were rooted in a bigger picture of how the researcher conceptualised the research process, of which data analysis was the core component. The analysis began with the integration of (1) the rationale; (2) the theoretical frameworks underpinning the study; (3) the concepts from the empirical literature; (4) the research question and sub questions and (5) presentation of results collected from the focus group interviews, observations (site observation and field notes) and documents analysis. After having gathered together and organised all of these materials, the data analysis began. Subsequent to that, the researcher described these components before turning to a more detailed examination of how the data was analysed.

5.2.1 Rationale of the study

This study is rooted in the personal and academic interest of the researcher regarding green schools and ESD interests. The researcher has spent her career studying primary school education and EE, in particular how resource depletion and shortages are a problem experienced by many schools. Depletion emerged due to schools' unsustainable lifestyles and lack of knowledge on greening schools. In addition, the researcher's personal

experiences at school level have informed this study to varying degrees. For example, the current study was conceptualised when the SMTs experienced periodic and recurring resource depletion, especially during the last quarter of the year when learners are about to write examinations. The budget was exhausted and contingency plans were failing. As the researcher was a member of the SMT responsible for LTSM at her previous school, she opted to study and put personal knowledge into the topic of “green schools and SD” to pursue her study further. Combining her experiences on LTSM depletion, EE background and knowledge, the researcher pursued this topic to project what may have been accomplished if the school was a green school.

5.2.2 Theoretical perspective

Aligned to the researcher’s emphasis on greening school and sustainable development, the researcher adopted the ecological democracy theory, which integrates ecology, democracy and greening school phenomena. Secondly, the sustainability theory was adopted to understand how green schools seek to find sustainable consumption patterns in the schools’ ever-growing demand on LTSM, energy, transport and others, since greening schools and SD are also located in this theory. Thirdly, the leadership complexity theory was also adopted since the complexities that arise in the educational endeavour concern not only the physical (attributes or resource use depletion and consumption) but also the normative questions of how leaders’ responsibility is taken and assigned at school (section 3.3).

Theoretically, this study is environmental in nature, integrating ecological democracy (Kensler, 2012), sustainability (Department of Environmental Affairs, 2012) and complexity leadership theories in education (Morison, 2007). These theories which underpin the study enabled the researcher to develop an argument that was conceptual in nature. This argument was based on the fact whether the 17-point SDGs will be achieved by all UN member states, or there will be an expansion of these 17-point SDGs due to the failure of most targeted countries being unable to achieve their set SDGs targets by 2030. The researcher’s commitment was to explore and understand the strengths, weaknesses, opportunities and threats (SWOT) on greening schools for SD and ameliorate the constraint conditions often facing school communities, particularly school role players.

This study brings a heightened consciousness of data analysis which reflects the lived experiences of the participants as well as the researcher's own. The researcher believes that research arises from the lived experiences of our everyday world and the portrayal of the world we try to understand (Humble & Radina, 2019, p. 65 citing Smith, 1993 and Richardson, 1997). As an analyst, in terms of the researcher's own perspective and interactions with other scholars, the researcher is as much a part of the analysis as the participants. The reflexivity involved in these theories are the key to the conscious scrutiny the researcher brings to data analysis and knowledge; production in EE and its sister disciplines of ESD. This study also combines these theories to address individual role players in schools in TND and social-historical time of 17 SDGs, vision 2030 and 2063 (Africa). The researcher reflected on theories and categories that helped in answering the main research question.

5.2.3 Concepts from the empirical literature

As mentioned before, sustainable development entails "development which meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (Robbins, 2011, p. 172 citing the Brundtland Report: *Our Common Future,* 1982). "Green school" is a label given to a school building whose occupants focus on sustainable development with regard to energy consumption (Kerlin, Santos & Bennett, 2015). A green school is made up of wireless, fuel-less buildings which utilise solar energy power, rainwater catchment, vegetative roofing, geothermal heating and cooling systems, to name but a few (Kerlin et al, 2015). It promotes sustainable development and education needs to strive to protect the Earth, whose resources have sometimes been compromised.

The literature review (section 2.2) demonstrated that schools' role players experience resource depletion at some stage, especially under-resourced school communities in village and township schools due to fiscal (financial) disparities. Under-resourced schools carry a disproportionate share of the resource depletion burden, including greater incidence rates of being merged into other institutions (SASA, 1996, p. 9) or the SGBs dissolved and declared dysfunctional resulting in being managed by other sufficient persons (SASA, 1996, p. 15). When depletion of resources occurs, physical, social, economic and environmental factors impose major barriers to recovery. In addition, the

lack of supportive entrepreneur skills, financial management and sustainability lifestyles on the part of role players are serious risk factors for resource depletion survivors.

At the same time, TND is seen as a district in the Gauteng Province of SA with a strong sense of self-reliance and affordability, however that is not necessarily the case. The schools in this district, including city schools are no-fee paying schools funded by the NNSSF (2018) due to their inability to pay school fund. They are challenged by changing family structures, unemployment, poverty and economic limitations. Shifts occur in the quantity of business people and government available to help during a crisis. Therefore, there is indeed a need for green schools in order to ensure sustainable development which will result in protecting future generations of the country. The study by Le Roux (2014, p. 95) revealed that the aftermath of the Apartheid era of 1948-1994 is still visible due to social inequity whereby city schools are still privileged and 45% of South Africans are poor people living in villages (Le Roux, 2014, p. 111).

5.2.4 Research questions

The combination of these theories in the literature, the rationale, lived experiences of resource depletion at some stage, especially under-resourced school communities in village schools due to fiscal (financial) disparities led to the following main research question: **“What are the strengths, weaknesses, opportunities and threats to greening schools for sustainable development?”**

The following are sub-questions which assist in unpacking the main research question:

1. What is the nature of the knowledge of the role players in the school about greening the school?
2. How do the contextual factors in the school shape the greening of the school?

These questions led to the focus group interviews, observation of school sites and document analysis. The researcher asked the participants questions which guided them through their green and sustainability journey, from the onset of their depletion and how their relationships and activities had changed since and after experiencing depletion of school resources.

5.2.5 Procedure on presentation of results

The results are presented threefold, namely focus group interviews, observations and document analysis for each participating school. The researcher presented data after collection and performed an analysis to decipher what the data is saying, and seeking to understand what it meant through interpretation, which are the researcher's lenses This procedure served to build up trustworthiness with regard to the researcher's results. It also provided an audit trail of what the researcher did along the way (Merriam, 1995, p. 56). The researcher's analysis looks at the evidence of good preferential options adopted by schools on greening and sustainable development.

The focus group interviews with SMT and SGB members were the researcher's focal research participants. The researcher began data collection by interviewing participants through online e-mail focus group interviews (for computer literate participants) and text-based focus group interviews (for computer illiterate participants). Initially, the researcher planned face-to-face interviews, but this procedure was interrupted by the unprecedented COVID-19 pandemic which forced the South African government to close schools prematurely before the end of the first term. As a result, it was difficult to approach participants and schools due to prolonged COVID-19 Regulations imposed on schools during the first to third terms of the school calendar.

Each participant in the group responded to semi-structured online text-based interview guide in an open-ended interview which averaged 90 minutes. The interview questions invited groups to think and talk more deeply about their own actions, motivations and experiences. The focus group interview was vital in establishing rapport and creating a climate of trust which assured the members that their story would be treated with the respect and care it deserved. Although telephone interviews are also a viable option (Humble & Radina, 2019, p. 67 citing Goldberg & Allen, 2015), the researcher learnt the difficulty of this method in a conference call. The researcher also wanted to physically demonstrate her investment of time, attention and credibility in addition to ensuring that the analysis reflected the way the participants wished to present themselves.

Qualitative data analysis is concerned with transforming raw data by searching, evaluating, recognising, coding, mapping, exploring and describing patterns, trends, themes and

categories in the raw data, in order to interpret them and provide their underlying meanings (Ngulube 2015, p.1). Data analysis started from description to interpretation. The study employed qualitative thematic content analysis to manually analyse, present and interpret collected data. Data interpretation involves explaining and making sense out of the data (Ngulube 2015, p.1). The use of qualitative thematic content analysis enabled the researcher to deductively use predetermined themes which are informed by the theoretical framework underpinning the study and sustainable development components that formed the focal point of the research question while maintaining flexibility to identify and accommodate divergent themes as data unfolds (Yin, 2009).

Categories were deductively developed linked to the ecology democratic, sustainability and complexity theories, guided by research questions underpinning the study, through discovering manifesting patterns of particular expressions of meaning and ideas in the data which allowed for exploration of narratives in the data (Ngulube 2015, p. 18). The complexity theory offers emancipatory framework with the goal of challenging the status quo and empowering individuals in schools who often find themselves in the on the edges of the mainstream society (Humble & Radina, 2019, p. 67 citing Allen, 2016 and Gilgun, 2016). A category refers to explicit content of text and is a simple description of the participants' accounts (Vaismoradi, Jones, Turunen & Snelgrove, 2016, p. 102). Themes refer to more implicit and abstract level, are more than a category and were used to elicit the essence of the participants' experiences. (Vaismoradi, et. al., 2016, p. 102). Coded categories derived directly from theories as presented in figure 5.1 below and participants' characteristic code played a major role in the study. The predetermined themes guided the researcher in planning and focusing on the most relevant data. Hence, a category refers to a descriptive level of content which can be seen as an expression of the manifest content of the text, while the theme is the expression of the latent content (Vaismoradi, Turunen & Bondas, 2013, p. 402 citing Graneheim & Landman, 2004). The researcher deemed it fit that the use predetermined themes and categories provided a greater potential for refinement of codes, new information as well as to explore the meaning underlying the physical message (Ngulube 2015, p. 14) and to guide the focus on most relevant, significant meaningful data.

In the preparatory stage of the analysis, data was transcribed, coded and categorised into meaningful chunks. Data was then presented by providing description of the key findings

under each theme guided by categories, from all data collection from individual online and text-based focus group interview, observation and document analysis. Results are presented in terms of three predetermined theories stated in chapter 3 (Section 3.3.) and figure 5.1 below extracted from the literature. Data was presented by providing description of the key findings under each theme guided by categories, from all data collected from focus group interview, observation, document analysis. Appropriate use of verbatim quotes was used to illustrate, describe, justify and facilitate the description. The findings were then interpreted to report the researcher's understanding. Focus group interviews data is presented first, followed by observation and lastly document analysis. The coding framework has been decided by the researcher in advance emanating from the theoretical frameworks adopted as presented in figure 5.1 below:

Figure 5.1: Eight major categories deducted from theories integrated in the study

The researcher utilised the deductive approach to analyse focus group interviews. Deductive approaches involve using a structure or predetermined framework to analyse data (Burnard, Gill, Stewart, Treasure & Chadwick, 2008, p. 429). This study used predetermined themes and categories emanating from theories. The researcher used Saldana's (2016, p. 14) guidelines on analysis from general to particular, but not from particular to general because they are much clearer than when presented from general to particular. Codifying data followed the streamlined theory-to-codes as illustrated in figure 5.2 below.

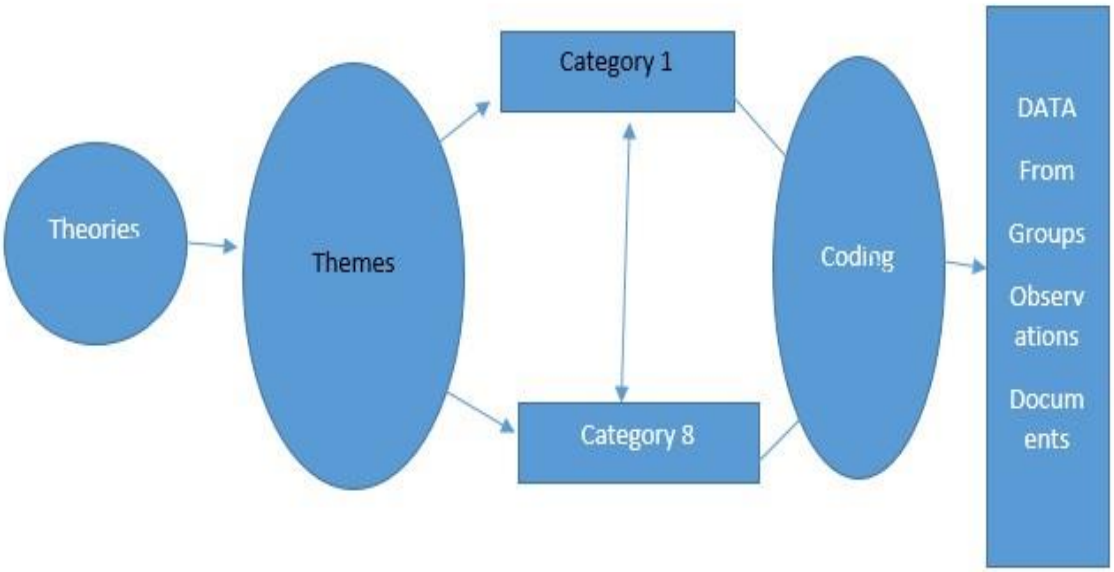


Figure 5.2: A streamlined theory-to-code model (Adapted from Saldana, 2016, p. 14)

5.2.6 Data analysis through thematic content analysis

Thematic analysis is a method for identifying, analysing and reporting themes within data (Vaismoradi, et.al., 2013, p. 400 citing Braun & Clarke, 2006, p. 79). Content analysis is a systematic coding and categorising approach used to explore large amounts of textual information unobtrusively to determine trends and patterns of words used, their frequency, their relationships and the structures and discourses of communication (Vaismoradi, et.al., 2013, p. 400 citing Mayring, 2000). Therefore, both thematic and content analysis were applied simultaneously since both are suitable for answering the question. Thematic content analysis was employed whereby five themes were reflected in the focus group interview guide. Five major themes are discussed with verbatim quotations from the participants and then linked to literature and theory wherever possible. The aim of these

five themes developed in the focus group interviews were to ensure that conclusive findings could be made. Themes are “used as attributes, descriptors, elements and concepts that enables the researcher to answer the research question; they have a high degree of generality that unifies ideas regarding the subject of inquiry” (Vaismoradi, et al., 2016, p. 101). This process allowed the researcher to later align themes with the main research question, sub-questions, aims and objectives of the study.

Guided by the research questions and selected theories’ concepts such as resource and waste management, the researcher’s approach to data analysis was deductive thematic content analysis. This methodological approach fits well with ecological democracy, sustainability and complexity theories since these theories offer an emancipatory framework to the researcher. The methods of reduction, display, conclusion and verification as described by Miles, Huberman and Saldana (2014) were used in data analysis.

5.3. FOCUS GROUP INTERVIEW RESULTS

The interview guide was compiled with five themes of questions aligned to the two research sub questions which were aimed at exploring the answer to the main research question, namely, to explore the strengths, weaknesses, opportunities and threats to greening schools for sustainable development. The first theme aimed at exploring role players’ knowledge regarding the sources of school funding. The second theme was aimed at exploring their experiences when school resources are used up. The third theme explored the role players’ experiences on items and activities that used-up school resources. Penultimately, the fourth theme explored their educational experiences on resource use. Lastly, the fifth theme explored practices of the role players’ sustainable development to survive the depletion of resources.

All participants in the focus group were interviewed individually and later as a group. The researcher conducted interviews which lasted for 90 minutes as proposed. Before interviewing the groups, the researcher asked for individuals’ permission to address ethical issues and those who participated signed the request permission letter. After receiving their responses, the researcher transcribed each group’s interview on a computer. In order to improve readability of transcripts, the researcher removed informal familiar languages such as:

“esp” transcribed as “especially" and “i.e.” as “that is”.

- Abbreviations such as “isn’t” transcribed as “is not”.
- Transliteration of “Jojo tanks” to “water tanks and “spaza shops” to “informal shops.”

While transcribing the interviews the researcher addressed ethical issues of confidentiality and anonymity (Section 4.8.1). The researcher read the transcripts of each group several times to familiarise herself with data in preparation for analysis. Verification with participants was executed to address creditability and trustworthiness (Section 4.5).

Data collected from focus group interviews from the three selected schools were coded as S1 for case A, S2 for case B and S3 for case C. The interview data was then coded with a predetermined coding framework from the theoretical framework. A code in qualitative inquiry is a word or a short phrase that symbolically assigns a summative, salient, essence-capturing and/or sentence evocative attribute for a portion of language-based or visual data (Saldana, 2016, p. 3). It should be noted for this study that coding and analysis are not synonymous, however coding is a crucial aspect of analysis (Saldana, 2016, p. 7 citing Basit, 2003, p. 145).

The researcher linked together the topics of reporting and analysis because it seemed appropriate for this study to mostly depend on the kind of report that it acquired. The analysis mainly focuses on what the researcher found and interpreting what the data means. Data analysis began with transcripts from the interviews. Next, data was coded in terms of the categories, including some quotations to present the perspectives of the participants (Terreblanhe, Durrheim & Kelly, 2006). The data was then reduced or condensed (Graneheim & Landman, 2004, p.106) and organised into five main themes (Section 5.4.1).

The researcher transcribed all online and text-based interviews of each participating school verbatim according to the predetermined themes in the interview guide. Setting code was used to code participating schools as S1 (Case A: city school), S2 (Case B: township school), and S3 (Case C: village school). Participant perspective code was given to every participant in each focus group and were coded as P1, P2, P3, etc. for participant 1, 2, 3 etc. This classification of codes helped the researcher to organise codes which enabled comparison and classification prior to the subsequent analytic steps (Vaismoradi et al.,

2016, p. 103). The participants' responses were analysed as a group with different viewpoints emanating from individuals about their school. Each group discussion covered more or less the same order, then reporting and analysis addressed the same topics. The researcher's report of the results was twofold, by using the direct quotations from the participants as well as by summarising the results where necessary. As categories were coded as C1 – C8 then patterns of codes emerged inductively, namely a "biography" of participants which was later coded as C9. The participants and codes of each focus group were coded according to table 5.1 below:

Table 5.1: Coding of participants and cases

CASES AND PARTICIPANTS	CODES
Case A	S1
Case B	S2
Case C	S3
Participant 1	P1
Participant 2	P2
Participant 3	P3
Participant 4	P4
Participant 5	P5
Participant 6	P6
Category 1 (Ecological principles)	C1
Category 2 (Democratic principles)	C2
Category 3 (Economic)	C3
Category 4 (Social)	C4
Category 5 (Ecological)	C5
Category 6 (Political)	C6
Category 7 (Spiritual)	C7
Category 8 (Complex environmental problems	C8
Category 9 (Biography)	C9
Interviewer	I

The transcripts were written in a question-by-question format to enable the researcher to capture what each participant in each group had to say regarding each question (Maree,

2012, p. 92) where possible. The group, not the individual, was the fundamental unit of analysis (Morgan, 2013, p. 60). It should be noted that what happens in any focus group depends on the individuals who responded. On the other hand, the focus groups are not isolated individuals, but rather is a group engaged in a conversation (Silverman, 2016, p. 176). Therefore, the group not the individual constituted a separable unit of analysis. Once the data was transcribed, the initial coding started with the theoretical framework, whereby the researcher read and reread the transcripts and made notes from words emanating from theories in the margins to sum up what had been said in the entire corpus of text, usually known as open-coding (Burnard, et al, 2008, p.430). Dross was uncoded and redundant categories and codes were discarded. Such 'off the topic' material is sometimes known as 'dross' (Burnard, et al., 2008, p. 430). The purpose of undertaking this process was to validate the conceptual framework employed.

The researcher started by coding the interview transcripts of every participating school. This procedure limited theory development (Burnard, et al, 2008, p. 429) in this study. A category implies groups of things which are put together not just because they are exactly alike or very much alike, but because they might have something in common, even if, paradoxically, that commonality consists of differences (Sadana, 2016, p. 7). As Vasmoradi et al puts it, "categories are descriptive level of text … descriptors of themes or subthemes" (2016, p. 102).

The researcher organised the predetermined framework into eight categories of ecological principles, democratic principles, economic, social, ecological, political, leadership and complex environmental problems. Codes were applied to the transcripts of each turn of talk. A complete framework of all 32 codes is provided in Table 5.2 below.

Table 5.2: Complete coding framework

Ecological princiles	Democratic principles	Economic	Social	Ecological	Political	Spiritual	Complex environmental problems
Development	Fairness & dignity	Prosperity	People	Breathable atmosphere	Policy makers	Christianity	Chaos
Network, partners-hip and diversity	Purpose & vision				Politicia ns	Judaism	Cognitive psychology
Dynamic balance	Integrity					Hinduism	Computer Science
Nested systems	Reflection & evaluation					Islam	Evolutionary Biology
Cycles	Accountabili ty						General systems
Solar energy and flows	Individual & collective						Fuzzy logic
	Dialogue & Listening						Information theory
	Decentralisa tion						
	Transparen cy						
	Choice						

The results from the participants' viewpoints are reported in some literary style rich in participants' commentaries being the main characteristics of qualitative methodologies (Vaismoradi, et. al, 2013, p. 398). The researcher decided that the analysis should depend on what the text says, referred to as the manifest content (Graneheim & Landman, 2003 p. 106; Bengtsson, 2016, p. 10). The information from these participants is followed by a brief interpretation of the analysed results linked to literature and theory wherever possible. The constant comparative method of analysis was also employed whereby comparisons were made between elements in a single case (Silverman, 2016, p. 143) in each focus group interview results.

The focus group discussions mainly tested the nature of the role players' knowledge in relation to sustainable practices (research question 1) and the contextual factors that shaped the greening of the school (research question 2). Biographical data of participants (C9) was obtained in order to gain insight into the demography, year of residency at the present school, experience and the time frame they participated in the schools' role-playing position. Five major themes of each case are discussed with verbatim quotations from the participants and then linked to literature and theory wherever possible.

5.3.1 The nature of knowledge of key role players on greening the school

The summary of results across all cases are presented in twofold, first the nature of knowledge of key role players from interviews and then from the environmental audit tool. The summary of results in interviews are presented according to the predetermined themes as outlined below.

5.3.1.1 Theme: Biographical data

The biographical data in S1 revealed that half of the participants had resided in the same school for less than three years (P1 and P4) and the other half for more than twenty years (P2 and P3). In S2 the participants had resided in the same school between two to six years and more than four years in S3. It can be deduced from the information provided that having been role players for more than two and twenty years indicate that the participants are knowledgeable about the description of duties they are expected to perform as informed by SASA (1996) and EEA (1998). It is also important to note that the participants emanated from different biographies whereby some are from members of the SGB and some from the SMT. Therefore, their contributions increased the trustworthiness of their inputs. Their terms of office are adequate to provide this study with credible and reliable information. All participants' term of office in the SGB were between 2018 to 2020. Having been in the role-playing position from 24 to 36 months, the researcher did not doubt their contribution due to the fact that the time spent in these positions gave them adequate knowledge and challenges about their schools which they lead on a daily basis.

5.3.1.2 Theme 1: Sources of school funding

This theme addressed C3, C4 and C6 with regard to role players' nature of knowledge on generating funds (research sub-question one) by this question *"What processes do you follow in generating money in the school coffers?".* The results indicated that the role players are knowledgeable about the sources of funding in their school. In S1 government funding, payment of school fees, NGOs and fundraising was reported. This is evident in the statement of P4 (S1) that: *"We are quintile 4 school, therefore, our learners are paying school fund. We also had some bit from state fund."* P2 collaborated that activities of fundraising through civvies days, cake sales and annual fundraising also contributed to the sources of income the school received. Subsequent to that, P4 elaborated that:

"We receive donations from the organisations such as Lotto… we have a tuck-shop that sell goodies to both learners and staff, market days where learners make and sell their items, field day through fun runs, selling of scrap material." In S2, P2 reported that: *"The school is entirely a no fee school relying on the government fund."* P2 (S3) stated that: "*Our school is no-fee paying school… is funded according to section 21 of norms and standards."* P1 also added recycling as another source of funding. Subsequent to that, P5 further explained the strategy adopted by the school regarding fundraising, and stated that: *"On Fridays learners wear casual clothes and donate R2,00 on that activity."* This statement is further supported by other participants in the group who identified the following sources of funding:

"*NGOs; fundraising through casual day on Friday, Valentine's Day, Heritage Day, entrepreneur Day, our learners paying R2,00; once a month… drama and dance events at R10,00 per child; do fun days, sell sweets, purchase and sell school uniforms to learners."* From these responses, it is evident that S1 did not utilise green strategies to accumulate funds such as selling of scrap material.

Drawing from the groups' information, it appears that schools are predominantly funded by the state from the National Treasury according to PFMA (1999). Since the DoBE is an organ of the state, the ministry is responsible for funding education according to the NNSSF (NEPA, 1996). Furthermore, it is evident that groups are knowledgeable that funding plays a predominant role in the improvement of the school's mission of providing better education

to the community. The groups appeared not to understand or be knowledgeable about green and sustainable practices that could be used to finance the school. This displayed negative activities to sustainable development.

5.3.1.3 Theme 2: Experience when resources are depleted

This theme was based on finding out the role players' experiential knowledge with regard to the causes of resource depletion at the school. In S1, P4 reported maintenance, infrastructure improvement, electricity, telephone and water bills, transportation, catering during workshops, stationery and buying diesel for generator use during load shedding as a few examples. In S2 poor monitoring, misuse of resources, over-admission, lack of security, burglary, theft and workshop transportation of educators were issues they know causes depletion of school finances and resources. As P5 posits, *"there is a lot of maintenance because of burglary and theft*". In S3 the group listed the following:
"School laptops, photocopiers, printers, printing paper, electricity by not switching-off lights at night, maintenance of machines, school building maintenance, stationary, electricity bills, feeding scheme, transport, using money haphazardly and poor budgeting by not prioritising and not harvesting rain water."

The participants' response regarding how they overcame depletion P2 (S1) stated that:
"*Sometimes we have to out-source from other schools or request from the SGB for new ones"*. P3 (S1) stated that they prioritised and left other expenses that could be paid later. Contrary to that, P1 (S1) stated that planning ahead minimised challenges. This was collaborated by P3 (S1), who suggested changing strategies through quarterly or monthly planning. However, P4 (S1) reported that this depletion could be overcome by using available resources efficiently and sustainably but did not elaborate how. P1 (S2) stated that they overcame and solved depletion problems by ensuring that teachers report resources to their HOD, Deputy Principal and principal in that order. P2 (S2) stated that they are supported by the district office and donors. P3 (S2) stated that they borrow resources from neighbouring schools whereas P4 (S2) stated that they fundraise and ask for more donations. Finally, P5 (S2) stated that they sometimes do not go to workshops to assist the school with maintenance.

S3 response regarding how their school solved or overcame depleted resources, were suggestions of:

"Sharing laptops, switching-off electrical appliances after use or use solar power, use borehole or rainwater, procure needs for LTSM, the SGB did fundraising by downloading internet comedy and did movie day on certain Fridays for a price, did ruffles, held entrepreneurship day and followed a strict budget."

This is evident that school are struggling to meet its obligations and used whatever works for them to overcome and solve depleted resources This is evident that the role players are knowledgeable that saving energy reduces the electricity bill through switching off electrical appliances and equipment. It appears that they did not know other alternative methods to save costly electricity bills. On the other hand, they also reported poor budgeting skills, not harvesting rainwater, not using borehole water and minimising transport costs has taught them a lesson on resource depletion.

5.3.1.4 Theme 3: Experience of using school resources

This question explored the participants' experiences on how school resources are depleted and how they overcame depletion of resources. In S1 participants stated that they experienced that resources are used on learning materials, equipment (P1), water and electricity bills, photocopiers, paper, stationery, workshop transport and fuel for the generator (P2), maintenance of sports fields, infrastructure (P3), books, charts, posters, games and electrical appliances (P4). P2 further commented that infrastructure is taken care of by the GDE for they have a budget to do such. This is contrary to P3, who commented that the school is the one that takes care of infrastructure, maintenance and sports grounds.

Secondly, in response from S1 regarding behaviour on saving water, electricity and paper, P1 calls it *"a nightmare",* stating that these resources run out before the expected time. Contrary to that, P2 who stated that:

"Water is controlled; we have leaders who assist teachers to supervise learners. Lights are switched off most times and paper taken for recycling."

P3 also reiterated that educators and general assistants use water sparingly and gardens are watered after sunset. Furthermore, P4 reported that they don't have water availability problems since borehole water is stored in "*jojo"* water tanks, the school also uses

municipality water supply, water pipes are maintained regularly to avoid leakages and taps are set on automatic lock to avoid spillages.

With regard to awareness S1 reported that they adopted by the school on resource use, it was reported that the school sensitised resource conservation by users (P1); learners are taught how to be responsible of the school property (P2); learners are encouraged to look after the school resources and report any misuse of any resource by others (P3). P4 elaborated that:

"*Staff members are always encouraged to switch lights and computers off before leaving the classes and offices. We use automatic outside light bulbs to save electricity. Automatic tap locks are used to avoid water spillages. Staff members and learners are encouraged to shred used and spoilt papers. Garbage bins are placed at every block to avoid littering, we just put waste in the waste bins. Some general assistant workers and local people take some waste like cold drink and juice bottles and tins from waste bins for recycling for their personal gains."*

With regard to attitudes used by the school to promote positive use of resources, P1 elaborated that:

"*Although the SMT and teachers try to emphasise and demonstrate conservation of resources and equipment, learners' display negative attitude towards resource conservation."*

P2 reported that the school used outside motivational speakers and, by keeping the school clean for a month, a class would receive incentives. However, P3 elaborated that:

"*We usually preach that cleanliness is next to godliness to the learners. As governing body of the school, we try to recover any mal-use of resources from parents of learners. Sometimes they ignore us and we try the legal route. To propose positive attitude and expect positive response is not always possible because some of the SGB members are not at school 24/7 and these responsibilities are left in the hands of teachers."*

In S2 the participants experienced learning problems in textbooks and stationaryThey complined about loss and quick damage of textbooks. They named issues such as burglary, under-resourcing and miuseuse of these items. P5 highlighted that when textbooks are depleted, they consulted the department for directives. It is evident that S2 security was compromised because the issue of burglary and theft was regularly stated

several times in issues related to expenditure. With regard to infrastructure, the participants experienced aintenance of broken windows and doors; electrical appliances; cables; sewage blockages; theft and burglary. Contrary to these, P2 and P6 collectively stated that the Department is in charge of buildings and its maintenance. However, P5 is concerned about the building, which is more than ten ears old. P6 stated that they used mobile classrooms and there are no sport fields.

There were inconsistencies regarding responses to awareness proposed by the school, whereby some are positive and some are negative to the environment. Positive awareness used by S2 was reported that:

"The school has save water awareness chart that is also emphasised during assembly; through parents' meetings learners are warned about poor usage of resources; there is a policy that only HODs use for paper topping … General assisstants issue resources; and telling learners to look after resources."

There are also negative reports by P3 that:

"H*onestly, ever since I worked here, I have never seen or heard learners being addressed about water usage… It's like people do not care because it is not their bill to pay."*

P5 reported that little time is given in the SGB to talk about school buildings and they do not have any clue regarding how to solve the problem. It is evident that awareness on resource use is not efficiently advocated.

To promote positive attitudes to resources, it is reported that the principal emphasised that educators should accompany learners for toilet routines for monitoring and supervision of resources; there are awareness programmes in place; LTSM coordinators help manage funds and the SMT is leading by example on good use of resources. Negative attitudes reported are that there are no water and electricity coordinators with regard to resources.

According S3 resource depletion was on LTSM (like purchasing of books, equipment, photocopying papers for formal tasks, stationery and printing cartridges), cleaning materials, maintenance of infrastructure (painting, re-installing electrical appliances and maintaining sports grounds), theft, vandalism and services (electricity, telephone, gas refilling) were identified to deplete school resources. According to P4, to overcome these constraints:

"persons who purposefully damaged school materials are expected to buy and replace the items." P5 commented that:

"The school also requested services from donor companies like the national lottery board."

It is noted that the school has adopted certain behaviour on resource usage as follows:

"*To save water the school used borehole water which was stored in tanks. Regarding electricity, the school used renewable solar energy and gas for the school feeding scheme, heaters are prohibited in winter and they switched off electricity lights and computers when not in use. To overcome paper constraints, the school asked parents and companies to donate printing paper, and they photocopied their tasks [on] both sides of the paper."*

Regarding awareness on resource use the group indicated that:

"The school has a policy on resource management, where school resources are retrieved or replaced by the offenders. They celebrate 'water week' to encourage recycling and 'no littering' posters/signage are placed around the premises. The school also invite officials from ESKOM, (which is an electricity utility company in SA) *and water retails to explain the importance of these resources."*

Regarding attitudes on resource use, the group collectively indicated that:

"Sub-committees are formed to deal with policies on safe usage and retrieval of various school resources. Breaking any school resource need to be replaced by the offenders."

It has become apparent from this school that despite losses of resources at school, replacement and recovery remain a serious problem for the school. Losses of items did not necessarily mean demise of an item, but is costly to the school and the offenders. Theme three addressed C1, C2, C3, C6 and C8.

The behaviour, attitude and awareness on resource use in all case is moderate to the environment because there are sufficient resources whose responsibility is passed to other subordinates like general assistants, motivational speakers, lawyers, teachers and giving incentives. Recycling waste in such a way that the school benefits is positive to the environment and promotes school finances. Reflecting on the difficulties they reported on generating funds, it is not wise to allow others to benefit from the schools' waste. The role players need to improve the way they dispose of their waste, to steer it into a direction that this waste can be disposed-off by the school and thus attain an environmental advantage.

5.3.1.5 Theme 4: Educational experience on resource use

This theme is concerned with the knowledge participants learned when using school resources in their day-to-day activities. In S1 a single participant rated himself below five regarding his capabilities on sustaining of school's resources. The majority who rated themselves above five stated that the reasons for doing so was that their learners are taught how to be responsible of school property (P2); they use resources sparingly and improvise where there is a shortage or lack of resources (P4). P3 rated at five and elaborated that:

"*Most of us did not study Accounting at school and sometimes it is very difficult to understand how to budget big funds to run the whole school successfully without a short-fall. Some plans sometimes fail us and we learn new ways every day. What was successful last year cannot be successful this year. Every year prices of resources like electricity and equipment go up, nothing goes down.*"

Contrary to these comments, P1, rated at four, elaborated that:

"*Attitude of learners towards sustainable use of resources is negative. The mentality that resources in the school are government property cannot be taken away from the resources users. Further, vandalism and rapid depletion of resources cannot be over looked.*"

Furthermore, P4 stated the lesson he learnt on school expenses was where a lot of money was channeled, and the realisation that the importance of fundraising and donations is to boost the school coffers for effective and efficient running of the school. This theme revealed that the lessons learnt by this group are not green and poses a threat to sustainable resources. This is the reason why one of the participants reported that there is a negative attitude of learners on sustainability of resources.

Five participants in S2 rated themselves above five regarding their capability on sustainability of resources. The rationale for doing so was that they:

"looked and cared after the resources; the community has a negative attitude of not conserving school resources; and there is sustainability of resources."

P3 rated himself at four, reporting that he had observed a lot of misuse of resources like books, chalks and markers, though they try their best to sustain them. Three participants

reported that their attitude towards being in the roleplaying position never changed because of:

"proper stock taking, high level of retrieving system and lost books being replaced; they are on the right track; and that they chose teaching as a career because of passion and dedication to improve people's lives."

Most participants in S3 collectively rated positively at five and above when reporting on their capability on sustainable resource use, whereby P1, P2, P4 and P5 rated at eight, seven, nine and five respectively. They reported varied reasons based on the regulations imposed by teamwork on the part of the SGB and SMT to sustain resources. They further reported that they are knowledgeable and informed of the disasters that could be caused by the scarcity of these resources due to population growth and the country receiving electricity and water from other countries. When prompted about their attitudes on being school role players, the participants who reported positive attitudes regarding not changing their role playing position due to the following reasons:

"The support they received; … learning new strategies; … that waste can make money; … looking after the needy; … workshops provided

to role players."

It appears that educational experience in relation to resource use can play a major role in the making of positive day-to-day sustainable decisions at school.

5.3.1.6 Theme 5: Sustainable development or Sustainability

This question explored the participants' nature of knowledge on sustainability of resources. A question was raised concerning which resources must be sustained, as such S1 named a number of resources, such as infrastructure (buildings, sports grounds, fencing, school hall, computer room and swimming pool); natural resources (water, vegetation, land or soil, atmosphere); LTSM (textbooks, paper, machines, furniture, equipment, desks, phones, chalkboards); lights and electricity. The group supported their choices stating that they are expensive to replace or service and that they should be able to cater for future generations. P2 elaborated that textbooks have a life-span of three years and school property should be utilised for years to come.

S1 revealed that these resources could be sustained by taking good care of them and using them sparingly. P3 explained that:

"*By making sure that everybody takes the responsibility of taking care of them. The school could also ensure that they have a good auditing or stock taking strategy to minimise loses. Writing paper sheets should be used again if the other side was not printed.*"

The group reported that the rationale of doing so was to conserve resources and to avoid depletion of resources that can be used by future generations (P1); to make sure that they last longer and minimise expenditure (P3) and to save costs (P4).

S1 named a variety of physical resources that should be sustained, not taking into consideration that human resources are also vital for the school to operate. The positive sustainable development fact was that this group was also able to name natural resources that should be sustained. This indicates that they are knowledgeable that they cannot survive without water, land and air from the atmosphere, which are indicators of positive environmental behaviour.

Regarding which resources should be sustained, S2 named the following:

"*Furniture, LTSM emphasising textbooks, laptops, photocopying machines, infrastructure (fence, gate, building) and water.*" The reasons were that: *"they are significant for teaching and learning; to save for other resources; for security; for curriculum purposes; without them there will be no progress; and that they are the engine of the school."*

The entire group overlooked natural resources like trees, plants and solar energy or electricity which supplies the equipment they listed. Above all, human resources were not mentioned even though schools cannot survive without them. They reported that these materials could be sustained by:

"taking good care of them; replacing lost books; good textbook retrieval; applying saving water strategies; having security staff; and servicing equipment."

According to these participants, the rationale for doing so is to:

"promote effective teaching and learning; and sustainable finances because they are the core for the school to function."

In contrast, not all items listed are the core, as everything in the school is vital for effective teaching and learning.

Lastly, S3 listed energy, equipment, books, paper, natural resources (water, vegetation, land or soil, atmosphere), infrastructure (buildings, sports grounds, fencing) and furniture (desks, phones, chalkboards, lights) as resources to be sustained at school. The participants reported mixed reasons that:

"These resources are the core or basic needs of the school to be able to operate; they are scarce, valuable and expensive."

It appears that this group understood the basic needs of the school and that they could reduce and use less of the scarce resources.

In general, the group showed little knowledge about resources such as knowledge, experiences and expertise of staff and students also need to be sustained to ensure future availability rather than depletion (Graham, Berman & Bellert, 2015, p. 60). It has become apparent that this group, despite their many years residing in the school, did not realise that human resources, their expertise and knowledge in the education field needed to be sustained so that these resources can provide for human needs for as long as possible (Spooner, 2012, p. 398) and that people and nature are intertwined (eco-centric). This theme addressed C1, C2, C3, C4, C5 and C6.

5.3.1.7 Additional comments

The closing question posed to participants to wrap up the discussion was whether they had anything else they wanted to add to the discussion. P1 (S1) stated that *"we should all develop a positive mind set and attitude towards resources entrusted to us in order to be better citizenry*". With regard to the most important question discussed, P1 and P3 selected the question "*What should be sustained at your school?"* P1 gave the reason that sustainability brings about development through conservation of resources and P3 stated that:

"Leaders at school should lead in such a way that they know which resources are very crucial to delivering excellent service of teaching and learning at the school they are leading."

However, P4 chose *"sustainable development",* stating that It is always trending in media and news channels and politicians say that it is one of many ways of using and saving resources in the country. It is evident that this school needs to become a more sustainable school, which is a positive attitude to sustainable development. In S2, P1 and P2, P5 and

P2 in S3 concurred that: "*Sustainability (theme 5) was as a very important question addressed."* Some participants in S3 opted for funding and theme 4 as important questions discussed because of difficulties related to funding. One could argue that a more positive approach to sustainability will often develop once the school discovers for itself how important sustainability is, which implies that the village school, which is a no-fee paying, for example, cannot operate in the same way as a city school which is able to do so.

5.3.1.8 An environmental audit tool

Secondly, in an environmental audit tool a matrix was used whereby when a cell is selected, it indicated an occurrence and comments from the findings per participant and coded P1 – P4 (S1); P1 – P6 (S2); and P1 – P5 (S3). P2 and P6 did not complete the environmental audit, therefore they are not reported in the analysis of S2. It is unfortunate that S2 participants did not provide any comments related to their selected criteria. In S3 P2 seems not to understand because he never commented to support the choices taken, and on top of that, even ticked in areas he was supposed to comment. The question regarding the type of globes used at school, P3 ticked twice and P4 commented on a "Yes" column. A comparison matrix is shown in Tables 5.3, 5.4 and 5.5 below:

Table 5.3: S1 environmental audit

SCORE	YES	SOMETIMES	NO	COMMENTS
Are you aware that switching off lights during school hours saves electricity?				
P1	√			I switch lights off regularly to save electricity
P2	√			
P3	√			
P4	√			Yes, I am aware
Are you aware that switching computers off after school saves energy?				
P1	√			Computers left on remain charging and consuming electricity.
P2	√			
P3	√			Yes I am aware
P4	√			
Are you aware that rain water harvesting saves water and electricity?				
P1	√			less use of household water and electric pumps pumping water into the households
P2	√			
P3	√			Because it is free and not billed by the municipality
P4	√			
Do you implement strategies to save water and electricity?				
P1		√		By re-using water and switching off unused electricity lights and equipment
P2				
P3	√			
	√			By teaching our learners about saving water and electricity
P4				
			√	We do not have water scarcity

Do you practice recycling of paper, water, electricity, machines, e-wastes, plastics, bottles, uniform etc? **P1** **P2** **P3** **P4**	√	√	√ √	yes, by making use of used items to create other things from them Paper and bottles are sometimes taken by recycling men who come during waste removal days and take them to recycling stores for their own benefit We do not have recycling resources.
Do you make your own food garden, for NSNP or for fundraising? **P1** **P2** **P3** **P4**	√		√ √ √	yes, specifically for own consumption, less buying of veggies Not at all
Do you use HVL globes at school or CFLs? **P1** **P2** **P3** **P4**			√ √ √ √	not at all, the school has florescent lights The are no such globes at our school
Do you know which materials are recyclable or places where to recycle? **P1** **P2** **P3** **P4**	√ √ √		√	yes, very familiar with recyclables and recycling places Yes, collect a can and cold drink bottle return to our local store
Do you have a school environmental or green policy? **P1** **P2** **P3** **P4**			√ √ √ √	still working on it Not really

Are you registered as a green school or Eco-school? **P1** **P2** **P3** **P4**			 √ √ √ √	 not registered Not yet
Do you audit waste relating to water, paper, energy, travel? **P1** **P2** **P3** **P4**			 √ √ √ √	 not at all Not really
Do you use renewable energy like solar energy? **P1** **P2** **P3** **P4**	 √		 √ √ √	 not always There are no solar energy appliances at school
When building or renovating, do you use local people and products? **P1** **P2** **P3** **P4**	 √ √ √	 √		 sometimes out-source Yes we do use local products because they are cheap and local businesses also charge us less when the school buys from them in bulk
Researcher's reflections:				P2 did not comment to support her ticks √√ on the interview guide

Table 5.4: S2 environmental audit

SCORE	YES	SOMETIMES	NO	COMMENTS
Are you aware that switching off lights during school hours saves electricity? P1 P2 P3 P4 P5 P6	 √ √ √ √			
Are you aware that switching computers off after school saves energy? P1 P2 P3 P4 P5 P6	 √ √ √ √			
Are you aware that rain water harvesting saves water and electricity? P1 P2 P3 P4 P5 P6	 √ √	 √ 	 √ 	
Do you implement strategies to save water and electricity? P1 P2 P3 P4 P5 P6	 	 √ √ 	 √ √ √	
Do you practice recycling of paper, water, electricity, machines, e-wastes, plastics, bottles, uniform etc? P1 P2 P3 P4 P5 P6	 √ √ 		 √ √	
Do you make your own food garden, for NSNP or for fundraising? P1 P2 P3 P4 P5 P6	 √ √ 		 √ √	

Do you use HVL globes at school or CFLs? P1 P2 P3 P4 P5 P6	 √ √	 	 √ HVL HVL	
Do you know which materials are recyclable or places where to recycle? P1 P2 P3 P4 P5 P6	 √ √ √ √ √	 	 	
Do you have a school environmental or green policy? P1 P2 P3 P4 P5 P6	 √ √	 	 √ √ 	
Are you registered as a green school or Eco-school? P1 P2 P3 P4 P5 P6	 	 √ 	 √ √ √ √	
Do you audit waste relating to water, paper, energy, travel? P1 P2 P3 P4 P5 P6	 	 	 √ √ √ √	
Do you use renewable energy like solar energy? P1 P2 P3 P4 P5 P6	 √	 	 √ √ √ 	

When building or renovating, do you use local people and products? P1 P2 P3 P4 P5 P6	 √ √ √ √			

Table 5.5: S3 environmental audit

SCORE	YES	SOMETIMES	NO	COMMENTS
Are you aware that switching off lights during school hours saves electricity?				
P1	√			
P2	√			
P3	√			
P4	√			
P5	√			Saves finances
Are you aware that switching computers off after school saves energy?				
P1	√			Water tanks and solar energy
P2	√			
P3	√			
P4	√			Increases the lifespan of the equipment
P5	√			
Are you aware that rain water harvesting saves water and electricity?				
P1				
P2	√			
P3	√			
P4			√	Rainwater is soft
P5	√			
	√			
Do you implement strategies to save water and electricity?				
P1	√			Water tanks Solar energy
P2	√			
P3			√	
P4	√			We have water tanks at school and make use of solar system
P5	√			We switch off computers after school and harvest water
Do you practice recycling of paper, water, electricity, machines, e-wastes, plastics, bottles, uniform etc?				
P1	√			Only papers & plastics
P2				
P3	√			
P4			√	
	√			We make use of [a] waste group company
P5	√			

Do you make your own food garden, for NSNP or for fundraising? P1 P2 P3 P4 P5	 √ √ √		 √ 	 √ I have mine, for nutrition at school and fundraising
Do you use HVL globes at school or CFLs? P1 P2 P3 P4 P5	 √ √ CFL √	 √ 	 	 √ They are energy saving light bulbs
Do you know which materials are recyclable or places where to recycle? P1 P2 P3 P4 P5	 √ √ √ √	 	 √ 	 Plastic, bottle & papers Waste group company They consume low current
Do you have a school environmental or green policy? P1 P2 P3 P4 P5	 √ √ √ 	 	 √ √	 The Eco-schools programme Not really
Are you registered as a green school or Eco-school? P1 P2 P3 P4 P5	 √ √ √	 	 √ 	 Edu-plant green school forum √ Since 2006
Do you audit waste relating to water, paper, energy, travel? P1 P2 P3 P4 P5	 √ √ 	 	 √ √	 √ We use the Green audit company We don't have knowledge

Do you use renewable energy like solar energy? P1 P2 P3 P4 P5	 √ 	 √ 	 √ √	 We use only electricity √ Solar panels have been installed in our school
When building or renovating, do you use local people and products? P1 P2 P3 P4 P5	 √ √ √ √ √	 	 	 To create jobs for local people and promote local products

The results of S1 environmental audit indicated that this group know how electricity could be saved regarding lights, computers and rainwater harvesting. One of the participants did not agree that the school implements strategies to save water and electricity because they do not have water scarcity. This group is also not knowledgeable about recycling taking place, whereas P3 has observed recyclers collecting bottles from refuse for their own livelihood. This indicates that recycling is not regularly practiced. The majority of the participants indicated that they do not own a vegetable garden. It is reported that the school does not have an environmental policy, is not registered as an eco-school, does not partake in auditing waste or use solar energy. When renovating or building, the school uses local people or sometimes out-sources labour. It is evident to note that water and energy conservation strategies used by the school are not environmentally friendly.

The results in S2 indicated that all participants who completed the environmental audit are aware that switching off electrical supply power and electrical appliances when not in use saves electricity expenses. A discrepancy emerged in the responses about harvesting rainwater in water tanks to save water and electricity. Two participants responded *"Yes"* (P3 and P5) whereas the other two responded "*No*" and "*Sometimes*" (P1 and P4) respectively. It is evident to note that some participants had no clue about the necessity of harvesting rainwater for water conservation. This indicates that the school relies mostly on

municipal water and electricity which is acquired at a price. Water and energy conservation strategies used by the school are not environmentally friendly. Only two participants were aware that the school practices recycling, has their own food garden and an environmental policy, although they did not provide comments on these matters. The group is knowledgeable that the school uses HVL or CFL (compact fluorescent lights) globes which consume low energy. It is evident that the school is not registered as a green or eco-school. The fact that auditing of waste relating to water, paper, energy and travel is not undertaken indicates poor sustainability practice. Their knowledge showed a need for more positive sustainability practice. Three participants indicated that the school does not use renewable solar energy. It is evident that the school uses non-renewable energy, which is not clean and green to promote sustainable behaviour. P6's comment that the school uses solar energy is not reliable and is an outlier. Using local people for school renovations and building is an environmentally friendly practice of supporting the local community and reducing transport costs. However, the deterministic negative attitude of the school towards positive sustainability behaviour is a threat to the schools' finances.

The results in S3 participants indicated that they were all aware that switching off electrical supply power and electrical appliances when not in use saves electricity expenses. Most participants commented that the school harvests rainwater in water tanks to save water and uses solar power to save electricity. Due to the fact that the school used electrical or fuel generators to draw borehole water from underground indicates a moderate environmental practice which moderately compromises sustainable development. The positive environmental practice was shown in the comments by P1 and P2, that the school used water tanks and solar energy to save both water and electricity. This group also know which materials could be recycled, although their school recycles only paper and plastics to waste group companies. This indicates a moderate sustainable practice. The group is knowledgeable that HVL or CFL (compact fluorescent lights) globes consume lower energy. It is evident that the school is not registered as a green or eco-school, although P1 indicated that it is registered with Edu-plant green school forum. The fact that auditing of waste relating to water, paper, energy and travel is not undertaken indicates a poor sustainability practice of the school. Their knowledge showed a need for more positive sustainability practice and there is still room for improvement.

The participants' knowledge with regard to the schools' auditing of waste materials is not consistent. However, P4 commented that the Green audit programme is used in this regard. The fact that auditing of waste relating to water, paper, energy and travel is not undertaken indicates poor sustainability practice of the school. This being the case, it is evident that auditing waste is not regularly undertaken. Regarding the school using renewable energy, it is evident that the school does not use renewable energy but uses nonrenewable electric power which is not clean and green to promote sustainable behaviour. However, P4 commented that the school has installed solar panels. Using local people for school renovations and building is a positive attitude by the school. Overall, the school is not practicing positive sustainability behaviour and sustainability of their resources is highly compromised and overwhelming the school's finances.

5.3.2 The contextual factors that shape the greening of the school.

The participants were able to identify contextual factors that hindered processes to shape the greening of schools in their schools as follows:

5.3.2.1 Theme 1: Sources of school funding

All participants in S1 acknowledged the fact that it is difficult and provided the following reasons:

"The school is located in the low-income area hence most parents struggle to pay the little stipulated school fees" (P1).

"Some of the parents don't participate with fund-raising and already we budgeted for 95% of the learners' participation" (P2).

"Some parents apply for school fund exemption due to children being orphaned or losing jobs. This puts the school in a serious problem because we usually budget before receiving funds. Some government subsidy funds sometimes came late and this puts the school in a serious position" (P3).

"Some learners do pay school fund late, some are not able to pay and have to make arrangements with them, which still use school funds to make contact with the parents. Donations are not always guaranteed and available, fundraising also do not always reach the expected target" (P4). The reasons given by participants in S1 indicated that there are contextual factors that made it difficult for the school to generate extra funding. The fact

that the school needs extra funding indicates that the schools' basic source of funding is not sufficient for it to operate efficiently. This being the case, it appears that all participants acknowledge the fact that the current methods used to generate funding are not sufficient to cover the schools' needs and the methods used to collect funds are not efficient.

The last question raised on this theme was "How did you deal about it? Meaning the difficult or easy way you used to collect funds." In S1, P1 stated that:

"*Parents are persuaded to pay school fees through constant letter reminders and during the Annual general meetings. However, many of them still struggle to pay or no payment at all is made."*

P2 stated that "*in annual fund-raising when you bring a complete document you get an incentive."*

Furthermore, P4 commented that they deal with this problem by always encouraging learners to participate in fundraising activities, bringing in different methods of fundraising as well as advertising and marketing their events on community radio stations and through local media. It appears that the strategies used by the school were not environmentally positive and extra funds were used for that matter, for example, giving incentives, advertising, marketing and social media.

It appeared in S2, according to five participants in this group, that there were contextual factors related to extra funding to top-up state funds. As P2 puts it that: *"Where learners have to wear civil clothes and pay R2,00 that day, it has a number of challenges since some learners come from previously disadvantaged backgrounds."*

P3 added that *"sometimes learners do not contribute as anticipated."* P4 indicated that most of them do not take part in these initiatives. P5 and P6 collectively stated that some parents are unemployed. Contrary to the majority of participants acknowledging challenges in school funding, P1 raised a different opinion that:

"*At the beginning of the year we plan different ways of generating money whereby different committees use various ways of generating money e.g. social committee raise funds through social activities and the environmental committee raise funds through recycling."*

The majority of the participants in S2 who acknowledged that there are difficulties in funding the school gave different opinions on this matter. P2 stated that they deal with this matter through parents" meetings, where the latter are encouraged to donate R2,00 on Fridays.

P3 felt that it is unethical to let them pay because they are already facing socio-economic challenges. P4 added that they dealt with this matter by giving churches classrooms as venues for fundraising. P5 supported the idea of P2 that they encourage parents to participate and told them the importance of doing so. P6 stated that they deal with this matter through "*muffty*", which is the term the group used for casual wear. P1 further contradicted himself, as he first stated in the previous question that it was not difficult and further stated that the difficult way of dealing with these challenges is when learners do not have money to contribute. This being the case, it appears that most participants acknowledge the fact that state funds are not adequate to cover all needs of the school and the methods used to collect funds are not environmentally friendly.

However, there are also some contextual factors experienced in S3, in topping-up state funds. P2, P3 and P5 collectively acknowledged that it is difficult to generate school funds, providing a number of reasons:

"Not all organisations donate money, some donate school uniform[s] to needy learners. Even among learners, not all learners wear casual clothes during the above mentioned days or events (P2*); … We struggle to get donations and we get some little funds from fundraising* (P3)*; Children may choose to buy from spaza (informal) shops or not pay for the fun day fund raising event* (P5)*."*

On the one hand, P1 remarked that it is "*sometimes difficult,"* stating that:

"*State funding is paid separately for Grade R and mainstream (Grades 1 – 7) learners and not allocated according to the total learner enrolment*."

Regarding fundraising, P1 stated that: "*Targets are not reached*." On the other hand, P5 strongly disagreed, stating that:

"*The school needs proper planning, sharing ideas and advices, teamwork, time management and making estimates for running fundraising projects."*

The question exploring their ways of dealing with funding, whether it is difficult or easy, revealed the varied views of participants. Those who reported negatively by commenting "*yes*" or *"sometimes difficult"* stated the following: P1 reasoned that:

"State funds: You lodge a query to the state about that, the problem is that, it will take longer sometimes to get it fixed or rectified.

Fundraising: You ask the parents by writing letters to inform them, and you repeat the fundraising activities again."

Other participants corroborated by stating that:

"*The school ended-up stopping the fund raising activities through casual days and made an agreement with parents to contribute R5; recruiting different businesses to support the school financially; reduced some spending to cover up for some important things;* and *„invited parents and explain how important it is to support their children and improve their school."*

However, in contrast to other participants, P5 reported positively with "*no*", stating that:

"*It is achieved since learners, educators, parents, stakeholders and the whole community are involved in fundraising."*

5.3.2.2 *Theme 3: Experience of using school resources*

Contextual factors were not reported in S1, but in S2 the group reported loss of and quick damage to textbooks, which were often difficult to replace. They named issues such as burglary, under-resourcing and misuse of these identified items. P5 highlighted that when these textbooks are depleted, they consulted the department for directives. It is evident that the school security system was compromised because the issue of burglary and theft was stated in several issues related to expenditure on resources.

With regard to infrastructure, the participants experienced maintenance on broken windows and doors; electrical appliances and cables; sewage blockages; theft and burglary. Contrary to these, P2 and P6 collectively stated that the Department is in charge of buildings and its maintenance. However, P5 is concerned about the building, which is more than ten years old. P6 stated that they have mobile classrooms and no sports field.

Contrary to some positive behaviours in S2, P3, P5 and P6 are concerned about not servicing resources, using cheap resources that deplete faster, a lack of water and electricity policies, leaving dripping taps, not switching lights off after school or use, stolen electrical cables and campaigning to the city of Tshwane for services. It is evident that the school does not have policies to manage resources like water, electricity and usage, however some school occupants do use positive measures to save these resources irrespective of policy endorsements.

There is inconsistency regarding responses to awareness proposed by S2, whereby some are positive and some are negative to the environment. Negative reports on attitudes are that there are no water and electricity coordinators with regard to resources. Some negative reports by P3 was that:

"H*onestly, ever since I worked here, I have never seen or heard learners being addressed about water usage… It's like people do not care because it is not their bill to pay."*

P5 reported that little time is given in the SGB to talk about school buildings and they do not have any clue regarding how to solve the problem. It is evident that awareness on resource use is not efficiently advocated. To promote positive attitudes to resources, it is reported that the principal emphasised that educators should accompany learners for toilet routines for monitoring and supervision of resources; there are awareness programmes in place; LTSM coordinators help manage funds and the SMT is leading by example on good use of resources.

In S3, it is revealed that there was a loss of resources at the school, for one reason or another. For these losses, the school implemented recovery plans to recover lost items by buying new items or ensuring the offenders buy new items to replace them.

It has become apparent from this school that despite losses of resources at school, replacement and recovery remain a serious problem for the school. Losses of items did not necessarily mean demise of an item, but is costly to the school and the offenders. Theme three addressed C1, C2, C3, C6 and C8.

5.3.2.3 Theme 4: Educational experience on resource use

Some participants in S1 indicated that their attitude on being role players in the school has changed. They reported that "*not everyone in the SMT emphasised resource conservation or displays willingness to use resources sustainably*" (P1). P3 highlighted that: *"It is difficult to make sure that resources are protected although we have securities at school to do so, and keep on guarding 24/7 but losses are there every year and nobody takes the responsibility*."

In S2 they concurred with S1 that their attitude has changed stating that they keep on encouraging teachers to take good care of resources. It appears that some of the role players are committed to carry on irrespective of the challenges they are facing, whereas

other role players had seemingly given up on issues that do not bear positive outcomes. Only one participant from S3 (P3) rated negatively regarding his capability on sustainable resource use at four gave the reasons that: "*Conservation and sustainable use of resources is not maximised and the impacts on resources is not effective."*

5.3.2.4 Additional comments

P3 in S1 complained about the Department of Educations' incapability to ensure that resources are sufficient to the school because it promised the citizens free education. P4 reported that they need to have more guidelines and information on practices of sustainable use of resources. S2 was concerned that NGOs and the Department of Education need to be more involved in donating resources and to consider putting protective measures in place on school resources respectively.

The group in S3 was concerned about the following items in their responsibilities:
P1 stated: "*The DoBE inability to audit tables and chairs annually."*
P2 mentioned elements such as: "to *overcome shortages; lack of knowledge in getting sponsors to the school by providing workshops in this regard*."
P5 was concerned about the lack of knowledge regarding drawing sponsors to school. P5 added that as role players, if they knew what they were supposed to do to get sponsors, they would have been masters in drawing sponsors to the school. It is evident that school role players need to be capacitated to live green and sustainably.

5.4. OBSERVATION RESULTS

Observation of school premises by means of the observation schedule and field notes was used for the purposes of rigour (Section 4.4). The researcher used these research techniques to identify issues which the participants may have seen as irrelevant to the study. The data collected by observations is meant for triangulation purposes to the data initially collected by interviews. There was no specified amount of time to be spent on observations. According to the researcher's view point, the time spent was determined by the size of the school premises, that is, the bigger the school premises, the more time spent for completion. For smaller sites such as S3, observation was completed in 30 - 45 minutes while for a bigger school like S1, it took 60 - 90 minutes to observe.

5.4.1 Site observation results

Site observation results are reported I detail according to Tables 5.6 below.

Table 5.6: Observation of sites

S1 site observation

CRITERIA	YES	NO	COMMENTS
Are water tanks installed to collect rainwater/for water harvesting/put rainwater runoff to good use like creating a wetland in their garden?		√	Water tanks were installed for storing ground water from a borehole. Rainwater was not harvested and no rainwater runoff was utilised for good use. No visibility of fountains, gardens or wetlands
Are there planting programmes or indigenous fynbos/indigenous medicinal plants at site?	√		Trees, lawn and flowers were planted around the building and sports grounds. There was visibility of indigenous acacia tree plants and no medicinal plants
Are there irrigation systems that conserve water and are leaking taps addressed?	√		Leaking taps were not visible and irrigation took place in the mornings to conserve water
Are there lighting systems that conserve fossil fuels and maximise the use of renewable energy like solar panels or LED lights?		√	Solar panels were not installed and the lighting systems used were not energy saving
Are there waste reduction methods used to minimise landfills?	√		The school used municipality bins for waste removal
Is the school located far from public transportation to reduce pollution and land degradation?	√		Public transportation was far from the school, so there was no air or noise pollution and land degradation
Is there an indoor environmental quality that provides occupants with thermal comfort and acoustic, visual and air quality?		√	They used air conditioners in the administration offices but none in the classrooms or any indoor plants
Is there reduction of waste materials and appropriate disposal to reduce resource depletion?	√		Office waste paper was shredded and recycled

S2 site observation

CRITERIA	YES	NO	COMMENTS
Are water tanks installed to collect rainwater/for water harvesting/put rainwater runoff to good use like creating a wetland in their garden?	√		Only two tanks available for harvesting rainwater which are used only during municipality water stoppages

Are there planting programmes or indigenous fynbos/indigenous medicinal plants at site?	√		Some plants are visible with visibility of some indigenous plants and few flower plants. No medicinal plants
Are there irrigation systems that conserve water and are leaking taps addressed?	√		Irrigation was done in the morning and leaking taps were addressed because learners used water containers available in their respective classes
Are there lighting systems that conserve fossil fuels and maximise the use of renewable energy like solar panels or LED lights?		√	There was no visibility of energy saving lights and solar panels
Are there waste reduction methods used to minimise landfills?	√		The school had four municipal bins where waste was stored for municipal collection
Is the school located far from public transportation to reduce pollution and land degradation?		√	Taxis and buses pass in front of the school gate causing noise pollution. There was no land degradation because the roads were tarred
Is there an indoor environmental quality that provides occupants with thermal comfort and acoustic, visual and air quality?		√	Air conditioners were installed only in the administration offices. There were no indoor plants in classes and offices
Is there reduction of waste materials and appropriate disposal to reduce resource depletion?			Waste was sorted in four waste bins for recycling of bottles, paper, plastic and solid waste

S3 site observation

CRITERIA	YES	NO	COMMENTS
Are water tanks installed to collect rainwater/for water harvesting/put rainwater runoff to good use like creating a wetland in their garden?	√		Rainwater harvested is used to water the gardens and cleaning of classrooms and toilets. There were no wetlands in their gardens
Are there planting programmes or indigenous fynbos/indigenous medicinal plants at site?	√		Used for shade, Trees, green grass and flower plants are planted for beautification and soil erosion prevention and for fundraising, especially citrus fruits and vegetables. The latter are also used to support the NSNP. No evidence of medicinal plants
Are there irrigation systems that conserve water and are leaking taps addressed?	√		They use jerry water cans with taps for irrigation and individual classes. Dripping water falls into basins and later used for irrigation
Are there lighting systems that conserve fossil fuels and maximise the use of renewable energy like solar panels or LED lights?		√	No evidence of renewable energy systems and the lighting systems are not energy conserving

Are there waste reduction methods used to minimise landfills?	√		There is a landfill for solid waste which is converted to compost to fertilise the gardens but there are no appropriate waste reduction methods.
Is the school located far from public transportation to reduce pollution and land degradation?		√	The school is not next to public transport and most learners walk to school because they reside in the neighbourhood. Those who are residing far from school use local transport and lift clubs
Is there an indoor environmental air quality that provides occupants with thermal comfort and acoustic, visual and air quality?		√	They rely on natural air plants on the premises which also support indoor air for occupants. Occupants open windows. One class is using an electrical fan and the office used a ceiling mounted fan; no air conditioners installed and no indoor plants.
Is there reduction of waste materials and appropriate disposal to reduce resource depletion?	√		Waste bins are used for collection of waste. Paper and steel waste from desks are recycled for fundraising purposes. Damaged desks are repaired.

S1 and S3 had indigenous plants, trees and flowers which made the school environment more attractive, whereas few of such plants were visible in S2. Events such as water tank installation to harvest water were practiced in all cases for different purposes. S1 did not harvest rainwater at all but stored borehole water in water tanks. S1 mainly used municipal water and used borehole water for backup purposes during municipal water stoppages. S2 relied entirely on municipal water but harvested rainwater in two tanks for the same reasons as S1. S1 and S2 used clean, recycled and treated water from the municipality at a cost and using borehole water as a backup by S1 is also a positive environmental practice because the schools should never run short of water. S3 relied entirely on borehole water and used harvested rainwater to water the school garden, cleaning the toilets and classrooms, which are positive sustainable practices. Water recycling kits were not available in any cases. The school garden in S3 indicated that the school ate organic healthy foods from the garden which is sustainable food production. Organic composters, gardens and agricultural products in S3 promote the natural conservation of water by products and processes necessary to make conserving water as easy as possible. Conserving rainwater by harvesting it in S2 and S3 not only has an enormous effect on the environment and the ongoing shortage of water in South Africa, it also saves them a significant amount of money as they consume, which is a positive practice.

S2 has limited space in its campus to allow enough planting of plants in the school environment. S3's planting of indigenous plants, vegetable gardens, fruit plants and flowers was beautifying, decorating and also landscaping the school environment to be attractive. This practice by S3 is sustainable and cost-effective because it improves habitats and promotes diversity. The fact that rainwater runoffs in S1 and S2 were not directed and used for watering the garden, the lawn, fountains and the wetlands proves that these schools have little knowledge in creating and maintaining their own diverse local ecosystem, complete with frogs and reeds for biodiversity conservation and eco-literacy. The fact that S3 was green through a variety of indigenous plants and lawn, flowers and fruit trees improves the outside breathable air quality and provides shade for the school buildings and playgrounds. This practice is also butterfly and bird-friendly since it increases populations of other species in the school environment. Thirdly, the availability of these plants produces clean, breathable outdoor air for the school community, which reduces health risks and are all positive green practices. Contrary to this practice, the lack of medicinal plants in all cases deprive learners of indigenous medicine knowledge and their usage. This practice is negative to improving greening and sustainable development behaviour.

Leaking taps were addressed in all cases since there was no visibility of water leakages in any of the schools. Repairing leaking taps and pipes is one of the easiest methods to conserve water in and around the school. It seemed that the learners were taught to switch off taps as another water conservation strategy. S2 also placed water containers in every classroom to combat water wastage and monitoring. On the other hand, usage of jerry water cans (plastic 20 litre containers with taps) by S3 aids in water conservation, as some taps may not be able to be completely turned off when not in use, and placing basins underneath jerry water cans to collect dripping water was the solution the school found. It is a positive DIY (do it yourself) water conservation strategy that is environmentally friendly and sustainable. It also indicated that S3 managed and saved water sustainably according to their capability. By educating learners about the importance of water conservation earlier, the school creates water saving advocates for the future for sustainable and responsible water use.

The lighting systems in all cases are compromised due to the fact that energy -efficient lights were not used. The fact that all light bulbs at the schools were not retro-fitted with

CFLs, which are energy-saving globes, needs attention and adjustments. This implies that the electricity bill is high and increases costs for the schools.

The waste reduction methods of relying only on municipal waste removal practiced in S1 was not sustainable, although the school was clean due to school cleaning staff employed on site. The waste reduction methods in S3 of minimising the landfills by composting solid waste from the garden and food waste are positive sustainable practices because they do not harm the environment.

5.4.2 Field notes results

New areas emerged from the researcher's reflection notes, namely physical and environmental infrastructure; cleanliness; environmental corner or bulletin board; air quality; water conservation; energy conservation and transportation. The researcher converted scribbled field notes into expanded write-ups by directly typing them. Direct recordings of field notes were transcribed into text, which is more clear to the reader and analyst and processed in the same way (Miles et.al, 2014) (see Appendix R). The researcher used deductive thematic content analysis with five pre-determined themes drawn from the SAGSP. Holistic coding as an exploratory method was used in the field notes based on what the researcher deductively assumed may be present in the data (Miles et. al, 2014) drawn from SAGSP. The researcher had a general idea of what to investigate in the data termed priori coding system (Miles et.al, 2014). The start list of themes (in bolded caps font) and then categories numbered C1 - C10 (in small caps) are provided according to figure 5.3 below:

THEME1:WASTE MANAGEMENT
C1: reduce
C2: reuse
C3: recycle
THEME2: ENERGY EFFICIENCY
C4: audits
C5: saving criteria
THEME3: WATER CONSERVATION
C6: rainwater harvesting
C7: Irrigation methods
THEME4: LANDSCAPING TREE PLANTING & BEAUTIFICATION
C8: carbon offsetting
THEME5: INSTITUTIONAL MANAGEMENT
C9: instil knowledge and skills
C10: instil awareness

Figure 5.3: List of themes and categories for analysing field notes

5.4.2.1 Theme 1: Waste management

Waste was not reused in S1 and S2, whereas S3 composts it to be used to fertilise their vegetable garden. Recycling bins were visible in S1 for municipal waste removal, and in S2 they were sorted for recycling. this is evident that S2 has joined an environmental awareness programme to promote waste reduction. It appears that recycling of metals, plastics and tins was not regularly practiced in S3. A remarkable practice in S3 was that waste water was used sparingly and reused for watering the lawn. This is evident that S3 had their own environmental activities to promote waste reduction of grey water. This waste management of reusing both the garden refuse and used water is environmentally friendly. It indicates that waste from food can be recycled into another method of producing fresh and organic local food. The sanitation system in all cases did not use low-flush toilet systems or products for water conservation. Using recyclable materials and using efficient

storage and collection sites of items in S2 increased sustainability. Waste reduction can be a key factor in ensuring sustainable practices.

5.4.2.2 Theme 2: Energy efficiency and conservation

There was no evidence of any solar panels or energy measuring unit in any cases, they all relied entirely on non-renewable electrical power. Since there was no visibility of solar panels on any buildings, it appears that the solar energy referred to in S3 interviews might be heat coming directly from the sun. Energy saving lighting systems were not utilised in all cases, which leads to negative sustainable practice.

5.4.2.3 Theme 3: Water management and conservation

Efforts to conserve water, whereby dripping water from water cans fell into basins to be later used to water the lawn and flower gardens, was a positive sustainable practice of conserving water in S3. The same applies to S2, whereby water containers were placed in every classroom to limit frequent journeys to taps. This is evident that the school has adopted positive water management measures. There were no water recycling, water purification kits or water saving devices in any cases. This poses a need for responsible sustainable water conservation strategies since water is costly. Water conservation and management was positive in S3, although borehole water was not tested for viruses before consumption and could pose a health risk. Utilisation of rainwater in S3 was extremely positive due to the fact that the school harvested it, stored it in water tanks and used it for cleaning classrooms and toilets. For sanitation, all cases used flushing toilets which consume a lot of water with every flush due to the fact that there are no flush limiting devices installed. Facilities can also be built with recycling water systems which take water from cooling systems and recycle that water so that the water is not wasted. Water from some systems can be collected at discharge and treated and reused in the same system or cycled into another system altogether. Thinking about water efficiency is key to sustainable building. However, S3 had chemical toilets to be used as a backup in cases when water is not available. Contrary to that, there was a new toilet construction in S3 since existing toilets were mobile toilets.

5.4.2.4 Theme 4: Landscaping and tree planting

Landscaping of S1 and S3 was extremely maintained with flowers, indigenous lawn and trees surrounding the building to provide shade and natural thermal comfort. Therefore, outdoor air and land pollution were positively controlled. S2 had limited space to beautify the school with more flowers, trees and indigenous plants. Carbon offsetting was positive in S1 and S3 because public transport was far from the schools. Most vehicles of teachers and learner public transport were stationary during school hours, which promoted a reduction of air and noise pollution. In S2 public transport of taxis and busses was close to the school gate, causing noise and air pollution.

5.4.2.5 Theme 5: Public participation and community empowerment

Local people were employed in the new toilets' construction, some as security personnel and others were employed for screening visitors, learners and staff for Covid-19 compliance. Employment of local people was a positive attitude to the local community for job creation and alleviation of poverty.

5.5. DOCUMENT ANALYSIS

According to Merriam (1998), the researcher has the authority to judge whether a document is appropriate as a data source by finding out whether the document contains information pertinent to the research question and whether it can easily be acquired. Similar to site observations, the researcher used document analysis for triangulation purposes and to try and find out if SD issues addressed shed light on the phenomena under study. Documents analysed included the CAPS curriculum and school's environmental or management policy. The CAPS document was used as a secondary source and the school environmental policy as a primary source pertinent to the research question. These documents shed light on the phenomena under study. Secondary sources refer to any material (books, articles, etc.) that are published and primary sources are unpublished documents (e.g. minutes of meetings, reports, correspondence, etc.) which the researcher has gathered directly from participants or organisations such as schools – in other words, original source documents (Maree, 2012, pp. 82-83)

5.5.1 CAPS curriculum analysis

CAPS is the current South African document that determines which content is taught and how the content must be taught and assessed in all school subjects since its implementation in 2012. With CAPS curriculum analysis, the researcher intended to explore the curriculum's provision on knowledge of EE and ESD content and how it guides implementation. CAPS (NCS Grades R-12, 2011) and the Learning Programme Guidelines documents of content subjects were obtained from the Inter-Sen (Intermediate and Senior) phase (Grades 4-7) HODs in the sampled schools. This document intends to guide the teacher on the topics to be covered weekly and term by term in a particular subject. It is evident that the EE or ESD theme is central to the curriculum as envisaged by the Constitution of SA. Some of the general aims of a curriculum which embraces SD are:

"Human rights, inclusivity, environmental and social justice: infusing the principles and practices of social and environmental justice and human rights as defined in the Constitution of the Republic of South Africa. The National Curriculum Statement Grades R-12 is sensitive to issues of diversity such as poverty, inequality, race, gender, language, age, disability and other factors; and

Valuing indigenous knowledge systems: acknowledging the rich history and heritage of this country as important contributors to nurturing the values contained in the Constitution" (NCS, 2011)

This is evident that the DoBE made an active decision to include ESD in the curriculum.

In this study, the researcher explored the content coverage of EE and ESD topics as well as examined these topics in the curriculum and whether these topics has achieved positive sustainable behaviour and practices in the study. The study focused on all content learning areas taught in the Inter-Sen phases (Grades 4 – 7) in primary schools. It was evident that Natural Science, Social Sciences, Life Skills, Life Orientation, Economic and Management Sciences and Technology contained EE or ESD impact topics which need to be taught and assessment undertaken with the learners. Mathematics and Languages were not included because the researchers‟ reflections of environmental content in these learning areas appeared to be that they are taught in context. That Mathematics and Languages are meant to promote both the learners' cognitive development and use of language means these subjects provide the necessary tools for learners to understand and develop sustainable practices. In addition, Languages develop literacy skills (writing, reading etc.)

needed for analysing and addressing sustainability risks and issues. Mathematics is a language that makes use of symbols and notations to describe numerical, geometric and graphical relations (CAPS, Mathematics, 2011, p. 8) and promotes collecting, classifying, analysing and interpreting environmental statistics, for example, weather, which is also covered in Geography. Furthermore, it is evident in these two learning areas that EE and ESD topics are taught only for skills, assessment and promotion purposes.

The data analysis was compared to CAPS (2011) document analysis to consolidate the findings made from all focus group interviews and observation analyses for coherence. The researcher re-read the interviews and observations to identify the relevant research objective, which is arguing about the knowledge of role players regarding greening the school and contextual factors they experienced in doing so. CAPS is a DoBE document which explains what the educator is required to teach and assess in a particular learning area. Therefore, educators should understand what content formation in the curriculum is all about since concepts in the content are important for communication and assist learners to make the complex world in which they live more meaningful. It is evident in S3 that concepts in the curriculum content gave the role players certain techniques and skills for making a compost heap to fertilise their domestic garden. This evidence also indicates that they were able to apply knowledge from the curriculum in a positive practice. Furthermore, the curriculum knowledge was able to change their behaviour and attitudes positively towards litter and surrounding garbage. The DEA has provided the guidance for teachers to understand how environmental content has been organised in the CAPS curriculum across various subjects of the Inter-Sen phases (DEA, n,d). Table Table 2.6 shed light on the major topics in the curriculum.

In analysing data in the CAPS document, it is clear that EE is integrated into the curriculum in contrast to the implementation by schools' role players. The findings of the analysis across the grades revealed that the concept "EE, ESD or green" is not mentioned in the curriculum content topics, however its content is variably integrated in all curricular subjects analysed. The study found that the operational methods on waste management of the schools do not show a positive relationship between content and practice or behaviour. For example, the curriculum has included water cycles and roles of water in ecosystems and wetlands, but the schools observed do not have any evidence of using harvested water for wetlands where frogs and other species can co-exist. There is no action plan made for

direct implementation of environmental topics in the curriculum. No planning of environmental activities is evident in the curriculum, which emphasised content and assessment. This study further revealed that renewable and non-renewable energy sources and renewable energy impact are topics in the curriculum, however all of the schools observed are still operating with non-renewable energy sources as the main source of energy. Additionally, strategies of implementing green features and SD skills are not suggested in the curriculum.

The curriculum is aimed at promoting cognitive skills for promotional purposes. The focus is on knowledge assessment, since it does not suggest sustainable strategies and implementation is not action-centred. Although knowledge is fundamental in promoting positive sustainable behaviour, CAPS did not provide guidelines for achieving the ability to solve environmental problems. There are no mechanisms established in the curriculum to assess the effectiveness of environmental programmes in the curriculum. In contrast, not all role players are teachers, and not all teachers in the SMT are ESD experts or specialists experienced in the interpretation of ESD content in the learning areas they are teaching and thus they are unable to come up with creative and innovative approaches to develop green and sustainable sites at schools.

These results indicate that teachers are making their own decision on which ESD content to teach and how to teach it. Additionally, strategies such as fieldwork are hindered by contextual factors such as resources, CAPS policy contradictions and teaching time as stipulated by the curriculum. It appears that there is a gap between the curriculum and role players' job descriptions if they might make efforts to implement SD through the curriculum content. As a result, it would be difficult for role players to identify SD themes in the curriculum and put them into practice.

It is apparent that ESD is not practical, but used as a tool for teaching and learning topics. To the learners, it appears that ESD has little importance to the school environment, as the school does not practice what it preaches. This could be a reason for poor visibility regarding a variety of environmental and sustainable practices. Furthermore, it is evident in these content learning areas that EE or ESD topics were taught only for skills (writing, reading etc.), assessment and promotion purposes. The role players need to utilise the information available in the curriculum and expert advice from environmental specialists

from their local government to improve their sustainability practices. Subject advisors could not help because they are employed as subject specialists, whose responsibility is to implement different subject policies, work schedules and assessors of teachers' progress in the subject. A question can be raised as to whether or not subject advisors actually regard ESD as part of their job description.

Although CAPS suggest inquiry-based learning opportunities and suggest that learners do practical tasks regularly, its major assessment objective is knowledge based. This is arguably based on the CAPS continuous statement on assessment guideline objective, which is "to check on learners' knowledge that they can [utilise]" (DoBE, 2012, p.62). Although knowledge is fundamental in developing sustainability literacy, CAPS did not inform guidelines for assessment of skill competencies in taking actions towards solving unsustainable environmental problems like using non-renewable energy sources. Lastly, the role players were not the product of the CAPS curriculum, therefore capacity building is needed to improve implementation.

5.5.2 Environmental policy analysis

Environmental education policy or management plan analysis sought to explore how sustainability programmes are put into practice; how it provided a framework for planning and coordinating greening and sustainability practices and how it complemented the CAPS curriculum in achieving positive environmental sustainability in schools. Only S3 provided the environmental policy for the school to be analysed. It was unfortunate that environmental education policies for S1 and S2 were not available to undergo analysis. The researcher was informed verbally by the school management team that the schools do not have an environmental management policy. School management were not comfortable in sharing some of their policies. The S1 principal shared a general file with sports grounds duty and waste management, however there were no policies on sports grounds management or waste management. Unfortunately, S2 had no copy or file to share with the researcher, but mentioned that their sustainability practices emanated from the principal's indigenous knowledge on gardening. The lack of environmental policies in these two cases revealed a lack of sustainability knowledge on conservation and management of resources. This clearly indicates that actions currently taken towards sustainable development are not directed towards positive sustainable benefits.

The S3 Environmental policy provided the following inputs:

The policy was given an effective date of January 2019 and was supposed to be reviewed in September 2020. The preamble was aligned to the Constitution of SA within its Bill of Rights that it provides all citizens with the right:

"*(a) to an environment that is not harmful to their health and wellbeing,"* and

"(b) *to have the environment protected for the benefit of the present and future generations through reasonable legislative and other measures."*

The protection of future generations regarding school resources was also highlighted by P4 when responding to the question "Which goods must be protected and why so?" P4 indicated that many generations can still make use of them. This response is aligned to the school's environmental policy they adopted as role players. The preamble was also aligned to the White Paper on Education and Training (1995) which stated that:

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

To put the White Paper declarations in their policy document was quite remarkable, because it will keep on reminding them annually that EE should be acknowledged as interdisciplinary in their day-to day operational activities.

The policy's purpose emphasised the following positive environmental practices, namely:

- *"to improve and include environmental components in the curriculum;*
- *To provide opportunities for learners to study local environmental issues;*
- *To implement an environmentally responsible purchasing policy;*
- *To reduce waste;*
- *To maximise the school's energy efficiency;*
- *To encourage the planting of vegetables at the school; and*
- *To optimise and control the use of water at the school."*

The findings on the environmental policy revealed that this policy was formulated and signed by SMT and SGB chairpersons. From the researcher's point of view, it is uncertain to verify that all members of the SGB and SMT participated in the formulation of this policy,

since P1, P2 and P4 responded that the school has an environmental policy in the interviews audit. Contrary to that, P3 and P5 responded that the school has no environmental policy. There are no clear responsibilities assigned to the role players and staff. Furthermore, the implementation plan is not included in the policy, which shows targets, cost implications and how activities are to be monitored and evaluated. Therefore, it is concluded that the environmental policy is occasionally presented to the role players, or it might be for filing purposes.

Secondly, the purchasing and energy efficiency policies needed attention as other matters of the purpose were not fully adhered to for sustainability of resources. Some policy statements like "*To optimise and control the use of water at the school"* is compiled but without clearly stating the school's environmental commitments that can be turned into actions. On resource use, the policy emphasised reducing waste by recycling, and minimising and monitoring total water consumption, yet these behaviours were not practiced. Regarding energy use, the policy indicated that the school plans to use the best energy saving technology although it did not elaborate how. According to the researcher's observations, a behaviour of using energy saving technology was not seen in their lighting, equipment and thermal comfort systems. Overall, the policy was well drafted to give the school some indicators, awareness, skills and knowledge of areas that needed improvement and adjustment. It should be noted that S1 and S2 did not have any environmental related policy.

5.6. SWOT ANALYSIS ON GREENING THE SCHOOL FOR SUSTAINABLE DEVELOPMENT

Exploring greening schools in three conveniently sampled schools at TND provided valuable insight into what the overall strengths, weaknesses, opportunities and threats (SWOT) are regarding sustainable development. The researcher acknowledges the fact that every school has a different view regarding greening and sustainable development practices and therefore executes them differently. By exploring the approaches implemented in these schools, the researcher examined areas that show evidence of positive or best practices and interpreted them as strengths for greening the school. The researcher then examined the negative or worst environmental practices and interpreted them as weaknesses. Furthermore, those practices that could guide or provide local planning approaches to achieve sustainable development were interpreted as

opportunities. Finally, those practices that were dangerous practices and could lead to health and safety risks were interpreted as threats. This section focuses on answering the main research question.

The researcher used the same deductive thematic content analysis with five pre-determined themes used in field notes drawn from SAGSP. A SWOT analysis was employed for each participating school using predetermined themes as displayed in figure 5.3 above. The aim of this empirical study is to interpret the findings and to present it in order to understand the strengths, weaknesses, opportunities and threats regarding school practices to firmly guide sustainable development initiatives in TND. The results across all cases is summarised in tables below, followed by the researcher's interpretation for each case to achieve an accurate conclusion on what are the SWOTs concerning greening schools for sustainable development. It should be noted that strenghths and weaknesses answers the nature of knowledge of role players (research question 1), opprtunies and threats revealed contextual factors (research question 2) as drawn from interviews, environmental audit and observations. SWOT analysis is summarised according to tables below.

5.6.1 Theme: Waste management

Table 5.7: SWOT analysis on waste management

	Waste Management			
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
S1	1. The school was clean from litter because there are cleaners employed for that purpose	1. No reuse or recycling of any waste 2. Organic waste is not composted	1. Sorting of waste materials for recycling could make money for the school to become more sustainable 2. Grass could be cut down and used in the compost heap for fertilising fruit and vegetable gardens	1. Refuse removal solely by the municipality puts a strain to municipal landfill sites and financial loss to the school 2. Hazardous waste is not disposed of according to regulations
S2	1. Waste is sorted for recycling and recycling bins are available around the school campus 2. The school was clean, litter-free and odour-free	1. No visibility of e-waste 2. Lack of gardens, sufficient lawns and trees around the premises	1. Recycling boosts the school finances to be more sustainable 2. Vegetable gardens can also support organic food to the school nutrition programme 3. Grass could be cut down and used in the compost heap for fertilising fruit and vegetable gardens	1. Toilets are not well maintained, and this poses a health and safety risk 2. If learners are exposed to hazardous e-waste, they could become sick as a result
S3	1. Organic waste is composted for use in the lawn, flower, fruit and vegetable gardens 2. The school was clean and litter free	2. There was no evidence of recycling of paper, tins, plastic or bottles	1. Recycling waste can help the school to generate extra cash for the school coffers	1. Lack of efficient recycling programmes poses financial loss to the school

The waste management findings revealed that there was no similarity among cases related to the recycling, reducing and reusing of waste. These findings revealed that S1 did not

practice the best waste management methods of reducing, reusing and recycling waste. S1's waste management was a less desired option based on green and sustainable principles. A question which could be raised as a concern regarding S1 is why they have to bury resources in landfill sites that can be used for socio-economic upliftment of the school? S1 and S3 did not use efficient sorting of waste materials for recycling. However, S3 used waste material for organic gardening which was efficiently managed. S2 implemented effective waste management methods whereby recycling bins were sorted at source and the materials prepared for selling. Therefore, disposal in a landfill site was used least in this school, since waste was used for economic and social upliftment of the school and did not risk the integrity of the environment. schools need to cut down on waste by recycling everything they cannot reduce or reuse.

5.6.2 Theme: Energy efficiency

Table 5.8: SWOT analysis on energy efficiency

	Energy efficiency			
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
S1	1. Laptops are put on safe mode after school 2. A generator was used as a backup during power failures and load shedding periods	1. No energy efficient lights 2. Non-renewable energy source	1. Solar energy and energy generated by renewable sources such as wave or wind energy can be used as a clean, free and renewable alternative to fossil fuels.	The school coffers are taxed heavily on their electricity bill 1. Safe mode for electronics is still costly, rather switch off
S2	1. Electrical appliances are switched off after school and save expenses	1. No energy efficient lights 2. Non-renewable energy source 3. Outside lights are switched on the entire night due to theft and vandalism	1. Solar energy and energy generated by renewable sources such as wave or wind energy can be used as a clean, free and renewable alternative to fossil fuels.	1. The electricity bill is taxing the school heavily 2. It is cost effective to use non-renewable energy sources
S3	1. Gas stoves were used for cooking in the school kitchen which saves money in the long run 2. Electrical appliances are switched off after school	1. No energy efficient lights 2. Non-renewable energy source was also used in the building	1. Solar energy and energy generated by renewable sources such as wave or wind energy can be used as a clean, free and renewable alternative to fossil fuels.	1. Non-renewable energy sources are more costly 2. No energy conservation action implemented

The energy efficient management findings revealed that all cases used nonrenewable energy sources, which were costly. However, S3 implemented fossil fuel energy in the form of gas for reducing costs on the school nutrition kitchen stoves. Natural gas is the cleanest burning of the various fossil fuels used today. There was no evidence of site wind power plants or solar generated renewable energy in all cases, which implies high taxation on electricity bills. On the other hand, S1 had a large generator installed on site to alleviate

costs and for backup purposes. However, the rate at which these schools use nonrenewable energy sources induces threats of depleting electrical power and denying future generations to benefit from them.

5.6.3 Theme: Water conservation

Table 5.9: SWOT analysis on water conservation

	Water conservation			
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
S1	1. Leaking taps and pipes were repaired 2. Use clean municipal water and borehole water for backup	1. No harvesting of rainwater. 2. Municipal water is costly 3. No surveys to monitor water usage	1. The school could install water tanks to harvest rainwater and this saves money and the environment at the same time	1. Lack of rainwater harvesting can cause soil erosion and floods 2. Relying only on one source of water is a high risk
S2	1. Leaking taps and pipes repaired, switching off taps and using water containers in classes for drinking conserves water. 2. Harvesting rainwater in two water tanks for backup during municipal water stoppages or repairs	1. No testing or purification kits for rainwater 2. No surveys to monitor water usage	1. The school could install more water tanks to harvest rainwater.	1. Lack of testing and purification kits for rainwater poses a health and safety risk

S3	1. Reusing of dripping and used water to water the lawn and flower garden is a positive conservation of water. 2. Repairing leaking taps and pipes, switching off taps and using jerry cans for drinking in classes also conserves water. 3. Harvesting rainwater in water tanks for watering the gardens and cleaning	1. No testing or purification kits for rainwater and borehole water 2. No surveys to monitor water usage	2. Water needs to be purified for safety and health purposes	1. Lack of testing or purification kits for rainwater and borehole water poses a health and safety risk

The findings on water conservation indicate that water was conserved in an effective way in all cases, since all water leaks were addressed. S2 and S3 installed water tanks to harvest rainwater and used this water in different positive ways. S3 put rain water runoff to good use in irrigation and having fruit and vegetable gardens. The negative approach revealed in all cases was that the schools did not create wetland plants from rainwater runoffs where learners could identify different species such as frogs, birds and insects which could help to improve environmental learning and action through the curriculum. There were also no water reduction techniques utilised in any of the cases through water surveys or audits.

5.6.4 Theme: Landscaping, tree planting and beautification

Table 5.10: SWOT analysis on landscaping, tree planting and beautification

	Landscaping, tree planting and beautification			
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
S1	1. Plants around the school allow rainwater runoff, fresh air, shade, beautification and prevent soil erosion 2. The campus is green by growing plants that beautify the surrounding and promote healthy air quality 3. Plants are used as a learning tool in Natural Sciences	1. Lack of indigenous medicinal garden plants 2. Plants are not labelled for educational purposes	1. Indoor plants can be promoted to increase air quality in classrooms	1. Lack of indoor plants poses a health and safety risk
S2	1. The building was surrounded by few trees, lawn and paving bricks	1. The school yard was too small to allow sufficient lawns and tree planting	1. The school can participate in more tree planting programmes and promote indoor plants	1. Some plant species pose a health risk and could damage the school ecosystem
S3	1. Plants, lawn and flowers around the school allows rainwater runoff, fresh air, shade, beautification, act as wind breakers and prevents soil erosion 2. Plants are used as a learning tool in Natural Sciences	1. Lack of indigenous medicinal garden plants 2. Plants are not labelled for educational purposes	1. Indoor plants can be promoted to increase air quality in classrooms	1. Lack of indoor plants and geo-thermal air conditioners in classrooms poses a health and safety risk

It can be argued, according to the findings in S2, as to whether the schools' surroundings were used as a learning tool or just for beatification. If it was used as a learning tool, then more trees including, indigenous trees, should be planted around the surroundings of S2. According to the findings in S1 and S3, tree and flower plantations including indigenous trees revealed that the outdoor air quality was environmentally healthy and supported local ecosystems and biodiversity conservation within the school. Indigenous trees are cost effective because most of them are drought resistant. The findings revealed that there were no indigenous medicinal plants in any cases and these deprived learners the opportunity to learn about the uses of different medicinal plants around their area.

5.6.5 Institutional management

Table 5.11: SWOT analysis on institutional management

	Institutional management			
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
S1	1. Parents pay school fees	1. Some parents or guardians were unable to pay school funds due to loss of jobs 2.The school is not registered as an eco-school	1. Those parents who are unable to pay school funds can volunteer to provide services which the school needs to outsource	1. Increase in unemployment rate propels parents to apply for school fund exemption
S2	1. The state is the main funder of the school. 2. Local people are provided with job opportunities	1. The school depends mainly on state funding 2. The school has a problem with theft and vandalism 3. The school is not registered as an eco-school	1. Alarm systems could be installed to reduce loss of resources	1. State funding is unreliable should the economy of the country collapse

S3	1. The state is the main funder of the school. 2. The school community support funding by incorporating activities to raise funds 3. Local people are provided with job opportunities	1. The school depends mainly on state funding. 2. The school is not registered as an eco-school	1. The network tower installed by a private company at the school will assist the school in future when it adopts a paperless mode of teaching	1. The building is very old although it is well maintained.

It is evident that institutional role players need to ensure that efforts are taken to govern and manage their schools in such a way that better environmental learning and action are sustained and become part of their responsibility. Schools need to register as eco-schools with WESSA/WWF Eco-school programme to enable learners to work towards positive sustainable development behaviour. Finally, schools need to celebrate environmental commemoration days to promote and encourage activism in schools and communities.

5.7. CONCLUDING REMARKS

The schools' data revealed that all schools sampled predominantly rely on government funding to survive, although it is made up of unequal contributions due to different quintiles. The data revealed that S1 is well-resourced when compared to S2 and S3 which are less well-resourced. This is exaggerated by the fact that the two least resourced schools are no-fee paying schools. The school context of S1 and S2 reveals serious socio-economic problems. All schools' data reveals that greening schools is a necessity for schools to achieve sustainable consumption of resources. In this sense, greening of the school should form part of any decision-making process undertaken by role players for effective sustainable resources. It is evident that more sustainable development initiatives and approaches are needed in order to provide answers to contextual factors hindering greening schools resulting from a lack of knowledge by role players in this area. Overcoming these contextual factors will benefit role players at a grass root level to effectively achieve sustainability. Schools are the backbone of society and can change the well-being of the society through green programmes and projects. The role players need to be capacitated and empowered to play a vital role in promoting sustainable livelihoods

for current and future generations. The discussion of results and limitations of the study are presented in the next chapter.

CHAPTER 6
DISCUSSION AND CONCLUSION

6.1. INTRODUCTION

The preceding chapter contained the presentation and analysis of data collected by means of focus group interviews, site observations and document analysis from three purposefully sampled schools from TND. The theoretical study explored the current execution of greening schools for sustainable development on a global and local level in South Africa in an attempt to reach an accurate conclusion on what the strengths, weaknesses, opportunities and threats are concerning greening schools in TND for sustainable development. The aim of this chapter is to is to synthesize the findings by discussing, drawing on the literature, the main trends and patterns in the data with reference to the research questions. This procedure includes the discussion of the findings, limitations of the study, recommendations to strengthen the implementation of green schools in terms of the SDGs (section 2.3.1) embedded in the NDP (NPC, 2013) and concluding remarks.

6.2. AIM AND OBJECTIVES OF THE STUDY

As stated in chapter one of this study, the researcher identified the following main aim of the study:

 To explore the strengths, weaknesses, opportunities and threats in greening the school for sustainable development.

The following objectives were identified:

1. To examine the nature of knowledge of the role players in the school about greening the school.
2. To establish how contextual factors in the school shape the greening of the school.

6.3. PRESENTTION OF RESULTS

Greening the school is a sustainable approach towards EE executed to control the biodiversity of the school environment in a sustainable manner (Somwaru, 2016). Greening the school also lays a foundation for a sustainable change of behaviour towards EE. Biodiversity, waste, sustainable water and energy utilisation are EE topics which create a

cleaner and more environmentally conscious school community that behaves in a sustainable way. Occupants of a green school approach the environment in a responsible and sustainable manner. This is the reason why a green school is also known as a sustainable or environmentally friendly building that is designed, built, operated, reused or renovated in an ecological and resource-efficient manner (Ramli, et al., 2012, p. 463).

In chapter two (section 2.9), a variety of benefits of green schools were mentioned, highlighting that green schools save money throughout their lifetime; strengthen achievement and improve health (Kerlin, Santos and Bennett, 2015). Sustainable green environments are therefore crucial (Le Roux, 2014, p. 134) and anything that can support schools in this regard should be implemented and invested in.

6.4. RESULTS TO RESEARCH QUESTIONS

The conclusions of the results are presented in line with the main research question and sub-questions. The contribution of reviewed literature and theory are also discussed where necessary to identify similarities and differences between literature and findings of the study in order to draw conclusions. The schools studied played a predominant role in providing data which could both be used in any planning processes where decisions have to be made regarding greening schools in TND. Whether those decisions are economic, political, environmental, technological or social decisions, these decisions could be beneficial to the majority of school role players. Thematic content analysis of each case was discussed with verbatim quotations from the participants and then linked to literature and theory wherever possible. The following conclusions were made with regard to the sub-questions postulated in chapter one.

6.4.1. The nature of the knowledge of the role players in the school about greening the school

It was necessary for the aim of this study to explore the role players' knowledge about greening the school for sustainable development. There were no questions asked to the role players to define the concepts "greening" and "sustainable development" since

interview questions prepared covered these areas and probing was used where necessary. The participants may not necessarily be knowledgeable about green and sustainable development, but given the opportunity to explore their schools' operations, they were able to provide this study with the information it required. The first research sub-question sought to explore the nature of the knowledge of the role players about greening the schools. The theoretical framework and literature identified various benefits and challenges sustainable development can offer to the role players' planning processes.

From the literature study of greening schools, most studies acknowledge the definition of sustainable development as defined by the Brundtlant report, that it is "development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (Kensler, 2012, p. 792; Oghenokokwo, 2017; Foo, 2013; Loubser, 2014, p. 124). This relates to P4 in S3, who asserted that "school resources like buildings and fencing need to be protected because many generations can still make use of them." The concept "sustainable" appears throughout this study because sustainability is arguably the most trending concept in education currently. As Spooner posits, "sustainability is the idea that humans can use and manage natural resources so that those resources can provide for human needs for as long as possible (potentially forever)" (2012, p. 398). Sustainable development has been universally driven by different declarations for many decades, namely the Brundtland Report, Tbilisi, UNESCO, UNDESD, WSSD and NDP to name but a few. The practice of democracy in South Africa has democratised organisations such as schools (SASA, 1996), such that schools also need to use and manage resources so that those resources can provide for its occupants' needs for as long as possible without lowering teaching and learning standards. This is endorsed by SASA (2007) as it clearly stipulates the roles of the SGB that:

> "the *general powers and functions including physical resources; finances of the school; maintain and improve school property, buildings and grounds (land where ecosystems exits); purchase LTSM; pay for services rendered; administer stock and stocktaking; charge school fund; storage , custody and care; disposal and letting assets; safety and security of equipment (furniture, office machines, photocopiers, printers) according to the Public Security Act (1994); transportation of learners and educators on behalf of the school for educational purposes."*

This clearly means that the SGB members understand that they are allocated financial powers and functions (SASA, 1996). This resontes to the response of P3 (S1)? who stated that "*school fund is decided by the SGB*"

According to a study by Kensler, greening schools focuses on sustainability (2012, p. 791). This is the rationale for sustainability to be used in this study because green is a pathway to sustainability (Ramsarup & Ward, 2017), promotes SD and provides opportunities for policy directives which steer development towards a sustainable path. Kensler (2012, p. 794) further opines that a green school is a zero-waste-tolerant school building that creates a healthy environment conducive to learning while saving energy and money and has a small carbon imprint on the environment. A green school includes the following components: efficient use of resources, healthy operations, ecological curriculum, nutritious food and sustainable community practices (Chapman, 2012, p. 3). Sustainability consists of three interrelated spheres which are interdependent to each other, namely economic, social and environmental spheres. For the school to achieve sustainable development, it has to consider economic, social and environmental issues (Loubser, 2014, p. 132). Economic factors include resources (goods) and services; social factors include political participation by societies, social services such as education and health; and environmental factors include stable and available natural resources maintaining biodiversity, atmospheric stability and protection of renewable resources (Dube, 2012, p.119). These three spheres of sustainability are aligned to the universally adopted 17 SDGs (2015-2030), aimed at improving sustainability of resources globally, of which SA is a part. A green and sustainable development approach is vital in the present-day schooling system and conclusions for this question are made based on economic, social and environmental factors due to their co-existent nature. These three pillars of sustainability need to be balanced within the school in order to ensure sustainable development which would result in a green school. Fortunately, there are a series of programmes that have been implemented by schools to assist in the fight against swift depletion of resources for sustainability and enhance sustainable development approaches in these cases.

6.4.1.1 Economic factors

Literature by Carvello (2009, p. 129) and a study by Le Grange et. al (2014) referred to the economic sphere of sustainability as human-made capital. Economic factors of

sustainability include knowledge of sources of funding of schools into sustainable strategies, consumption of goods, services and technology. The majority of the role player participants have knowledge about the sources of funding received by their respective schools. They know that the DoBE is the main funder according to the NNSSF since S2 and S3 are no-fee paying schools in quintile two and one respectively. According to the projected funding plan, the state allocated R1 458,00 per learner in S1 and S2 in 2020 (NNSSF, 2018 January). This procedure is in accordance with the NDP (2013, p. 51) and the official guide to SA in Education (GCIS, 2018/19, p. 94). S1 is in quintile 4 and charges school fees as determined by the SGB according to SASA (2007). The state also allocated S1 an amount of R736,00 per learner in 2020 and may offer Q4 or Q5 no-fee status at the threshold level of R1, 316,00 voluntarily (NNSSF, 2018 January). All participants are knowledgeable that the state is the main source of funding to enable the school to operate effectively. However, according to the participants in all cases, they acknowledge that these funds are not sufficient to run day-to-day operations of the school.

Due to insufficient funds the schools came across, the participants acknowledged that they participate in a variety of fundraising strategies to assist the school to meet its mandate. These strategies also include asking for donations from NGOs and parents. The majority of the participants acknowledged that they lack knowledge and experience on challenges to achieve efficient fundraising methods for sustainability of school resources. However, a minority maintains that there are methods that can be used to sustain resources, namely by taking good care of resources, proper planning, sharing ideas and advice, teamwork, time management and making estimates for running fundraising projects. These findings are supported by the DoBE, stating that “together, the SGB and the SMT should ensure that the schools’ operational budget is managed carefully and responsibly so that the school has money for all of the programmes and activities it offers, communicating regularly and efficiently with all stakeholders and their constituencies” (2016, p. 10). Contrary to this, economic constraints experienced by schools on meeting expected funds cannot be resolved by the DoBE leadership because none of the participants reported how they were workshopped or trained regarding accumulating funding. This is supported by the comments of P2 in S1, who reported that they *“don’t have NGOs that assist the school but the Gauteng Department of Education assist in their own time.”*

It is revealed that the fundraising processes are ineffective, since the majority of participants commented about the inability to obtain donors and to reach positive fundraising targets. One participant in S1 also indicated that for the school to reach the expected target, the role players offered incentives to parents and learners who were able to reach the target and deadlines expected. The strategies implemented are not green and sustainable. The participants have no knowledge that there are local companies in Tshwane local municipality, like Nampak (Ringdahl, 2008, p. 36) and Collect-a-Can that are recyclers which create a culture of recycling initiatives in SA. Collect-a-Can has obtained local and international acclaim for its contribution towards protecting the environment, as well as its significant contribution to job creation and poverty alleviation (GICS, 2018/19, p. 114). These companies often provide recycling bins for bottles, paper, plastic and tins. The waste is separated, weighted and schools are reimbursed for waste recycled as observed in S2. Schools need to recycle everything they cannot reduce or reuse in order to be self-reliant.

Schools should also consider recycling their e-waste such as computers, copiers, laptops, personal devices such as smartphones, screens, computers, tablets and TVs, as well as household appliances such as heating and cooling equipment. This is in line with a study by Tshimbana and Tekere (37th EEASA Conference, 2019), who presented that people do not know what to do with their e-waste or what harm it can do to the environment and their health if not disposed of in a proper manner. Furthermore, food and garden waste can also be composted to be reused for the school garden which can sell vegetables to the local community as practiced in S3. This practice is aligned to the study by Hens, et. al., (2010, p. 666), who reported that vegetable gardens of the schools studied were used to support the feeding schemes of those schools. The strategies in S3 are green sustainable practices that could add to the schools' green economic growth. S1 has a large yard but the school is not knowledgeable that this yard could be used to generate large amounts of money by using the food garden strategy. The role players can generate sufficient funds by selling organic vegetables to Tshwane North communities. Literature by Earthman (2009, p. 264) states that these practices reduce incidents of illness and absenteeism. This is similar to the findings of a study by the US Health Report (2015). Unfortunately, S2 would not be able to erect a food garden because of the limited space. It can be easily assumed that schools did not understand that they could be able to function on their own by producing and selling goods and services within their own boundaries by utilising the resources they

have through knowledge gained locally. This is supported by P2 in S3, who commented that another way their school used to fund the school was through renting classes to different churches to run their services on the school premises. A sustainable development approach is increasingly important in a modern developing country (Dube, 2012, p. 120).

In every economy, either of a country or a school, saving criteria minimises financial strains and promotes sustainable development. For example, all participants from all cases acknowledged that they know and understand that using energy efficient lights and unplugging electrical appliances when not in use saves electrical expenses. Contrary to that, all schools revealed that their main source of energy is non-renewable energy, lights are switched on at night in S2 and in S3 they do not use energy efficient lights. A study by Le Roux (2014, p. 111) reported that an increase in energy demand in SA led to the increase in electricity prices seen yearly. This is aligned to the participants' report during focus groups interviews that electricity and electrical appliances extort school finances (P5 in S3) and P3 in S1 stating that:

"*Money is depleted by services such as water bills, electricity bills, photocopying machines, paper, stationary, transport for teacher workshops, fuel for the generator."*

According to the South African guide on mineral resources and energy document, most areas in South Africa have an average of 2 500 hours of sunshine per year and have sunshine all year round (GCIS, 2018/19, p. 167). Therefore, solar energy is a necessity to schools because it is cheap, green, sustainable and renewable energy that could be used to save money. According to observations, none of the cases studied had installed solar panels on its roof as a means of utilising renewable energy sources. This indicates a lack of knowledge on how this renewable energy can turn their schools into self-reliant and sustainable green schools. A study by Carvello (2009, p. 129) raises an issue related to knowledge economy, which is a system of production and consumption that is based on intellectual capital. Role players need to turn their schools into a clean power station by installing solar panels onto the roof of their schools or wind energy power turbines because wind can never be used up and does not pollute the atmosphere with greenhouse gases like carbon dioxide (Peacock, 2004, p. 28). CAPS content has included water as a source of renewable energy called hydro-energy. This energy comes at a cost similar to non-renewable energy generated from coal, which is not environmentally friendly and has an impact on the greenhouse effect.

Furthermore, S1 revealed that their computers are left in standby mode when not in use. Literature revealed that machines left in standby mode still draw 20% of the power they do when fully operational (Gear, 2009). This support the majority of participants' comments that large amounts of money are paid on water and electricity bills. In addition, S1 needs to install roof gutters to channel rainwater into water tanks which may be used for irrigation and filling the swimming pool. The swimming pool needs to be covered with a pool cover to also reduce water evaporation, pollution and wastage. However, installation of boreholes in S1 and S3 are also very efficient, although a little energy is needed by using an electrical or fuel generator to extract underground water. These practices are environmentally and eco-friendly, green, sustainable and saves large amounts of money. These processes also reduce unnecessary water bills in S2 to a certain extent.

6.4.1.2 Social factors

In a study by Le Grange et al. (2014), the social sphere of sustainability is referred to as human capital. The society is important in sustainable development because they come with decisions and action plans on implementing a green school. A study from Carvelo (2009, p. 130) substantiated that knowledge economy is beneficial to the individuals and collective drive for an environmentally literate society as well as the attainment of SDGs. The role players at school, as representatives of the society, need to knowledgeable to ensure that the entire school community (staff, learners and parents) reside in a healthy and safe environment conducive to effective teaching and learning that is also costeffective. Therefore, they need to understand quite clearly the benefits that the society can have, for example the preservation of the environment by minimal consumption of natural resources for future generations.

According to the findings of this study, it can be concluded that there are a many inequities in funding schools by the NNSSF. S1 and S2 are no-fee paying school the state allocates funds according to their affordability (NNSSF, 2018 January). Some schools are no-fee paying schools due to their economic background and thus inability to do so. which means that the schools are categorised in Quintile 1 and 2. According to a study by Hens et al. (2010, p. 666), who investigated the monitoring of environmental management in 39 primary schools in SA, it was stated that SA is a developing country with differences between schools in urban, rural and informal settlements. This is similar in relation to the

findings of this study where differences in infrastructure and funding were reported. This is not in line with UN SDGs (2015-2030). The study revealed that the aftermath of the Apartheid era of 1948-1994 (Le Roux, 2014, p. 95 citing Mariotti, 2009) is still visible due to social inequity in TND schools whereby city schools are still privileged. S1 is a previously white-only school, well-resourced when compared to S2 and S3, who are still suffering with the same under-resourced township and rural schools originally designed for nonwhite learners. The staff and learners in S1 are a combination of all races who are able to pay the school fees, as compared to S2 and S3 which are both demographically 100% black, and are not able to pay school funds. This relates to a study by Le Roux (2014, p. 111) which revealed that a total of 45% of South Africans are poor people living in villages. The knowledge of the UN MDGs (section 2.3.2.1) and SDGs (section 2.3.2.2) adopted by UNGAS to ensure equitable education; decent work and economic growth; and responsible consumption of resources is still a myth. These goals are extremely important indicators when it comes to the social pillar of sustainability. The findings in S2 revealed that the role players have knowledge that their school has challenges of unemployment, vandalism and theft due to the inability to install alarms and to employ well trained security guards to secure the safety of the school infrastructure and occupants. S1 has employed the best security company available for protection of school resources from theft and vandalism. Additionally, there are alarm systems installed on the school premises by a reputable company.

The role players in all cases also understand that injecting state funds into the school coffers does not guarantee sustainability. The society needs to be provided with decent jobs (SDG number 8) to be able to take care of their children's' education. The findings further revealed that even the city school in S1, which used to be well-resourced, reported a drop in school fund contribution due to job losses. This resonates with P2 in S1, who reported that when they undertake the process of budgeting, they estimate 95% of the expected income. Parents in S1 are applying for school fund exemption and the school is also receiving a fraction of state financial support. From the little evidence showed above, it can be concluded that the role players understand that the schools are struggling at the present moment and more funds need to be injected to lead to sustainability. What is needed is that role players need to be taught how to fish rather than be given a fish to eat. On the other hand, role players might not be knowledgeable about greening, SD or SDGs, yet they did manage to implement some green features in their schools while unaware.

This coincidental knowledge provides a platform for future positive sustainable development opportunities at schools. This implies that they were able to learn to generate their own sustainable funds.

However, there are traces of a lack of societal knowledge regarding the following issues:

• Use of renewable, non-toxic energy sources to heat and power the school surroundings. The participants are not aware that the electricity bills they pay monthly are due to the generation of power by coal, which is nonrenewable and toxic to the environment, and could result in large climate change impact.

• Goods and services should be sustained to meet the school needs and surpluses should be shared with other less-resourced schools, rather than disposing of them.

• Whether a city, township or rural school, the societies need to understand the interconnectedness and interdependence of all elements of life on Earth.

• That Eco-schools support environmental learning in the classroom with themes linked to SDGs and support ESD in the curriculum, with over 50% of the content in all CAPS subjects being environmental in nature (WESSA).

6.4.1.3 Environmental factors

The study by Le Grange et al. (2014) referred to the environmental sphere of sustainable development as natural capital. Some scientists believe that this is the most important aspect of the three pillars of sustainability because it is one of the MDGs that attracts the most attention all around the world (Le Roux, 2014, p. 15). Le Roux further elaborated that environmental sustainability involves conserving and maintaining natural resources, such as forests, oil, water, animal species, etc. (2014, p. 15). The first theme of the interviews explored the sources schools used to generate funds to their schools. None of the participants confirmed that they generated funds from their schools' immediate environment since they revealed that they rely on the state, fundraising and NGOs. Replacing paving by landscape planting of trees, flowers, grass, fruits and vegetables is physically greening the school and also embraces sustainability of the school occupants. This resonates with the findings of Carvello (p. 2009), who established that vegetation supports the ecosystem within a school with curricular benefits on biodiversity study and is also aligned with global SDGs (2015-2030); Eco-school themes of nature and biodiversity and healthy living. In addition, plants provide shelter to people and habitats to biodiversity;

are home to 80% of terrestrial biodiversity and provide building materials to 300 million people; maintain global climate; are sources of medicines and clean water and are the lungs of the Earth, which add to the oxygen content of the atmosphere (SANBI, 2018). These criteria resonate with the study of Le Roux (2014), who stated that the environment should not be overused or exploited, but protected for atmospheric stability. These processes improve air quality, provide shade to the school play grounds, reduces water runoff, storm water pollution and improves the appearance of the school. Building vegetable and fruit gardens support the school residents with organic sustainable food production as practiced in S3. The observation of the case study of school premises has led to the conclusion that the school environment of S2 presents some of the typical environmental problems encountered, such as inadequate external shading protection resulting in overheating and poor indoor air quality in classrooms. These problems derive from few plants in the surrounding are for appropriate natural shading. The use of curtains in S3 offices leads to a reduction of daylight and glare problems which maximise natural lighting. A study by Tsikra and Andreou (2017, p. 207) revealed that the use of curtains increases the need for more frequent use of artificial lighting that significantly increases the operating costs. These results pose a health threat which does not align to the Constitution (1996) that gives South Africans the right to a healthy environment that is not harmful to their health or well-being. A study by Kensler (2012, p. 797) revealed that when the environment is not protected, the results are horrifying whirlwinds, record-breaking tornados, coastal flooding, drought and wildfires. It is evident from the cases studied that role players are grappling with the challenges of how to lead, plan and manage their respective school environments to be more sustainable. In this regard, role players need to be capacitated to protect their immediate environment to protect this generation and future generations to come.

6.4.2 The contextual factors in the school shape the greening of the school.

It was necessary for the aim of this study to explore what role players know about greening and SD and to identify contextual factors that hinder these processes to shape the greening of schools. For the purpose of this study, contextual factors imply hindrances that are beyond the role players' control. "Shape" might mean different things to different people. "Shape" in this study implies transforming schools for a positive environmental practice. Contextual factors are firstly identified in all cases and then later followed by a discussion

on how they could shape the greening of the school. Contextual factors identified below are categorised as (a) contextual factors as a result of school context; (b) contextual factors due to bad planning by schools and (c) contextual factors between in curriculum and practice in schools., Based on the school background profiles, location and funding in quintiles, these contextual categories derived from the findings revealed a lack of appropriate resource management policies and a gap between theory in curriculum and putting theory into practice in schools.

6.4.2.1 Contextual factors as a result of school contexts

The following contextual factors are identified with regard to the schools studied:

- Many South African learners, particularly black learners, are still located in disadvantaged locations pre-designed by the apartheid regime, where the majority of black learners still find themselves in disadvantaged impoverished townships and villages where service delivery is still a problem (le Roux, 2014). The state has also categorised schools into quintiles whereby disadvantaged school communities are still at the mercy of the state. The state declared them non-fee paying schools and imposed compulsory education until Grade 9 as well as feeding schemes through the NSNP. Due to location, these schools continue to struggle to be on par with their counterparts in city schools.
- There is a high level of information technology disparity among these schools whereby rural schools have more limited resources than city schools, where parents are able to fund the school for computer technology lessons and have sufficient resources. Learners in disadvantaged schools are unable to access the internet for online learning and they become discouraged when learning online because it is costly to them or networks are not available.
- Schools are not always informed about why certain projects are carried out or ignored by other state partners.

6.4.2.2 Contextual factors as a result of bad planning by schools

- Lack of environmental, waste and resource management policies. schools were not able to furnish the researcher with an environmental policy

• Inability to resolve environmental conflicts whereby when schools are damaged due to structural failure, poor maintenance, floods or hail, matters are passed from one state department to another. For example, where the department of public works is expected to repair schools, this takes longer to repair and further disrupts school attendance.

6.4.2.3 Contextual factors as a result of curriculum implementation and practice

• Policies, legislations and curriculum are written in colonial languages like English or Afrikaans.
• In curriculum draft and implementation, a top-down approach is still in operation.
• Greening schools is left to the responsibility of NGOs like WESSA, FEE or LEDET, whereby implementation is voluntary and can be in the form of competition, whereby schools receive incentives, prizes or awards for participating.
• When the researcher visited TND offices to prepare sampling procedures, she was informed that the district office does not have an environmental advisor or officer to capacitate role players on green and sustainable ways. The responsibility on EE or ESD was allocated to the Geography subject advisor, who verified that she is not familiar with green school programmes and sent the researcher to the DWA. Therefore, schools improvised greening their schools and did try to economise to achieve some sustainable development practices.

Table 6.1 below shows a summary of the current state of the contextual factors according to the three pillars of sustainability on the cases studied:

Table 6.1: Summary of contextual factors

Social	Economic	Environmental
1. Poverty, high unemployment rate and inequities in terms of social income	1. Ineffective use of non-renewable resources Lack of 2. economic knowledge	1. Diminishing natural resources and pollution 2. Limited space 3. Lack of e-waste recycling

These contextual factors could shape the greening of the school by implementing the following:

• Firstly, to shape greening schools for sustainable development starts with education management of the country. The DoBE is the Department which is given the responsibility of running basic education is SA. Therefore, it is bound by the Constitution to promote SDGs at the centre of its policies and legislation (SASA, EEA). This is substantiated by the fact that SA is a member of UNESCO (Carvello, 2009, p. 102) and DoBE is an organ of the state. At policy level, the DoBE has achieved integrating ESD in the NCS (2012) through CAPS. The focus should now be to effectively put this policy and the NDP into practice within the entire school community for green status. Education is a vessel that needs to be utilised to achieve SDGs. To shape greening of the schools, the DoBE needs to consider revising and reviewing the current CAPS, SASA and EEA legislations and teacher training programmes to include all school communities to align and apply the current SDGs.

• Secondly, in order to promote greening schools for sustainable development, the DoBE needs to make solid partnerships with NGOs like FEE, WWF and WESSA to enable schools to fully (not voluntarily) participate in Eco-school programmes. This process will be able to close the gap between curriculum and practice. This process also resonates with the findings of Hens et al. (2010, p. 676), who established in a study of monitoring environmental management of 39 primary schools studied in SA, that 80% of the schools did integrate environment in the management of the schools using EMSs. According to WESSA, Eco-schools' programmes are developed to support environmental learning in the classroom with over 50% of the content in all CAPS subjects being environmental in nature with themes linked to the SDGs (www.wessa.co.za). Registration in Eco-schools programmes could lay a foundation to understanding sustainable development by teachers, learners and role players as the Constitutional demands.

• LEDET, if given opportunity to all schools in SA, with SAGSP criteria at its disposal as well as the implementation of the EMSs by FEE (Meiboudi et al., 2017) at all levels of schooling, could shape and transform schools into sustainable, self-reliant entities.

6.5. CONCLUSIONS TO THE MAIN RESEARCH QUESTION

The conclusion of the strengths, weaknesses, opportunities and threats to greening the school for sustainable development are presented separately in the sections that follow. It is necessary for this study to summarise the SWOT analysis as reported in the findings of the main research question (section 5.8). The problem statement revealed that there are problems experienced by role players in ensuring that the schools are self-sufficient, self-reliant and able to run smoothly without impediment. It is apparent that there is a need for schools to go green by implementing sustainable development projects. The following conclusions on greening the school were made with regard to the main research question:

6.5.1 Strengths

South African legislation has laws in place that control the management of core resources in the country towards sustainable development. The Constitution of SA is the supreme law of the country which ensures the protection of the environment as underpinned by the Constitutional court (2009) and the ministry and leadership of the DEA (2010, p. 9). One of the duties of the DEA is enforcing environmental compliance, EE training and community empowerment, according to NEMA (1998). The DWA, DAFF, DME are given ministerial powers to regulate resources in such a way that the citizens are ensured a healthy environment which does not jeopardise their livelihood. The South African government has legislated resources like water, energy, forestry and information technology, to name but a few. The legislation of these resources is then rolled out from national government to provincial and municipalities through Acts, regulations and policies. This approach is a top-down approach, for example, from Acts at national level to school policy at a grass root level. In the national government, it is the responsibility of the minister of a particular department to ensure that legislation is carried out. In the provincial government the MEC is responsible for regulating every resource in his or her department according to provincial laws and regulations. Local governments under the authority of the mayor also ensure that resources are properly managed, as well as the schools in each cluster, circuit, district or region. The NDP supports the UN SDGs in transformation to a green sustainable future.

6.5.2 Weaknesses

The DoBE is a state organ which is given the responsibility to run the education system of the country through the PED, districts, circuits, SGBs and SMTs. This top-to-bottom approach is not effective due to the fact that most personnel did not specialise in water, energy, waste or forestry management. They are specialists in education, either in educational management, school management or governance. This being the case, schools at the bottom are struggling with resource management as traces of negative resource management are revealed in this study. The different school premises were clean, clear of litter and odour-free, but some schools did not use green projects for SD like recycling, reusing and reducing. It should be noted that resource management is regulated by legislation at a national level, however implementation does not take place at a national level (Makokotlela, 2016, p. 55). but rather at a grass root level in institutions such as schools. One of the duties of the institutional district support officers is to “assist principals and educators to improve the quality of teaching and learning in their institutions” ((DoBE, 2015).

Secondly, one of the duties of the SMT is administration of learner records and management of school professional records. The administration of these records include LTSM, curricula, tests, examinations, etc. The circuits and districts do not have an HOD of water, energy, waste management or landscaping. The Constitution guarantees the right to basic education for every citizen through the DoBE. The ministry of education is responsible for funding schools, curriculum frameworks, examinations and certification as some of his or her roles (NEPA, 1996). At a provincial level, these duties are undertaken by the office of the MEC for education descending to districts, circuits and ultimately schools. These factors are some of the weaknesses which hamper schools in going green in their day-to-day programmes. Legislation, including SASA (1996), is theoretical and normally does not indicate the practical implementation process at a grass root level, in this case, schools. This being the case, it is a cul-de-sac at grass root level.

6.5.3 Opportunities

The departments that are responsible for resources utilised at schools need to roll out specialists to schools to enable these institutions to manage the resources at their disposal

sustainably. For example, some schools have a school nurse or councilors rolled out from the Department of Health to manage health issues at the school through the school' sickbay. These officials can also provide role players with training workshops in their respective resource management tool kits. Some of these officials can be rolled out from the local government where the school is located. Secondly, WESSA could also roll out its specialists to schools so that more schools could be given opportunities to register for Eco-schools programmes.

6.5.4 Threats

The socio-economic conditions which the schools currently experience due to high rates of unemployment and reliance on state funding, constraints to state funds are posed since this might result in a reduction of tax collection. Reduction in tax income might force the country to borrow money from the IMF and reduce assistance to schools through funding. This might lead to some schools becoming bankrupt since the country is over-stretched by the additional expenses caused by the COVID-19 response.

The air quality in the classrooms due to lack of air conditioners and indoor plants poses a health risk to the occupants, which can ultimately lead to increased absenteeism. Absenteeism by teachers and learners poses a threat to poor performance. The lack of non-renewable energy use through wind or solar generated power poses a threat of catastrophic climate change impact since SA still uses coal generated electricity as its main source of power, which leads to high greenhouse gas emissions.

6.6. LIMITATIONS OF THE STUDY

The above-mentioned questions were largely answered, however there were a number of limitations in the research process. This study, like any other study, has several limiting factors beyond the researcher's control, listed below:

• It was difficult to compare the findings with other studies and literature data as there was no existing local green school data that could be used to compare different studies related to green schools in SA. However, this qualitative study supports existing good practices of sustainable development in schools.

• The researcher experienced difficulty in finding an adequate number (four) of members of the SGBs in the focus group interviews. Access to schools was also problematic due to some schools claiming that they did not receive any authorisation from the district manager and the GDE, although those letters were confirmed by the district manager that the schools sampled were duly informed.

• The collection of data through face-to-face focus group interviews was interrupted by the unprecedented COVID-19 pandemic which forced the South African government to close schools prematurely before the end of the first term. As a result, it was difficult to approach participants and schools due to prolonged COVID-19 Regulations imposed on schools during the first to third terms of the school calendar. Each participant in the group responded to a semi-structured online text-based interview guide in an open-ended interview.

• This study ignored behavioural and political factors that may have influenced the weight determination process.

• South Africa is a vast country with nine provinces, many races, diverse cultures and religions of valuable research direction who would have been included; or could have investigated schools in other districts and provinces in quantitative data or in independent schools to reflect the socio-economic background in the research.

6.7 CONCLUDING REMARKS

Implementation of green schools plays a cardinal role in any development and planning where decisions have to be made, whether at macro level (central government), meso level (provinces) or micro level (schools). When such decisions are made, whether they are political, environmental social or economic decisions, it is beneficial to get the public involved, young and old citizens. The recommendations, contribution to the study for education for sustainable development and concluding remarks are presented in the next final chapter.

CHAPTER 7
RECOMMENDATIONS AND CONLUSIONS

7.1 INTRODUCTION

Green schools' implementation is still at infantry stage in South African schools. Participatory planning by all stakeholders can ensure realization of green schools' initiatives and the development of sustainable green environments. This research placed emphasis on knowledge, as well as contextual factors that result in various challenges in terms of realising effective green schools that will enhance sustainable development. This final chapter aims to provide recommendations of how South Africa should respond, move forward, improve and ensure effective implementation of green schools, while enhancing sustainability.

7.2 RECOMMENDATIONS

This section provides recommendations of the study as well as recommendations for further studies on identified gaps.

7.7.1 Recommendations of the study

In accordance with the findings of this study, the following recommendations are suggested:

• Firstly, there should be an introduction of school awareness campaigns on greening schools programmes such as initiatives on solar energy which reduce greenhouse emission because they are climate change resistant.
• Secondly, the introduction of greenest schools' competition on: waste management; energy efficiency and conservation; landscaping, tree planting and beautification; water management; public participation and community empowerment.
• Thirdly, the creation of an integrative assessment of green schools in SA that embraces practical activity plans in curricula, infrastructure and research in the area of greening schools.
• Fourthly, an introduction of green school experts who have a history of green school project experience and related activities in this field of study. The findings clearly pointed to the need for training and capacity building of role players in SD. Among these were:

inability to work on their own in order to save the school from resource depletion; complaining that the NGOs, DoBE, learners and parents did not sufficiently support the school; and ineffective fundraising strategies that did not meet targets because of a lack of skill in reaching targets expected. The DoBE needs to support green programmes in partnership with relevant stakeholders.

• Fifthly, the DoBE should consider introducing or establishing vegetable gardens at schools as part of the curriculum. This would actively involve learners in positively influencing green and sustainable attitudes, awareness and ultimately lead to consumption of a wider variety of fruits and vegetables. This resonates with the findings of this study whereby one school implemented indigenous decorative gardens, vegetable gardens, organic waste composting and appropriate green aspects such as water, waste and energy management. This could align with the gap between theory the curriculum and practice. The gap revealed that policies in CAPS, SASA, EEA did not assist nor provide the role players with knowledge (know how) in regards to implementing ESD or encouraging sustainability of school resources, neither is there any environmental officer or subject advisor of EE or ESD in TND, as the researcher was informed. Legislations in schools need to be revised to align with UNDP and NDP.

• Sixthly, this study revealed that education in SA is implemented through a top-down approach. That is, from national legislations in the Constitution, DoBE, PED, districts, circuits to SGB (SASA). This top-to-bottom approach is not effective due to the fact that most personnel and role players did not specialise in water, energy, waste or financial management. These legislations also do not indicate how SDGs targets can be achieved. Therefore, this study recommends a two-way approach model which implies both top-to-bottom and bottom-up approaches as follows:

(a) In the first step, the state rolls out expertise from every state department that manages ESD resources to the DOBE, every PED, local governments, districts, circuits and schools to capacitate these entities in ESD and greening skills in accordance with global SDGs, and how to achieve the proposed 169 targets by UNGAS. This is a practical balance between legislation and reality to support green ESD through legislation and policies which control resource use without capacitating those who are given authority to do so. It should be noted that legislation enforces issues or controls and does not necessarily make provisions to guide implementation.

(b) In the second step, the best executed greening is publicised to encourage other institutions to follow suit.

(c) In step three, the best innovative and new green sustainable strategies in schools need to be complemented, rolled out and gazetted at a national level to encourage others to promote ESD through greening practices obtained from a middle or grass root level as illustrated in figure 6.1 below. This process is democracy in action, not imposing and depriving public contribution.

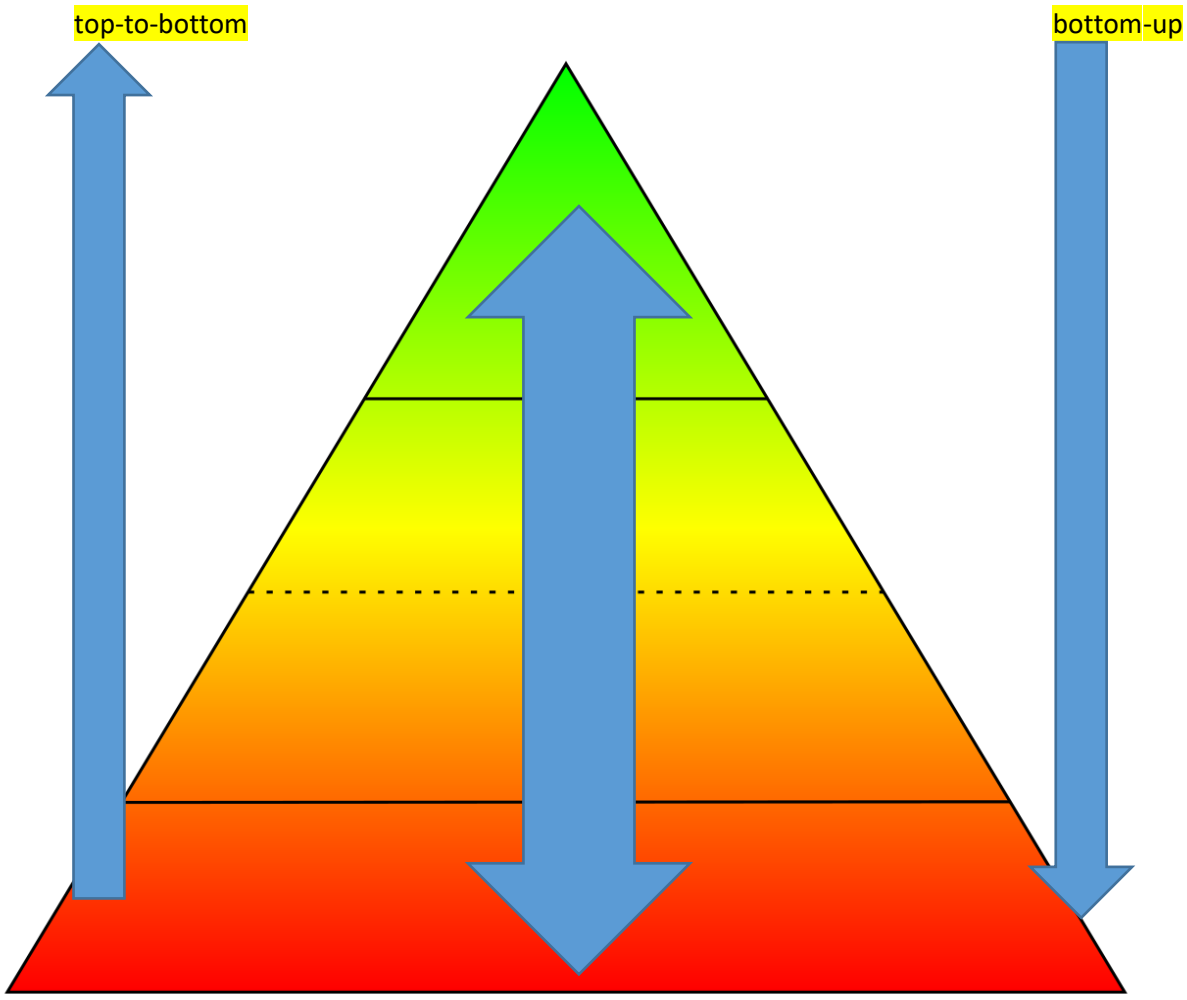


Figure 7.1: Two-way approach to greening the school (Own source)

7.1.2 Recommendations for further studies

- This study recommends that further studies using quantitative and mixedmethod approaches at ECD centres, primary and high schools, Technical, Vocational, Education and Training (TVET) colleges and other districts, provinces and countries needs to be undertaken.

- Penultimately, further study which includes teachers, learners, administrative staff, curriculum designers and subject advisors is recommended for holistic results.
- Lastly, action research which requires role players as co-researchers is also recommended to assist in designing school-based sustainability programmes that will involve collective decision-making from a South African context.

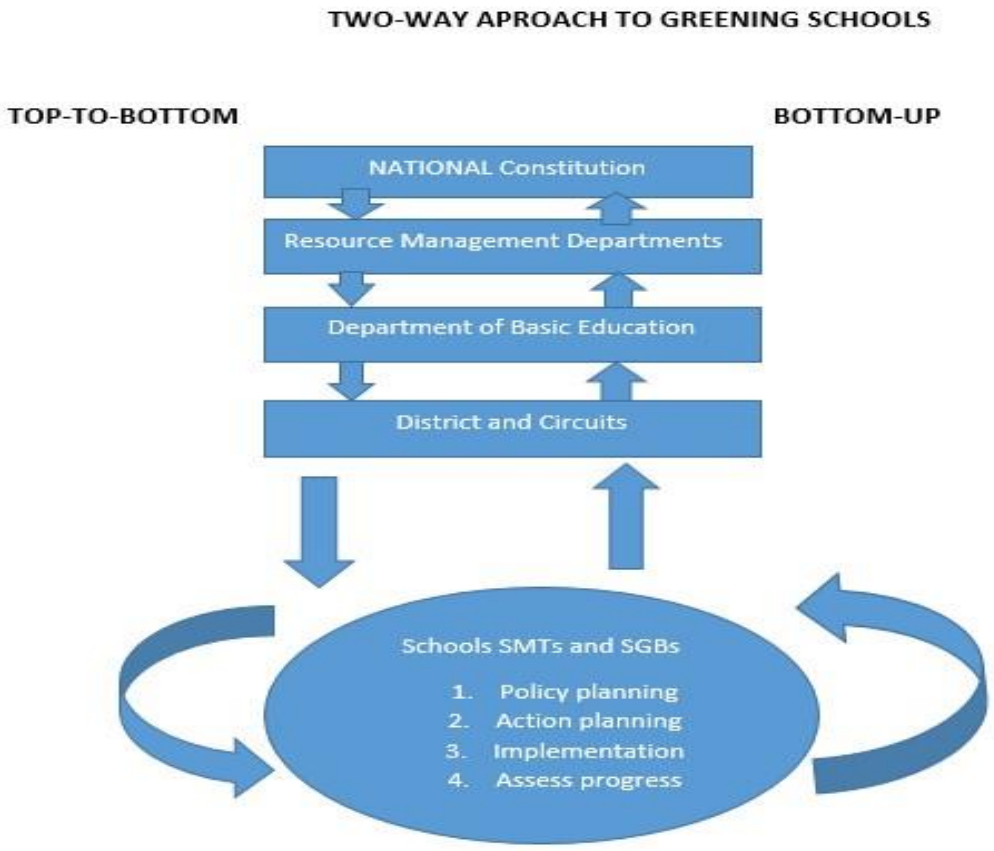
7.3. CONTRIBUTION OF THE STUDY TO EDUCATION FOR SUSTAINABLE DEVELOPMENT

Similar studies on green schools, also known as Eco-schools has taken place in SA using EMSs provided by FEE (Hens, et al, 2010) in analysing green compliance. The SAGSP criteria launched by LEDET in 2017 used following six thematic areas, namely, waste management; energy efficiency and conservation; water management; landscaping, tree planting and beautification; public participation and community empowerment; and leadership and institutional arrangements. The continent of Africa has many good practices to draw from that seeks to generate and scale up progress in all levels and areas education of in order to accelerate progress towards ESD, such as the Eco-school initiatives in Africa (Africa Environmental Education and Training Action Plan, 2015-2024).

Similar international studies have reported using LEED by USGBS (2009). Iran used the fuzzy analytic hierarchy process (FAHP, 2016) and Greece used Ecotect Analysis tool (Tsikra & Andreou, 2017) in analysing green compliance. Since the field of thematic systems of green schools and buildings is varied, this study came up with five thematic areas developed for focus group interviews to explore greening of selected schools for school role players to achieve sustainable development. These themes were (1) sources of funding; (2) experience on resource depletion; (3) experience on using school resources; (4) educational experience on resource use; and (5) sustainable development. These themes developed were doable, easy to apply and holistically included green exploration and were also used to analyse greening schools for SD in selected schools. This thematic framework was different from other studies because it targeted the key role players at schools, namely, SMTs and SGBs. Therefore, these thematic areas could add another way in exploring schools' ESD and greening.

This study, on the other hand, came up with an audit tool that could be used by schools to assess their greenness (section 5.4.1). Furthermore, most of the schools" contextual factors were due to lack of knowledge, environmental policy and capacity building from expertise in greening and SD to guide them on implementation of green features. The participants reported about lack of support from the DoBE in green and SD matters except funding schools. Strategies employed for sustaining school resources came mainly from fund raising initiated by schools. This revealed that school role players were taking strains and overwhelmed in ensuring that proper teaching and learning takes place.

Additionally, this study adds another responsibility to the DoBE as an organ of state, to ensure that ESD should not be only for funding, imparting knowledge, assessment, examinations, promotions and certification. There is a need for capacity building of role players on how to assess the green status of their schools and improve the threats posed by this study, namely, diminishing ecosystems; constraints on state funds; and bringing climate change catastrophies and calamities to the country that has been hit hard economically by COVID 19. In the field of ESD, the findings of this study should add to the debates on sustainability as revealed in SDGs and NDP (2013) to be achieved in 2030 and schools should not be left behind. The DoBE should raise awareness to assist role players with directives that can be taken in achieving green status. The thematic areas and environmental tool developed successfully diagnosed areas of strengths, weaknesses, opportunities and threats faced by schools' resource management on waste, energy, water, landscaping, institutional management and governance. This is so because it left the Constitutional interpretation and other legislative frameworks to resources under threats as revealed in this study. It is necessary for role players not to be excluded on SD issues, but to be exposed to other knowledge areas such as how to audit waste, energy and water consumption. The thematic framework was different from other studies because it targeted the key role players at schools. This study proposed the two-way model below for ensuring holistic involvement of greening schools by all stakeholders from top-to-bottom and bottom up:



Two-way approach (Own source)

7.4. CONCLUDING REMARKS

In conclusion, education is the best vessel or vehicle to bring about a paradigm shift from unsustainable behaviour to green, efficient, sustainable schools. However, it should be highlighted that the education system cannot achieve positive results if the implementation is done in isolation. All citizens need to be taken on board irrespective of their age, educational and economic backgrounds. SD needs to become a way of life of all South Africans. This is because the education system, as an organ of the state, has the ability to coordinate and bring together greening from IK experts, green movement activists, NPOs and NGOs. In this way, education needs to be at the forefront to lead SA, more than ever, to fulfil the responsibility of protecting our vulnerable environment as endorsed by the Constitution. Mainstream studies are broadly concerned with how technology education, be it in schools or in engineering programmes at university level, can be improved and geared towards sustainable development with faith in the prospect of 'green' technological innovations (Knutsson, 2018, p. 5). This study did not elaborate more on technology in schools since current schooling is not yet paperless. There is a trail of e-waste generated from old technology that still needs to be addressed, whereby less than 20% of e-waste is

recycled, resulting in global health risks, environmental risks and loss of scarce and valuable natural materials (World Economic Forum Annual Meeting, 2020).

Finally, collective responsibility is an important part of our heritage to survive on planet Earth. Changes to SD and green lifestyles is a global need, it must happen and cannot be ignored or neglected. If SA cannot achieve collective responsibility, massive damage is predicted to our already fragile environment which might escalate to the degradation of the planet Earth to such an extent that environmental collapse becomes eminent and restoration of depleted resources becomes impossible. Greening and SD in our schools and communities can be a major contributor to reversing the damage already done to planet Earth.

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APPENDICES

APPENDIX A: ETHICAL CLEARANCE CERTIFICATE

UNISA

UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2019/10/16

Ref: **2019/10/16/6498116/06/MC**
Name: Mrs J Bopape
Student No.: 6498116

Dear Mrs Bopape

Decision: Ethics Approval from 2019/10/16 to 2024/10/16

Researcher(s): Name: Mrs J Bopape
E-mail address: 6498116@mylife.unisa.ac.za
Telephone: +27 72 997 3836

Supervisor(s): Name: Prof AV Mudau
E-mail address: mudauav@unisa.ac.za
Telephone: +27 12 429 6353

Title of research:

Greening the school for sustainable development: A case of Tshwane North District

Qualification: PhD in Environmental 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 2019/10/16 to 2024/10/16.

*The **low risk** application was reviewed by the Ethics Review Committee on 2019/10/15 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.

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:	15 October 2019
Validity of Research Approval:	10 February 2020 – 30 September 2020 2019/300
Name of Researcher:	Bopape J
Address of Researcher:	6 Lindeboom Crescent
	The Orchrads Extension 16
	0182
Telephone Number:	072 997 3836
Email address:	6498116@mylife.unisa.ac.za/ joeybopape@gmail.com
Research Topic:	Greening the school for sustainable development: A case of Tshwane North District.
Type of qualification	PhD (Environmental Education)
Number and type of schools:	Three Primary Schools
Districts/HO	Tshwane North

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.

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:

15/10/2019

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 PERMISSION TO CONDUCT RESEARCH

Enquiries: A JOOSTE sub-Directorate: ISSP
GAUTENG PROVINCE Office Number: 124
Tel: 012 543 4315/16
îDUCATiON
Email: Ashraf.Dawood@gauteng.gov.za REPUBLIC OF AFRICA Ann.Jooste@gauteng.gov.za SOUTH

Dear Sir/Madam

It is our pleasure to inform you that the District Office grants you permission to conduct research. The research topic is "Greening the schools for sustainable development".

The research will be conducted at the following Primary Schools:

[redacted] Primary School, Se[redacted]rimary School, [redacted] Primary School and [redacted] Primary School

You may only conduct the research after contact time to protect teaching and learning activities. The principal must be consulted about an appropriate time to conduct the research.

You are personally responsible for providing and utilizing your own research resources. Participants' names must not appear in the research report and all appropriate ethical measures must be implemented to protect them.

Tshwane North District expects you to submit, upon completion, a summary of your research findings as stipulated in Clause No. 14 of the GDE letter of approval you received.

The District appreciates your contribution towards the enhancement of education in the province and District and anticipates your success with your research project. Regards

[redacted]

MS THEA COETSER
DISTRICT DIRECTOR: TSHWANE NORTH

03/12/2019

MS THEA COETSER DISTRICT DIRECTOR: TSHWANE NORTH
Tel: (012) 543 4302, cell: 083 346 6963, Fax: 086 633 4568 | Email: Thea.Coetser@gauteng.govza Wonderboom Junction Mall, 1st Floor, Corner Lavender & Lavender West Road, Wonderboom, 0066, Private Bag Pretoria, 0001 www.education.gpg.gov.za I Call Centre: 0800 005

APPENDIX D: CODED INTERVIEW TRANSCRIPTS

S1 Coded Focus Group Interviews

PARTICIPANTS' INTRODUCTIONS **P1:** First name: *Khu* Year of residency at the present school: *2016* When did you participate in SGB and SMT committee(s)? *2017* **P2:** First name: *Eu* Year of residency at the present school: *1999* When did you participate in SGB and SMT committee(s)? *2007* **P3:** First name: *JO* Year of residency at the present school: Since *1999* When did you participate in SGB and SMT committee(s)? *2018* **P4:** First name*: Kg* Year of residency at the present school*: 3 Years* When did you participate in SGB and SMT committee(s*)? From 2018 to date*	Biography
THEME 1: SOURCES OF FUNDING (ECONOMIC) • What processes do you follow in generating money in the school's coffers? **Probing:** school fund, state funds or NGOs **P1:** *Government funding* **P2:** *We have civvies every fortnight, cake sale and annual fundraising* **P3:** *School fund decided by the SGB and state allocation* **P4:** *We are quintile 4 school, therefore, our learners are paying school fund. We also had some bit from state fund We a receive donations from the organizations such as Lotto, we also do the fund raising through no uniform day and learners pay certain amounts for not wearing uniform, we have a tuck-shop that sell goodies to both learners and staff, Market days where learners make and sell their items, field day through fun runs, selling of scrap material and others.* **I:** Is it difficult to generate funds? **P1:** *Yes* **P2:** *Yes* **P3:** *Yes* **P4:** *Yes, it is* **Probing:** If so or not, in what ways? **P1:** *The school is located in the low-income area hence most parents struggle to pay the little stipulated school fees* **P2:** *Some of the parents don't participate with fund-raising and already we budgeted for 95% of the learners" participation* **P3:** *Some parents apply for school fund exemption due to children being orphaned or losing jobs. This puts the school in a serious problem because we usually budget before receiving funds. Some government subsidy funds sometimes late and this puts the school in a serious position* **P4:** *Some learners do pay school fund late, some are not able to pay and have to make arrangements with them, which still use school funds to make contact with the parents. Donations are not always guaranteed and available, fundraising also do not always reach the expected target.* **I:** How do you deal about it? Meaning the difficult or easy way you use	

to collect funds. **P1:** *Parents are persuaded to pay school fees through constant letter reminders and during the Annual general meetings. However, many of them still struggle to pay or no payment at all is made.* **P2:** *For instance, in annual fund-raising when you bring a complete document you get an incentive* **P3:** *We normally ask for donations from parents by fundraising programmes* **P4:** *Always encourages learners to participate in the fundraising programs, bring in different methods of fundraising, advertise and market our events in community radio stations and social media.*	
THEME 2: EXPERIENCE WHEN RESOURCES ARE DEPLETED (Finished/used up). • Tell me about causes of depletion at your school. **P1:** *When resources are used up at my school the school struggles to run smoothly as expected. Sometimes the school sources funding from donors and meager fund raising activities until the next financial year* **P2:** *Sometimes we have to out-source from other schools or request from the SGB for new ones* **P3:** *We try to prioritise and leave other expenses that could be paid later* **P4:** *Our school is quintile 4 therefore; we do our own maintenance and infrastructure improvement, electricity, telephone and water bills, transportation, catering during workshop, stationery, buying diesel for generator use during load shedding and other costs.* **I:** During depletion, how do you overcome or solve these constraints/challenges? **P1:** *Most of the activities are set aside while waiting for the next government funding* **P2:** *Planning ahead is something that minimises our challenges* **P3:** *We change strategies and try to plan quarterly or monthly to try and meet the necessary deadlines* **P4:** *By using available resources efficiently and sustainably.* **I:** How did the Department of Basic Education and Non-Governmental Organisations (NGOs) assist in these matters? **P1:** *The Department of Education has only provided funding during the prescribed financial year while non-governmental organization have extended a hand in trying to mitigate the problems.* **P2:** *We don't have NGOs that assist the school but the Gauteng Department of Education assist in their own time* **P3:** *They assist by depositing funds according to the prescribed allocation of the school. When the funds are finished they don't deposit extra money which was not promised.* **P4:** *We get donations of trees from department of agriculture, Department of basic Education provides a bit of funding.*	
THEME 3: EXPERIENCE OF USING SCHOOL RESOURCES **I:** How do you extort/deplete resources on: - **Probing:** Learner teacher support materials (Books, paper and equipment: **P1:** *Mostly no regard to learning materials or equipment is displayed by most individuals entrusted with materials or equipment although stringent consequences are enforced*	

P2: *Books are donated to other schools and paper is taken for recycling and that's another way of fund-raising* **P3:** *Money is depleted by services such as water bills, electricity bills, photocopying machines, paper, stationary, transport for teacher workshops, fuel for the generator* **P4:** *The department provides workbooks. Parents buy books and other stationery. However, the school buy supporting materials such as charts, posters, games, and other materials that support effective teaching and learning. The school also gets donations of books and posters from publishers.* • Infrastructure (buildings, sports fields, electrical appliances installations etc) **P1:** *Very little positive attitudes are revealed towards buildings and sports field. Further electrical appliances and installations are regularly vandalized impacting negatively in teaching and learning owing to depleted resources and equipment.* **P2:** *Mostly the GDE do assist and we do have a budget for such* **P3:** *Maintaining sport fields and infrastructure is very costly for the school. Most donors withdraw their funds due to their respective constraints. Some years, donations are very positive, but 2020 was the year where every donor is complaining about its own insufficient funds due to closure of businesses. So, these businesses had to tighten their belts, as we are told.* **P4:** *The school provides money for infrastructure and school maintenance, sports field and grounds, buy school's electrical appliances.* □ Behavior on saving resources like water, electricity, paper etc: **P1:** *Resource conservation such as water stationery and electricity is a nightmare at the school despite repeated emphasis on resources conservation by stakeholders, thus the school resources run out before stipulated time or expected period.* **P2:** *Water is controlled; we have leaders who assist teachers to supervise learners. Lights are switched off most times and paper taken for recycling* **P3:** *Educators assist in their classes to control using water sparingly. General assistants in the gardens also use water sparingly by watering the gardens early in the morning or after sunset. Children know that the school is struggling with municipal water and why the school uses borehole water most of the times* **P4:** *We have jojo water tanks where we store borehole water. We also use municipality water. we do not have problems with water. Our rainwater runs off into the grounds. Water used in the kitchen is drained out into the drainage system. Water pipes are maintained regularly to avoid leakages, and taps are set on automatic lock to avoid spillages.* □ Awareness proposed or used by the school with regard to resource use **P1:** *The school embarks on sensitising resource conservation by the users, however the behaviour portrayed by the stakeholders does not conform to sustainable use of resources* **P2:** *Our learners are taught how to be responsible of school property.* **P3:** *We encourage learners to look after the school resources and report any misuse of any resource by other learners* **P4:** *Staff members are always encouraged to switch lights and*	

computers off before leaving the classes and offices. We use automatic outside light bulbs to save electricity. Automatic tap locks are used to avoid water spillages. Staff members and learners are encouraged to shred used and spoilt papers. Garbage bins are placed at every block to avoid littering, we just put waste in the waste bins. Some general assistant workers and local people take some waste like cold drink and juice bottles and tins from waste bins for recycling for their personal gains. □ Attitudes proposed or used by the school to promote positive use of school resources: **P1:** *Although the SMT and teachers try to emphasise and demonstrate conservation of resources and equipment, learners" display negative attitude towards resource conservation.* **P2:** *Through outside motivational speakers and keeping the school clean for a month, a class get incentives* **P3:** *We usually preach that cleanliness is next to godliness to the learners. As governing body of the school, we try to recover any maluse of resources from parents of learners. Sometimes they ignore us and we try the legal route. To propose positive attitude and expect positive response is not always possible because some of the SGB members are not at school 24/7 and these responsibilities are left in the hands of teachers* **P4:** *We encourage learners to use school resources sparingly*	
THEME 4: EDUCATIONAL EXPERIENCE ON RESOURCE USE **I:** How do you rate your capabilities with regard to sustainability of school resources in the scale of 1-10? **P1:** *4 out of 10* **P2:** *9* **P3:** *5* **P4:** *I could rate our sustainability use of resources 8 of 10* **Probe:** Give reasons why you rated the score above. P1: *Attitude of learners towards sustainable use of resources is negative. The mentality that resources in the school are government property cannot be taken away from the resources users. Further, vandalism and rapid depletion of resources cannot be over looked.* **P2:** *Our learners are taught how to be responsible of school property.* **P3:** *Most of us did not study accounting at school and sometimes it is very difficult to understand how to budget big funds to run the whole school successfully without a shot-fall. Some plans sometimes fail us and we learn new ways every day. What was successful last year cannot be successful this year. Every year prices of resources like electricity and equipments go up, nothing goes down* **P4:** *I use resources sparingly; improvise where there is shortage or lack of resources.* **Probe:** Since most of you are not from entrepreneurship profession, ever since your school suffered resource depletion/constraints, has your attitude towards being in the school role playing position (SMT or SGB) changed? **P1:** *Yes* **P2:** *No* **P3:** *Yes* **P4:** *Yes* Probe: If changed or not, explain how or in what way there is a change	

or not? **P1:** *Not everyone in the SMT emphasized resource conservation or displays willingness to use resources sustainably.* **P2:** **P3:** *It is difficult to make sure that resources are protected although we have securities at school to do so, and keep on guarding 24/7 but loses are there every year and nobody takes the responsibility* **P4:** *I have learnt on school expenses and where lot of money are channeled. I have also realized the importance of fundraising and donations to boost school coffers for effective and efficient running of school*	
THEME 5: SUSTAINABLE DEVELOPMENT/SUSTAINABILITY **I:** What must be sustained at school (protected to last longer)? **Probing:** Which goods must be protected? Why so? How? **P1:** *Buildings, water, electricity and infrastructure in order for these resources not to be depleted and be in a position to cater for future generations* **P2:** *Textbooks and school property.* **P3:** *Infrastructure, paper and machines because they are expensive to replace, to service or buy new ones* **P4:** *School buildings and grounds, books, machines, water and electricity.* *I think school sports, buildings, school hall, water, computer room and swimming pool* **I:** Why so? or Why should the above listed resources or goods be sustained? **P1:** *To cater for future generations and to save finances* **P2:** *Textbooks have a life-span of 3 years and school property should be utilised for years to come.* **P3:** *Because infrastructure maintenance and machines are expensive to replace, to service equipments or buy new ones is also expensive* **P4:** *For protection and to save costs instead of buying new ones.* **I:** How should these resources be sustained? **P1:** *By using resources sparingly* **P2:** *By taking good care of them.* **P3:** *By making sure that everybody takes the responsibility of taking care of them. The school could also ensure that they have a good auditing or stock tacking strategy to minimise loses. Writing paper sheets should be used again if the other side was not printed* **P4:** *By using them correctly and sparingly. By improvising and having innovating and creative ways in the use of technology.* **I:** What is the rationale (reasons) of doing so? **P1:** *To conserve resources and to avoid depletion of resources that can be used by future generations.* **P2:** **P3:** *To make that they last longer and minimise expenditure. Again, because they are expensive and the school cannot run without them* **P4:** *To save costs at all odds.*	

CLOSURE Do you have anything else you want to add to the discussion? **P1:** *Yes* **P2:** *No* **P3:** *Yes* **P4:** *Yes* **Probing:** If so, what do you want to add? **P1:** *We should all develop positive mind set and attitudes towards resources entrusted to us in order to be better citizenry.* **P2:** **P3:** *Why is the Department of Education not making sure that resources are sufficient to the school because they promised the citizens free education. You cannot promise the people free education with something that you don't have.* **P4:** *To have more guidelines and information on practices of sustainable use of resources.* **I:** What is the most important question we have discussed so far? **P1:** *What should be sustained at your school?* **P2:** **P3:** *What must be sustained at school? / sustainable development* **P4:** *Sustainable development and sustainability.* **Probing:** Why do you think is the most important question? **P1:** *Sustainability brings about development through conservation of resources.* **P2:** *Sustainable development* **P3:** *Leaders at school should lead in such a way that they know which resources are very crucial to delivering excellent service of teaching and learning at the school they are leading* **P4:** *It is always trending in media and news channels. Politicians say that it is one of many ways of using and saving resources in our country.*	

S2 CODED FOCUS GROUP INTERVIEWS

PARTICIPANTS' INTRODUCTIONS **P1** First name: *Fra* Year of residency at the present school: *6 years* When did you participate in SGB and SMT committee(s)? *From 2018* **P2** First name: *Mo* Year of residency at the present school: *6 years* When did you participate in SGB and SMT committee(s)? *2020* **P3** First name: *Ma* Year of residency at the present school: *From 2018* When did you participate in SGB and SMT committee(s)? *From 2018* **P4** First name: *Ng* Year of residency at the present school: *From 2019* When did you participate in SGB and SMT committee(s)? *2020* **P5** First name: *Ph* Year of residency at the present school: *2 years* When did you participate in SGB and SMT committee(s)? *2 years* **P6** First name: *Tha* Year of residency at the present school: *6 years* When did you participate in SGB and SMT committee(s)? *From 2018*	
THEME 1: SOURCES OF FUNDING (ECONOMIC) **I:** What processes do you follow in generating money in the school's coffers? **Probing:** school fund, state funds or NGOs **P1** *The school generate money through raising funds, again from the state funds, as well as from NGOs, through recycling* **P2:** *The school is entirely a no fee school relying on the government fund, but there are a number of NGO sponsors that partake into this process* **P3:** *We use state funds and also fundraising* **P4:** *State funds and fundraising* **P5:** *We have school fundraising on Friday wherein learners wear casual clothes and pay R2, 00* **P6:** *State funds* **I:** Is it difficult to generate funds? **P1:** *No, it is not difficult to generate funds at school* **P2:** *Yes* **P3:** *Yes* **P4:** *Yes* **P5:** *Yes* **P6:** *Yes* **I:** Probing: If so or not, in what ways? **P1:** *At the beginning of the year, we plan different ways of generating money. Different committees use various ways of generating money e.g. social committee raise funds through social activities, the environmental committee raise funds through recycling.* **P2:** *We have "muffty" where learners have to wear civil clothes and pay R2, 00 that day, but it has a number of challenges since our learners come from previously disadvantaged backgrounds.* **P3:** *we use fundraising to generate extra funding, sometimes the learners do not contribute as anticipated* **P4:** *Most people do n t take part in such initiatives and think we want money for our own benefit* **P5:** *Because few of them pay; the majority of these learners' parents are not working*	

P6: *Some parents cannot give their children money because they are unemployed* **I:** How do you deal about it? Meaning the difficult or easy way you use to collect funds. **P1:** *The difficult way is when learners do have money have to contribute to a particular social event, e.g. Valentines' day, which make it difficult for us to reach our target. Sometimes it becomes difficult to generate funds if the SGB do not give us permission to do so.* **P2:** *Through parents' meetings is where we encourage parents to give learners a minimum of R2, 00 on Fridays* **P3:** *I feel it is not ethical to make learners pay to wear home clothes because already they are facing socio-economic challenges* **P4:** *We use several ways like mufty, churches. It is difficult because most learners do not wear mufty or wear wear mufty but do not bring the funds* **P5:** *We encourage them and tell them the importance of having those funds* **P6:** *Through mufty*	
THEME 2: EXPERIENCE WHEN RESOURCES ARE DEPLETED (Finished/used up). **I:** Tell me about causes of depletion at your school. **P1:** *The resources in schools are depleted because they are not well monitored for, e.g. after hosting a soccer/netball game in the school, the learner's gear is not well monitored, and it disappears. Misusing the school resources- most teachers are lacking management skills, they do not manage the resources effectively, e.g. learners messing up the text books, charts and their stationery when the teacher is out of the classroom. Another example would be giving the learners an activity to work on, and the teacher go outside the classroom, the Foundation Phase learners tear out their books and throw away their pencils through the window, thus, the teacher will have to give the learner some more books as well as pencils, in order to get the learning activity done. Inadequate care of resources-most teachers do not make it their responsibility to look after the resources of the school, they shift the responsibility to the teacher who is in a position of the coordinator. Lack of security, thus resources get stolen.* **P2:** *Over-admission since no learner can be turned back. Theft which is cancerous in the community we live* **P3:** *Misuse of resource* *Theft and burglary* **P4***: In our school we experience burglary each and every term, then we have to replace; Misuse of resources* **P5:** *Funds are depleted due to two reasons, one: there are lots of maintenance in our school due to burglary and theft. Two: there is too much money for transport in relation to workshops* **P6:** *If the resources are broken or very old* **I:** During depletion, how do you overcome or solve these constraints/challenges? **P1:** *The teachers report to the HOD, that they do not have resources anymore, then HOD will report to the Deputy Principal and ultimately to the Office of the Principal, then depending on the availability of funds, the resource might be provided, but if the SGB does not sign the cheque, there will be no resources. In some cases, some teachers request the resources from the parents again. They would normally tell the learners to tell their parents that they do not have stationery anymore* **P2:** *through the support of the district office and other relevant donors contribute in this regard* **P3:** *We can borrow money from donors*	

Or we also borrow resources from neighbouring schools and when we recover we reimburse them **P4:** *We try to fundraise and ask for donations far much as we can* **P5:** *Sometimes we don't attend other workshops and fair to do maintenance* **P6:** *We inform the district director* **I:** How did the Department of Basic Education and Non-Governmental Organisations (NGOs) assist in these matters? **P1:** *The NGOs would normally visit the school and ask for number of vulnerable learners per grade. They normally donate school uniform and pencils to needy learners only. The Department of Basic Education provide the school the money (allocation) once a year, to buy teaching and learning materials. Once that money is depleted, they do not become involved in such cases.* **P2:** *The Department assist with furniture, books and food, while NGOs sometimes may select about 20 learners across the school for assistance* **P3:** *Sometimes the Department does not help much as the funds are allocated to certain uses. NGOs sometimes assist by donating money or they borrow the school* **P4:** *The government doesn't help much since they deal with allocations and if it's depleted then that's that* **P5:** *They buy books (stationary and textbooks); they give maintenance money but not enough for the whole year* **P6:** *We are assisted by donations*	
THEME 3: EXPERIENCE OF USING SCHOOL RESOURCES **I:** How do you extort/deplete resources on: - **Probing:** Learner teacher support materials (Books, paper and equipment) **P1:** *This resources are depleted because of lack of monitoring* **P2:** *In terms of LTSM, stationery we normally extort it yearly and books and other stationery, we buy in November for the following year* **P3:** *Misuse of LTSM; limited LTSM depletes fast (under resourced)* **P4:** *Misuse of resources; under-resourced* **P5:** *We have enough but textbooks get lost and damaged quickly and it is difficult to replace; issues of burglary again* **P6:** *When textbooks are depleted, we inform the department and they give us a directive* **Probing:** Infrastructure (buildings, sports fields, electrical appliances installations etc.) **P1:** *The infrastructure needs maintenance, sometime the windows and doors are broken, and the electrical cable are not working* **P2:** *The Department is in charge of buildings, furniture and electrical appliances. It normally sends a contractor if they are damaged* **P3:** *Theft; burglary* **P4:** *During thefts in our school we have to replace everything using school finances. Regular sewage blockages need money* **P5:** *The challenge is theft. You cannot install some electrical appliances because they are stolen very quickly. Some buildings are tin houses they are now aging because they are more than 10 years' old* **P6:** *We have extra mobile in terms of classrooms. Maintenance is solved by the Department of education. The school has no sports' field* • Behavior on saving resources like water, electricity, paper etc.: **P1:** *Teachers have the water container in their classrooms to save water. So when the child needs water, the teacher will be monitoring how the learners is pouring water into the glass* **P2:** *We have a standby JoJo (water) tank to store rainwater, gas for cooking and recycling of paper took place*	

P3: *Not servicing resources regularly; using cheap resources that deplete fast; no policy or guidance how to use water and electricity; people leave taps dripping and they do not switch off lights after school and do not switch off sockets after using* **P4:** *We try to monitor water usage and minimise paper usage by reusing paper where possible* **P5:** *Electricity cables inside classes and outside are stolen and that is set as backwardness because we are unable to use electronics sometimes* **P6:** *Campaigning in connection or collaboration with the city of Tshwane* • Awareness proposed or used by the school with regard to resource use **P1:** *The school has save water awareness charts, and we also emphasise it during assembly, that learners should save water.* **P2:** *Through parents' meetings learners are warned with poor usage of school resources and measures are put in place to assist in this matter* **P3:** *Honestly, ever since I worked here, I have never seen or heard learners being addressed about water usage in the school. It's like people do not care because it is not their bill to pay* **P4***: In our school we have a policy that only HODs can use the paper topping; we have the Gas responsible for issuing everything we need* **P5:** *In our SGB meeting there is little time to talk about issues of school buildings and its properties. Yes, we are aware of what is happening and we don't have a clue on how to solve the problem* **P6:** *By telling the learners and educators to look after the resources* • Attitudes proposed or used by the school to promote positive use of school resource: **P1:** *The principal emphasise that educators should accompany learners for toilet routines in order to monitoring and supervision* **P2:** *Awareness programmes for learners and parents are put in place* **P3:** *For LTSM, we have coordinators to help manage funds. However, for water and electricity none on the table* **P4:** *There are people responsible for every resource that we have to avoid misuse; the teachers (SMT) are leading by example in leading on good use of resources* **P5:** *Some parents understand what a positive environment can do to the community. This will give enough space for learners in a healthy environment* **P6:** *Teachers and learners are aware of the attitudes to resources of what we have*	
THEME 4: EDUCATIONAL EXPERIENCE ON RESOURCE USE **I:** How do you rate your capabilities with regard to sustainability of school resources in the scale of 1-10? **P1:** *6* **P2:** *5* **P3:** *4* **P4:** *6* **P5:** *6* **P6:** *8* **Probe:** Give reasons why you rated the score above. **P1:** *I look after the school resources and ensure that they are cared for* **P2:** *I rated ourselves 5 because our community has a negative attitude of not conserving school resources* **P3:** *I observed a lot of misuse of resources and not caring what happens to the resources. No saving on resources. Only a few managed to save on resources but others (majority) just misuse them*	

P4: *We usually don't run out of resources like books, chalks and markers we try our best. We try to sustain our educational resources*
P5: *We buy things, they get stolen. We give them textbooks, they either damage them or get stolen*
P6: *Because there is sustainability of resources at school*
Probe: Since most of you are not from entrepreneurship profession, ever since your school suffered resource depletion/constraints, has your attitude towards being in the school role playing position (SMT or SGB) changed?
P1: *No*
P2: *Yes*
P3: *Yes*
P4: *No*
P5: *No*
P6: *Yes*
Probe: If changed or not, explain how or in what way there is a change or not?
P1: *We keep on encouraging teachers to take good care of the school resources*
P2: *Proper stocktaking is taking place before procurement of resources. High level of retrieving system is taking place quarterly. Lost books are being replaced by parents*
P3: *To save more and work with a mentality that resources do get depleted and it is not always that you can refurbish them*
P4: *I believe we were on the right track and we will learn as time goes on. Good things take time*
P5: *We chose teaching as a career because of passion and dedication to improve people's lives. We are forever committed to see this ambition achieved*
P6: *Working hard with NGOs and making sure we take responsibility*
THEME 5: SUSTAINABLE DEVELOPMENT/SUSTAINABILITY
I: What must be sustained at school (protected to last longer)?
Probing: Which goods must be protected? Why so? How?
P1: *The chairs, tables as well as the textbooks.*
P2: *Furniture and books (textbooks)*
P3: *Infrastructure, fence, gate, ablution facilities, water, LTSM (textbooks)*
P4: *Textbooks: they are the main resource for teaching and learning to take place; y proper retrieval*
P5: *Laptops carry crucial information. Textbooks because that's where poor learners get information from. Infrastructure*
P6: *Photocopying machine, laptops – by servicing them*
Probing: Why so? or Why should the above listed resources or goods be sustained?
P1: *The listed resources need to be sustained as they significant for teaching and learning.*
P2: *So that we could save for other resources that are in shortage*
P3: *Well, without infrastructure there will be no school and learners and teachers won't be protected; ablution facilities for individuals to respond to them; fence and gate for security; water … textbooks for curriculum purposes*
P4: *Because textbooks are the backbone of teaching and learning and they are used year by year*
P5*: Because they are critical to what we are doing. Without them it is not going to be progress*
P6: *They are the main resources of the school. Like laptops and photocopying machines, they are the engine of the school*
- How should these resources be sustained?

P1: *By taking good care of the school resources*
P2: *By implementing a sound retrieval system and always replace the lost books*

P3: *Good textbook retrieval system; use of good materials for infrastructure + ablution facilities; ground duty for learners during lunch to save water and not to break taps*
P4: *By proper retrieval at the end of each year. Constant checking of books in between terms*
P5: *By having securities at school I a form of personnel and other security features to make them save*
P6: *Kept in a safe place and be serviced and must have specific people to use them so that they are responsible in terms of any misuse or brokenness or damaged*
I: What is the rationale (reasons) of doing so?
P1: *Because teaching and learning will not be effective without those resources*
P2: *To promote sustainable financial muscles of the institution*
P3: *These are the core that make a school to function. If you pull out one then the system becomes disrupted*
P4: *Because for teaching and learning to run smoothly we need textbooks*
P5: *We date we are carrying laptops to our hoes and it is difficult and unlawful to do that but to help a school to run we must do that*
P6: *We want them to last longer because laptops have got more information of the school and we use them every year, so meaning the school information is used every year in the laptops for learner and educator purposes*
CLOSURE
I: Do you have anything else you want to add to the discussion?
P1: *No*
P2: *No*
P3: *No*
P4: *Yes*
P5: *Yes*
P6:
Probing: If so, what do you want to add?
P1:
P2:
P3:
P4: *I would like NGOs to be more involved in donations of resources for the benefit of the black child*
P5: *Our government or Department of education must give serious consideration to protect what they bought rather than to always replac**e***
P6:
I: What is the most important question we have discussed so far?
P1: *Generating money in schools*
P2:
P3:
P4: *All questions on theme four*
P5: *Is our government taking black learners' education serious? Why are they not making it possible for them to learn in a more advanced and healthy environment?*
P6:
Probing: Why do you think is the most important question?
P1: *Because it is difficult for schools to operate without fuds*
P2:
P3:
P4: *Because it is educational and that is the main reason we are here at school*
P5: *Because if we address that we will see learners living township schools to suburb' schools*

S3 CODED TRANSCRIPT OF FOCUS GROUP INTERVIEW

TRANSCRIPT	CODES
PARTICIPANTS' INTRODUCTIONS **P1** First name: ***Joy*** *Year of residency at the present school:* ***Since 1989*** *When did you participate in SGB or SMT committee(s)?* ***SMT for 20 Years*** **P2** First name: ***Kar*** *Year of residency at the present school:* ***4 years*** *When did you participate in SGB or SMT committee(s)?* ***2018*** **P3** First name: ***Kga*** *Year of residency at the present school:* ***12*** *When did you participate in SGB or SMT committee(s)?* ***2018-2020 circle*** **P4** First name: ***Joh*** *Year of residency at the present school:* ***Twelve years*** *When did you participate in SGB or SMT committee(s)?* ***2014- 2019*** **P5** First name: ***Ani*** *Year of residency at the present school:* ***Five years*** *When did you participate in SGB or SMT committee(s)?* ***2018***	Biography
THEME 1: SOURCES OF FUNDING (ECONOMIC) **I: What processes do you follow in generating money in the school's coffers?** **Probing**: **School fund, state funds or NGOs** **P1***: State Funds* *NGOs* *Fundraising* **P2:** *Our school is a no-fee school. We get allocation from the department according to section 21 of norms and standards. We also get money from some few non-governmental organizations. Before covid-19 restrictions we were able to raise funds by allowing learners to wear casual clothes on Fridays, valentine's day, heritage day and pay a certain amount. Funds are also raised during entrepreneur's day where by learners contribute a certain amount in order to secure their places to sell their products. The other way of raising funds is through renting classes for different churches to run their services in the school premises. Small businesses are allowed to sell our school uniforms and donate a certain amount to the school coffers.*	Prosperity

P3: *State funds, donations, fundraising* **P4:** *Normally on Fridays is a casual day for our learners at school. For them to wear casual clothes we ask each child to pay R2.00 to contribute towards the school's coffers. Once a month we hold drama and dance events at R10.00 for the purpose of helping the school. Twice a year we ask the parents and the community to take part in our marathons i.e. fun walk and run at R50.00 for adults and R20.00 for children. Once a year we have a bazaar/ flea market where we ask the community to come and sell their products beginning with consumable to non-consumables and they hire a place for their stalls in the school's premises at R100.00 per entrepreneur.*	people Christianity
P5: *1, state fund* *2, selling sweets* *3, Fun day* *4, Purchasing of school uniform*	Political; people
I: Is it difficult to generate funds?	People
P1: *Sometimes is difficult.* **Probing: If so or not, in what ways?** *State funds: The money is not paid according to the number of learners at once, it is divided into parts, for GR R and mainstream i.e. GR 1 -7* *Fundraising: target is not reached*	Political People
P2: *Yes* **Probing: If so or not, in what ways**? *Not all organizations donate money, some donate school uniform to needy leaners. Even among learners, not all learners wear casual clothes during the above mention days or events.*	Diversity Purpose and vision
P3: *Yes* **Probing: If so or not, in what ways?** *Our school is non-school fund payment; we rely on state fund to run the school. We struggle to get donations and we get some little funds from fundraising*	Individual & collective
P4: *It is not difficult.* **Probing: If so or not, in what ways**? *It needs proper planning, sharing ideas and advises, teamwork and involvement, suggestions need to be embraced, time management plays a*	Diversity Political

major role in undertaking a project, knowing/ estimating the costs of running that projects, focusing is very important and the outcome/ fruits of raising these funds. **P5:** *Yes* **Probing: If so or not, in what ways?** *Children may choose to buy from spaza (informal) shops or not pay for the fun day fund raising event* **I: How do you deal about it? Meaning the difficult or easy way you use to collect funds.** **P1**: *State funds: You lodge a query to the state about that, the problem is that, it will take longer sometimes to get it fixed or rectified* *Fundraising: You ask the parents by writing letters to inform them, and you repeat the fundraising activities again* **P2:** *The school ended-up stopping the fund raising activities through casual days and made an agreement with parents to contribute R5 every Friday in order to help in hiring parents to clean the classrooms as most learners can't clean during school out because they use scholar transport. Again the school keeps on recruiting different businesses to support our school financially* **P3:** *We just struggle, reduce some spending to cover up for some important things.* **P4:** *The school is part of the community and children are community's members as well. Educators are not from their own planet but also members of community and some have children in our school. Children, educators, parents, stakeholders and the whole community are involved in this fundraising.* **P5:** *We invited parents and explain how important it is to support their children and improve their school*	People Dialogue & listening Diversity Political Dialogue & listening People Network & partnership People Prosperity
THEME 2: EXPERIENCE WHEN RESOURCES ARE DEPLETED (Finished/used up). **I: Tell me about causes of depletion at your school.** *Over using of resources, such as, laptops, binding machines, printers without maintenance - Purchasing more than is needed*	Constraints

Electricity: switch off during the night *Without prioritizing (budget)* *Using more papers* **P2:** *Recourses are used for running the school and for making sure that teaching and learning are taking place effectively so.* **P3:** *School maintenance, Stationery, bills, feeding scheme, transportation, projects and other mecilineous expenditure.* **P4:** *An easy access to funds by everyone and not nominating the financial administrator or treasurer. Failing to evaluate the need for the funds to be released i.e. using money haphazardly.* **P5:** *Switch off lights, minimise the use of paper, harvest of rain water.*	General systems; computer science General systems General systems Prosperity
I: During depletion, how do you overcome or solve these constraints/challenges?	
P1: *Make sure the resources such as laptops are used by 2 or 3 people* *Electricity: switch off after use or use solar energy* *Promote sustainable rules* *Water: use borehole water or rain water* *Papers: Recycle* **P2:** *The school through Learner Teacher Support Material committee procure the needed resources.* **P3:** *Through fundraising* **P4:** *Those in charge of funds need to communicate regularly until this is heard in the ears of everyone. Strict budget is followed and we need to know what is the money used for i.e. evidence / statements and slips are kept safe.* **P5:** *SGB download comedy movies and do bioscope day on Fridays, we also did ruffle, entrepreneurship day.*	Computer science Solar energy & flows; policy makers Choice Policy makers Prosperity Policy makers Accountability Cognitive psychology; fuzzy logic
I: How did the Department of Basic Education and Non-Governmental Organisations (NGOs) assist in these matters?	
After every 5 years of use, the Department of Education (replace) or purchase new learners' furniture *SGBs & SMT (recycle) papers, old textbooks (fundraising)*	Politicians Policy makers

Laptops & printers, (fundraising) sell them or exchange them to get the new one 's with a reasonable amount. **P2:** *The department allocate a certain amount to the school since we fall under no fee school. The school is a quintile 1 which means it is supported by the Department of Basic Education financially due to lack of funds.* **P3:** *We are nonpaying schools so we get norms and standards funds from the department* **P4:** *The Department hold our principal accountable as he is supposed to have administrative competencies regarding the funds of the schools. There are trainings, policies, surveys and assessments done to our school by the Department of Education as a way of supporting our school. Our principal and teachers have acquainted themselves with these documents to avoid negligence. THE NGO's are advocating well even though the political instability and mismanagement of the resources by some schools also affect them.* **P5:** *One NGO partnered with the school and organized an activity event with jumping castles, mobile swimming pool or water games and part of the money goes to school as a fund raising; quiz competitions are run where school children participate and donations goes to school.*	Diversity Politicians Accountability Networks Fuzzy logic Networks
THEME 3: EXPERIENCE OF USING SCHOOL RESOURCES **I: How do you extort/deplete resources on?** **Probing: Learner teacher support materials (Books, paper and equipment)** **P1**: *Books: We recycle or donate to the libraries* *Papers: We recycle or make models (art activities)* *Equipment: recycle or sell* **P2:** *By running examinations and formal tasks* *By copying informal activities* *Some learners damage and lost books* **P3:** *School's stationery, including photocopying papers, cartridge for printing, cleaning materials and others.* **P4:** *There is a proper monitoring and recording of every item released to the learner. If it is found that the learner was negligent in handling the resources, parents are held liable because of the contract signed by the school and parent/ guardian to buy and replace the item.*	Nested systems Fairness Dignity Dynamic balance

P5: *Poor budget system and late payment of state fund.* **Probing**: Infrastructure (buildings, sports fields, electrical appliances installations etc.) *Buildings: We maintain and re-paint* • *Sport field: maintain* • *Electricity: re-install* the *appliance* **P2***: Some learners break furniture including windows* *Vandalism by community members* *Some equipment is being stolen* **P3:** *Clearing and maintaining of sports grounds, building, maintenance, electric bills, telephone and data bills, filling of gas stove for feeding scheme.* **P4:** *If the damage was caused by accident the school buys and replace the damaged window as an example. If the cause was purposeful then the person involved will have to replace it.* **P5:** *SGB asked companies that provide services, national lottery commission or local businesses to sponsor us on all stated above needs.* **I: Behavior used on saving resources like water, electricity, paper etc.**: **P1:** *Water: use boreholes to save money or install (JoJo) water tanks* *Electricity: use renewable energy such as solar system to save money or switch off the electricity when not in use* *Paper: re-use by making art activities or recycle* *Promote sustainable rules* **P2:** *The school has a bore hole for toilets flushing* *Containers are placed in front of every classroom for hand washing* *Activities are copied in a back to back style in order to save papers* **P3:** *Using tap water, using gas stove for feeding scheme, using energy saving bulbs, fixing pipe leaks, switching off lights when leaving the classroom, switching computers off.* **P4:** *We encourage learners to bring water bottles to avoid them to be at the water tap now and then the whole day. We also encourage parents to buy a pack of Typek (photocopying) paper per learner to be used the whole year.* **P5:** We buy (Jojo) water tanks to store water, we don't use heaters in winter, we use paper donated by companies and use them on the other side. **I: Awareness proposed or used by the school with regard to resource use**	Politicians Energy flows Reflection Development Energy flows Fairness Accountability Policy makers Nested systems cycles Nested systems cycles Fuzzy logic Information theory Dynamic balance Dignity Dynamic balance Individual & collective Networks & partnership; prosperity

P1: *Retrieval rules: (on school resources) Books: you damage or got lost – you purchase*	policy makers
Building: e.g. furniture – you break – you pay it	policy makers
P2: *There is a school policy to manage resources.*	
P3: *Encourages recycling of paper; celebrating water week, placing of rubbish around the school to avoid littering, no litter posters around the premises.*	Breathable atmosphere Cognitive psychology
P4: *Children are childish but they can hear the message. We talk to them not only once but several times until it is written in their minds. Sometimes we invite officials from ESKOM or water retails to come and explain through their visual aids the importance of taking care of the resources. To deepen the message, we take the children on excursion to learn more about the resources.*	Networks & partnerships Choice Information theory
P5: *Visibility of signage from the gate to admin block stating that water is a source of life, switch off the computers, cycling bins and adhere to the school policy.*	Policy makers
I: Attitudes proposed or used by the school to promote positive use of school resources: -	
P1: *Auditing and retrieval of school resources should be completed for every second term, to check the damages, losses of each and every resource*	Accountability
P2: *Sub committees have been formed, which deals with various resources used in the school. Each and every sub- committee has coordinator responsible for making sure that staff members adhere to the policy regarding the usage of the resources in a safe way*.	Policy makers
P3: *Placing of rubbish bin around the premises, encouraging non littering culture, raising awareness on saving water and electricity.*	Breathable
P4: *We set the boundaries and rules, make sure that children and educators adhere to them. Some of these rules we draft them together with the children.*	Policy makers Individual & collective
P5: *Breaking of windows, door handles or taps you pay.*	Accountability

THEME 4: EDUCATIONAL EXPERIENCE ON RESOURCE USE **I: How do you rate your capabilities with regard to sustainability of school resources in the scale of 1-10?**	
P1: *8* **Probe: Give reasons why you rated the score above.** *According to the rules and regulations and SMT & SGB team work, we were capable to sustain our school resources for a longer period and to provide enough for school needs.*	Knowledge Policy makers
P2: *7* **Probe: Give reasons why you rated the score above.** *Because lot of resources are managed properly*	Policy makers
P3: *I would say 4* **Probe: Give reasons why you rated the score above**. *Conservation and sustainable use of resources is not maximized, raising awareness on our impacts on natural resources is not effective*	Policy makers
P4: *9 POINTS* **Probe: Give reasons why you rated the score above**. *I am knowledgeable and informed about the scarcity of these resources and lack of them will make our lives miserable. We are receiving our water and electricity from other countries that is why we must look after the little we have. There is population is growth in the country and the forests are reduced so, there is shortage of material to make books.*	Information theory
P5: *5* **Probe: Give reasons why you rated the score above.** *My first experience with SGB was a learning curve and I had no knowledge of how the school is run.*	Information theory
Probe: Since most of you are not from entrepreneurship profession, ever since your school suffered resource depletion/constraints, has your attitude towards being in the school role playing position (SMT or SGB) changed? *YES* **Probe: If changed or not, explain how or in what way there is a change or not?** *There is a change because we were provided with enough support to minimize the constraints of our school resources.*	Information theory
P2: *No*	

Probe: **If changed or not, explain how or in what way there is a change or not?** *Because I learn new strategies each time that could be implemented in trying to sustain the school resources as my duty is to make sure that there is an effective smooth running of the school.* **P3:** *Yes* **Probe: If changed or not, explain how or in what way there is a change or not?** *I have realized that we can make money form waste materials.* **P4:** *YES* **Probe: If changed or not, explain how or in what way there is a change or not?** *I am taking care of the school properties and where necessary I buy my own stationary instead of using those of the school and the deserving so that the needy children can receive the books from the schools.* **P5:** *Yes, it changed due to skills training provided to us.* **Probe: If changed or not, explain how or in what way there is a change or not?** *SGB workshops made it easy for me to understand.*	Information theory Information theory Cognitive psychology; fairness; integrity Information theory Information theory
THEME 5: SUSTAINABLE DEVELOPMENT/SUSTAINABILITY **I: What must be sustained at school (protected to last longer)?** **Probing: Which goods must be protected? Why so? How?** **P1:** *Energy (electricity), water, paper, and laptops* *Printers (machines)* **Probing: Why so? or Why should the above listed resources or goods be sustained?** *Because the school cannot function without them, they are the (core resources) basic needs.* **Probing: How should these resources be sustained?** *By making sure that we have enough energy for electricity;* *Enough water for all in a longer period of time;* *Enough water for all in a longer period of time;* *Enough paper for all learners; and* *Enough laptops and printers.* *NB: Budget should be made quarterly for these resources i.e. for purchases and maintenance.*	SUSTAINABILITY: General systems General systems

Probing: What is the rationale (reasons) of doing so? *To make sure that there is no shortage, and for every resource there is enough money to attend to it; and* *To maintain the damages in time.* *NB: To sustain every one's interest in the working place.*	General systems
I: What must be sustained at school (protected to last longer)?	
Probing: Which goods must be protected? Why so? How? **P2:** *Electricity, paper, books and water.*	Nested systems cycles
Probing: Why so? or Why should the above listed resources or goods be sustained? *Without electricity, there won't be any power for copying machine;* *Without paper, the school won't be able to make copies of activities;* *Without books, there won't be any effective teaching and learning; and* *Without water, there won't be any life at school (drinking water*).	Breathable atmosphere Dynamic
Probing: How should these resources be sustained? **P2:** *By using water sparingly;* *By switching off the plugs that are not in use;* *By handling books with care by covering them and by using inventories;* *By record book numbers for tracking purpose; and* *By making learners to replace damaged and lost books.*	Fairness; dignity
Probing: What is the rationale (reasons) of doing so? **P2:** *To sensitize all stake holders about the importance of the resources in the school*.	Cognitive psychology
I: What must be sustained at school (protected to last longer)?	
Probing: Which goods must be protected? Why so? How? **P3:** *Natural vegetation, water, electricity* **Probing:** Which goods must be protected? Why so? How? **P3:** *Land or soil from degradation, atmosphere from pollution, ground water from contamination etc.*	Development
Probing: Why so? or Why should the above listed resources or goods be sustained? **P3:** *Because they are scares resources, they get depleted when overused.*	Reflection
Probing: How should these resources be sustained?	

P3: *Use them sparingly, conserving and protecting them.* **Probing: What is the rationale (reasons) of doing so?** **P3:** *To avoid resource scarcity and depletion*. *Because they are scarce resources, they get depleted when overused.*	Fairness
I: What must be sustained at school (protected to last longer)? **Probing: Which goods must be protected? Why so? How?** **P4:** *Fixed and movable properties like buildings, wall-fencing, desks and chalkboards.* **Probing: Which goods must be protected? Why so? How?** **P4:** *GOODS: Buildings, wall-fencing, desks, chalkboards, lights, taps and phone.* *WHY: The value of that item will not deteriorate. Many generations can still make use of them. They become an antique.* *HOW: If I willingly avail myself to take care and treasure the items, then those who are watching will do the same. We lead by example.* **Probing: Why so? or Why should the above listed resources or goods be sustained?** **P4:** *Generations after generations can make use of them.* **Probing: How should these resources be sustained?** **P4:** *Paint the buildings every, or after a certain period of time. Repair broken windows and doors. Fix leaking taps, toilets, cisterns and basins. Good maintenance is highly recommended.* **Probing: What is the rationale (reasons) of doing so?** *It will not lose its value. If a problem is fixed immediately it reduces the risk of permanent damage and high costs if one wants to repair.*	Development Prosperity; Cognitive Psychology General systems
I: How should these resources be sustained? **Probing: Which goods must be protected? Why so? How?** **P5:** *Machines, water, paper, learning materials, water, lights* **Probing: Why so? or Why should the above listed resources or goods be sustained?** **P5:** *So that teaching and learning process is not disturbed*. **Probing: How should these resources be sustained?**	Cognitive psychology Nested systems

P5*: Servicing machines, water pipes, photo copying machines, reusing of papers* **Probing: What is the rationale (reasons) of doing so?** **P5:** *To save school constrained expenses*.	Prosperity
CLOSURE **I: Do you have anything else you want to add to the discussion?** **P1:** *YES* **Probing: If so, what do you want to add?** **P1***: Department of Basic Education should make an audit on learner tables and chairs for every year in every school, the reason being that, they must purchase and deliver the shortages***.** **P2:** *No* **P3:** *Yes* **Probing: If so, what do you want to add?** **P2:** *How do we get sponsors to support the school maintenance?* **P4:** *YES* **Probing: If so, what do you want to add?** *Providing trainings and workshops to the people who are accountable to these properties should be prioritised. Changing the mindset of people by showing them how to take care of the properties in the workplace or school to be like their homes because this is where they spend most of their time than at home. This phrase of saying: "Go to work, get paid and go back home", is a harsh and poor phrase or statement. It is a wrong concept to many of us and we need to deal with this character, attitude and behavior. In your space of work, you are a master and boss, do not do the work just because someone is behind you or just a hired employee. Make your environment beautiful and by your actions, others will be drawn to that and change*. **P5:** *No* **I: What is the most important question we have discussed so far?** **P1:** *Theme 5* **Probing: Why do you think is the most important question?**	Politicians Information theory Information theory Fuzzy logic

Theme 5 Addresses sustainable development/sustainability. It defines the meaning of sustainability. It helps us to develop the processes of maintaining our school resources, especially the (core-ones). It improves team-work between SMTs & SGBs regarding protection of school resources.	Development Policy makers
P2: *Sustainable development* **Probing**: **Why do you think is the most important question?** *Because it is very important for people to know the importance of resource sustainability. Without resources, there won't be any effective teaching and learning since lot of money will be used to buy things time and again.*	Development Prosperity
P3: *Sources of funding* **Probing: Why do you think is the most important question?** **P3:** *It addresses the economic gain and loss of the school.*	
P4: *Sustainable development* **Probing: Why do you think is the most important question?** *Generations after generations will make use of them. It is the history and antique of the country and will be remembered as the best.*	Prosperity Fairness; integrity
P5: *Saving resources* **Probing: Why do you think is the most important question?** *It is important because it makes the school to be sustainable by generating funds.*	Prosperity

APPENDIX E: CODED FIELD NOTES

S1 CODED FIELD NOTES TRANSCRIPTS

DESCRIPTIVE NOTES	CODE
1. **Physical (building) and environmental infrastructure** **Objective:** To determine the school's commitment in greening the school building and campus by using plants and trees for educational and health purposes. The school is a two floors building erected prior 1994 in the city of Pretoria facing the northern side. The external walls are made of strong face bricks with external shading front. The building is rectangular shaped and receives solar gains in all its facades. The classrooms are located in both floors while the library if in the first floor. The campus was surrounded by green plants (grass and trees) grown in the outdoor areas, with most of them being indigenous acacia trees. Most plants were grown in outdoor areas, species carefully chosen to achieve compatibility with the campus environment. This implies that flowers were visible around the administration block and trees and green grass around the playgrounds, school boundaries, swimming pool, main gate and podiums to provide shade and air during sporting activities. The plants were not labelled which indicated that they were not used for health issues or educational purposes. Contrary to this, there were no plants grown in the indoor areas (e.g. classrooms, offices, staffrooms, sickbay, kitchen, computer room and library). There were no corners in the classrooms demarcated for organic farming to indicate that no organic farming was practiced for educational purposes.	Saving criteria beautification beautification rainwater harvesting beautification knowledge and skills
2. Cleanliness Objective: To determine the extent of the school's commitment in involving all school members in keeping the campus clean, tidy and beautified. When the researcher arrived at the school premises around 13h30, all facilities were clean, tidy, stagnant water-free,	reduce

odour-free and litter free except two or three packets of snacks around the cafeteria. Next to the cafeteria there was a municipality dust bin which indicates that two or three learners disobeyed the rules. Since it was school out, cleaners were busy cleaning the classrooms where the researcher also observed the small bins where the learners put litter during lessons. In the staffrooms where photocopiers were kept, there was a shredder. The researcher observed a plastic bag full of unwanted or used sheets of paper. She asked the cleaners whether they are going to dispose the sheets of papers, and the response by one of the cleaners was that since the papers were thrown into municipality dustbins, she deemed it fit to collect them for personal recycling purposes. The researcher's observation indicated that waste was not sorted, i.e. metal, plastic, paper, fabric, toner cartridges, books etc. and also not sent for recycling because there were no recycling bins or containers available around the school campus.	recycle reduce recycle recycle
3. Environmental corner or bulletin board **Objective:** To determine the extent of the school's commitment in providing display and communication facilities which help to disseminate updated environmental information to encourage exchange of opinions through these facilities. According to the researcher's observation, there was no specified area or bulletin board within the campus and classrooms for displaying environmental news such as government plans and initiatives or school's environmental and green plans initiatives.	instil awareness

4. Air quality Both air emission and indoor air qualities are kept at satisfactory levels. This is due to enough trees and grass planted around the school premises. This is also because of big windows on the buildings that allow sufficient air to facilities. There were also air conditioners in the administration block where staffrooms and offices are located.	Saving criteria
5. Water conservation There were no visible water conservation actions like rainwater catchment tanks and rain water flow restrictors installed in all buildings to save water. Water used in the kitchen and tuck shop (grey water) was not reused. On the other hand, there was no evidence of water pipes leakage.	rainwater harvesting reuse; reduce
6. Energy conservation Energy conservation measures like putting computers and copiers on safe mode after school were adopted. On the other hand, energy-efficient electrical lights were not used on the entire school. In addition, more advanced energy conservation measures of using renewal energy sources from solar or wind energy were not adopted. However, a generator was also used for power during power failure and load shedding.	Saving criteria Reduce audits
7. Transportation Air emission sources are identified but the school has no information about air emission quality. This was observed by school vehicles (staff cars, school bus and learner mini bus transportation) which were stationery during school hours. Most vehicles run on environmentally compatible fuels (e.g. unleaded petrol and diesel) and have installed exhaust purification systems. Very few school community members walk, cycle. Most learners use public transport to and from school. Most teachers do not use public transport, walk, cycle or lift clubs.	reduce saving criteria reduce saving criteria reduce

S2 CODED FIELD NOTES TRANSCRIPTS

DESCRIPTIVE NOTES	CODES
1. Description of the building: The building was erected pre-1994 by the apartheid regime. When the enrolment increased due to population growth and incorporation of Grade R classes in the mainstreams, 4 container-shaped classes were installed for this with electrically propelled ventilators and a single flushing toilet. There were administration and management computers, laptops, printers and copiers with rims of photocopying paper. There was a visibility of files and prepared learner tasks. The building was surrounded by trees, lawn and paving bricks installed. The school has a small library (3m X 4m) which was used as a storage of extra chairs. There were few old books before the CAPS curriculum and there was no librarian on site. The sports ground consisted of a soccer field with lawn and grand stand; and two multi-purpose courts with concrete grounds.	
2. Cleanliness: The school was clean inside and outside, because they had sufficient general assistants employed at the site as cleaners.	
3. Environmental corner or bulletin board: At the entrance the names of companies that donate to the school were visible, with a signage. There was a certain company's billboard indicating the school "Recycle, Reuse, Reduce". There was a display of learners' gardening projects and competitions the school participated in the principal's office, and so was the HIV/AIDS manual. The researcher was informed that the school do participate in environmental activities such as tree planting and climate change when invited to do so.	

4. Water management: Water source was distributed by the Tshwane local municipality at a cost. There were two water tanks for harvesting rainwater. The rainwater, as the researcher was informed, was used by the school during municipality water cuts or when water pipes are repaired by the municipality. The rainwater was not tested for viruses or recycled and the school did not have testing kits to do such. Another interesting observation was that there were no leaking taps. The water was collected from taps and filled in water containers with taps for every class. There was no visibility of water leakages or drippings.	
5. Energy management: Electrical supply to the school was solely ESKOM municipality at a cost. No alternative energy source like solar or wind plant visible. Electricity was used for lights, photocopiers and other electrical appliances. Energy efficient lights were not installed in the entire building. The researcher was informed that computers, laptops and copiers were switched-off after school. Only outside lights were switched on the entire night.	
6. Waste management: There were four large waste bins with sorted litter for bottles, papers and card boxes, tins and foodstuffs well labelled and full of garbage. The researcher was informed that they were prepared as such because there are recycling companies that were coming that day to collect these waste materials. There were small waste bins in the offices and classrooms for the school community to throw in unwanted waste, which is later collected in the classrooms and sorted in large bins outside. There were sufficient flushing toilets with no water limitation flushes. The toilet papers were in the learners' respective classes where they were cut to the quantity needed for the purpose the learner needs to perform. When the learner needs to go to the bathroom, he/she collects prepared parcel of tissue paper	

7. Air quality: Previously built classrooms had no ceiling fans or air conditioners. Windows and doors were the main source of ventilation. The administration offices were using thermal comfort from air conditioners. There were insufficient trees and grass planted.	
8. Transport management: Most learners walk to school and few use public transport that was not stationery at the school, they drop them at school in the morning and collect them after school. Teachers use public transport, their own cars and lift clubs.	

S3 CODED FIELD NOTES TRANSCRIPTS

DESCRIPTIVE NOTES	CODES
1. Description of the building The school is a free-standing building erected in 1959 by the local rural community in the far north direction of the city of Tshwane. The building consists of three blocks facing North, South (parallel to each other) and East. The offices have ceiling fans, curtain and use non-energy saving lights. The external walls are made of strong mortar bricks with external shading front verandas. The building is rectangular shaped and receives solar gains in all its facades. The school has no library, sickbay, common room, hall, computer room and staff kitchen. The campus was surrounded by green plants (grass and trees) grown in the outdoor areas, with most of them being indigenous acacia trees. There is a vegetable garden that is used for fundraising and for donating veggies in the school nutrition scheme and sometimes used for helping the needy. There is an orchard where some fruits are grown for fundraising purposes. The landscaping is beautified by lawn, paving and flowers. Installed in the campus is the communication tower which is privately owned and pay rental fees to donate to the school.	Saving criteria Saving criteria Saving criteria reduce beautification; reduce saving criteria saving criteria beautification/reduce saving criteria
2. Cleanliness: All facilities were clean, tidy, stagnant water free, odour-free and litter free. There were waste bins in and outside classrooms where the researcher also observed learners put litter during lessons. Overall, the school was extremely tidy.	Reduce Reuse
3. Environmental corner or bulletin board According to the researcher's observation, there was no display, specified area or bulletin board for communication facilities which help to disseminate and update environmental information to encourage environmental plans and initiatives.	instil knowledge & skills; instil awareness

4. Water management: The water source is borehole and rain water harvested in water tanks. Rainwater is mainly used for cleaning classrooms and toilets, flushing toilets and gardening. Every classroom has a jelly can with a tap for drinking. Underneath every jelly can there is a basin for harvesting dripping water. The latter is later used for watering the flower and lawn garden planted in front of their classrooms.	saving criteria rainwater harvesting reduce Irrigation methods reuse
5. Energy management: Electrical energy is mainly used for lights, equipment like administration computers, printers and copiers. There were no CFL lights in classrooms and offices. Gas is used for cooking in feeding scheme kitchen. Petrol fuel is used for the generator to extract underground water from the borehole.	reduce saving criteria
6. Waste management: papers, plastics and broken steels from desks are recycled. Waste are not sorted, while solid waste from food is used as compost or manure for the vegetable garden. There were two types of toilets utilised by the school for different convenient reasons. Movable flushing toilets drain the waste materials in the septic tank. There are chemical toilets that are used in cases when there is no water on site. On the other hand, there is a construction of new permanent flushing toilets. Old pit toilets are reused as storerooms for LTSM deliveries.	recycling reuse saving criteria; audits reuse reuse saving criteria audits
7. Air quality: The office has a ceiling fan and only one classroom has a movable fan, both used for thermal comfort. Both appliances use electrical power. In the classrooms, opening of windows and doors for fresh air is a strategy used for thermal comfort.	saving criteria audits
8. Transport management: Staff cars, school bus and learner mini bus transportation were stationery during school hours. Most vehicles run on environmentally compatible fuels (e.g. unleaded petrol and diesel) and have installed exhaust purification systems. Most learners did not use public transport they walk to school. Most teachers use public transport and lift clubs to and from school.	saving criteria reduce

APPENDIX F: S3 SCHOOL ENVIROMENTAL POLICY

TABLE OF CONTENTS

1. ENVIRONMENTAL POLICY

2. EFFECTIVE DATE	01/09/2019	3. DATE OF NEXT REVIEW	01/09/2020
4. REVISION HISTORY			

5. PREAMBLE

The Constitution of the Republic of South Africa (Act No. 108 of 1996) Section 4.2.1
The constitution, within its Bill of Rights (p. 10), provides all citizens with the rights (a) "to an environment that is not harmful to their health or wellbeing", and (b) "to have the environment protected for the benefit of present and " future generations, through reasonable legislative and other measures.

WHITE PAPER ON EDUCATION AND TRAINING

The White Paper on Education and Training states that "environmental education, involving an interdisciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of the education and training system, in order to create environmentally literate and active

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

6. PURPOSE

[redacted] Primary School will actively pursue a policy of environmental best practice in order to assist in creating an environmentally sustainable future.

- To include and improve the environmental components of the curriculum.
- To provide opportunities for learners to study locate environmental issues.
- To implement an environmentally responsible purchasing policy.
- To reduce school waste.
- To maximise the school's energy efficiency.
- To encourage the planting of vegetables at the school
- To optimise and control the use of water at the school.

7. OBJECTIVES

Educational

[redacted] Primary School intends to enhance (increase and improve) the environmental content of the curriculum offered in our school by:

- Improving awareness amongst teaching staff around the environmental content of subjects.
- The inclusion of environmental issues in the curriculum where appropriate.
- Promoting the environmental orientation of the school.

8. RESOURCE USE

Waste

The school will aim to improve its management of waste produced by:

- Minimising (reducing and /or recycling) wherever possible its waste
- Using recycled products wherever feasible.
- Adopting a purchasing policy sensitive to environmental concerns.
- Ensuring satisfactory disposal of wastes that cannot be re-used or recycled.

Energy

The school will aim to maximise energy efficiency by:

- Minimising total energy consumption.
- Implementing wherever possible to best available energy technology for all new buildings and in existing structures where possible.

Water

The school will aim to manage its water resources efficiently:

- Minimising and monitoring the total water consumption.
- Ensuring that water systems at school are not wasteful.

9. COMMUNITY INVOLVEMENT

Through the implementation of the Environmental Policy it is important that partnerships are encouraged and formed between those directly associated with and affected by the actions of the school. This will be achieved by:

- Approving and facilitating interactions and communications of the school's environmental actions between the school and members of the communities which surround its grounds and with which its staff interacts.
- Reporting annually on how environmental practices in the community have been addressed by the school.
- Learner involvement

The school will encourage learners to play an important role in the implementation, maintenance and assessment of the environmental policy by:

- Increasing the ways in which learners can participate in the policy implementation.
- Ensuring policy implementation is fed back to the learners. • Reporting annually on how learners have been involved in implementing the policy and assessing environmental issues on the school grounds.

10. MANAGEMENT INVOLVEMENT

The School management will:

- Incorporate the environmental responsibility into its mission statement.
- Continue to uphold the schools responsibilities towards the environment.
- Ensure the implementation and monitoring of the environmental policy.
- Ensure that the community is aware of the policy and to communicate the results of the monitoring process.

- Maintain an environment which is conducive to good scholarship and provides good working conditions.

APPROVAL

Recommended by: Principal (print name)	[redacted]	Signature:	[redacted]
Date:			
Approved by: SGB Chairperson (Print name)	[redacted]	Signature:	[redacted]
Date:	01 SEPTEMBER 2021		
Verification by GDE: Cluster Manager (Print Name)		Signature:	
Date of Verification			
Verification by GDE: Circuit Manager (Print Name)		Signature:	
Date of Verification			
Certified by : District Director (Print Name)		Signature:	
Date:			

GAUTENG DEPARTMENT OF EDUCATION

TSHWANE NORTH
DISTRICT

APPENDIX G: EDITOR'S CONFIRMATION LETTER

Academic consultancy

"Perfection is our DNA"

302 Aardal flat
219 Stead Avenue, Queenswood
academicconsultancy3@gmail.com3

07 January 2021

To whom it may concern

This letter is to confirm that I, Keegan Bruce Schmidt, freelance copy-editor, have edited and proofread degree for Doctor of Philosophy in Education: **GREENING THE SCHOOL FOR SUSTAINABLE DEVELOPMENT: A CASE OF TSHWANE NORTH DISTRICT BY JOHANNAH BOPAPE** for grammar and spelling. I have not changed any of the ideas presented in this paper and only the grammar and spelling has been altered for the purposes of clarity. This is to confirm that I have edited the document to a level I deem satisfactory.

Keegan Schmidt
Qualifications:

- BIS (University of Pretoria)
- BIS Hons (University of Pretoria)

APPENDIX H: TURNITIN REPORT

Greening the school for sustainable development: A case of Tshwane North District

ORIGINALITY REPORT

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