

**Title**

**Promoting education for sustainable development: An environmental management systems framework for South African primary schools**

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*Raising healthy children is a labour-intensive operation.  
Contrary to the news from the broader culture, most of what children need, money cannot buy.  
Children need time and space, attention, affection, guidance and conversation.  
They need sheltered places where they can be safe as they learn what they need to know to survive.*  
Mary Pipher

This study is dedicated to the memory of my father, João de Sousa, and my grandmother, Isabel Lourenço Coutinho de Olim. My father taught me to work hard and pursue my dreams. His love, support and motivation during my pre-graduate studies encouraged me to continue in academia. My grandmother, a remarkable lady, was a rightful teacher, not by profession, but by virtue of her wisdom, patience, care and optimism. I owe my consciousness of living sustainably to both. Despite their absence, they are not forgotten.

... do everything for the glory of God.  
1 Corinthians 10 verse 31

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## SUMMARY

### **Promoting education for sustainable development: An environmental management systems framework for South African primary schools**

This study undertook to investigate the implementation of an environmental management system (EMS) to promote education for sustainable development (ESD) in a township, farm and urban primary school in South Africa. This was done by examining how the EMS is implemented in three case study sites located in the provinces of North West and Gauteng to determine and understand how environmental learning is integrated in the three schools, and by identifying key indicators of the EMS. The study then set out to design what an EMS framework should look like to promote ESD.

This qualitative multiple case study research methodology was undertaken within the interpretivist research paradigm. The data was collected from documents, non-participant observations, as well as through one-on-one interviews and focus-group interviews undertaken with the participants who are role-players in each of the three schools, namely the principal; a member of the governing body, community, cleaning staff, gardening staff and administration staff; an environmental committee coordinator; a Foundation phase, an Intermediate phase, and a Senior phase teacher; and learners representative of the Intermediate and Senior phase grades. A within-case analysis of how environmental learning is integrated and how an EMS is implemented in all three schools respectively, was undertaken. Bronfenbrenner's ecological systems theory was applied for a cross-case analysis to illustrate how environmental learning and an EMS are integrated in a township, farm and urban primary school promoting ESD. The knowledge gained was used to design an EMS framework for the primary schools in order to guide them in their teaching, learning and management toward promoting ESD, with the understanding that case study research does not generalise.

An EMS framework designed for the primary schools in the case study, with guiding indicators for teachers and school management to promote ESD, includes the five environmental education (EE) objectives, together with evaluation and systems theory, and is regarded as the study's main contribution to new knowledge. The study has also contributed to the revision of the EMS guidelines in the *Education for Sustainable Living* project by recommending that in South African primary schools an environmental committee consisting of the principal, heads of department and governing body representative should be responsible for the EMS. This team is responsible for the dissemination of the action plan to the participating role-players in the school.

This study also contributes to knowledge regarding management since it reveals that the components of the management process play a central role in the implementation of an EMS, and that a sound management system and structure need to be present when implementing environmental management in South African primary schools. Furthermore, a whole-school approach with role-players who are aware of and knowledgeable of the EMS and united in their endeavour to promote ESD is deemed important. Despite South African primary schools not being mandated by the Department of Basic Education (DBE) to implement an EMS, the results of this study will be presented to the DBE to not only inform them, but to encourage them to consider mandating the implementation of an EMS so as to aid in the promotion of ESD and aid as a tool to mitigate the effects of Climate Change. The EMS framework designed in this study contributes toward the promotion of ESD through workshops disseminating how to implement an EMS to in-service teachers, and at tertiary level environmental management modules can inform pre-service teachers.

Keywords: Bronfenbrenner's ecological systems theory, education for sustainable development, environmental education, environmental learning, environmental management system, primary schools.

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## OPSOMMING

### Die Bevordering van opvoeding vir volhoubere ontwikkeling: 'n Omgewingsbestuurstelselraamwerk vir Suid-Afrikaanse laerskole

Hierdie studie is onderneem om die implementering van 'n omgewingsbestuurstelsel (OBS) te ondersoek om opvoeding vir volhoubare ontwikkeling (OVO) in 'n laerskool in 'n dorpsgebied (*township*), plaas en voorstad in Suid-Afrika te bevorder. Dit het geskied deur te ondersoek hoe die OBS in drie gevallestudies, geleë in die provinsies Noordwes en Gauteng, geïmplementeer word en te bepaal en te begryp hoe omgewingsleer in die drie skole geïntegreer word, en deur sleutel-aanwysers van die OBS te identifiseer. Die studie het vervolgens 'n konsep ontwerp van hoe 'n OBS-raamwerk daar behoort uit te sien om OVO te bevorder.

Die kwalitatiewe veelvoudige navorsingsmetodologie van die gevallestudies is binne die interpretatiewe navorsingsparadigma onderneem. Die data is versamel uit dokumente, deur passiewe waarnemings, sowel as een-tot-een onderhoude en fokusgroep-onderhoude wat gevoer is met rolspelers in elk van die drie skole, naamlik die skoolhoof; 'n lid van die beheerliggaam, gemeenskap, skoonmaak-, tuin- en administrasiepersoneel; 'n omgewingskomiteekoördineerder; 'n Grondslag-, Intermediêre en Senior Fase-onderwyser; en leerders verteenwoordigend van die Intermediêre en Senior Fase-grade. 'n Binne-geval analise van hoe omgewingsopvoeding geïntegreer word en hoe 'n OBS in al drie skole respektiewelik geïmplementeer word, is onderneem. Bronfenbrenner se ekosistiem teorie is toegepas vir 'n kruis-geval analise om te illustreer hoe omgewingsopvoeding en 'n OBS geïntegreer word in 'n dorpsgebied-, plaas- en voorstedelike laerskool wat OVO bevorder. Die kennis wat verwerf is, is gebruik om 'n OBS-raamwerk vir die laerskole te ontwerp om hulle leiding te gee in hulle onderrig, leer en bestuur om OVO te bevorder, met dien verstande dat gevallestudienavorsing nie veralgemeen nie.

'n OBS-raamwerk wat vir die laerskole in die gevallestudie ontwerp is met leidende aanduiders vir onderwysers en skoolbestuur om OVO te bevorder, sluit die vyf doelwitte van omgewingsopvoeding (OO) saam met evaluering en sistemiese teorie in en word beskou as die studie se belangrikste bydrae tot nuwe kennis. Die studie het ook bygedra tot die hersiening van die OBS-riglyne in die Opvoeding vir Volhoubare Lewe-projek deur aan te beveel dat in Suid-Afrikaanse laerskole 'n omgewingskomitee wat bestaan uit die skoolhoof, departementshoofde en beheerliggaamverteenvoorder, vir die OBS verantwoordelik moet wees. Die span is verantwoordelik vir die disseminasie van die aksieplan na die deelnemende rolspelers in die skool.

Die studie dra ook by tot bestuurskunde aangesien dit openbaar dat die komponente van die bestuursproses 'n sentrale rol in die implementering van 'n OBS speel, en dat 'n grondige bestuurstelsel en –struktuur teenwoordig moet wees wanneer omgewingsbestuur geïmplementeer word in Suid-Afrikaanse laerskole. Daarbenewens word 'n heleskoolbenadering met rolspelers wat bewus is van en kundig is oor die OBS en verenig in hul strewe om OVO te bevorder, belangrik geag. Alhoewel Suid-Afrikaanse skole nie van die Departement van Basiese Onderwys (DBO) opdrag ontvang het om 'n OBS te implementeer nie, sal die resultate van hierdie studie aan die DBO voorgelê word, nie net ter inligting nie, maar ook om hulle aan te moedig om daaraan oorweging te skenk om opdrag te gee dat 'n OBS geïmplementeer word om sodoende die bevordering van OVO te fasiliteer en instrumenteel te wees in die versagting van die effekte van Klimaatsverandering. Die OBS-raamwerk wat in hierdie studie ontwerp is, dra by tot die bevordering van OVO deur werkwinkels wat aan praktiserende onderwysers dissemineer hoe om 'n OBS te implementeer, en op tersiêre vlak kan omgewingsbestuurmodules voornemende onderwysers inlig.

Sleutelwoorde: Bronfenbrenner se ekosisteem teorie, opvoeding vir volhoubare ontwikkeling, omgewingsopvoeding, omgewingsleer, omgewingsbestuurselsel, laerskole.

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## ABBREVIATIONS AND ACRONYMS

3R	Reduce, Reuse, Recycle
ANU	Arbeitsgemeinschaft Natur- und Umweltbildung ( <i>Association of Environmental Education Centres</i> )
ARIES	Australian Research Institute in Education for Sustainability
BANU	Bundesarbeitskreis der Naturschutzakademien ( <i>Nature Conservation and Environmental Protection Fields</i> )
BBL	Bolt Beter Leefmilieu
C2005	Curriculum 2005
CAPS	Curriculum and Assessment Policy Statement
CED	Conference on Environment and Development
CEE	Centre for Environment Education
DAC	Development Assistance Committee
DBE	Department of Basic Education
DEC	Delta Environmental Centre
DESD	Decade of Education for Sustainable Development
DoE	Department of Education
DoEA	Department of Environmental Affairs
DSP	Dominant Social Paradigm
EBSCOhost	EBSCO Publishing. (An online databases to libraries.)
ECO-ED	Education and Communication on Environment and Development
EE	Environmental Education
EEASA	Environmental Education Association of Southern Africa
EECI	Environmental Education Curriculum Initiative
EECIWC	Environmental Education Curriculum Initiative Western Cape
EEPI	Environmental Education Policy Initiative
EFA	Education For All
EMAS	Eco-Management and Audit Scheme

EMS	Environmental Management System
ERIC	Education Resources Information Center
ESC	Economic and Social Council
ESD	Education for Sustainable Development
ETU	Education and Training Unit
FAO	Food and Agriculture Organisation of the United Nations
FCSD	Federal Council for Sustainable Development
FEE	Foundation for Environmental Education
FSSD	Flemish Strategy for Sustainable Development
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit ( <i>German Society for International Cooperation</i> )
HITTSD	Hamburg Institute for Teacher Training and School Development
ICT	Information and Communication Technology
IEEP	International EE Programme
IoD	Institute of Directors
ISO	International Organisation for Standardisation
IUCN	International Union for Conservation of Nature and Natural Resources
MDG	Millennium Development Goals
MOS	<i>Milieuzorg Op School</i>
MP	Management Plan
NCS	National Curriculum Statement
NEEP-GET	National Environmental Education Programme for General Education and Training
NEMA	National Environmental Management Act
NEP	New Environmental Paradigm
NGO	Non-Government Organisation
NPO	Non-Profit Organisation
NWU	North-West University
OECD	Organisation for Economic Cooperation and Development

PDCA	Plan-Do-Check-Act
RB	Reckitt Benckiser
Rio +20	United Nations Conference on Sustainable Development, also known as “Earth Summit 2012”.
RU	Rhodes University
SA	South Africa
SD	Sustainable Development
SEP	Schools Environmental Policy
SGB	School Governing Body
SMT	School Management Team
Tbilisi +35	Intergovernmental Conference on Environmental Education for Sustainable Development held in Tbilisi held in 2012, thirty-five years since the publication of the Tbilisi Declaration.
TQM	Total Quality Management
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
Unisa	University of South Africa
USSR	Union of Soviet Socialist Republics
WCED	World Commission on Environment and Development
WESSA	Wildlife and Environment Society of South Africa
WSSD	World Summit on Sustainable Development
WWF	World Wildlife Fund



*It really boils down to this: that all life is interrelated. We are all caught in an inescapable network of mutuality, tied into a single garment of destiny. Whatever affects one directly, affects all indirectly.*  
*Martin Luther King, Jr. (1929-1968), Trumpet of Conscience*

# CHAPTER 1

## INTRODUCTION AND ORIENTATION TO THE STUDY

### 1.1 INTRODUCTION

This chapter introduces the study, which researches the implementation of an environmental management system (EMS) in a township, farm and urban primary school respectively to promote education for sustainable development (ESD) in the Republic of South Africa<sup>1</sup>.

Chapter 1 begins by discussing the motivation for undertaking the study. It is followed by a contextualisation of the study leading to the problem statement explanation and research questions. The chapter further introduces the method of research used in the study, ethical aspects related to the study and ends with a layout of the chapter divisions of this thesis.

### 1.2 MOTIVATION FOR THE STUDY

My background as a Social Sciences educator originates from my family history and an inherent interest in people and places. My innate interest in human and physical geography stemming from childhood was developed further during my travels around the country, and my interest in the environment flourished when I practised as a teacher. When the opportunity arose to become involved in an environmental education (EE) project, when globally humankind needs to reflect seriously on living sustainably, the connection was made with my personal principles regarding living sustainably.

This study is one that originated from collaboration between the Faculty of Education Sciences (Potchefstroom Campus) of the North-West University (NWU), and the Human Ecology Department of the Vrije Universiteit Brussel. The project introduced to interested

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<sup>1</sup> Republic of South Africa will be referred to as South Africa.

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primary schools in South Africa was an EMS, with adapted themes, from Belgium's *Milieuzorg Op School* (MOS) [Environmental Care At School]. The South African primary schools who participated in the *Education for Sustainable Living* project (cf. 2.2.6.1) included 60 primary schools in Northern Gauteng, Limpopo, North West and the Free State. The project was equally supported by the Gauteng and North West Provincial Departments of Basic Education<sup>2</sup> (DBE) in South Africa, and the Flemish education department as sponsor.

The schools incorporated an EMS with their whole-school programme to promote ESD. Bearing in mind that South Africa has unique problems and challenges, and that a European-developed structure is not always applicable – though successful, it should be used as foundations and infused with South Africa's unique requirements and resources – the call for a South African-based management approach was considered (Khoza, 1994:118-120). Hence, this study deemed it important to research what key indicators must be considered when implementing an EMS for South African schools, specifically primary schools in a township, farm and urban setting, so that a framework can be designed to promote ESD. The three schools, like many others in South Africa, have rural or urban environments that are constantly changing, leaving its leaders and management facing challenges (Naidu, Joubert, Mestry, Mosoge & Ngcobo, 2008:1). The poorest primary schools in South Africa are exempt from paying school fees based on the economic level of the community around the school (SA, DBE, 2012b), and are called quintile<sup>3</sup> schools. Within these environments, education in its traditional form is not enough to meet the challenges of unsustainable living (Maclean, 2005:xiv, xv). Maclean is also of the opinion that education entails more than knowledge reproduction in the twenty-first century, and so it must promote changes in behaviour, life styles, and values, among others. All of this is necessary so as to achieve sustainability for the survival of humankind. New educational approaches are therefore suggested as necessary in order to guide life style changes that will help in developing a new ecological vision and an awareness of global solidarity. I agree with Maclean that ESD represents a new vision for education. It also questions the way in which “performance is traditionally validated in a formal educational setting”, deeming it necessary to revisit how schools manage to progress toward achieving sustainability.

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<sup>2</sup> The Department of Education (DoE) was closed as a legal entity, following the establishment of two new departments after the national election of 2009. In May 2009 the DoE was split into a Department of Basic Education (DBE) for primary and secondary education, and a Department of Higher Education and Training for tertiary education (SA, DoE, 2010:7, 9).

<sup>3</sup> The quintile system, introduced in 2006, requires provincial education departments to assign to each school a poverty score based on the relative poverty (socio-economic circumstances) of the community in which that school is located. It is a system of ranking and funding for South African schools. Provinces then assign each school to a quintile according to a national poverty distribution table, so that poor schools in different provinces receive equal school allocations (Pandor, 2008). The schools are ranked from quintile 1 to 5. The lowest 40% (quintiles 1 and 2) are deemed poor and receive more funding. These schools are no fee schools and parents only pay for school uniforms, but not for textbooks and stationary. Government funds the expenses that were previously covered by school fees (ETU, 2012). Quintile 4 and 5 schools are the least poor and receive the least in terms of the Norms and Standards for Funding Schools (SA, DBE, 2009:11).

Currently, endeavours to live sustainably are made according to global and local dimensions, especially when the slogan *Think globally and act locally*, synonymous with caring for the Earth, is followed. By acting globally the ball is set in motion to solve global issues, and when thinking locally the challenge is to use local traditional environmental knowledge together with local understanding and experience of environmental problems (Yencken, 2005:4). In 2009, a South African ministerial task team report made recommendations to revise and amend the National Curriculum Statement (NCS)<sup>4</sup> of the day. The NCS Grades R-12 was gazetted as the national education policy in September 2011 comprising of the Curriculum and Assessment Policy Statement (CAPS), with implementation as from 2012 (SA. DBE, 2011s:4-14; SA. DBE, 2011r:3, 4). CAPS is being implemented in phases<sup>5</sup>. The curriculum being phased out for Grades R-9, known as the NCS, stipulates that the acquisition of knowledge, skills, values and attitudes in all the Learning Areas are required to be mastered at the end of the General Education and Training band<sup>6</sup> (SA, DoE, 2002a:6, 14). CAPS replaces Learning Areas<sup>7</sup> with subjects<sup>8</sup> from Grade R-9. CAPS views knowledge, skills and values highly, and focuses on knowledge and skills acquisition, as well as application in the curriculum within local contexts, with an awareness of global issues (SA. DBE, 2011b:4; SA. DBE, 2011r:3). As an organisation of learning, schools are ideal platforms to disseminate the knowledge, understanding, skills, values and attitudes regarding the interrelatedness of both local and global environmental learning. If schools are to transform, then the leaders and management have to keep up with emerging trends (Naidu *et al.*, 2008:2).

The purpose of this study is to understand how three South African primary schools implemented an EMS to promote ESD, and to establish from the data analysis what indicators of the EMS emerge, for the purpose of designing an EMS framework. The EMS is based on a whole-school approach, taking the environment into consideration in all the elements of school life ranging from teaching and learning to management. It also includes all the role-players<sup>9</sup> at a school, ranging from the learners<sup>9</sup> to the teaching and non-teaching

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<sup>4</sup> The NCS curricula, i.e. the Revised NCS Grades R-9 (the RNCS was revised to simplify and clarify its predecessor *Curriculum 2005 [C2005]*) and the NCS Grades 10-12 of 2002 were amended in 2011 and combined in a single document known as the NCS Grades R-12. The 2002 curricula are maintained as the *status quo* until such time that the NCS Grades R-12 is fully operational after its progressive implementation (Dada, Dipholo, Hoadley, Khembo, Muller & Volmink, 2009:13-16). After the implementation of the RNCS, it became commonly known as the NCS (SA. DoE, 2006: 13-14; SA. DBE, 2011r:3).

<sup>5</sup> The CAPS implementation works as follows: January 2012 in Grades R-3 and 10; January 2013 in Grades 4-6 and 11; January 2014 in Grades 7-9 and 12 (SA. DBE, 2011r:3).

<sup>6</sup> The General Education and Training band is the first ten years of compulsory schooling from Grades R to 9.

<sup>7</sup> Learning Areas are the fields of knowledge in the NCS (SA. DoE, 2002a:104) that was policy during this research study.

<sup>8</sup> Subjects are the new and revised fields of knowledge in the CAPS that replace the name Learning Areas. The task team who reviewed the NCS in 2009 suggested the name change to “ensure simplicity, clarity and consistency” at all levels (Dada *et al.*, 2009:41, 42, 49).

<sup>9</sup> Role-players in this study refers in general to the principal, governing body, teaching staff, administration staff, cleaning staff, garden staff, community members and learners who form part of the whole-school approach.

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staff. A study by Henderson and Tilbury (2004:6) found that internationally there is a lack of conclusive evaluation and research findings to address questions regarding the implementation and effectiveness of whole-school sustainability programmes, despite education having for some time now been identified by the United Nations (UN) General Assembly as the means by which to promote sustainable development (SD). In actual fact, ESD was identified as a key priority by the United Nations Educational Scientific and Cultural Organization (UNESCO) (UNESCO, 2009a) who subsequently instituted a United Nations Decade of Education for Sustainable Development (UN-DESD) from 2005-2014 (UN, 2002a:62). Internationally, the UN-DESD has provided a stimulus for schools to make use of an EMS, for example, an Eco-School programme, as an approach to EE (Webster, 2004:97, 100), ensuring that schools move toward becoming sustainable with a focus on ESD.

In South Africa, research into whole-school programmes that implement an EMS as a means of ensuring that environmental principles are put into practice is rare (Hens, Wiedemann, Raath, Stone, Renders & Craenhals, 2010:906), except for Eco-Schools research. Interventions by the South African government to implement EE into teaching and learning have been limited to references to the environment in the curriculum (SA, 2000: 10, 12; SA, DBE, 2011i:5) (cf. 3.5). In fact, it was only as recently as 2011 that the country's DBE convened a workshop, bringing together over 50 teachers to discuss the best practice around ESD. The DBE is only currently in the process of developing a policy for ESD (SA, DBE, 2011t). Of significance to me, is that this study that formed part of the *Education for Sustainable Living* project can facilitate primary schools toward promoting ESD in South Africa.

### **1.3 CONTEXTUALISATION, PROBLEM STATEMENT AND RESEARCH QUESTION**

Reference to EE can be interpreted as far back as the eighteenth century, to the work of Jean Jacques Rousseau. He speaks of three masters that, if at peace with one another, will lead to a well-educated scholar. His masters of education are nature, men and things. *Nature* refers to among others our environment, and *things* refers to what individuals gain by their experiences of their surroundings. "We begin to learn when we begin to live; our education begins with ourselves ..." (Rousseau, 1911:6-9). Rousseau's words are meaningful within the context of experiential learning. We begin to learn when we involve ourselves with and influence and care for the environment. The realisation that rights are accompanied by responsibilities is also part of the learning process and alludes to interconnections. The latter was made more prominent at the end of the last century by the

International Union for Conservation of Nature and Natural Resources (IUCN) within the context of EE.

Back in 1970 the IUCN defined EE as “ ... the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among men, his culture and his biophysical surroundings. EE also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality.” (IUCN, 1970:11). A year later the IUCN was also the first to advocate that the environment had to effectively be incorporated into education and that the future challenge was for educationists to use their environment to its full potential so as to create awareness about the environment and incorporate it into school education, in both rural and urban societies (IUCN, 1971:10, 11). The latter references to the IUCN refer to the prioritisation of EE and address the importance of the environment in education. These issues, among others, were taken up at several UN conferences of note that require mentioning: The 1972 United Nations Conference on Human Environment, held in Stockholm, Sweden; the International Environmental Workshop in Yugoslavia and as a result of it, the Belgrade Charter (1975) that was set up from a proposed global framework for EE. In 1977, UNESCO together with the UN Environment Programme organised the world’s first intergovernmental Conference on EE in Tbilisi, Georgia. The Tbilisi Declaration (1977) together with the recommendations of the conference made up the framework, principles and guidelines for EE at local, national, regional, and international levels, for all citizens both inside and outside of the formal school system (UNESCO-UNEP, 1978:24-28; Athman & Monroe, 2001:38). The Tbilisi Declaration states that: “Environmental education should be integrated into the whole system of formal education at all levels to provide the necessary knowledge, understanding, values and skills ...” (UNESCO-UNEP, 1978:12). More recently, UNESCO adopted resolution 57/254 which was adopted by the UN General Assembly in 2002, specifying that the decade 2005-2014 would be known as the UN-DESD (UNESCO, 2009a). According to UNESCO (2009a), the goal of the UN-DESD is to “integrate the principles, values, and practices of sustainable development into all aspects of education and learning.” National business and governments together with schools have no excuse for not incorporating the environment into their management and curriculum, respectively, since environmental issues have become important topics on world societal agendas. A thorough review of South Africa’s stance toward ESD within the UN Decade of ESD found that in March 2006 African Ministers of Education signed a statement of commitment to implement the UN-DESD through the development of national strategies and action plans. So far the Department of Environmental Affairs (DoEA) and the DBE of South Africa have set up a draft *Framework for Action: Education for Sustainable Development (ESD) in South Africa* - a discussion document - that was to be revised in 2011 (SA, DoEA & DBE, 2010:iii).

The Constitution of South Africa has produced a framework for environmental governance. The Constitution incorporates the right to an environment that is not harmful to the health and well-being of its citizens (SA, DoE, 1995:41). The National Environmental Management Act (NEMA) (107 of 1998) was promulgated as the central legislative framework for environmental governance in the country. In 2008 it was amended (Act 62 of 2008) (SA, 2009:1-3) and comprises a set of National Environmental Management Principles. The core values of NEMA are summed up in two of its four principles. NEMA (SA, 1998:10) states that: “Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably,” and “Development must be socially, environmentally and economically sustainable.” NEMA, therefore, deals with the important issue of environmental management and it acknowledges that a human-environment relationship exists that is interrelated and central to management.

In light of the aforementioned reference to NEMA’s principles concerning environmental management, the King III Report<sup>10</sup> also refers to management and management systems (IoD, 2009a:83), and specifically to the International Organization for Standardization (ISO) 14000 EMS (IoD, 2009a:105). However, the King III Report communicates that managers can make use of several international and local guidance materials, for example standards and management tools other than the ISO 14000 environmental standards. A whole-school programme like the Eco-Schools programme in South Africa uses the ISO14001:2004 as a basis to implement an EMS. The latter programme focuses on school development and is underpinned by the whole-school approach to sustainability. Other established whole-school programmes, for example Green schools and EnviroSchools projects, aim to achieve ESD by making use of their own key features, characteristics, principles and focus (that includes both its content and process). Each programme’s focus guides its planning, decision-making and implementation. A programme is also influenced by environmental, educational and socio-political needs, cultural perspectives and interpretations of sustainability that are unique to the context of the country where a programme originates, leading to differences between programmes (Henderson & Tilbury, 2004:11, 12, 28). The Belgian MOS programme that forms the basis for the *Education for Sustainable Living* project of the NWU aims to raise learner’s awareness of environmental issues through the school’s own environment (Horton, 2009:3), using the curriculum and EMS. The implementation of an EMS at participating South African schools in the *Education for Sustainable Living* project also involves all the role-players of the school and develops options for the optimal management of resources,

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<sup>10</sup> The King III Report (2009) is the third report on Governance in South Africa, written by the Institute of Directors (IoD) in Southern Africa, a credible institution who is the custodian of corporate governance in South Africa.

promoting that ESD materialises by means of the curriculum and management practices (Raath, Stone & Van Heerden, 2004:6).

The Department of Education (DoE) recognised that transformation in the South African education system required effective national management and leadership. Mattson and Harley (2002:284) note further that educationalists were alerted about the fact that African schools display western symbols that influence the African nature of schools. They even argue that the South African education policy is influenced by western ideals. Therefore, the question arises as to whether European programmes and EMS are the best frameworks for South African primary schools. A challenge for South African schools is to develop EE and move toward environmental management aimed at ESD that is specific for an African primary school context.

In South Africa, the 14 456 primary schools (SA. DBE, 2012c:3) should focus more on environmental management in order for ESD to be possible through active learning. Primary schools must identify controllable environmental aspects unique to their situation that can be influenced and explored so that the journey to SD can begin. An important factor to remember is that environmental indicators dependant on the school's situation must be taken into account, because to only raise learner awareness of sustainable environmental development issues, as is the case with Eco-Schools, is not sufficient on its own. Effective preventative models of environmental management (Lotz-Sisitka, 2005:168) aimed at SD are highly recommended. EE in schools should be fundamentally linked with an EMS that comprises an approach set up by the characteristics of the specific school (Lotz-Sisitka, 2005:168), that can ensure continuous ESD. Therefore, it is assumed that active learning through EE and support by management at a school that implements an EMS, can ensure the promotion of ESD. Thus, one can ask what indicators can be identified at primary schools that have implemented an EMS that promotes ESD? The research will, therefore, identify key indicators in the EMS of the three primary schools in order to design an EMS framework to promote ESD.

The following research question serves as motivation for this research study:

- How is an EMS implemented in South African primary schools to promote ESD?

## **1.4 AIMS OF THE RESEARCH**

In order to answer the research question the aims of this study are to determine:

- How environmental learning is presently integrated in a township, farm and urban primary school in South Africa to promote ESD.
- What key indicators of the EMS that promote ESD can be identified in the township, farm and urban primary school.
- What an EMS framework should look like to promote ESD in South African primary schools.

The main purpose of the study is to design an EMS framework for a township, farm and urban primary school in South Africa (and for schools who find themselves in similar contexts), after identifying key indicators in these schools, respectively with the aim of implementing environmental management and promoting ESD. The findings of the study will also be sent to the DBE since it is my opinion that the findings and recommendations can influence policy development, especially the policy currently being developed on ESD.

## **1.5 METHOD OF RESEARCH**

An overview of the method of research followed in this study is presented next.

### **1.5.1 LITERATURE STUDY**

In order to find relevant and recent sources for the literature study an ERIC and EBSCOHost Academic Search was undertaken to gather information from theses, journals, and other primary and secondary sources. The literature study will be used to contextualise the study and to compare and control the findings. The following keywords were used: environmental management systems, environmental management, environmental education, education for sustainable development, environmental learning, whole-school approach, revised national curriculum statement, curriculum and assessment policy statement, systems thinking.

### **1.5.2 RESEARCH APPROACH**

Denzin and Lincoln (2005:3) define qualitative research as being “... a situated activity that locates the observer in the world. It consists of a set interpretive, material practices that make the world visible. ...qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of meanings people bring them.” This study follows a qualitative research approach and it fulfils the definition provided by Denzin and Lincoln. This qualitative research is characterised by a rich description of the qualitative inquiry based on a multiple case study consisting of three primary schools.

### **1.5.3 RESEARCH PARADIGM**

My point of departure for this study was that of an idealist who, in trying to understand how an EMS is implemented at three different primary schools in South Africa when undertaking an interdisciplinary approach to teaching about the environment, is dependent on a hermeneutic understanding and interpretative factors. The research of this study is based on the Interpretivist epistemology since it aims to understand how the school following a whole-school approach to promoting ESD has implemented an EMS as a system within a school as a system. Interpretivism is known to be characterised as hermeneutic and it is reasoned that “in order to understand the specific sentence, utterance or act, the inquirer must understand the whole” (Schwandt, 2003:300).

### **1.5.4 RESEARCH DESIGN: MULTIPLE CASE STUDY**

This study follows a qualitative approach with a multiple case study research design (Merriam, 2009:21, 46-49) based on three schools within the *Education for Sustainable Living* project. The research design informs how the research is going to be conducted. For example, it informs about the methodology, method of data collection and techniques for analysing the data (Wagner, Botha & Mentz, 2012:21). The study involved the whole-school involvement at a township, farm and urban school representing three different schools in the project that have implemented an EMS.

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### 1.5.4.1 STUDY SITES

Literature has revealed how the DoE in its reports refers to five types of schools, namely urban, township, rural, remote rural and farm schools. The type “rural” was not chosen as a type of school in this study because of the matter of size and scale that it refers to. Also, in South Africa, the terms rural has a history and today its meaning has changed. Rural referred to “homelands” far away from urban areas (Gardiner, 2008:8, 13). In this study, the three schools chosen were used to obtain a composite picture of the EMS implemented in the primary schools that formed part of the *Education for Sustainable Living* project. The schools are situated in North West and Gauteng. The township school refers to an urban settlement for African people that still exists on the outskirts of towns and cities as a settlement planned for people classed as black or of mixed ethnic origin by the apartheid system (Anon., 2005). The farm school chosen is located on community-owned farming land and not a commercial farm. The school only provides primary education and the learners are the children of African and Coloured<sup>11</sup> farm workers. The urban school chosen in this study refers to a school found in a city’s residential suburb. It is known as a former white Model-C<sup>12</sup> school. For ethical and practical reasons the three schools in this multiple case study are not called by name, but are referred to as a township, farm and urban school. The three types of school are described next.

#### 1.5.4.1.1 TOWNSHIP SCHOOL

The Township School has the following services on the premises, namely water, sanitation, electricity and telecommunication. The school has an administration block which is equipped with WiFi for internet communication. Brick and prefabricated buildings house the classrooms. The library is non-functional. The school is fenced and has no sports field. The school is surrounded by tarred roads and is situated in a residential area in a township with formal and informal housing. The school services the township community who are dependent on work from the mine, light industry and retail in the towns in the area, but unemployment is high. It has 1447 children attending the school in a given year. The learners are from the African and Coloured population groups. The teaching personnel

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<sup>11</sup> Statistics South Africa describes the population groups in the country as African, Coloured, Indian/Asian and White (Burger, 2011:17).

<sup>12</sup> Model C schools were introduced in 1992 in South Africa in order to cope with the financial cutbacks of the white education budget. Schools were required to scale down expenditure by either reducing the number of teachers or services provided. By taking up the Model C option, parents paid increased school fees to enable them to continue and to hire more teachers, but they had greater autonomy in the development of school policy. For example, they managed and controlled the appointment of teachers, the admission policy, additions to the curriculum, the use of buildings and financial policy (McLennan & Thurlow, 2003:10-11).

consist of Africans and Coloureds and the rest of the school personnel are African. The mother tongue taught is Sepedi in the Foundation phase and English is the medium of instruction from Grade 4 to 7.

#### **1.5.4.1.2 FARM SCHOOL**

The Farm School has the following services on the premises, namely water, sanitation, electricity and telecommunication. Water for consumption is pumped from a borehole into a holding tank. The toilets work on a system whereby the grey water fills a septic tank situated below the surface. The satellite internet communication is out of order. The school has an administration block. Brick and asbestos buildings house the classrooms. No library exists, but a computer media centre has computer facilities without internet access. The school is fenced and has a sports field. The school is surrounded by dirt roads and is adjacent to farms, a residential area and a cemetery. The school services the farming community who are largely unemployed and has 498 children attending the school in a given year. Two grade classes are found in the Foundation phase (Grade R-3) and only one class per grade is found in the Intermediate (Grade 4-6) and Senior phases (Grade 7). The learners are from the African and Coloured population groups. The teaching personnel are made up of Africans, Coloureds and Whites while the rest of the school personnel are African. The mother tongue taught in the Foundation phase is Afrikaans. English is the medium of instruction from Grade 4 to 7.

#### **1.5.4.1.3 URBAN SCHOOL**

The Urban School has the following services on the premises, namely water, sanitation, electricity and telecommunication. The school is equipped with internet communication in the administration block and a media centre/library. Brick and asbestos buildings house the classrooms. The library is functional and is also the media centre. The school is fenced and has a sports field and tennis courts. The school is surrounded by tarred roads and is situated in a residential suburb in a city. The school services the city's suburban community who are dependent on work from the mines in the area, light industry, and retail in the city. It has 1112 children attending the school in a given year. The school learners are from the African, Coloured and White population groups. The teaching personnel are made up of Whites and rest of the school personnel is African. The mother tongue taught at the school in the Foundation phase is Afrikaans. Afrikaans is also the medium of instruction from Grade 4 to 7.

### 1.5.4.2 PARTICIPANTS

Purposive sampling was applied when choosing the three schools since they were selected based on the predetermined criteria of implementing an EMS. The participants<sup>13</sup> (within the whole-school approach) were deliberately selected as being the best representatives who could share their knowledge and experience of environmental management, teaching and learning. Each case study's participants differed in number due to their unique situations that is further explained in chapter 5. The participants interviewed in each of the three schools are tabulated below (cf. Tables 1.1, 1.2 & 1.3).

**Table 1.1 Participants interviewed in the township school**

Township school	Administration member
	Cleaner
	Community member
	Environmental co-ordinator who is a Senior phase teacher
	Foundation phase teacher
	Gardener
	Governing body chairperson
	Group of learners representing the Intermediate and Senior phases
	Intermediate phase teacher
	Learner from Grade 7
Principal	

**Table 1.2 Participants interviewed in the farm school**

Farm school	Administration member
	Cleaner
	Community member/Governing body
	Environmental co-ordinator who is a Senior phase teacher
	Foundation phase teacher
	Gardener
	Group of learners representing the Intermediate and Senior phases
	Intermediate phase teacher
	Learner from Grade 6
	Principal

<sup>13</sup> Participants in this study refer to the individuals who were selected to take part in this study's interviews. They are role-players in a school. Each school's participants are listed in Table 1.1, 1.2 & 1.3.

**Table 1.3** Participants interviewed in the urban school

Urban school	Administration member
	Cleaner
	Community member
	Group of learners representing the Intermediate and Senior phases
	Governing body chairperson
	Factotum <sup>14</sup> / Intermediate phase teacher
	Foundation phase teacher
	Intermediate phase teacher/Environmental coordinator
	Learner from Grade 7
	Photocopy maker and cleaner
	Principal
Senior phase teacher/Environmental coordinator	

### 1.5.4.3 DATA COLLECTION METHODS

The following data collection methods were used in order to triangulate the findings:

- individual interviews with semi-structured interview using open-ended questions (cf. Addendum A),
- focus-group interview with semi-structured interview using open-ended questions (cf. Addendum A),
- non-participant classroom and schoolyard observations, and
- document analysis of the documents made accessible related to the EMS implemented at the school.

The focus group interview was undertaken with learners (both boys and girls) as participants from the Intermediate and Senior Phases to establish where in the curriculum and how have learners learnt about the environment. These learners would be able to articulate their thoughts and experiences in a clear and logical manner during the discussion. As learners in the Foundation Phase are unable to express themselves coherently in an interview, observation of lessons was undertaken.

A pilot study was undertaken at a project school in a town in the Free State where open-ended questions were posed to interviewees over three days along with non-participant observations. The shortcomings realised in the pilot study were addressed accordingly in the main study over four days. The pilot study helped to clarify the data collection methods used and to ensure trustworthiness, among others, of the research since, it was realised that a more comprehensive whole-school approach should be followed in this study. Participants in

<sup>14</sup> In the urban school the factotum supervises the grounds men who maintain the school gardens and property.

each of the three schools took part in semi-structured interviews since it required no predetermined wording and the questions used were flexible (Merriam, 2009:89). Open-ended questions were used.

#### **1.5.4.4 DATA COLLECTION PROCEDURE**

Research was conducted separately at each of the three schools. I assisted the environmental coordinator at each school to identify the participants from the list of possible role-players I had submitted. All participants received a letter informing them of the study. They were invited to participate and were requested to give their signed consent (cf. Addendum B & Addendum C). The interviews were scheduled at a time determined by the principal so as not to disrupt the participant's school day, extra-mural activities and/or work commitments. The Foundation phase classroom non-participant observations were undertaken randomly throughout the phase, between interviews, with teachers in the phase having knowledge that I could be sitting at the back of their classroom for observation purposes. Schoolyard non-participant observations were also conducted between interviews. The document analysis consisted of analysing the environmental committee file that contained the information pertaining to the implementation of the EMS, as well as documents requested, but not always received, for example minutes of meetings, reports and newsletters.

#### **1.5.4.5 DATA ANALYSIS**

For the purpose of this study, inductive inference was used when dealing with the within-case analysis of three cases in this study to establish how environmental learning is integrated in the township, farm and urban primary school to promote ESD and to identify indicators of the EMS implemented at the three schools. Abductive inference was used when dealing with the cross-case systems analysis based on the ecological systems theory, so as to identify indicators that attempt to build a general explanation for an EMS framework that fits the individual cases (Danermark, Ekström, Jakobson & Karlsson, 2002:80, 88). Conclusions could be drawn about how the EMS is implemented in the three schools and their situation (Leedy & Ormrod, 2005:32), but not generalisations. The interpretation of the results comprised content analysis of all the interviews that were analysed by establishing categories (coding) and then interpretation of the data in terms of common themes (Leedy & Ormrod, 2005:32). Within-case coding and categorising of the data took place for each of the three cases.

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#### 1.5.4.6 QUALITY CRITERIA

A discussion regarding the measures to ensure trustworthiness involving establishing the credibility, dependability, and transferability of the data is undertaken. The generalisability of a case study in qualitative research and triangulation as a means of cross-checking the results are also discussed (Wagner, Kawulich & Garner, 2012:275).

### 1.6 ETHICAL ASPECTS

For the purpose of this study, the following ethical agreements are valid:

- The Faculty of Education Sciences at the Potchefstroom Campus of the NWU was granted ethics approval for a scientific project with human participants for both the pilot and the main study by the ethics committee of the NWU (cf. Addendum D & Addendum E).
- Written consent was obtained from the DBE in both North West and Gauteng (cf. Addendum F & Addendum G), as well as verbal consent from the principals of all three primary schools.
- All participants, including learners and their parents, signed a consent form requesting permission to take part in the interviews.
- The right to privacy is upheld by not divulging the name of the school and participants. Schools are referred to as a township, farm or urban school. Participants are referred to according to their role at the school (cf. 1.5.4.2) and interviews are treated confidentially.
- This study did not aim to place participants under any pressure or expose them to humiliation.
- This study aimed to maintain honesty toward professional colleagues in respect of credibility and trustworthiness of the data collection methods, data collection procedures and the accurate presentation of the data.
- The findings of this study will be made available to the North-West and Gauteng DBE as requested.
- All three schools as well as the pilot school will receive feedback from this study pertaining to their school.

## 1.7 CHAPTER DIVISION

This chapter has placed this study in context of the *Education for Sustainable Living* project and the motivation for EMS in South African primary schools. The chapter also describes the three schools that make up the multiple case study and explains why a township, farm and urban school were chosen. The motivation for undertaking the study and the research question and aims are discussed for understanding the thesis.

Chapter 2 discusses environmental management systems. It defines the concept and emphasises the implementation and structure of an EMS, as well as the hindrances in its way. It discusses the step-by-step guidelines used by schools in this study to implement an EMS. International programmes that implement EMS like MOS and Eco-Schools are also discussed. The chapter ends by providing a discussion of environmental management in South Africa's legislation and education.

Chapter 3 is committed to a discussion of the origins, strategies and principles of EE, SD and ESD. The chapter then briefly describes a whole-school approach to EMS. This description is followed by a discussion of environmental learning in education. A description and analysis of EE in South Africa's NCS and CAPS curriculum is presented to show where ESD can be promoted.

Chapter 4 contains the theoretical framework of this study. In this chapter systems thinking, systemic thinking and the ecological systems theory are discussed. It is followed by a discussion of management approaches and models for education management as a management approach that is applicable to EMS, especially the systems theory of management.

Chapter 5 explains the methodology and methods of this study. The research paradigmatic approach is explained, as well as how a multiple case study design was used and why. The chapter discusses the data collection methods used, the method of analysis, as well as the measures taken to ensure trustworthiness, credibility and triangulation of the data. The discussion of the ethical issues and limitations of the data collection closes the chapter.

Chapter 6 presents a description of the data from the three schools in the study. Narratives and figures are used to present the data. The themes that emerged from the data are used to discuss the data under the research aims, namely *How environmental learning is presently integrated in a township, farm and urban primary school to promote ESD; and what key indicators of the EMS in the township, farm and urban primary school can be identified that promote ESD.*

Chapter 7 presents the findings of the study and provides a synthesis of the study. The explanations given use the literature study, as well as the data presented in chapter 6, to attain the last research aim. The contribution of the study will be presented as an EMS framework for primary schools to promote ESD.

Chapter 8 concludes the study. It provides a summary of the literature study and empirical research. The contribution of this study to new knowledge is stated, as well as recommendations for further research. The limitations of this study are indicated and the chapter ends with stating the conclusion reached.

## **1.8 SUMMARY**

In this chapter I presented the orientation to the study and an overview of the structure of this thesis. I began by providing the motivation of the study, the contextualisation for the study and presented the problem statement, research question, research aims, method of research, ethical aspects, and chapter division. I introduced the respective township, farm and urban school that made up the cases in the study. The next chapter will deal with an explanation and discussion of what an EMS is, since it is central to this research.

*History will record that, this - our generation - knew of the problem,  
its cause, effect and solutions, and did - or did not - act.  
Robert Vincin (United Nations Environment Program)*

# CHAPTER 2

## ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS) AS AN APPROACH TOWARDS PROMOTING EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

### 2.1 INTRODUCTION

The purpose of chapter 2 is to discuss the concept EMS, as well as its implementation and structure, and to place it in the context of school education and management. This chapter will discuss the *Education for Sustainable Living* project EMS guidelines used by the three cases in this study. The EMS of two international programmes, namely the MOS-project, from which the *Education for Sustainable Living* project EMS guidelines originate, and Eco-Schools will also be analysed. Internationally, the implementation of an EMS as a new management tool since the mid-1990s, has been cited as being “a privileged holistic and integrated way to tackle environmental problems within an organisation that can be a valuable tool to improve a university’s environmental performance and promote sustainability learning.” (Ferreira, Lopes & Morais, 2006: 974; Steger, 2000:23). This quote is also relevant to a primary and secondary school, since they too are organisations of education. Schools not only teach about the environment, they should also be concerned with their own impact on the environment and sustainable living. With reference to a commercial interest in EMS, Steger (2000:23) states that empirical research studies have pointed out that the use of an EMS leads to a more “effective organisation and information flow, a higher degree of legal compliance and a more comprehensive exploitation of the ‘win – win’ potential of ecological and economic benefits.” Regarding education, Song and Kralj (2009:69) advocate that education and environmental management together with environmental policy

(stemming from the EMS) is a first step to SD. This recommendation is favourable to the intention of this study, but in practice organisations do not bring about change based on responsibility or desire to become sustainable. It is rather, as suggested by Netherwood (1996:54, 56, 57), that legislative compliance will motivate organisations to undertake environmental management. Nonetheless, the fact that the implementation of SD practices into an EMS is a voluntary decision, does not guarantee meaningful improvement in the organisation's environmental performance or sustainable management practices. In fact, the paradigm shift in organisational thinking through EMS is made difficult due to economic, organisational and political requirements. Even though doubt exists as to the ability of an EMS to deliver sustainable practices within organisations, an EMS can achieve improvements in environmental performance since it is a tool that is used to work towards SD. Accordingly, the chapter ends by providing a discussion of environmental management in South Africa's legislation, education management and environmental management in education, so as to place the EMS in context.

## **2.2 DEFINING EMS**

As a point of departure, it is necessary to state that an EMS is a management tool designed to help an organisation improve its awareness of and control over environmental impacts (Barrow, 2006:201). Comprehensively, an EMS is defined as a management tool consisting of planning, organising, and a transparent and systematic process with the purpose of implementing environmental goals, policies and responsibilities, and mechanisms to control and audit these elements. It is an organisational structure, responsibility, practice, procedure and resource for determining and implementing environmental policy (Steger, 2000:24; Bhargava & Welford, 1996b:120; Barrow, 2006:125). The positive environmental impact of EMS is that a "systematic and comprehensive approach to environmental management" takes place (Steger, 2000:26).

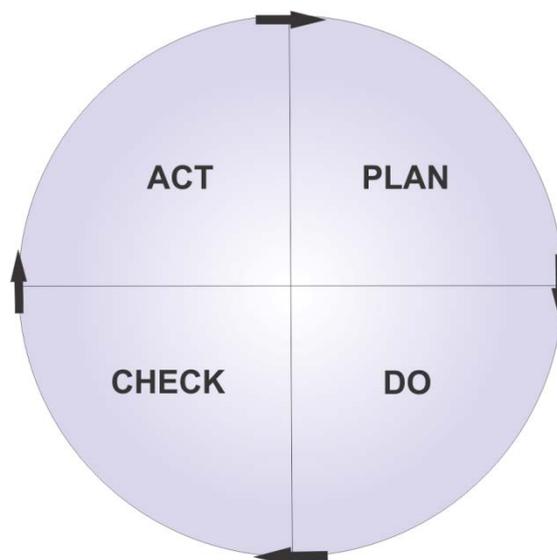
The development of an EMS as a management tool evolved over time and in response to environmental pressures. It began as a safety audit and grew into Total Quality Environmental Management. Both are measurable standards that attempted to control the environment and treat it as a quality issue. Environmental management was seen as an add-on to the existing total quality management (TQM) (cf. 4.3.1.5). The third phase of the EMS development was the environmental/eco-management audit. The audit frameworks that were developed included the British Standard for EMS's BS 7750 that was replaced by the International Organisation for Standardisations' (ISO) 14001 and the European Union's Eco-Management and Audit Scheme called EMAS (cf. 2.2.1). The environmental audit was

developed to improve the EMS by ensuring checks and balances that would identify risks and savings opportunities. Finally, the EMS was devised (Tinsley & Pillai, 2006:15-17). In fact, these EMS standards were developed to provide organisations with a framework to implement an EMS within their organisation and are based on the principles of TQM. Theoretically the association between EMS and TQM systems is that they both aim to achieve “a continuous cycle of improvement through the commitment of the whole organisation”. Both systems require effective commitment, planning, leadership, communications, organisation, control and monitoring in order to succeed. The fact that an EMS requires audits, measuring and reviewing is similar to the elements of a TQM system that is developed to ensure that the activities, policies and processes of organisations conform to specified quality requirements. Critique against an EMS approach is that it does not go far enough in environmental terms, is defensive, bureaucratic, lacks good framework to deal with urgent environmental issues and works towards sustainable management practices (Netherwood, 1996:36-38).

### **2.2.1 THE ISO 14001 AND THE EMAS AS EMS STANDARDS: EXAMPLES OF AUDIT FRAMEWORKS**

From an education perspective it is important to refer briefly to a review of the most common EMS applied to education organisations globally. They have been designed to help organisations develop a formalised management process. According to Carreiras, Ferreira, Lopes and Castanheira (2006:5), Van Rooyen and Naidoo (2008:743, 744), and Clarke and Kouri (2009:975), the ISO 14001 standard and EMAS are the most popular frameworks used to assist organisations manage environmental requirements. Both are embedded in a continuous improvement philosophy based on the Deming cycle (Plan, Do, Check and Act). This allows organisations to identify their problems, define actions to solve them, create a methodology to check actions and results and redefine actions to improve the system. EMS building blocks are supported throughout the process and start from the existing management system as a basis point. The ISO 14001 model uses: policy, planning, implementation and operation, checking and corrective action, and management review. It offers a formal certification and is not sector-specific. The new EMAS II regulation uses environmental policy, planning, implementation and operation, checking and corrective action, and management review.

In defining 'management', reference is made to the Deming Management Model. Also known as the Deming Cycle, it is a management process used by the environmental management community, especially where ISO 14001-based EMSs are implemented. Bhargava and Welford (1996b:120) list planning, organising, implementing and controlling as elements of a sound EMS. Similarly, the Deming models, known as the PDCA cycles, maintain that management should, at least, include the *planning* or identification of issues, *doing* or implementation of the planning outcomes, *checking* or verification of the implanted arrangements and then importantly, be followed by a review and improvement of all the phases of the management cycle, therefore, *acting* or updating on the planning (cf. Figure 2.1). The Deming cycle's principles state that any management process should include planning, doing, checking and acting elements (Nel & Kotzé, 2009:7). These principles are applicable to a school as an organisation. Van der Westhuizen (1991b:45-47) and Clarke (2007: 3-5) maintain that planning, organising, leading and guiding as well as controlling will ensure that a school's principal moves closer to the core of management.



**Figure 2.1** The Deming Cycle as a management process

Raath, Stone and Van Heerden (2009:10, 11) have elaborated their analysis of the functions of general environmental management that are presented as a guideline for use by schools or commercial organisations. Their five principles are related to the Deming cycle, but also include:

- planning that involves analysing, goal setting and decision-making;
- organising that deals with human, financial and physical assessment;

- leading so as to improve the performance of employees, involving directing, motivating and communication;
- controlling to emphasise evaluation and monitoring; and
- goal setting to assess the achievement of goals and to take remedial actions.

In line with the Deming model, the Organization for Economic Cooperation and Development (OECD) (OECD, 2001:39, 40) highlights that a broad participation in strategic planning is necessary for ensuring commitment. If a manager's capacities are weak then the participatory mechanisms are usually poor. Furthermore, it is also important to consider which management process a manager will choose. The International Organisation for Standardization's 14001:2004 standard (ISO 14001:2004) and the Eco-management Systems Audit (EMSA) will be briefly discussed next.

### **2.2.1.1 THE ISO 14001:2004**

The ISO was established in 1947 and is located in Geneva, Switzerland. The ISO was developed as a set of internationally recognisable standards applicable to all types and sizes of industry. The range of ISO 14000 standards addresses different aspects of environmental management. The ISO 14001:2004 standard provides the requirements for an EMS and was officially published in 2004. It cancelled and replaced the first ISO standard, namely ISO 14001:1996, that expired in 2006, which covered EMS in general. The ISO 14001:2004 standard consists of a set of environmental management requirements for EMS. The purpose of this standard is to help all kinds of organisations to protect the environment, prevent pollution, and improve their overall environment performance by providing a framework for a holistic, strategic approach to the organisation's implemented environmental policy, plans and actions. Once this is done according to international standards, an EMS is certified (ISO, 2009).

In order for an organisation to become more environmentally responsible it is required to comply with legislation, consumer demand, eco-labelling programmes, economic benefits and the ISO 14000 environmental management standards certification. The ISO 14000 enables organisations to become more proactive to environmental concerns. Of note is that environmentally conscious business practices make good business sense and lead to further positive spin-offs (Emblemsvåg & Bras, 2001:5-6).

According to Nel and Kotzé (2009:10), the ISO 14001: 2004 contains requirements that state that activities, products and services of organisations are managed so as to reduce the actual and potential impacts on the receiving environment. This viewpoint confirms that the

environment is not managed, but rather that activities, products and services are managed so as to prevent an undesired change to the environment. EMS based on the ISO 14001: 2004 also require that positive impacts be elevated, so allowing for compromises to be made between any negative and positive impacts. This adds another dimension to choices or compromises to the concept of EMS. The focus on actual and potential impacts also shows both a preventive and corrective approach to managing activities, products and services. The principle that activities, products and services need to be managed also broadens the traditional focus of environmental management on activities only. The ISO 14001 model for EMS states that aspects rather than impacts associated with activities, products and services must be managed. This means that a proactive or futuristic approach rather than a reactive or historic solution to historical environmental challenges must be found. According to Steger (2000:28-29), ISO 14001 became a 'stepping stone' to EMAS and its implementation in Europe.

### **2.2.1.2 EMAS**

The European Union's EMAS is an EMS used by the European organisations in accordance with the EU's EMAS II Regulation (EC Regulation No.761/2001 of the European Council of March 2001). The EU's Community's framework must define an environmental policy that is committed to EMS. Furthermore, it consists of requirements where there must be continuous improvement between the requirements. The framework consists of the following features: an environmental policy, followed by planning that needs to take environmental issues and legislation into account. Objectives and targets are set together with an environmental management programme. The implementation and operation facet involves reflection on structure and responsibilities, training and awareness, information, communication and documentation, operational control, and prevention and emergency response. The next facet involves checking and corrective action with specific reference to monitoring, nonconformities and actions, corrective actions, registering and an environmental audit. The management review is the final facet (Carreiras, Ferreira & Lopes, 2005:3, 4, 9). The EMAS moves beyond the eco-audit. It requires an approved EMS and the production of an independently verified public statement. It encourages organisations to adopt a proactive approach to environmental management and to improve their performance (Barrow, 2006:194).

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### 2.2.1.3 CRITIQUE AGAINST ISO 14001 AND EMAS

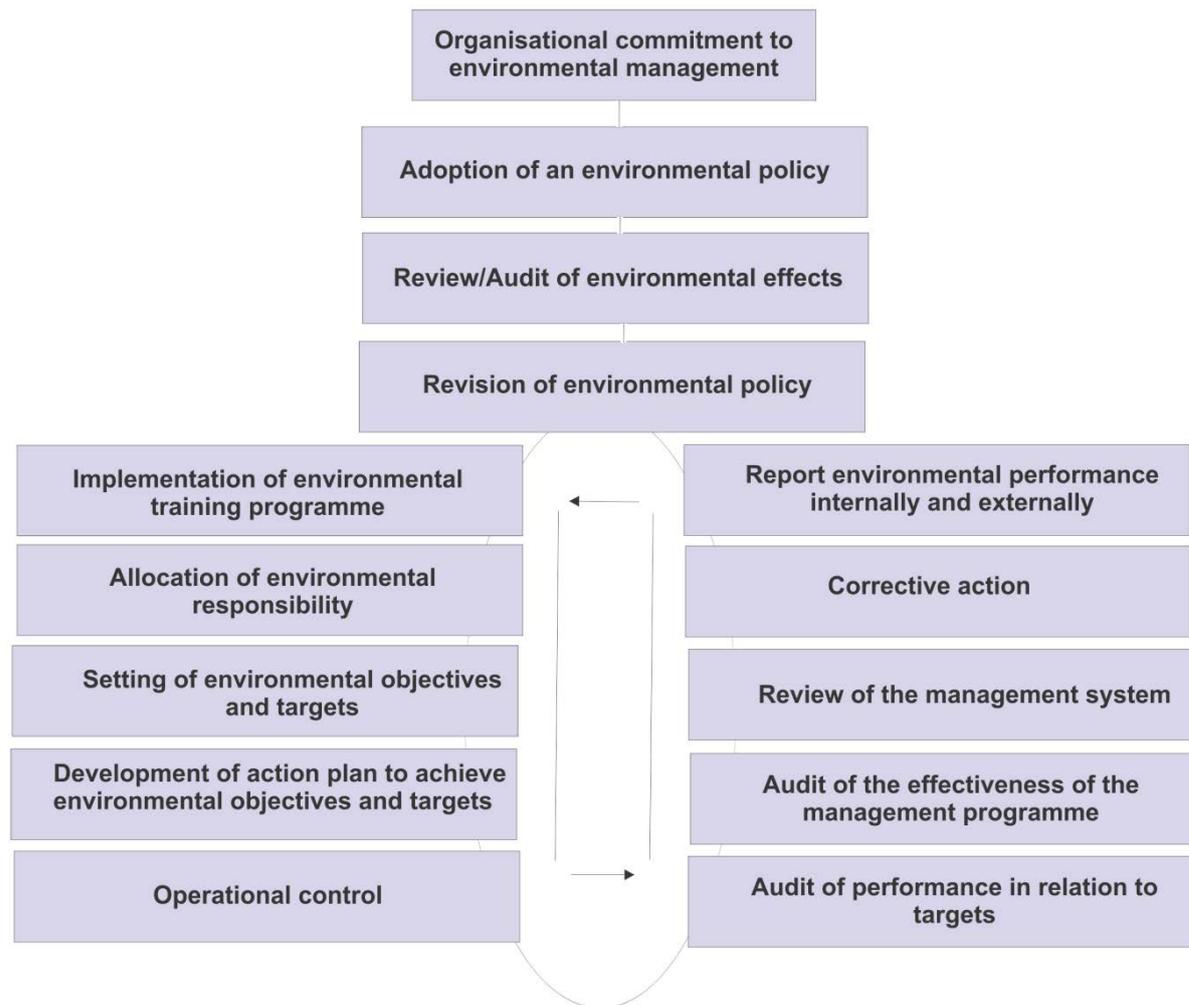
From empirical investigations it has been noted in the literature that no visible or measurable difference in environmental performance exists between EMAS, ISO 14001 or any company specific systems (Steger, 2000:26). Ferreira, Lopes, Carreiras, Martins, Costa, Ribeiro, Magalhães, Soares, Fidalgo, Torres, Amaro, Feio, Dias Pereira, Castanheira, and Martins, (2005:10, 12) critique whether the strategies of current international standards and regulations of EMS, like ISO 14001 and EMAS II, are not too prescriptive. They state that this may impair the improvement of an organisation's environmental performance and overall sustainability. The critique is that the ISO 14001 standard and EMAS II regulation are "highly bureaucratic" by nature and "lack of integration". It is believed that such EMS strategies are technical solutions that do not eliminate the problem at its source that will allow legal requirements to be met. It is feared that the EMS will hardly contribute to the competitiveness of an organisation.

Carreiras *et al.* (2006:3, 5, 6, 9, 10) critique the combination of a top-down approach with a bottom-up approach. They believe it is more time-demanding, meaning it takes more time to implement and to get to the levels required for an organisation to become certified or registered. According to Carreiras *et al.* (2006:3, 5, 6, 9, 10) and Ferreira *et al.* (2005:19, 20), the rigid top-down model of management is the basis for the implementation of ISO14001 standards where functions and responsibilities are well established, giving little or no opportunity for discussion and public participation. However this top-down power structure limits the scope and methods of public participation. EMAS II stimulates stakeholders' participation in a bottom-up approach. It was found that all role-players need to be involved, since exclusions have proven to be a major drawback in attempts to try and improve an organisation's environmental and overall performance. By excluding someone, human resources, determination and commitment are wasted. Ferreira *et al.* (2005:3, 19, 22) believe that key factors to consider for an EMS to succeed at an organisation are, firstly, the implementation of a double, top-down and bottom-up approach, secondly, to foster participation and thirdly, to promote feedback. The latter refers to the necessity of involving key stakeholders as much as possible so as to promote sustainability. Having taken into consideration the critique around ISO 14001 and EMAS as EMS standards it is necessary to know how to implement an EMS, as is discussed next.

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## 2.2.2 IMPLEMENTING AN EMS

When an organisation decides to implement an EMS, it is required to set goals, monitor performance against them and take corrective action or make improvements. It means that the EMS approach involves continual improvement, from environmental policy to planning, management review, implementations and operations, monitoring and correction, and a cycle of periodic audit and review. In fact, the eco-audit together with health and safety management is largely interrelated. The well-being of the environment is seen to be connected closely with the well-being of the individual in the organisation since the two influence each other (Barrow, 2006:195, 198, 199). Viewed from another angle, an EMS includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing and maintaining an environmental policy. The management processes and procedures of an EMS allow an organisation to analyse, control and reduce the environmental impact of its operations and services to save costs, achieve greater efficiency and supervision as well as streamlined regulatory compliance (Pawar & Risetto, 2001:10). Furthermore, one must bear in mind that a *management system* is a network of interrelated elements that include, responsibilities, authorities, relationships, functions, processes, procedures, practices, and resources. A management system, therefore, uses these elements to establish policies and objectives and to develop ways of applying these policies and achieving these objectives (Praxiom, 2009). An EMS integrates environmental thinking into all levels and processes of an organisation and enables environmental concerns to become integral to overall performance (Pawar & Risetto, 2001:11). The emphasis of the EMS is placed on management to control policy issues, internal resources, purchasing, product of service design, communication and education. When implementing an EMS, management decision-making and environmental consequences need to be measured, and environmental management needs to be made part of the daily operational activity (Tinsley & Pillai, 2006:17). An organisation's EMS will vary due to differences within and between organisations. It is, however, dependent on the structure and level of environmental commitment by senior management. A typical system that could be used to implement an EMS in an organisation is shown in Figure 2.2 (Netherwood, 1996:38, 39).



**Figure 2.2 An EMS (Netherwood, 2006:39)**

Figure 2.2 shows a typical EMS. It is suggested that responsibilities for environmental management are a necessity in an organisation. The first two stages are extremely important since the organisation must commit to continued environmental improvement and an environmental policy. It is then followed by a review of the environmental effects and an obvious revision of the environmental policy. The implementation of the programme, allocation of responsibility, setting of objectives, the action plan and operational control must all work together and provide feedback to the environmental policy that must be reviewed. The revision of the environmental policy will also be affected by the audits of the performance and effectiveness of the management programme, as well as by the management system that is reviewed, adjusted and then reported together with the overall environmental performance that is communicated both internally and externally (Netherwood, 1996:38-47). Tinsley and Pillai (2006:26-72) feature the same criteria points for an EMS, with the exception and inclusion of a register of current legislation that impacts on the activities of the organisation. Netherwood (1996:47) is mindful of the fact that many

organisations use these common steps to develop an EMS. The critique is that there is a large inconsistency in the quality of the EMS in different organisations in terms of its ability to ease environmental impacts and integrate environmental management into the organisation. It is acknowledged that the standards mentioned earlier (cf. 2.2.1) provide a framework for organisations to begin identifying and quantifying their effects on the environment. It provides for a commitment by participating organisations to continuous improvement of environmental performance, through an EMS.

The aim of an EMS is to produce a corporate environmental plan that will lead an organisation to improved environmental performance. It is argued that monitoring and measuring the effectiveness of the EMS together with regular updating of the organisation's environmental plan is key to successful environmental improvement. An organisation's environmental plan is developed to integrate all the environmental management activities of the organisation into one coordinated and easy-to-communicate action plan. It will, for example, state what the organisation's environmental management objectives are and how the environmental management activities are to be carried out (Tinsley & Pillai, 2006:15, 26).

An EMS can serve a dual purpose when implemented at a school. It can be used as a tool to manage the environmental performance of the school as a non-profit organisation (NPO) and as the basis of environmental learning in the school. An EMS can ensure that the environment is taken into account in all management decisions (Raath *et al.*, 2009:3). Similarly, Zorpas (2009:1551-1552) notes that in an organisation with less than 50 employees (similar to a school), internal benefits result in positive outcomes when implementing an EMS. These include: organisational benefits (e.g. the overall quality of management improves), financial benefits (e.g. cost savings are measured, but an EMS does not necessarily result in the reduction of waste), and people benefits (e.g. people are trained and innovation increases). EMSs implemented in schools can, according to (Raath *et al.*, 2009:3):

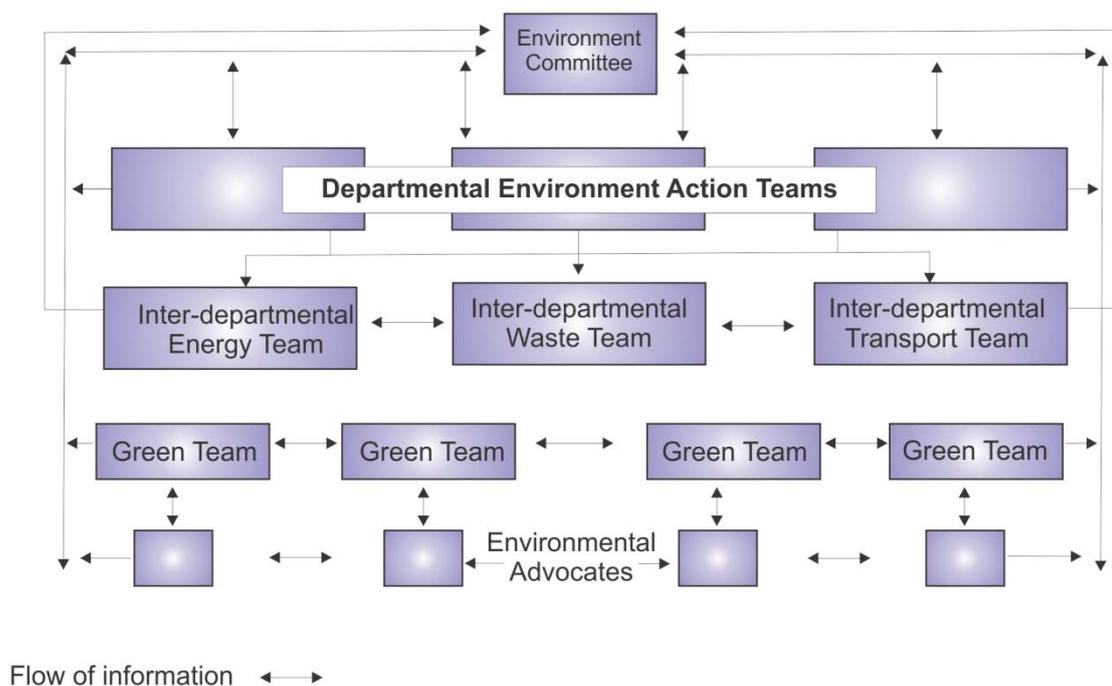
- provide insight into the impact of the school on the environment
- show how the school can reduce its impact on the environment
- identify aspects that can be detrimental to the environment
- provide options for optimal management of resources
- aim to create behavioural changes in the school
- reduce school expenditure.

It is clear, therefore, that when implementing an EMS in a school, all role-players are to be involved when SD practices are followed through. This calls to mind a principle noted from the Education For All (EFA) programme over the 1992-2002 decade. The principle reads, “School effectiveness and learning outcomes can be improved through developing a culture of maintenance, discipline, stewardship, care and self-esteem, democratic management, school community partnerships, and a commitment to responsibility, professionalism and excellence.” This principle has been integrated into regional and national EFA action plans (UNESCO, 2002:16).

Hence the EMS process should involve continuous ongoing improvement with a cycle of goals set, checks conducted and results published. The EMS should, for example, help ensure a structured, standardised and balanced approach to environmental management and improve the school's image, attractiveness to learners and parents and the community (Barrow, 2006:199).

### 2.2.3 THE STRUCTURE OF THE EMS

Netherwood (1996:48, 49) describes a typical management structure for an EMS. The structure is developed to help with the coordination and communication among those involved in the environmental management process (cf. Figure 2.3).



**Figure 2.3 A management structure for an EMS (Netherwood, 1996:48)**

The environmental committee is the main decision-making level of the EMS. It is made up of a representative from different committees who represent all the role-players within the organisation. They disseminate and receive information, coordinate environmental activity and ensure that policy is being effectively implemented at all levels of the organisation. The most important feature of Figure 2.3 is that it demonstrates how during all the stages of the EMS it is crucial that horizontal as well as vertical flow of information is a reality throughout the management structure (Netherwood, 1996:48, 49).

## **2.2.4 HINDRANCES IN THE PATH OF AN EMS**

The fact that an organisation with its own EMS sets its own environmental objectives and targets to improve its environmental performance means that a self-regulated EMS does not guarantee significant improvements in performance. In environmental terms it can mean that EMSs are fundamentally flawed. The development of an EMS can be hampered by the economic and political factors and attitude and culture inherent within the organisation. Restrictive management practices, the belief that an EMS is too bureaucratic, and limiting management time move environmental management responsibilities to the bottom of the list for the role-players in an organisation. At times health and safety management are added as additional environmental responsibilities, resulting in environmental management not being regarded as a separate and important responsibility. Some organisations with many departments, staff and functions find it difficult to coordinate an EMS. Different types of organisations are faced with specific organisational barriers to EMS. It is important to analyse the organisational barriers in order to understand what hindrance management can encounter, so as to ensure that the EMS is implemented and managed successfully (Netherwood, 1996:50-53).

### **2.2.4.1 ORGANISATIONAL BARRIERS**

Stone (2000:354) and Tinsley and Pillai (2006:77) discuss organisational barriers to EMSs as well as the extent to which the barriers either help or hinder the implementation of an EMS. The barriers are based within the organisation's structure and culture and are listed as:

- The structure of the organisation. This refers to the management hierarchy.
- The environment in which the organisation operates. This refers to the legislative framework, economic culture, geography, among others.
- The decision-making process. This refers to the management style and hierarchy.

- The people within the organisation. This refers to personal beliefs, priorities, level of education.
- The general way in which change is viewed and implemented. This refers to the management style, hierarchy and the organisational culture, whether it is proactive, reactive or passive.

Twelve barriers are listed by Tinsley and Pillai (2006:77-92) that emerged from the literature of environmental management and organisational theory (cf. 4.3.1.4). They are;

- Management style (cf. 4.3.3.1). Whether the leadership/managerial style is autocratic or democratic, each has its own strengths and weaknesses. The autocratic manager holds decision-making power that can get in the way of an environmental plan for an organisation since it excludes the role-players in the improvement of the management system. The democratic management style is well suited to implementing an EMS as both are long-term processes. This style encourages employees to be a part of the decision-making process. These managers empower employees through support that in turn encourages the employee who is kept informed and shares in problem-solving responsibilities.
- Top management commitment. When top management, who rely on feedback information to determine the extent of their investment decisions, are given negative feedback it can limit the level of commitment to environmental management.
- Credible plans. Good planning can mean that there is greater general awareness of the EMS, reduced risk in decision-making, the identification of influential aspects, and the establishment of agreement on organisational priorities. Good planning also includes coordination of statements, procedures, plans and budgets.
- Innovation. Improvements in the environment can be done slowly, showing low priority or drastic steps taken could result in unwanted results due to lack of planning and understanding.
- Communication. Lack of education and training in EMS implementation and communication can hamper the levels of environmental knowledge. Both formal and informal communication methods are beneficial when aiming to keep everybody informed. Two-way communication must also be maintained. The communication barrier comes about when role-players are not informed that the organisation is environmentally aware. This can be overcome through meetings, newsletters, websites and environmental reports that can boost the organisation's image, since the implemented EMS can be projected as an image booster for the organisation. In

smaller organisations ineffective communication between role-players is a result of a lack of understanding that reduces the value of environmental reporting.

- **Organisational culture.** The culture of an organisation is the driving force for the organisation and is reflected in its values and attitudes. Elements of an organisation's culture includes: the commitment of decision-makers and the style of management (this refers to a hierarchical structure), the encouragement of role-players (this refers to encouraging role-players to identify environmental improvements), and the management's approach or attitude (this refers to an organisation taking action because they want to comply in reaction to pressure, or the organisation anticipates future changes and so acts proactively, or the organisation is innovative and decides to take on a new approach) (Stone, 2000:355). In small organisations, management instability, resistance to change, lack of internal marketing of the EMS, and a low status of the person leading the EMS may hamper its implementation.
- **Strategy integration.** The system itself, with its complexities and own organisational structure and culture, determines the success of an EMS. The environmental system must blend in with the political, economic and operational needs of each organisation. In small organisations interruptions in the EMS implementation can lead to fading interest in the completion, and the inability to see the relevance of all the stages can hamper the implementation. Netherwood (1996:52) is of the opinion that organisations need to undergo cultural change in order to implement effective environmental management, but that the EMS process and training may not be able to achieve a shift in corporate culture, despite only achieving limited change in individual thought processes that work towards a common environmental goal.
- **Technology.** Environmentally sound technology refers to not only hardware, but also to systems and techniques that ensure efficient resources use with reduced waste and emissions.
- **Strategy complexity.** The implementation of an EMS is seen by managers as an add-on to the already complex organisation, instead of realising that the actual purpose is to make the complex environmental issues manageable.
- **Available resources.** The lack of resources, for example budgets, human resources and corporate incentives, may hamper the implementation of an EMS. For example, the implementation of the EMS becomes the task of an individual who cannot devote his/her full-time to environmental management since it is not their main job responsibility. This multi-functionality of an individual means that little time is on hand to give both responsibilities the necessary attention. This is especially true for small organisations.

- Incentives and controls. Without incentives and control employee support is not guaranteed.
- Organisational structure. A change in the organisational structure or strategy is necessary in order for the EMS to be effective. Not only does it deal with the structure of the organisation, but also with the environment in which it operates, the way in which decisions are made by management , the people in an organisation, and the dynamics of change (Stone: 2000:354).

#### **2.2.4.2 EMS CRITIQUE**

Barrow (2006:201) offers critique of EMS by stating that it is pointless to develop an EMS if an organisation or government has insufficient funds to address any problems that may be revealed through the implementation of the EMS. Of concern is that an EMS can become bureaucratic, mechanistic and not flexible enough, but the cycle of periodic audits and review may change this. It must be remembered that an EMS is a management tool designed to help a business improve its awareness of and control over environmental impacts. EMSs are being adopted and adapted constantly. Critique by Tinsley and Pillai (2006:26) speaks of the necessity to involve full management commitment for the successful installation of an EMS. Transparency together with the dedication of senior management is necessary. Lack of support from a leader or member of the management team will mean that the implementation process is made difficult and even impossible. Also, an EMS may require a participating body to publish an environmental policy statement and it needs to be updated regularly. Barrow (2006:201) elaborates further on the positive effects of an EMS and lists how an EMS can: help to develop a proactive environmental approach; encourage a balanced view across all functions; enable effective, directed environmental goal setting; control environmental impacts; involve all staff in environmental care, including senior management; ensure that legal requirements are met (for example, pollution control); develop objectives and targets; and make the environmental auditing process effective.

Further critique on EMS, referring to their use and implementation, is voiced by Ferreira *et al.* (2005:21) who argue that to promote sustainability, EMS must be more flexible and best practices must be developed and pursued. Ferreira, Lopes *et al.* (2006: 974) explain that an EMS implementation requires trained personnel in terms of the appropriate methodology, policy formulation and implementation, since they must be able to assess where and how improvements can be made. They describe four areas of training for the implementation of EMS: (1) Environmental awareness of how environmental issues affect organisations; (2) Setting up and running systems to manage the organisation's environmental impacts; (3)

Environmental auditing; (4) Specialist training for staff. EMSs are being implemented by tertiary education institutions worldwide in reaction to appeals for ecologically sustainability development and for leadership in environmental protection. It is important to note that the rationale behind an EMS is to help management to achieve their goals more effectively. This means that if an organisation sets its goals before formalising their EMS, the EMS will not lead to great changes in goal setting. This has been a negative criticism against the implementation of an EMS by disappointed managers who expected that change would be automatic through the goals that were set (Steger, 2000:26).

Having gained an understanding of EMS, its standards, implementation, structure and hindrances, it is necessary to focus on defining EMS in a school context.

## **2.2.5 DEFINING EMS IN AN EDUCATION CONTEXT**

An EMS in a school is defined by Van Volsem and Vens in Hens *et al.* (2010:907) as “a systematic, coherent set of measures and provisions intended to: quantify, prevent and, where possible, limit the amount of pollution generated by the school”. The implementation of EMS at schools involves a whole-school approach to achieving education for SD. It also develops options for the optimal management of resources ensuring that education for SD materialises by means of the curriculum and management practices (Raath *et al.*, 2004:6). Simply stated, an EMS is described as a method of incorporating environmental care throughout an organisational structure (Van Rooyen & Naidoo, 2008:740). Looking at it in finer detail, it is further defined as a transparent and systematic process part of an overall management system (Steger, 2000:24; Emblemståg & Bras, 2001:xix) that corporations and organisations use to implement environmental goals, policies and responsibilities together with regular auditing of its elements (Heras & Arana, 2010:726; Steger, 2000:24). It manages the environmental aspects of an organisation’s activities, products, and services (Praxiom, 2009). The word *system* is used to refer to the integrated aspects of an organisation (Raath *et al.*, 2009:3).

### **2.2.5.1 EMS FOR SCHOOL AND EDUCATION INTENT**

According to Raath *et al.* (2009:8, 12), the components of an EMS (adapted from the ISO 14001 document) for determining and implementing environmental policy can be sub-divided into the following components: an organisational structure, responsibilities, policies, practices, procedures, processes, and resources. Raath *et al.* also note that an EMS provides schools with a structure to address environmental concerns through allocating

resources, assigning responsibilities, and ongoing evaluation of practices, procedures and processes within a school. EMS not only provides opportunities to involve learners in the management of the school, but it also creates a sense of ownership in the process. According to Hens (2006:2), schools are organisations that, like profit-driven organisations consume resources and cause pollution. By using EMS, schools may ensure that the integration of the environment in all the disciplines takes place, therefore, marrying the theory with practice. This means that, for example, the school environment can be used to ensure that an understanding of the theory becomes tangible. For example, Malone and Tranter (2003) revealed in their research that learners who were exposed to classroom activities (through planned formal curricula) relevant to their school grounds, followed these up in their play activities (informal), showing that the use of such environmental spaces on the school grounds can improve the quality of life for learners and provide significant experiences for stimulating their environmental learning. This was even evident in the eighteenth century, since Jean Jacques Rousseau commented that interaction with the natural environment and with peers on the school premises is worth “a hundredfold more” than what learners learn in a classroom lesson (Rousseau, 1911:89).

### **2.2.5.2 SCHOOL GROUND USE AND DESIGN**

The implementation of an EMS not only influences the attitude of the learners towards the environment, but also impacts their social behaviour, since environmental consciousness leads to a general societal accountable attitude (Hens, 2006:2). This was the subject of research by Malone and Tranter (2003) who focused on cognitive play<sup>15</sup> and outdoor environmental learning<sup>16</sup>. Their premise was that school grounds should promote learning and development because a school ground is a place where learners not only act freely, but connect with the social, cultural and ecological domains of childhood and it is here that self-discovery learning can take place. Their research outcomes showed that the design of the school ground and the school philosophy are the two most significant factors affecting the ability of school grounds to enhance learner's environmental learning. Referring to the latter, it was found that schools that followed a philosophy of “educating the child as a whole being connected to the earth”, nurtured the physical environment for the learner. This ensured that the school ground environment was viewed as an extension of the learners' overall learning.

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<sup>15</sup> Cognitive play “allows children to act on the environment and discover and understand relationships through their own behavior. This type of play usually has as its goal problem solving, choosing, constructing, exploring, and discovery, and is unstructured informal learning.” Malone & Tranter (2003).

<sup>16</sup> Outdoor environmental learning refers to “opportunities initiated by teachers or learners to complement or supplement the formal curricula indoors.” *ibid.*

This is opposed to those schools that regulated access to the school ground environment due to good or bad learner behaviour, therefore creating a perception that the school ground environment, where learning potentially can take place, was rather a place to “let off steam”.

With regard to the design of school grounds as learning environments Malone and Tranter (2003) found that school grounds should be designed more according to the values and needs of the learner and not those of the adults. School environments that were unstructured and not specifically designed for children's play (e.g. forest areas, garden beds) were most beneficial to environmental learning. Unstructured playground designs allow learners to express and build their own relationship with the natural surroundings, since the environment is not structured, but flexible for learners. The *over-design* of the school environment does not enhance the learner's learning, but is done to manage the physical maintenance of the school ground. Therefore, over-designing and regulating school grounds leads to designing out the capacity for learners to engage in natural environmental learning that can promote cognitive learning through field-based learning experiences. Worthy of note is that schools that have space limitations do not have to feel restricted when it comes to a variety of natural experiences for learners. Research shows that a place for flower boxes, a small vegetable garden, a tree, or a patch of grass can be experienced all year and are important for providing access to nature regardless of the size of the school grounds. Furthermore, despite school location, size, site, history, or financial resources school grounds have the potential to offer opportunities to create meaningful learning places. This in light of the fact that the twenty-first century learner spends less time outside due to safety, among others. School grounds are increasingly one of the few sites where environmental learning can take place and are likely to become more so in the future, according to Malone and Tranter (2003).

### **2.2.5.3 INTERDISCIPLINARY CURRICULUM AND ROLE-PLAYER INTERACTION**

Ferreira, Lopes *et al.* (2006: 974) describe how EMS implementation can contribute to solve the problem posed by EE when referring to interdisciplinary issues in the curricula. The implementation of the EMS must encompass the widest possible assembly of participants. It must involve environmental teaching across the entire curricula and throughout the organisation's practices. The implementation of the EMS must not only improve the organisation's environmental performance, but will affect the assumptions and beliefs of staff members, by affecting their self-awareness and environmental conscience. Thinking

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holistically is a principle of education for sustainability, and environmental management tools depend on a holistic understanding of problems and integrated responses in order to become effective. The expected final result is the development of a 'shadow curriculum' that improves collaborative undertakings between all the role-players at an organisation. The ideal collaboration is an integration of the curricula and the daily functioning of an efficient organisation. The implementation of an EMS is aimed at actively involve learners, "to enrich their training through the development of a new environmental ethic, a holistic perspective and the acquisition of critical 'hands-on' and 'on-the-job' business skills" so as to repeat the experience further in their careers. Just how an EMS is implemented in primary schools is analysed and discussed in the following section.

## **2.2.6 EMS IMPLEMENTED IN PRIMARY SCHOOLS: THE *EDUCATION FOR SUSTAINABLE LIVING* PROJECT, MILIEUZORG OP SCHOOL (MOS)-PROJECT, AND ECO-SCHOOLS INTERNATIONAL PROGRAMME**

The EMS implemented by the township, farm and urban schools in this study was developed by the *Education for Sustainable Living* project that has as its origin the EMS guidelines from the MOS-project. The latter two EMSs as well as the Eco-Schools Programme will be analysed and discussed.

### **2.2.6.1 THE *EDUCATION FOR SUSTAINABLE LIVING* PROJECT**

The *Education for Sustainable Living* project emanated from a previous, smaller project involving only schools in the eastern provinces of South Africa. After monitoring environmental management in primary schools in South Africa prior to 2009, Craenhals, Hens, Raath, Renders, Richter, Stone and Wiedemann (2010:667) suggested the implementation of an EMS. They argued that an EMS would ensure the application of environmental principles in schools that functioned according to traditional programmes. Their suggestion resulted in a handbook, "Education for Sustainable Living" being developed for South African Primary Schools (Raath *et al.*, 2009:1). The handbook was prepared for primary schools as an aid in setting up and maintaining an EMS. It was developed by the Vrije Universiteit Brussel (VUB) in Belgium, NWU (Potchefstroom Campus) in South Africa and Museum Park (a South African NGO). Despite the EMS being ISO-based (cf. 2.2.1), it was solidly based on the practical experiences from the Environmental Care in Schools

project in the Flanders region (MOS) under the auspices of the Flemish Government in Belgium. Hence, the format of the MOS programme was adapted for schools in South Africa. The North-West and Gauteng provincial DBE, where the project was implemented, supported the *Education for Sustainable Living* project and school principals were invited, not obliged, to take part. The project coordinator who helped create the EMS guideline book workshopped its contents to representatives of the schools that took part in the project. Each school received teaching and learning resources, and awards were presented to the participating schools after aspects of environmental management practices were successfully implemented in the schools (Richter, Hens & Raath, 2012:27).

The EMS was developed to help the school management team (SMT) ensure that ESD was promoted in the school. The EMS also served to help the school make decisions that would benefit both the operational and educational functions of the school, and protect the environment. This reinforces what Hens *et al.* (2010:907) stated about an EMS, namely that it ensures that the environment is taken into account in all management decisions of the school, as well as in decisions regarding the implementation of the curriculum.

#### **2.2.6.1.1 THE AIM OF THE *EDUCATION FOR SUSTAINABLE LIVING* PROJECT**

The main aim of the *Education for Sustainable Living* project was to introduce, implement and monitor EMS in primary schools that took part in the project in Northern Gauteng, Limpopo, North-West and the Free State provinces. Furthermore, the project aimed to have a practical trans-curricular approach to EE in primary schools that would be an integral and integrated part of an educational approach.

The purpose of the *Education for Sustainable Living* project was to support the implementation of environmental management by providing schools with information and training on the development of an EMS and environmental learning in primary schools by indicating the linkages between an EMS and the curriculum. The intention was to assist schools to set up and maintain a sustainable EMS as an integral part of the school management and curriculum activities, not as an add-on activity, but rather as a trans-curricular approach to environmental learning. Hence, the EMS was intended to be used as a tool to manage the environmental performance of the school as an organisation when implemented. The EMS was also to be used as a means to encourage and support environmental learning in the school (Richter, Hens & Raath, 2012: 3-8).

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### 2.2.6.1.2 STEP-BY-STEP GUIDELINES TO DEVELOPING AN EMS FOR PRIMARY SCHOOLS IN SOUTH AFRICA AS DEVELOPED BY THE EDUCATION FOR SUSTAINABLE LIVING PROJECT

The seven steps suggested in the handbook “Education for sustainable living” were used as a guideline instrument for planning, organising and communication by the participating schools. The steps are not rigid, but serve as a guideline. At a series of workshops schools were alerted to the fact that they needed to adapt the EMS for their specific circumstances. The handbook “Education for sustainable living” also provided a review of the NCS, showing teachers where and how they could address and integrate environmental learning into their lessons so that the ESD could be promoted. Hens *et al.* (2010:916) reported on a pilot EMS introduced in primary schools in South Africa following the seven steps discussed above. It was described as being successful in establishing awareness of environmental management. A brief summary of the steps follows (Raath *et al.*, 2009:14-28):

#### **Step 1 - School commitment**

Members of the staff or community motivate the reasons for the school to become environmentally conscious. Reasons usually centre on the requirement in the NCS to include the environment when drawing up the learning programmes; the requirement by environmental legislation; monetary savings since wastage will be reduced; and it will produce environmentally literate learners.

The principal together with the SMT needs to buy into the planning for a sustainable environment and get the commitment from all stakeholders involved. The commitment must be extended to the teachers, learners, administrative and support staff since it is a people-driven process.

A written commitment must be drawn up and a declaration must be signed by the learners, teachers, administration, and support staff. It is advisable to display these documents in the staff room, classroom and administration office so that it becomes a communication and marketing tool. The SMT must approve the EMS and the declaration and initiate the project. The school and community at large can be notified through publicity about the project.

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### Step 2 - Involvement of the community

In line with the policy of transparency and democracy the broader school community can be invited to join in the development of the whole-school approach towards education for SD by means of workshops.

A representative environmental committee consisting of representative learners, teachers and community members can be appointed. A coordinator is appointed at this stage and is usually an enthusiastic teacher who will be tasked with the development and implementation of the EMS. The coordinator should focus on maintaining educational and community relevance in the PDCA management guidelines. Learners, educators and parents need to be involved. The environmental committee should develop a statement of intent regarding education and the environment plan. The statement becomes the basis of the objectives and targets for the EMS. The environmental committee coordinator should work closely with the SMT. Meetings must be scheduled, work must be allocated, and a year programme must be worked out. The PDCA management guidelines recommended earlier (cf. 2.2.1) should be implemented. It will guide the development of the EMS policy.

### Step 3 - Environmental questioning

At this step the school needs to ascertain where it is environmentally and what aims or objective can be set to improve its situation. This can be done by focusing on the environmental management with respect to the school management and in the class situation. It is also important that environmental aspects (elements/services of the school's activities that have or can have an environmental impact) are monitored on a regular basis to identify potential impacts.

An environmental policy statement for the whole school must be developed from the information obtained from the environmental questioning. The policy must aim to give a sense of direction and set the principles of action.

The SMT and the environmental committee are responsible for setting the environmental policy. Its implementation and any input for modification are the responsibility of everybody in the school. It is recommended that the policy fulfils the following criteria:

- is *appropriate* to the nature, scale and environmental impacts of its activities, products or services;
- includes a commitment to *continual improvement* and prevention of pollution;
- includes a commitment to comply with relevant *environmental legislation* and regulations, and with other requirements the school subscribes to;

- provides the framework for setting and reviewing *environmental objectives* and targets;
- is documented, implemented, maintained and *communicated* to all teachers, parents and learners;
- includes a commitment to 'educational profit' for the learners, and will result in a positive change of behaviour towards the environment.

**Step 4 - Identify a theme**

The environmental committee must choose one or two themes that can be obtained from the NCS or a theme that pertains to a specific environmental situation of the school. Four themes are suggested by the EMS designer, namely: energy, water, waste management and gardens, the latter referring to both indigenous and vegetable gardens.

**Step 5 - Develop an action plan**

Once a theme has been chosen by the environmental committee, an action plan must be set up. The whole school must be informed as well as local authorities, companies and environmental associations. The action plan is a list of things that need to be done and a plan for doing them, specifying who does what, how and when.

Environmental objectives must be set at all levels to address the priority issues chosen. Environmental targets can then be set to achieve these objectives within a specified time frame.

Legal requirements must be researched so as to set minimum levels of performance. This must be done before setting internal standards and procedures. The school's environmental policy, objectives and targets should provide a framework for the level of standards to be set. Standards and procedures developed should form part of everyday practice.

In determining the success of the implementation of an EMS it is important that the emphasis should be placed on the prevention of environmental damage when looking at the availability of resources, for example equipment, controls, process monitoring systems, expertise and management time.

The SMT and the environmental committee of the school should clearly define who in the school management is accountable and responsible for effective implementation of the EMS.

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**Step 6 - Implement the action plan on all levels**

It is important that the environmental management is conducted within a structured management system and integrated with the overall management and curriculum activity of the school. Reviews or audits can be done to assess environmental performance and ascertain whether the policy requirements have been met. The distribution of tasks and responsibilities and the use of available management tools will help to ensure the implementation of the EMS by using, for example, effect-directed and source-directed instruments. Effect-directed instruments aim to focus on solving effects, for example water saving technology in the toilets. If correctly applied, these instruments change the quality of the environment without influencing personnel and learners towards changing their behaviour. Source-directed instruments focus on behavioural changes, for example activities that focus on educating, informing and solving problems.

**Step 7 – Self-evaluation**

Step seven focuses on the review and continual improvement that a school should undertake of its EMS. The objective is to improve its overall environmental performance. Critical evaluation is crucial and the environmental committee are tasked to decide how to manage the project in the future, what new action plans will look like, and how the school can improve its goals. The evaluation must look at the integration of an EMS in the whole school management.

**2.2.6.2 THE MOS-PROJECT**

The MOS-project is an EMS that was started in 2001 in pre-primary, primary and secondary schools in Belgium. The principle objective of the MOS-project is to raise a learner's awareness of environmental issues through the school's own environment. Teachers and learners work through a teaching package that contains educational material that helps to make environmental care a reality at the school (Renders, 2005:1).

The MOS-project has three core themes, namely: water / energy / waste, as well as three additional themes that can be used, namely: mobility/traffic, green space planning/nature at school and, for technical vocational education schools, a theme called environmental care in the workplace. Schools are advised to choose one theme in their first year, more specifically, a theme relevant to their school and may even work with an issue within a theme, for example, paper within waste. All schools receive all five manuals/guides with educational aids for each theme. These aids contain ideas for theme implementation within

the school subjects for elementary and secondary learners. Schools that take part are rewarded with a logo. The logo takes the form of a puzzle that is completed when the three parts are obtained by the school. The school's projects are assessed by a jury, every school-year. Schools are encouraged to develop long-term projects that must entrench environmental awareness in the entire policy of the school (Craenhals, 2010a).

Since MOS forms part of a government project it cannot be a member of the Foundation for Environment Education (FEE), as the FEE is a non-government organisation (NGO). However, MOS is part of the Bolt Beter Leefmilieu (BBL) [The Federal Better Environment in Flanders]. It also organises other programmes of FEE, such as "Blue Flag" and "Green Key". This means that BBL is an umbrella organisation of all environmental NGOs in Belgium and a member of FEE. MOS is, therefore, an affiliated member of BBL and registers MOS-project schools with Eco-Schools when they want to apply for Eco-School status and work towards receiving a green flag. In the MOS-project this can only be done after a school has obtained their three MOS logos. The difference here is that FEE can in some cases already obtain a green flag after their first year of joining the programme. This is not the case within the MOS-project because it can be argued that they set higher standards for schools to achieve a green flag (Craenhals, 2010b:2) With MOS, after two years of flying a green flag a school must prove that they can keep the green flag by applying for the same status (Craenhals, 2010a).

#### **2.2.6.2.1 THE AIMS OF THE MOS-PROJECT**

The aim of MOS is to involve the whole school population, so that learners are involved, take responsibility and become eager to use their own initiatives regarding care for the environment (Renders, 2005:2; Craenhals, 2010a; MOSwijzer, 2010). Craenhals (2010d:29, 31) explains that the principles of education for sustainability fit perfectly within the MOS-project. On 1 September 2010 the environment and SD was approved as one of the seven contexts of the then new cross-curricular final objectives for secondary schools. Schools are not expected to solve sustainability issues, but opportunities must be created for learners to develop skills to work with others to find solutions to current environmental problems. In this way ESD can give direction to a different perspective on education that better equips people to tackle complex sustainability issues. Teachers can work on ESD through the educational practice of broadening horizons, making connections and integration. All these assumptions are meant to shape both the content and the process approach to ESD.

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### 2.2.6.2.2 STEPS THAT NEED TO BE IMPLEMENTED TO TAKE PART IN THE MOS-PROJECT

The components of the MOS-project's EMS are made up of a step-by-step approach that must follow a cyclical flow (Renders, 2005:2; Craenhals, 2010a; Craenhals, 2010c:9-15). According to Craenhals (2010d:11), the MOS step plan consist of three stages: Steps 1-3 fall within the Conception stage. Steps 4-6 fall within the Doing stage and step7 is found in the Evaluation stage.

The steps entail the following:

1. Signing of an environmental policy declaration that is the official document, in which the school commits itself to implementing environmental care and which has to be signed by the head of the school.
2. Identify existing initiatives and choose a MOS theme.
3. Sensitisation. Decide what the school wants to achieve and determine the objectives.
4. Get started. At this stage the school knows what they want to do and where they want to go. Now a route must be chosen to follow.
5. Set up a MOS action plan. This means that a review of all the planned environmental activities at school for the year, in the classroom and the school environment must be planned.
6. Execute the action plan.
7. Self-evaluation, adjustment and consolidation. It is important to reflect on achievements and look critically at what has been accomplished at the end of a school year.

### 2.2.6.2.3 THE MOS-PROJECT CRITERIA

According to Craenhals (2010c:16, 17, 18), the key to MOS success lies in the way a school tackles the MOS-project. Quality outcomes, educational and environmental benefits are dependent on the following criteria:

- Vision and planning – Systematic, planned and step by step work will ensure greater chances of an ingrained school culture as well as environmental and educational gains. It is also part of the school curriculum and part of the school budget is spent on

environmental management's in-service training and other tangible measures. Craenhals (2010d:6) suggests that one follows the PDCA cycle to master this criterion.

- Involvement of learners – All role-players (learners, teachers, principal, administrative staff, tutors, housemasters, maintenance staff, parents, external partners) must make up the participants who are involved in the project (Renders, 2005:2).
- Broad support – When the whole school is involved, the success rate is higher.
- Communication - A communication strategy is important for the success of a project. A constructive, original and creative communication line presents the school as a sustainable and environmentally friendly school. The use of notice boards, catchy slogans, images and the Internet to let the outside world know about a schools' project is very effective.
- Anchoring/embedding - The MOS activities are a common thread throughout the school year and are a healthy mix of curricular and class-based activities. MOS must become an integral part of the school climate.

#### **2.2.6.2.4 MOS-PROJECT SUCCESSES AND FAILURES**

The annual report of the MOS-project identifies how one should overcome opposition, aversion, prejudices. These include: getting everybody informed, including parents, and organising a good communication strategy. This can be done through planning of projects to determine future implications and directions for projects. A broad basis of consultation is important and it must involve learners from all age groups from the initial stages because they all have an opinion. Working at different levels simultaneously shows interrelatedness of the classroom, school and school surroundings. It is important to divide and share jobs and responsibilities between all role-players, assessing regularly and ensuring that the projects are entertaining.

It is not advisable to connect environmental care only with “things learners are not allowed to do”. Learners must be involved in a positive way and not negatively with the environment. In some school communities it was discovered that there was no autonomous purchase policies. This leads to a slower rate of change towards the use of more environmentally friendly purchases of products (Craenhals, 2010c:10). The seven steps described share characteristics with the international Eco-Schools Programme guidelines.

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### 2.2.6.2.5 EMS INDICATORS OBSERVED AT THREE MOS-PROJECT SCHOOLS IN BELGIUM

I deemed it necessary to report on observations from three MOS-project schools I visited because I identified indicators<sup>17</sup> that revealed what works in practice in an international context when implementing an EMS. The Kleuterschool Doremi is a preprimary school with three classes. The Lagere School Goede Lucht in Anderlecht is a primary school catering for learners 6 to 12 years. The Vocational and Technical School of Zottegem in Zottegem caters for learners aged between 13 to 17 years. The latter school's choice was due to the discretion of the MOS-project coordinator who felt that I would benefit from visiting that school and because learners attending the school are of the same school-going age as South African Senior phase learners. The visit took up at least four hours of the school day. It involved an informal conversation with the principal and environmental committee head teacher, followed by a guided visit of the school premises. The conversation dealt with the implementation of the MOS-project in the school's teaching, learning and management. The descriptive indicators are listed next.

- Enthusiastic principals and environmental committee coordinators who have pride in showing off how they work sustainably in their management, by, for example, printing all documents in their files on both sides.
- School MOS-project information boards contain the aims of the project and other important information. For example, the year planner containing the action plan and activities planned with parent involvement shows how environmental learning is engrained into the curriculum as a whole-school approach.
- The information board serves as a means of communication for parents, staff and the community.
- One theme is chosen and integrated by different grades, as shown on the information board.
- At the two primary schools the garden and MOS-project are headed by one enthusiastic teacher. A difference was noticed at the school where the male teacher who was in charge, built more technological structures, for example solar lights for the garden and a rainwater drainage system for water harvesting from the roof of an insect hotel. The garden run by the female teacher had more basic structures, but attention

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<sup>17</sup> The term *indicator* originates from a Latin verb meaning to disclose or point out (UNEP, 2000) and will be used as a tool for communicating a summary of observations undertaken in schools. The indicators provide insight into how schools implement an EMS in their teaching and learning, as well as EMS.

was given to a variety of plant and animal species. The vegetables grown in both gardens are prepared in the kitchen and eaten by the learners.

- Parents are encouraged to avoid sending bottled drinks to school because learners use reusable cups.
- Leftovers from meals are placed in composters and used as fertilizer for the flower beds of the schools' herb and vegetable gardens.
- Schools have separate bins for sorting waste.
- The schools also have their logo awards fixed to the wall outside the building.

The school in Zottegem was most impressive. The indicators observed are listed below:

- The MOS-project information board contains printed media regarding the MOS-project and the same information is also available on the school's website.
- Unnecessary lights are switched off in the offices.
- The principal is aware of all environmental projects at the school and not only the environmental committee coordinator.
- One enthusiastic teacher heads the projects and liaises with fellow teachers.
- Excessive lights in the cafeteria have been permanently removed after an assessment was done on how to save on electricity.
- Bins are clearly labelled for sorting of waste.
- Clear notices are on the walls reminding learners to switch off unnecessary lights and save electricity, and to close taps so as not to waste water.
- Learners on the eco-committee have their own MOS-project office.
- Projects are undertaken with the local community, for example, a *Safe cycling school road map* was developed as part of the school's mobility project that then incorporated other schools and the town authorities.
- School waste like battery acid is disposed of in sealed containers and together with the rest of the sorted waste is collected twice a week, some of which brings in an income.
- More than one theme is dealt with at this school.

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### 2.2.6.3 THE ECO-SCHOOLS INTERNATIONAL PROGRAMME

The Eco-Schools Programme is an international programme for EE that originates within the Foundation for Environmental Education<sup>18</sup> (FEE). FEE is a NGO and NPO. It aims to promote SD by implementing EE within the formal school education system's curriculum and by the training of staff. The FEE is primarily active through five EE programmes: Blue Flag, Eco-Schools, Young Reporters for the Environment, Learning about Forests and Green Key. In 2003, Eco-Schools were identified by the United Nations Environment Programme (UNEP) as a model initiative for ESD (Eco-Schools, 2010a; Eco-Schools, 2010b; FEE, 2010).

#### 2.2.6.3.1 THE AIMS OF THE ECO-SCHOOLS PROGRAMME

Eco-Schools aim to raise awareness among learners about sustainable environmental development issues. It is therefore clear that the Eco-Schools Programme follows a holistic, participatory approach that combines learning and action. This ensures an effective method for improving the environments of schools and leads to awareness of the environment and behavioural change among learners, school staff, families, local authorities and the community at large. Since it involves full learner participation in its decision-making, planning and activities, it is an ideal way to implement Local Agenda 21 in the school community. It is committed to improving the environmental performance at the school by using an EMS at a school, based on an ISO14001 and EMAS approach (cf. 2.2.1) (Eco-Schools, 2010a; Eco-Schools, 2010b; Eco-Schools, 2010c:3-6).

The Eco-Schools Programme in South Africa is supported by the DBE and is designed for pre-primary schools, primary and secondary schools, schools for learners with special needs, home schools and environmental clubs. The South African Eco-Schools Programme differs from the international programme in that it has been adapted to reinforce the NCS and is used together with the five themes selected by the Eco-Schools Programme, namely: Resource Use, Nature and Biodiversity, Local and Global Issues, Healthy Living and Community and Heritage. Since the environment features across the South African curriculum for Grades R-9 and Grades 10-12, teachers are given the freedom to select the content and learning outcomes from the curriculum, chosen within the school's subject frameworks and learning programmes together with the five themes (Eco-Schools, 2010c:4; WESSA, 2010b; WESSA, 2010c:2, 20). The implementation of an Eco-School Programme is briefly discussed next.

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<sup>18</sup> FEEE changed its name to the Foundation for Environmental Education (FEE), omitting the last "E" representing Europe.

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### 2.2.6.3.2 STEP-BY-STEP GUIDELINE TO DEVELOPING AN ECO-SCHOOLS PROGRAMME

The Eco-Schools Programme involves various role-players consisting of teachers, learners, community members and/or partner organisations who together undertake projects to improve some aspect of environmental management at their school but the learners play the most important role. The programme comprises seven steps that any school can adopt (WESSA, 2010c:1):

1. Forming an eco-committee: This process can include teachers, learners, school governing body (SGB) members and other community members.
2. Writing an eco-code: An Eco-Code is the statement of the ideals the school wishes to achieve when it comes to environmental management and environmental learning. It states how teachers and learners will conduct themselves in this regard.
3. Compiling an eco-audit and choosing a theme: This involves a review of the way things are run at the school (a checklist of the current conditions at the school). It looks at what can be done to improve the school, its environment and the learning that takes place there. Five themes help to guide the committee: resource use, nature and biodiversity, local and global issues, healthy living, and community and heritage.
4. Planning for teaching and learning: Environmental learning opportunities in the curriculum that relate to the theme and topic chosen for the school need to be identified. Schools must teach at least three lessons related to their chosen theme during the year as part of their Eco-Schools Programme.
5. Planning and taking action: The whole school audit and specific theme audit will show which areas of environmental management need attention. Action must be taken accordingly and involve the whole school and wider community where possible.
6. Reporting and sharing: In order to qualify as an Eco-School, the school needs to share what has been done, in the form of an Eco-Report. The Eco-Report is a portfolio of evidence that shows that the required steps have been followed.
7. Receiving an award: Since 2008 Eco-Schools South Africa has introduced a new award system, which is used elsewhere in the world as well. A multi-level system must exist before a school may be awarded the Green Flag. For example, a Bronze Certificate, Silver Certificate, Eco-Schools Green Flag, Gold Certificate, International Flags and a special merit prize may be awarded (Eco-Schools, 2010c:5; WESSA, 2010a; WESSA, 2010c:5).

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**2.2.6.3.3 EVALUATION OF THE ECO-SCHOOLS PROGRAMME**

According to Eco-Schools, not only is environmental awareness of learners, teachers and communities raised, but the school environment is also improved, the community becomes more integrated and financial savings are made. Schools can also create links with other Eco-Schools nationally and internationally (FEE, 2010).

An evaluation report of the Eco-Schools Programme by Rosenberg (2008:63-67) sheds light on whether Eco-Schools can add value to schools. The evaluation does suggest that the Eco-Schools Programme in South Africa as a whole does indeed add value to schools since they are not unplanned, short-term, and do not hold less value for curriculum-related work in comparison to other programmes. Regarding the basic functionality of a school using the Eco-Schools Programme it was found that only a small portion of schools achieved whole-school involvement, the reason being that teachers found it difficult to involve colleagues, especially where the principal was not actively supportive. It was found that the Eco-Schools Programme's obligatory audit of the school by teachers and learners does lead to improvement of infrastructure. Teachers reported that they believed that planning, action and review cycles had made a significant difference in management at their school. Since teachers are encouraged to take on a leadership role in their school and community, the eco-committee strengthened communication with colleagues and others outside the school. School governance was improved by the development and implementation of school environmental policies and environmental learning outcomes that were addressed in the prescribed curriculum. This was evident from Eco-Schools' potential for providing a consistent framework for planning and delivery. The Programme reports success in the eco-committee that involves parents and community members, who help in outreach initiatives and the celebration of national environmental days. Through this work respect for the local environment is achieved and the school serves the needs of the local community. The Programme supplies teachers with resource materials on EE and environmental topics specifically focused on working with the curriculum. This in turn develops teachers and reinforces the quality of teaching and learning. Regarding learner development, no documented work is available on the impact of Eco-Schools activities on learner achievement.

#### 2.2.6.3.4 EMS INDICATORS OBSERVED AT TWO ECO-SCHOOLS IN GERMANY

As with the school visits in Belgium, two Eco-Schools were visited in Hamburg, Germany. The visit took up at least four hours of the school day. It involved an informal conversation with the head teachers who deal with the environmental projects related to Eco-Schools, followed by a guided visit of the school premises. The conversation dealt with the school's long history of being involved in the Eco-Schools Programme and the related teaching and learning. At the Alexander-von-Humboldt Gymnasium that has been an Eco-School for over 15 years, the teacher organised an informal discussion with learners from the environmental committee. The almost 750 learners in 23 classes of 11 - 16-year-olds are taught by 55 teachers.

At the Alexander-von-Humboldt Gymnasium the following indicators were identified:

- One enthusiastic Biology teacher who liaises with the sustainability audit committee that consists of learners, teachers and the principal. This person is the Eco-Schools representative and driving force for all the award-winning projects of the school. The projects are displayed on the walls of the school foyer.
- The school has solar power installed that taps into the main stream electrical line.
- The parking area is packed with bicycles parked at bicycle parking bays, showing that it is a main method of transport for the learners.
- A Stevenson screen for measuring temperature, among others, is present on the property.
- An Eco-Schools' green flag, logos and certificates adorn the school property as well as the UN-DESD logo plaques.
- An unmaintained herb garden is present, but the apple trees planted as part of a past project bears fruit that is used by mothers for baking at an annual school market fundraiser.
- Drainage at the school is channelled and an existing project that involves the clearing a small depression that will be converted into a pond so that plant and animal species can flourish in it. It is to be used for teaching and learning.
- An environmental notice board is present and the library also contains many books related to environmental learning.
- Sorting bins are found in all the classrooms.

- Cups for drinks at lunch time are re-used and water drinking bottles are re-used by sourcing water from a water distiller purchased with money from a project.
- Leftover food from the cafeteria is placed in a composter and used as fertiliser for the flower beds and the school's herb and vegetable garden.
- More than one theme is followed, for example, saving water and electricity, waste management, ecological assessment, resources and nature, among others.
- Projects that are initiated are not ended after a year, but are addressed continuously through the years, therefore, exposing year groups to the project as it develops and expands.
- A sustainability audit team of learners representing each grade is responsible for getting classmates involved in environmental projects through word of mouth.
- Waste separated in classes is sold and assets are bought for school, for example tables, chairs, and a water dispenser. The learners reveal how the whole school decides on what to buy with the money collected from environmental projects and award's money.
- Competitions are initiated per grade. For example, classrooms that are kept clean are rewarded with cash, and learners would receive time off from school as an incentive.

At the Gymnasium Ohmoor Eco-School in Hamburg the almost 1 000 learners in 50 classes are taught by 54 teachers. The following indicators were identified:

- A Science teacher who is responsible for the Eco-Schools Programme implements environmental learning in his subject and so does his colleague in Geography.
- The parking area was packed with bicycles in bicycle bays, showing that it is a main method of transport for the learners.
- A Stevenson screen is also present on the property to measure the weather elements.
- Due to the personal interest of the teacher, the projects that are incorporated into the teaching and learning activities are undertaken annually because they form part of *The Globe program: connecting the next generation of scientists*. All the scientific tests done at the river are recorded and together with the weather data is e-mailed to the Globe programme. The teacher and learners then analyse and evaluate the past and current date by drawing graphs and reaching conclusions. The learners are not involved in huge projects, but rather continuous hands-on research that they can use practically. At this school the process is more important than the results or awards that can be won.

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#### 2.2.6.4 A SUMMARY OF THREE EMS IMPLEMENTED IN PRIMARY SCHOOLS: THE *EDUCATION FOR SUSTAINABLE LIVING* PROJECT, MOS-PROJECT, AND ECO-SCHOOLS INTERNATIONAL PROGRAMME

The main aim of the *Education for Sustainable Living* project was twofold. Firstly, it aimed to support the implementation of environmental management by providing primary schools with information and training on the development of an EMS. Secondly, it aimed to introduce trans-curricular approaches to environmental learning in primary schools and so link the curriculum to the EMS. It is clear that this project, due to its novice nature, aims to focus on school commitment to the implementation of an EMS in management as well as through the curriculum. It differs from the MOS-project in that this project is supported by the Flemish government. Similarly, the main objective of the MOS-project involves the whole school population, but its aims are easier to achieve since the environment and SD were approved as one of the seven contexts of the cross-curricular final objectives for secondary schools. The Eco-Schools Programme, on the other hand, is committed to improving the environmental performance of a school by using an EMS, so as to raise awareness among learners of sustainable environmental development issues. The Eco-Schools Programme is also a holistic, participatory approach that combines learning and action. This programme improves the school environment and leads to awareness of the environment and behavioural change among learners, school staff, families, local authorities and the community.

Regarding the implementation steps, the *Education for Sustainable Living* project and MOS-project share the closest similarities because the latter project was used as the basis to work from for the *Education for Sustainable Living* project. The steps do not follow the same order of sequence, but their content remains similar. The Eco-Schools Programme implements the same steps, just in a different order. The two differences are that with the MOS-project and Eco-Schools Programme a formal evaluation takes place, which serves the purpose of being awarded a plaque or flag, respectively, meaning that the school works towards being recognised by receiving a reward that is physically displayed outside the school. The *Education for Sustainable Living* project receives an award after a project promoter inspection. The second difference between the three projects/programmes is the themes chosen by each. The *Education for Sustainable Living* project and the MOS-project share four themes, namely energy, water, waste management and gardens as green spaces. The MOS-project also has mobility/traffic as a fifth theme and for technical vocational education schools that is environmental care in the workplace. Eco-Schools have decided to give schools broad themes that leave room for the inclusion of many possibilities within teaching

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and learning, namely resource use, nature and biodiversity, local and global issues, healthy living, and community and heritage.

In the aforementioned sections I focused on defining an EMS and detailing its implementation and structure, among others, before defining it in an education context. In the last section I will focus on placing an EMS in an environmental management, international, South African and an education management context.

## 2.3 A BACKGROUND TO THE EVOLUTION OF ENVIRONMENTAL MANAGEMENT

The 1972 UN Conference on the Human Environment Action Plan for the Human Environment in Sweden developed a framework for environmental action. One of its recommendations, adopted by the Conference, was a plan to initiate environmental management activities (UNESCO, 1972:1). Over the last forty years, international environmental management experienced phases of progression that aimed to achieve more environmentally sustainable economies and societies. The United States of America pioneered environmental legislation by enforcing compliance since the mid-1980s. A *resistance-to-change management era* between 1970 and 1985 saw resistance build up as environmental regulations recommended that companies clear up their pollution emissions (Miller, 2004:331). It was in this era that EMS is believed to have taken form and become established (Tinsley & Pillai, 2006:25). In Europe, the governmental environmental protection policy of the 1970s prioritised cleaning-up. It led to a clean but not necessarily a sustainable environment (Steger, 2000:23-25).

In South Africa the momentum for environmental management was set in motion by the historic United Nations World Summit on Sustainable Development (UN-WSSD) held in Johannesburg in September 2002. The framework of Agenda 21 for SD and the eight Millennium Development Goals<sup>19</sup> (MDG) also received positive support from the South African leaders present at the UN-WSSD (UN, 2002b:15). The report of the UN-WSSD stated that fundamental changes in the way societies produce and consume are indispensable for achieving global SD. A school is such a society that needs to implement environmental management. The UN-WSSD suggested:

“18. Enhance corporate environmental and social responsibility and accountability. This would include actions at all levels to: (a) Encourage industry to improve social and environmental performance through voluntary initiatives, including Environmental

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<sup>19</sup> The Millennium Development Goals (MDG) developed in 2000 by the General Assembly of the United Nations as the Millennium Declaration.

Management Systems...” and “Develop, implement, monitor and review education action plans and programmes at the national, sub-national and local levels, as appropriate, that reflect the Dakar Framework for Action on Education for All ... and make education for sustainable development a part of those plans.” (UN, 2002b:15, 61).

The UN’s WSSD bears evidence of the realisation by the economic sector that they needed to deal with the interrelated nature of the environment at a socio-economic level. Furthermore, reference to the Dakar Framework for Action on Education for All, reveals the UN-WSSD’s realisation of the importance of education systems in achieving SD. One of the five strategic objectives named and that needs to be undertaken, is *improving management and governance* (UNESCO, 2000:29). The UN’s WSSD and the earlier establishment of the South African Constitution of 1998 reveal greater consideration of the environment in the economic and education sectors, realising that environmental management impacts the environment positively. A closer look at environmental management in South Africa’s legislation will reveal greater consideration for the environment.

### **2.3.1 ENVIRONMENTAL MANAGEMENT IN SOUTH AFRICA’S LEGISLATION**

The NEMA of 1998 protects the environmental rights of the South African citizen (Strydom & King, 2009:iv), second only to the Constitution of the country. An important principle of NEMA is that: (b) Environmental Management must be integrated acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option (SA, 1998:12). Most importantly, NEMA commits the South African government to SD and it highlights the need for EE to promote community well-being and empowerment (SA, 1998:2, 10, 12, 28; 34, 40, 52). The environment is not only the responsibility of the state and the individual, but profit and NPOs have also been tasked to adhere to the newly developed regulations. Schools are NPOs and despite the differences that exist between them and companies (profit organisations) they share a similarity in that their application of good governance principles is the same.

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This means that King III<sup>20</sup> is relevant to both (Du Plessis, 2010:2). As a NPO, a school's performance is measured in terms of achievement of their objectives, which centre on social objectives. However, schools, in accordance to the sustainability principles in King III, are required to contextualise financial performance by providing their social and environmental performances. This can be facilitated when an EMS is implemented in a school.

Subsequently, and applicable to education, in the UN-WSSD's Summit Plan of Implementation (UN, 2002a), reference is made to changing unsustainable patterns of consumption and production through education. More importantly, the summit plan of implementation noted the following:

"17. Enhance corporate environmental and social responsibility and accountability. This would include actions at all levels to:

(a) Encourage industry to improve social and environmental performance through voluntary initiatives, including Environmental Management systems, codes of conduct, certification and public reporting on environmental and social issues, taking into account such initiatives as the ISO standards and Global Reporting Initiative guidelines on sustainability reporting, bearing in mind principle 11 of the Rio Declaration on Environment and Development".

This clearly refers to the implementation of an EMS in the administration of an organisation, for example a school. Furthermore, the plan suggests a means of implementation that should:

"Integrate sustainable development into education systems at all levels of education in order to promote education as a key agent for change."

An outcome that flowed from the Johannesburg Principles was the call to significantly improve the compliance with and the implementation, development and enforcement of environmental law. The UN responded with the UNEP that motivated countries to initiated plans to draw up country-specific programmes for strengthening judicial capacity. Critique by Strydom and King (2009:ivi) is that South Africa has a general inadequate capacity to enforce the laws of the new national environmental management policies. However, the implementation of EMS within an education organisation can be viewed as a representation of a bridge between the academic, societal and business world, thus compelling management to address environmental issues (Ferreira, Lopes *et al.*, 2006: 974). Despite the latter suggestion, Sauv , Berryman and Brunelle (2007:34) are of the opinion that the

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<sup>20</sup> The third King *Report* on Governance for South Africa 2009 (known as the Report) together with the *Code of Governance Principles* for South Africa 2009 (known as the Code) are collectively referred to as 'King III' of which the latter was published on 1 September 2009 (IoD, 2009b:6). King III came into effect on 1 March 2010. It was deemed necessary because of the Companies Act, 2009 (which came into legal force in 2010) and changing trends in international governance. The requirements of King III are intended for the economic and public sectors (PricewaterhouseCoopers, 2009:2, 3).

introduction of an environmental dimension into school curricula or into non-formal education programmes is a demanding task at national level. A closer look at environmental management will highlight how an environmental dimension can be included in an organisation.

### **2.3.2 ENVIRONMENTAL MANAGEMENT APPROACHES**

Environmental management is concerned with human-environment interactions, so much so that Nel and Kotzé (2009:1, 7) maintain that environmental management aims to influence or change the behaviour of people in their living environment. A school and its curriculum are ideal platforms for creating awareness and influencing attitudes that can lead to a change in behaviour in my opinion. A principle of environmental management is stewardship (cf. 3.3.3.1) and practicality that can be reinforced in schools. Environmental management demands a multidisciplinary, interdisciplinary or even holistic approach (Barrow, 2006:7) proving that environmental management reiterates the principles of EE (cf. 3.2.1.2.1). For example, school teachers or principals, as managers, may be professional with a “natural science or social science” background. They may be tasked to deal with problems that have an element of human interference in the environment. This requires them to have a multidisciplinary background. They are then faced with an interdisciplinary issue that needs to be resolved from a “quantitative and/or futuristic viewpoint”. A key point is that environmental managers should aim to find the best possible environmental option to promote SD (Barrow, 2005:5). In a school, environmental management is focused on the school controlling its activities, products and services that have or could have a significant impact on the environment (Raath *et al.*, 2009:9) that can be viewed as holistic.

The OECD (2001:48) mentions that an effective strategy for SD must provide “co-ordination, leadership, administration and financial control, harnessing of skills and capacities and ensure adherence to timetables”. Leadership is an essential component of a successful strategy, whether it be from a small team or an individual that maintains the vision, motivation and momentum through challenging times. Raath *et al.* (2009:8) describe how a school as an organisation has many ongoing tasks and activities. They add that the school management needs to plan, organise, lead, and control the school and its staff in their duties. This brings the leadership and management role of a principal at a school into question.

It is important to focus on the leadership role of the principal of a school since it is he/she who is responsible for getting things to change. Principals are responsible for establishing the direction in which they want their schools to move. This is based on their vision. Principals need to have a good understanding of their schools and the needs of the

community they serve. This means that a principal needs to understand the ethos of the school and its social and physical environment before a vision can be revealed. In order for the vision to materialise, a strategy with practical steps for the staff and principal needs to be developed. Once the strategy has been established, all the members of the school community need to be informed about the vision and its value for them. Comprehension of the vision and good communication that motivate the staff, governing body and parents will lead to greater enthusiasm and commitment to the vision and strategy. This will be cemented further if they also become part of the process of developing the strategy. Leading by example is crucial at this stage. The principal needs to lastly lead the school by motivating and inspiring those around him/her. This will ensure that they understand the values and benefits of the vision to the school for those involved in it and committed to its welfare (Clarke, 2007:2, 3). The components of a green management system reflect on the latter guidelines for environmental management. It includes: strategy (Where do we want to be?), action plan (How do we get there?), Monitoring and managing (How do we measure success?), communications (Who should we tell?), and auditing (Where are we? Where are the others?) (Bhargava & Welford, 1996b:120). One must bear in mind that a school is similar to a business in that the manager must also deal with the resources used and those discarded by the school. Therefore, both need to examine the effect of their choices of input and output management of resources on the environment (Raath *et al.*, 2009:9). What concerns me is that the South African Schools Act (SA. DoE, 1996a:9-10) does not make mention of an environmental sub-committee in the list of duties and functions that a governing body may establish to deal with environmental management. Even though the purpose of a school is to ensure that “learning takes place and that education occurs” (Rentoul, 1996:1), environmental management can also be achieved through human, material and financial resource management of those resources. The aim of education management is to manage resources effectively in order to facilitate teaching and learning that will produce educated individuals (Rentoul, 1996:1). Clarke (2007:1, 3-5, 45) discusses how good management and strong leadership are essential for the success of a school. Principals, as managers of a school, are responsible for ensuring that systems operate effectively. It is also important to note that the traditional hierarchy, individualistic and competitive organisational structures of the past decades have made way for the sharing of ideas and a co-operative approach to effective management.

Viewing the school as a system with many parts, these parts of the system tend to interfere with each other. It is important to have knowledge in order to realise that a solution to one problem may cause even greater problems somewhere else. This adds to the difficulty of environmental management and prompts the manager to apply a macroscopic view (Jørgensen, 1991:1-6). Environmental management is not straightforward. It involves a

mixture of policy making, planning and management. There is also no specific generally adopted framework to give it structure, guidance for policy and procedures, as well as standards and systems, even though, for example, the ISO 14001 exists (Barrow, 2006:163,164). For example, an environmental manager in a school is faced with unique situations and the approach adopted is a reflection of the many factors that include the attitudes and background of those involved as well the particular situation, time, funding, etc. The environmental management approach chosen can include the following features: top-down (authoritarian), bottom-up (participatory/inclusive), centralised, decentralised, socialist, free market, Western, company focus, non-business focus, non-Western, light-green (technology accepted), dark-green (technology opposed), giving priority to social development (poverty alleviation), and giving priority to environment before human welfare. A systematic and comprehensive approach to environmental management leads to the realisation that the positive environmental impact of EMS is beneficial to all (Steger, 2000:26).

EMS reviewed in a study by Steger (2000:27, 28) showed that during the first year of implementation EMS was mostly implemented as a top-down process. An EMS is regarded as a tool that provides support for environmental management and standardisation (Barrow, 2006:177). The OECD (2001:41) describes top-down management approaches as those usually developed by an authority who usually will not involve any stakeholder for whom the strategy is intended. Such strategies are usually developed by co-operation agencies, which are held accountable for implementing sustainability approaches and implemented by an authority. A top-down approach is affected by a shortfall of time and funds. This results in a lost depth of assessment and reliability due to haste and financial shortcuts. The critique against the top-down approach is that it relies on regulations and inspection, among others. The bottom-up approach is opposite to the top-down approach and involves the active participation of stakeholders, who often initiate the strategy. The bottom-up approach is often too slow to be practical. The critique against the bottom-up approach relies on rewards to obtain results (Barrow, 2006:174). It is important not to associate top-down approaches with failure or to associate bottom-up approaches with success. Raath *et al.* (2009:12) state that an EMS at a school cannot be a one-man, top-down management system. All the role-players in the school are required to take part in the planning, implementation and maintenance of the EMS. It is believed that this will ensure that the school will become successful in its sustainable management and functioning. Nel and Kotzé (2009: 8, 9) maintain that environmental managers must be sensitive to the culture and the management model within which they function. This is applicable to any school situation. Barrow (2006:174) maintains that no single “best approach” to environmental management exists, since each situation is unique and calls for an adoption that reflects the attitudes and

background of those involved, among others. The ideal is a quick, thorough, adaptable and transparent approach where results can be seen. The reality is that a manager is faced with the two choices discussed.

An approach to management that is based on SD for managing an organisation is recommended by Welford and Jones (1996:245-253) and can be applicable to an EMS. The approach includes elements such as:

- Accountability – an organisation must be accountable to all its role-players.
- Transparency/openness – it will mean a smaller likelihood to want to hide environmentally damaging practices.
- Education and learning – to communicate education about the organisation that will improve their understanding of the SD process.
- Equity – empowerment of role-players in an organisation must be present to challenge traditional balances of power.
- Futurity – organisations must move towards using non-renewable resources or other alternatives.
- Biodiversity and animal protection – organisations can monitor and report on their impact on the environment.
- Human rights – the organisation must comply with all legal requirements and all role-players must be exposed to equal opportunities.
- Local action and scale – a close relationship with the community within which the organisation operates is important.
- Life cycle impacts – the organisation must aim to reduce any negative impacts, reduce waste and environmental damage.

If these elements are implanted in an EMS in South Africa, they not only maintain the principles of a democratic government, but they apply to the principles of conservation.

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## 2.4 A BRIEF OVERVIEW OF EDUCATION MANAGEMENT IN SOUTH AFRICA

In South Africa, the primary purpose of education management has been described as creating an environment for effective teaching and learning, meaning that it must improve performance in the education service according to three criteria (SA. DoE, 1996b:37):

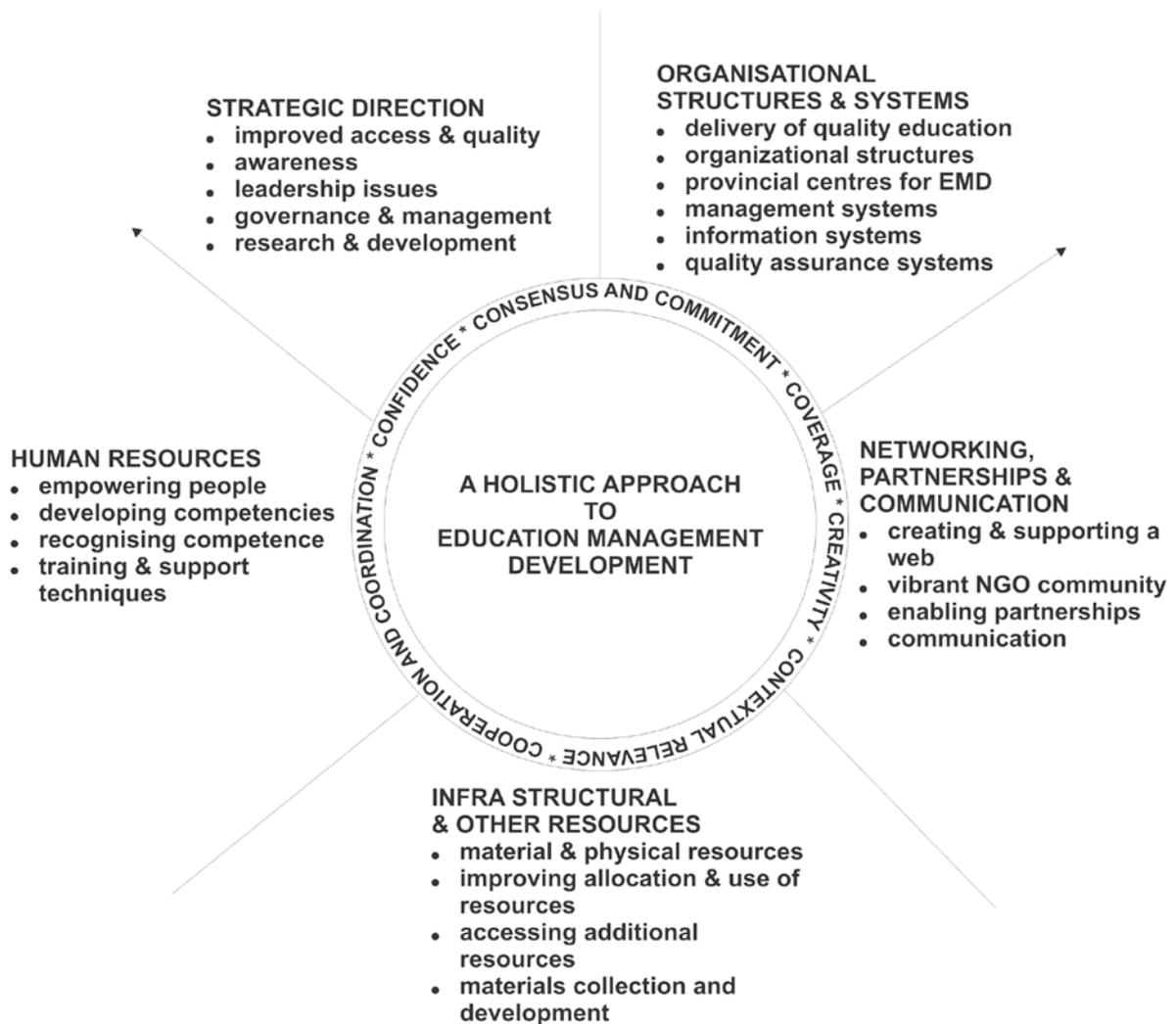
- Effectiveness- achieving the objectives of the school;
- Efficiency – improving performance at equivalent or lower cost, and using resources to best effect; and
- Relevance- sustaining the ability to learn and adapt.

It is necessary to understand how management functions in a school, as an organisation, especially since it was reported that there is an “inappropriate nature of many of the existing management systems, processes and structures” (SA,DoE, 1996b:25) in schools. A summary is provided for placing the EMS in context within an education management system.

According to Van der Westhuizen and Van Vuuren (2007:436), a 1996 task team on Education Management Development put forward a framework for education management development that follows a holistic approach (cf. Figure 2.4) (SA. DoE, 1996b:36-38). It is made up of five components:

- Strategic direction - referring to setting a path to guide schools within the context of agreed values and principles.
- Organisational structures and systems - referring to building capacity to develop and deliver quality education services through effective structures and procedures.
- Human resources - referring to developing all the role-players within education.
- Infrastructural and other resources - referring to developing the basic infrastructure for decision-making and providing enough technical, financial and material back-up.
- Networking, partnerships and communication - referring to linking organisations, people, resources and interest groups inside and outside South Africa and improving levels of communication.

A key feature of the education management developed is the holistic approach, showing that a school functions as a unit with many parts that are connected.



**Figure 2.4 A holistic approach to education management development (SA. DoE, 1996b:36-38).**

McLennan and Thurlow (2003:3-5) report on the challenges faced by education management in post-apartheid South Africa. They state that effective management is hampered by the exclusion of major *stakeholders and the broader community*; *unequal* distribution of organisational power, management capacity, and education and training along gender, race and ethnic lines; *effectiveness* of ensuring the delivery of services and *efficiency* of saving resources; financial and management *accountability*; *sharing responsibility* that implies the development of new skills and capacities; and establishing *democratic processes* will require that existing political and organisational arrangements be challenged. The principal, as the manager of an education organisation who is faced with the latter challenges, will manage using a certain education management approach. It is necessary to mention the approaches to education management from within a certain worldview:

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- The (Christian) scientific education management approach is based on Christian ethics. Control is important to this approach. It is associated with authoritarian, hierarchical and inaccessible management styles where officials are implementers of policy.
  - Education management that focuses on leadership is where the principal plays a central role in ensuring motivation and performance of staff. Less emphasis is placed on administrative processes and more on management and leadership functions of managers. This approach is seen to have originated as a result of the introduction of “Model C”<sup>21</sup> schools. There is decentralisation of authority.
  - Education governance and management is characterised by change management since alternatives to education management are being sought. It is concerned with the relationship between policy, decision-making processes and implementation. It focuses on community involvement and communication (McLennan & Thurlow, 2003:7-14; SA. DoE, 1996b:15).
  - School-based system of education management where the responsibility lies firmly on a school principal, the management team and the governing body according to the Schools Act (SA, DoE, 1996a:8). Strategic management in South African schools has been strengthened by the acquisition of Section 21<sup>22</sup> status in accordance with the South African Schools Act of 1996. School with this status have greater autonomy.
  - TQM also offers schools a holistic and integrated approach (Bush & Coleman, 2000:65). TQM is commonly used to aid in the search for “quality” education. This management approach focuses on the internal functioning of an organisation to ensure sustainable performance improvement. TQM involves everybody in the organisation in decision-making. This is done so that teacher commitment and learner and parent satisfaction can be enhanced. It enables a school as organisation to assess their products and serves to meet the needs of the learners and parents, eliminates waste, increases efficiency and improves productivity. Its beliefs and principles focus on continuous improvement so that needs of learners and parents are met and their expectations can be exceeded. This means that the school is expected to provide learners with teaching

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<sup>21</sup> Model C schools were introduced in 1992 in South Africa in order to cope with the financial cutbacks of the white education budget. Schools were required to scale down expenditure by either reducing the number of teachers or services provided. By taking up the Model C option, parents paid increased school fees, to be able to continue and hire more teachers, but they had a greater autonomy in the development of school policy. For example, they managed and controlled the appointment of teachers, the admission policy, additions to the curriculum, the use of buildings and financial policy (McLennan & Thurlow, 2003:10-11).

<sup>22</sup> The greater the authority exerted by SMTs and school governing bodies (SGBs), the greater the potential for a truly strategic approach to emerge. The challenge is that the SMTs and SGBs are required to think and act strategically in order to align school policies and practices with national legislation. However, there is only limited empirical evidence of a strategic approach being adopted in practice. (Moloi, 2007:466, 467).

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and learning services that will enable them to become useful citizens who serve their communities (Naidu *et al.*, 2008:42, 43).

### 2.4.1 THE SCHOOL AS AN ORGANISATION

It is not enough to know that leadership and management within a school are important. The school as an organisation has particular characteristics and relationships between elements of organisational life (Davidoff & Lazarus, 2002:17). The school as an organisation is described as a collection of teachers, learners, parents, and non-teaching staff all working towards the common goals of ensuring that learners are provided with quality teaching and learning (Naidu *et al.*, 2008:75). Everard, Morris & Wilson (2004:150) describe the school as an organisation consisting of four interdependent elements, namely structure, people, technology and culture. Davidoff and Lazarus (2002:21-41) have analysed the elements of a school as an organisation in greater detail remembering that all the elements are interlinked and interdependent. The eight elements are listed and briefly described.

- School culture - this refers to the organisation's value system, underlying norms and the overall ethos of the school.
- Identity - refers to the school's vision, organisational character, core purpose and the direction in which the school wants to move.
- Strategy - refers to the adopted strategy to develop the school as an environment for teaching and learning, focusing on setting goals, planning and evaluating the organisational context and the curriculum.
- Structures and procedures - refers to the interrelated nature of the different aspect of school life. Structures are the departments and committees and how these relate to one another, and the lines of responsibility and accountability within and between these units. Procedures refer to the rules, regulations and methods whereby these structures relate to one another.
- Technical support - refers to resource access and control, teaching and learning support, finances and administration.
- Human resources - concerns all the role-players at the school. Five aspects are highlighted: the use of human resources; the training and development of human resources; personal and interpersonal relationships and dynamics, service conditions: and psychosocial and learning support.

- Leadership, management and governance - refers to the different leadership styles, school policy, the governing body's central role as part of the organisational management and curriculum management.
- The context - refers to social, political, economic, technological, legislative, ecological, physical, cultural and organisational dynamics as aspects that shape the broader context of the school. On a macro scale the community resources, education support services and local dynamics feature. On a macro scale the national and provincial education and related policies, resources and systemic dynamics feature. On a global scale international trends and dynamics feature.

The school as an organisation can act as a microcosm of society. In reality long-term environmental gains are sacrificed for short-term economic advantage and indifference towards environmental issues is shown (Netherwood, 1996:52). Despite this, environmental management in schools can help to change the outlook, as is discussed next.

## **2.5 ENVIRONMENTAL MANAGEMENT IN EDUCATION IN SOUTH AFRICAN SCHOOLS**

EE in South African schools was initiated by a donor-funded initiative between 2000 and 2002. Named the National Environmental Education Programme for General Education and Training (NEEP-GET), it helped teachers to integrate environmental learning (Lotz-Sisitka, 2002:98) with the outcomes-based curriculum, C2005. One strategy of the national DoE NEEP-GET to improve environmental learning in schools through this project was “encouraging teachers to initiate activities and projects that supported environmental learning, that included the development of school environmental policies and management plans” (SA. DoE, 2003). The Schools Environmental Policy (SEP) project and Management Plan (MP) originated from this strategy. SEP helped schools to interpret the environmental management policies (like NEMA) and to implement these policies (rather than the new curriculum) through practical action projects, for example gardens and water saving projects. The SEP was the forerunner of Eco-Schools (cf. 2.2.6.3) in South Africa. SEP was more focused on environmental management and action projects, than on EE in the curriculum (Rosenburg, 2008:59).

The focus on environmental management was changed when the Environmental Education Curriculum Initiative (EECI) became a national curriculum initiative aiming to ensure that EE was included in C2005. It evolved from the Environmental Education Policy Initiative (EEPI) that succeeded in getting EE recognised in the White Paper on Education and Training

(1995) (cf. 3.5.2). The Department of Environmental Affairs and Tourism in Pretoria coordinated the national initiative and distributed the newsletter. Provincial working groups made up of representatives of education departments and a variety of EE service providers ensured local implementation. The SEP and MP was one of the most important products of the EEI (EECIWC, 2000) since it helped master the specific outcomes in learning programmes that fulfilled C2005s needs. It provided guidance to schools, enabling them to develop and implement an environmental policy at a local level (Petersen, 2000). Some provinces did not commit themselves to any environmental management measures, yet others did, for example the KwaZulu-Natal DoE that aimed to get each school in the province to adopt such a policy by the year 2000. Mpumalanga and the Free State were also exposed to a SEP and MP tailored for their respective provinces. The Western Cape Metropolitan Council undertook a pilot project whereby local schools in the Western Cape developed and implemented their own environmental policies. The "SEP and MP" in the Western Cape was presented in July 1999 (Petersen, 2000). The EEI in the Western Cape's SEP and MP consisted of a resource pack featuring about 30 A4 worksheets and reference pages. It provided different methods of approaching the diverse range of activities and roles that schools typically have to deal with. The non-prescriptive document contained suggestions for a procedure for schools to develop their own unique EE policy (EECIWC, 2000). The South African Schools Act of 1996 makes provision for schools to become more involved in making decisions about their own facilities, governance and expenditure (SA. DoE, 1996a:10, 16). By using the schools environmental policy, a school community can manage their environment better.

Pillay (2004:86-89) formulated a SEP and MP. Similarities exist between the work of Pillay and the *Education for Sustainable Living* project's EMS. Pillay's policy and plan involve the following processes:

- Appointing a responsible person/team/environmental committee
- Involving all role-players and stakeholders
- Performing an environmental audit identifying environmental issues to be addressed. Environmental auditing helps schools to assess their general environmental performance; evaluating current environmental practice; and identifying priorities for change. The audit sheet that is compiled must be customised according to the context of the school. The auditing process must also involve all stakeholders at the school. These include the SGB members, learners and teachers.
- Identifying a policy statement and action plan to address the issues.
- Implementing the action plan. The action plan outlines how the aim set out by the school could be achieved. Action plans must be measurable, achievable and realistic.

It must define the action (what); allocate responsibility (who); provide a time frame (when); and provide an opportunity for formal assessment and modification (comments).

- Evaluating, reflecting and improving on the policy and action plans

It is also noted by Pillay (2004:86-89) that policy development processes are open and differ from school to school. The process encourages schools to audit existing activities and to formulate, evaluate and review EE goals and actions for key curriculum and extra-mural activities. School managers need to deal with the process of implementing an environmental policy and management plan with care, since it is an on-going evaluation in a cycle that will lead to a new plan of action. This approach can be aided by an EMS.

Schools as NPOs not only provide services, but also consume commodities that in turn impact on the environment. Managers of schools need to have a plan for managing the input and outflow of resources. This means that managers of schools have a duty to adhere to environmental legislation (cf. 2.3.1) and a responsibility to manage the school in an environmentally responsible manner. The development of an EMS by managers therefore affords learners the opportunity to participate in working towards a sustainable environment (Raath *et al.*, 2009:2).

This section has revealed that environmental management is a manifestation of the time we are living in. Commercial and education organisations are compelled to become more conscious of their management of the whole organisation that includes an environmental component to promote SD.

## 2.6 CONCLUSION

This chapter has provided a discussion of what an EMS is understood to be from within the context of its implementation in a school as an organisation. This chapter has revealed that an EMS within a school is a method of integrating environmental care by means of the inclusion of themes related to the curriculum, and management practices. The EMS in the three cases in this study, adopted the seven step guidelines suggested by the *Education for Sustainable Living* project that are similar to the steps of the MOS-project and Eco-Schools Programme. The chapter furthermore showed that environmental management involves policy making, planning, and management, and together with its systematic and comprehensive approach it can aid the positive environmental impact of the EMS implemented in a school. An EMS is, therefore, a management tool designed to help a school improve its awareness of and control over environmental impacts that requires structure with good communication channels between role-players. In a school, the EMS can serve as a tool to manage the environmental performance of the school. It can be used as the basis of environmental learning, where a school follows education management approaches that are interlinked and interdependent. In the following chapter, the origins, strategies and principles of EE, SD and ESD, as well as the whole school approach to EMS, environmental learning in education, and EE in South Africa's curriculum will be discussed so as to explain how ESD is promoted when an EMS approach is implemented in a primary school.

*“The ultimate goal of ESD is to empower people with perspectives, knowledge, and skills for helping them live in peaceful sustainable societies.”*  
*The Luneburg Declaration on Higher Education for Sustainable Development. UNESCO 2001*

# CHAPTER 3

## ORIGINS OF ENVIRONMENTAL EDUCATION (EE): PROMOTING EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

### **3.1 INTRODUCTION**

In chapter 2 the implementation of an EMS in the school as an organisation was discussed. Maclean (2005:xiv) maintains that education in its traditional form is not enough to meet the great challenges posed by the phenomenon of unsustainable living, and that new educational approaches are necessary if people are to act upon the awareness of the dangers related to unsustainable living that society faces. Hence, chapter 3 is committed to a discussion of the origins, strategies and principles of EE, SD and ESD. This chapter will also describe a whole-school approach to EMS, followed by a discussion of environmental learning, and an analysis of EE in South Africa’s curriculum to show where ESD can be promoted in teaching and learning.

### **3.2 A CONTEXTUALISATION OF EE**

The term *environmental education* is continuously changing in its meaning and application. The term originated at a meeting of the IUCN in Paris in 1948, when Thomas Pritchard suggested that a need for an educational approach to fuse the natural and social sciences might be called EE (Daudi & Heimlich, 1997:1 ; Disinger, 1983:18). The first attempt at a

definition for EE was by Dr. William Stapp and others who defined the concept in 1969 as being

“... aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution”.

Stapp's definition became a basis for future discussion and development. Three issues stood out in the definition at that stage – knowledge of environmental problems, awareness of possible solutions, and motivation to work toward solutions (Stapp, 1969:31). By the 1970s EE had become a conventional term in educational literature owing to Rachel Carson's 1962 publication of *Silent Spring*. Carson raised public awareness about pollution and excessive energy demands (Daudi & Heimlich, 1997:2). Lauded as the mother of the modern environmental movement, her knowledge of the environment and her writing skills made it possible for ordinary citizens to understand environmental science (Carson, 2002:xii, xiii, 22).

In 1970 a final report by an International working meeting on EE in the school curriculum described EE as

*“... the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among men, his culture and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behavior about issues concerning environmental quality”* (IUCN, 1970:11).

Shortly thereafter, the European Working Conference on Environmental Conservation Education was the first to support the incorporation of the environment into education. The challenge was for educationists to use their environment to its potential so as to create awareness about and incorporate the environment into school education, both in rural and urban societies (IUCN, 1971:10, 11). Clearly the IUCN prioritised EE and addressed the importance of the environment in education. It is important to highlight the role of the UN in the development of EE.

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### 3.2.1 THE ROLE OF THE UN AGENCIES IN EE

The 1972 UN Stockholm Conference on the environment may be viewed as a landmark development for EE. Recommendation 96 of this conference advised that

“... the necessary steps to establish an international programme in EE, interdisciplinary in approach, in school and out of school, encompassing all levels of education and directed towards the general public, in particular the ordinary citizen living in rural and urban areas, youth and adult alike, with a view to educating him as to the simple steps he might take, within his means, to manage and control his environment”

be taken (UNESCO, 1972:35). EE as a critical means by which to address the world's environmental crises was on its way to becoming a buzzword internationally. The conference led directly to the establishment of the UN Environmental Programme (UNEP), whose first task was to establish the term “*environmental education*” as the conceptual framework within which further international development could take place. The UNEP together with UNESCO organised the first International Environmental Workshop in Belgrade, Yugoslavia in 1975 (Irwin & Lotz-Sisitka, 2005:40).

#### 3.2.1.1 THE BELGRADE CHARTER

The International EE Programme (IEEP), established by UNESCO and UNEP in 1975, recognised recommendation 96 at the International Environmental Workshop. The Belgrade Charter materialised at the workshop as a framework and set of guiding principles for global EE. Adopted during the UN conference, the Belgrade Charter provides a widely accepted goal statement for EE, namely:

“To develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.” (UNESCO, 1975:3).

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### 3.2.1.2 THE TBILISI DECLARATION

The Belgrade Charter was further refined at the first Intergovernmental Conference on EE held at Tbilisi in Georgia (then still the USSR) in 1977. Guiding principles of EE were agreed on and published in the “Tbilisi Declaration”. According to this declaration,

“EE, ... should constitute a comprehensive lifelong education, one responsive to changes in a rapidly changing world. It should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values. By adopting a holistic approach, rooted in a broad interdisciplinary base... acknowledges the fact that natural environment and man-made environment are profoundly interdependent. It helps reveal the enduring continuity which links the acts of today to the consequences for tomorrow.” (UNESCO-UNEP, 1978: 24).

Plainly stated, EE was to be integrated into educational programmes, therefore, providing an integrated perception of the environment. The Tbilisi Declaration clearly highlights a relationship between development (economic), conservation of the environment and a need for worldwide compassion where humanity and kindness are fundamental (cf. Ubuntu - 4.2.3.1). Henderson and Tilbury (2004:11) acknowledge that together, the Belgrade Charter and the Tbilisi Declaration provided the foundation for an internationally accepted framework for official policies in EE. Thirty-five years have passed since the publication of the Tbilisi Declaration. The Tbilisi+35 Intergovernmental Conference on Environmental Education for Sustainable Development held in Tbilisi in 2012, affirms that education is critical to achieving SD. The communiqué looks at ESD beyond 2014 when the UN-DESD culminates in 2014 so that life-long learning for SD for all can be in place via a post-Decade framework for ESD. Related to the implementation of an EMS in a school, the communiqué calls for the institutionalisation of ESD commitments at all levels contributing to good governance. It also supports educational organisations to adhere to ESD principles and approaches in their curriculum-planning and mechanisms, and encourages incorporation of ESD into action plans. Furthermore, it encourages the adoption of whole-school approaches (‘whole institution approach’) (cf. 3.4) (UNESCO & UNEP, 2012:1-6).

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### 3.2.1.2.1 THE OBJECTIVES AND PRINCIPLES OF EE RESULTING FROM THE TBILISI DECLARATION

The Tbilisi Declaration makes up the framework, objectives and principles for EE at local, national, regional, and international level, for all citizens both inside and outside of the formal school system (UNESCO-UNEP, 1978: 24-29). The objectives of EE are summarised as follows, namely to help social groups and individuals to:

- acquire an *awareness* of and sensitivity to the total environment and its related problems;
- gain *knowledge* and experience in, and an understanding of, the environment and all its related problems;
- acquire an *attitude* founded on a set of values with feelings of concern for the environment, thus motivating active participation in environmental improvement and protection;
- acquire the *skills* for identifying and solving environmental problems; and
- *participate* actively at all levels so as to work toward resolving environmental problems.

The *evaluation* of environmental measures and education programmes has been included, unofficially, as an additional objective of EE in secondary sources within different education contexts. For example, *evaluation* was originally *recommendation no. 5* that recommends that “governments systematically evaluate the environmental impact of development activities” (UNESCO-UNEP, 1978:29; UNESCO-UNEP, 1985:10, 11).

The 12 guiding principles for effective EE are summarised below. They are now referred to as the Tbilisi Principles of EE and state that EE should:

1. consider the environment in its *totality*;
2. be a *continuous lifelong process*;
3. be *interdisciplinary* in its approach and use a *holistic* and *balanced* perspective;
4. examine major environmental issues from *local, national, regional and international points of view*;
5. focus on *current* and *potential* environmental situations, and the *historical* perspective;

6. promote the value and necessity of *local, national and international co-operation* in the prevention and solution of environmental problems;
7. consider *environmental aspects* in plans for development and growth;
8. enable *learners* to have a *role* in planning their learning experiences, and provide an opportunity for *making decisions* and *accepting their consequences*;
9. relate *environmental sensitivity, knowledge, problem-solving skills and values clarification* to the learner's own community in early years and every age;
10. help *learners discover the symptoms and real causes* of environmental problems;
11. emphasise the *complexity* of environmental problems, thus *developing critical thinking and problem-solving skills*;
12. use *diverse learning environments* as well as different *educational approaches* to teaching/learning about and from the environment with due stress on *practical activities and first-hand experience*.

The objectives and principles of EE show that through acquired knowledge all citizens will be made to realise the interrelated nature of the environment, and gain a holistic perspective that can aid in changing attitudes, whereby lifelong learners will together be able to use acquired skills to find solutions to current environmental problems. The Tbilisi Principles for EE can be integrated into a school EMS and teaching and learning activities, since it recognises EE as a lifelong process based on an interdisciplinary approach. A 1987 International Conference on EE held in Moscow reaffirmed the Tbilisi Principles as sound guideline for the development of national EE programmes. However, at the time the South African apartheid government was of the opinion that the Tbilisi Declaration had a “communist origin” and failed to accept the principles (Irwin & Lotz-Sisitka, 2005:40).

### 3.2.1.3 THE EARTH SUMMIT

The UN Conference on Environment and Development (UNCED) (known as The Earth Summit), held in Rio de Janeiro, Brazil, from 3 - 14 June 1992 reaffirmed the Declaration of the UN Conference on Human Environment, adopted at Stockholm in 1972. A notable observation of the Earth Summit is that it focused on the role of EE as an *educational response* to the environmental crisis (Irwin & Lotz-Sisitka, 2005:42). Two important resulting foundation documents from this conference need mentioning.

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### 3.2.1.3.1 AGENDA 21 CHAPTER 36

The Agenda for the 21st century (Agenda 21) is the contemporary motivation for EE and is seen as a comprehensive programme for global action in all areas of SD. A majority of countries worldwide agreed to accept SD as a goal and Chapter 36 of Agenda 21 focused on the importance of educating for SD. It was seen as a means to promote SD and address environmental issues through education, public awareness and training (UNESCO, 2005:27-29). EE was described as a process that involves teachers and learners in promoting SD and improving the capacity of the people to solve environmental and development problems. Education was described as being critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with SD and for effective public participation in decision-making. The agenda affirms that the latter will be effective if EE deals with both the physical/biological and socio-economic environment and human (as well as spiritual) development, integrated in all disciplines, using all means of communication. Agenda 21 promotes multi-disciplinary responses to issues of environmental sustainability<sup>23</sup> (UNCED, 1992a), and the need for widespread EE programmes in diverse settings is emphasised (Irwin & Lotz-Sisitka, 2005:42). According to Maclean (2005:xiv), the challenge identified in Chapter 36 of Agenda 21 is that of reorienting education “to promote widespread public understanding, critical analysis and support for SD”. The challenge was met by teachers who supported the idea that EE should be focused primarily on achieving the goals of SD (Irwin & Lotz-Sisitka, 2005:43). It shows that Chapter 36 of Agenda 21 has ensured that an international framework for action does exist through education. New educational approaches that Maclean (2005:xiv) refers to are needed if people are to act upon an awareness of the environment and a new ecological vision supported by global solidarity. This is being attempted by UNESCO through its trans-disciplinary project “Educating for a Sustainable Future” and as Task Manager for the implementation of Chapter 36, playing a leading role in this regard. This is to be achieved through partnerships - between governments, the private sector and parliaments, academic and scientific communities, NGOs, local communities and the media. The change is thought to come through top-up and top-down channels with responsibility resting with the leaders and implementers of education reform.

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<sup>23</sup> According to Sauvé (2005:30), sustainability refers to “maintaining life and social equity” and less with an “economist vision of SD”.

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### 3.2.1.3.2 THE RIO DECLARATION ON ENVIRONMENT AND DEVELOPMENT

The Rio Declaration on Environment and Development supported Agenda 21 by defining the rights and responsibilities of countries and holding as a principle that humans are at the centre of concerns for SD. The Rio Declaration also contains 27 principles of sustainability. These principles are in place to help governments, communities, and school systems identify knowledge, principles, skills and values on which they will create ESD or reorient existing education to address sustainability (UNESCO, 2005:27). Three principles proclaimed within the Rio Declaration on Environment and Development that are relevant to this study and that form part of the principles of SD (UNCED, 1992b) are highlighted.

Principle 10: Environmental issues are best handled with the participation of all concerned citizens ... and the opportunity to participate in decision-making processes...

Principle 11: States shall enact effective environmental legislation. ...management objectives and priorities should reflect the environmental and developmental context to which they apply...

Principle 21: The creativity, ideals and courage of the youth of the world should be mobilised to forge a global partnership in order to achieve SD and ensure a better future for all.

The excerpts from the three principles highlight the importance of ensuring the participation of all citizens, for example applying an EMS in a school, in order to manage and search for solutions to current and future environmental issues so as to achieve SD. Twenty years after the Earth Summit, the UN Conference on Sustainable Development, Rio+20, encouraged schools to consider adopting sustainability management following what is interpreted as a whole-school approach with regard to participants and teaching SD as an integrated component across disciplines. They also promote ESD and the more active integration of SD into education (UN, 2012:40, 41).

### 3.2.1.3.3 THE NGO FORUM

On 9 June 1991 the NGO Forum Treaty on EE for Sustainable and Socially Just Societies was presented to the plenary session of the International Forum of Non-Governmental Organisations and Social Movements during the Earth Summit in Rio de Janeiro. Even though these principles are less widely known and adopted than the Tbilisi Principles, they

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are of significance to EE since the treaty recognised the central role of education in shaping values and social action. The NGO Forum highlighted the role of NGOs in EE processes, and in developing educational processes. These processes recognised that everybody has something to learn and something to contribute. The treaty was also committed to a process of educational transformation aimed at involving individuals, communities and nations in creating equitable and sustainable societies. It regarded EE as a socially transformative and continuous learning process based on respect for all life. Selected excerpts of the NGO Forum Principles of EE for equitable and sustainable societies that are of significance to this study are listed below because they speak of a holistic and interdisciplinary approach that through the knowledge, skills, values, attitudes and actions gained in education experiences can promote behavioural changes to address global issues in a systemic approach (Irwin & Lotz-Sisitka, 2005:43, 44; UN, 1992).

- EE .....must involve a holistic approach and thus an interdisciplinary focus in the relations between human beings, nature and the universe.
- EE ..... should treat critical global issues, their causes and interrelationships with a systemic approach and within their social and historical contexts...
- EE ..... must integrate knowledge, skills, values, attitudes and actions. It should convert every opportunity into an educational experience for sustainable societies.

#### **3.2.1.4 THE THESSALONIKI DECLARATION**

The International Conference on Environment and Society: Education and Public Awareness for Sustainability held in Thessaloniki, Greece from 8 - 12 December 1997, was aimed at celebrating 20 years of the Tbilisi Declaration. The Thessaloniki Declaration reaffirmed UNESCO's commitment to ESD and referred to it as education for environment and sustainability. The conference aimed to evaluate education as a basis for a fourth pillar of sustainability in the 21<sup>st</sup> century (Irwin & Lotz-Sisitka, 2005:46). It was reaffirmed that "all subject areas, including the humanities and the social sciences, need to address issues related to environment and SD. Addressing sustainability requires a holistic, interdisciplinary approach which brings together the different disciplines and institutions while retaining their distinct identities." This clearly points to a whole-school approach<sup>24</sup> (cf. 3.4). There was also mention of an action framework for environment and sustainability that needed to take local, regional or national contexts into account. The reorientation of education called for not only

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<sup>24</sup> A whole-school approach to sustainability incorporates all elements of school life, for example school governance, pedagogical approaches, curriculum, resource management, school operations and grounds. Whole-school approaches can also mean that the local community is involved as a partner (Henderson & Tilbury, 2004:8).

the involvement of the educational community, but also that of governments, financial institutions, and all other actors. This action framework that comprises many role-players recommends that education should be an integral part of Local Agenda 21<sup>25</sup> initiatives. They recommend that “Schools be encouraged and supported to adjust their curricula to meet the needs for a sustainable future.” (UNESCO, 1997). Sauvé (1999:30) argues that from a reconstructive perspective, EE was in search of meaning and significance, but unfortunately, following the Thessaloniki Conference, UNESCO opted too soon for a reductionist proposal, because they oversimplified its meaning.

### **3.2.1.5 THE WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT**

The UN held a World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa from 26 August - 4 September 2002. Government officials and other interested parties from around the world gathered to discuss longer-term environmental issues. Support for the use of education to promote SD was reaffirmed and delegates recommended to the UN General Assembly that it consider adopting a DESD, starting in 2005 (cf. 3.3.3.2) (UN, 2002b:62).

### **3.2.1.6 THE AHMEDABAD DECLARATION AND RECOMMENDATIONS**

At the fourth International Conference on EE held in Ahmedabad, India in 2007, the *Ahmedabad Declaration 2007: a call to action* was drafted in the context of the UN-DESD (2005-2014). It reinforced the belief that through education people can learn to live sustainably. It stated further that individuals are “learners and teachers” and that “ESD encourages a shift from viewing education as a delivery mechanism to a lifelong, holistic and inclusive process.” (UNESCO, 2007a). The conference delegates recommended, among others, that countries give greater priority to funding and support for the implementation of policies and frameworks for EE and ESD; the promotion of systemic thinking skills in EE; the integration of education processes as an essential and practical part of environmental management and SD plans and strategies in all organisations concerned with environmental change and SD. It also recommended the review and change of existing educational structures, roles and forms to allow for effective EE and ESD practices. In order to

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<sup>25</sup> Local Agenda 21 refers to the local policies and programmes developed by the local community that work towards achieving SD. It is based on the concept described in chapter 28 of Agenda 21 of the 1992 Earth Summit (Srinivas, 2010).

implement the recommendations, the conference called for immediate change in the purpose and practices of education. This can be interpreted as the implementation of an EMS in school structures and management (UNESCO, 2007b:4-10).

### **3.2.1.7 THE BONN DECLARATION**

The 2009 UNESCO World Conference on Education for SD aimed to reflect on the achievements of the first half of the UN-DESD, and to establish what remained to be done in the years to come. An outcome of the conference was the adoption of the Bonn Declaration. It called for all countries to work collaboratively to ensure SD, assuring that investment in ESD is an investment in the future. It also urged all countries to commit themselves to education for change where education provides the values, knowledge, skills and competencies for sustainable living. ESD is to promote quality education and help societies to address different priorities and issues, for example water, energy, climate change, disaster and risk reduction, loss of biodiversity, food crises, health risks, social vulnerability and insecurity, through a systemic and integrated approach. This is to take place in formal, non-formal and informal education, through the development of pedagogical approaches, teacher education, teaching practice, curricula, learning materials, and education leadership development in all disciplines and areas of a school (UNESCO, 2009b:1, 2, 4).

It is evident from the discussion above, which highlights the involvement and role of the UN in the development of EE over almost seven decades, that education holds a prominent place in ensuring that people learn to live sustainably. As recent as 2011, the UN Economic and Social Council (UNESC) called for education to play “an important role in enabling people to live together” in ways that contribute to SD (UNESC, 2011:2).

## **3.2.2 AN EVALUATION OF EE**

The above review of the role of UN agencies in EE no longer refers exclusively to the sustainability of flora and fauna, as was the case when the concept originated. One must consider for a moment the critique of those who have studied UN documents’ perspectives on education. For example, Sauv , Berryman and Brunelle (2007:36, 37, 49) through scrutiny of UN documents feel strongly that EE should be considered a core dimension of basic education, and that education is the main strategy that can bring minds together

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towards the achievement of SD. I am of the opinion that education plays a central role in the promotion of EE and SD. In agreement with the general view of the UN declarations and meetings I do concur that the promotion of systemic thinking skills in EE and especially the integration of teaching and learning in education is an essential and practical part of environmental management, hence the implementation of an EMS in a school to promote ESD. This approach will silence the critique against EE that it views problems from a biophysical environmental perspective, fails to take into account the human aspects of a situation, and is taught as “environment-related” education (Sauvé, 1999:18; Sauvé, Berryman & Brunelle, 2007:50). Furthermore, the discussion of EE also revealed that a holistic and interdisciplinary approach to EE is necessary, which can also be achieved by means of an EMS implemented in an organisation since it will fulfil the call for lifelong learning. It is also clear that “the” definition of EE cannot be claimed because education is not static; rather it is a flexible and often contested concept (Jickling, 1997:97). When referring to statements like “Education is a key to achieving SD”, “Education is critical for promoting SD” and “Integrate SD into education systems at all levels of education in order to promote education as a key agent for change”, it becomes evident that education and environment are both prominent (UN, 2002b:61, 102).

The next sections of this chapter analyses the origin of SD and the discourse that exists regarding ESD, and education for, in or about the environment.

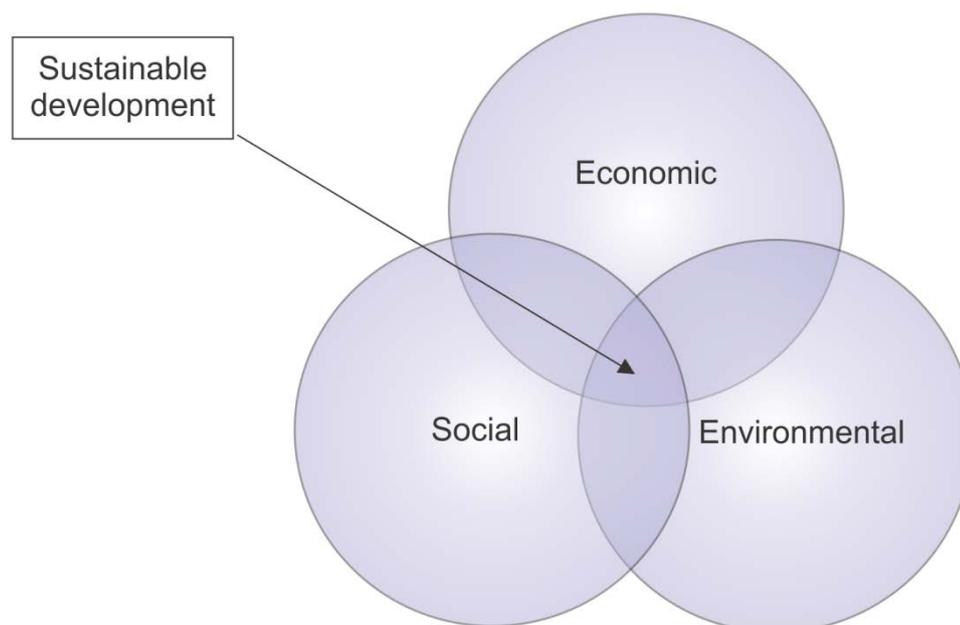
### 3.3 A CONTEXTUALISATION OF SD

The term *sustainable development* grew in popularity during the mid-1980s. It gradually entered the EE movement and became a dominant perspective (Sauvé, 2005:29). It was in the *World Conservation Strategy* published by the IUCN, the UN Environment Programme (UNEP) and the World Wildlife Fund (WWF) that the term SD first appeared in an educational context (IUCN, UNEP, WWF, FAO & UNESCO, 1980:1-6). It became a common term with the publication of the Brundtland Commission’s 1987 report, *Our Common Future*, which popularised the term SD. In the early 1980s the UN recognised that conservation and development were equally important to all countries, thus emphasising SD as a concept. The Brundtland Commission defined SD as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. The intention of the term was to allow one to continue to improve human welfare (i.e. develop) within the limits of the earth’s natural resources (i.e. conservation) (WECD, 1987). This allows for both social and economic development of individuals, and at the same time it recognises the importance of conserving the environment for future generations (cf. Figure

3.1). I stand in agreement with Sterling (2003:181) who is of the opinion that the Brundtland report held a somewhat holistic and systemic view of issues pertaining to the environment and development. In the 21<sup>st</sup> century SD is regarded as one process of social change because it is thought that attitudes, behaviours and practices of policy makers, businesses and consumers can be changed through policy and management processes. SD is strongly regarded as being an issue of attitude. Therefore, authorities in Belgium consider ESD to be crucial (Sleurs, De Smet & Gaeremynck, 2008:28, 29). Alternative interpretations of SD need to be mentioned in order to understand its meaning within the context of environmental management.

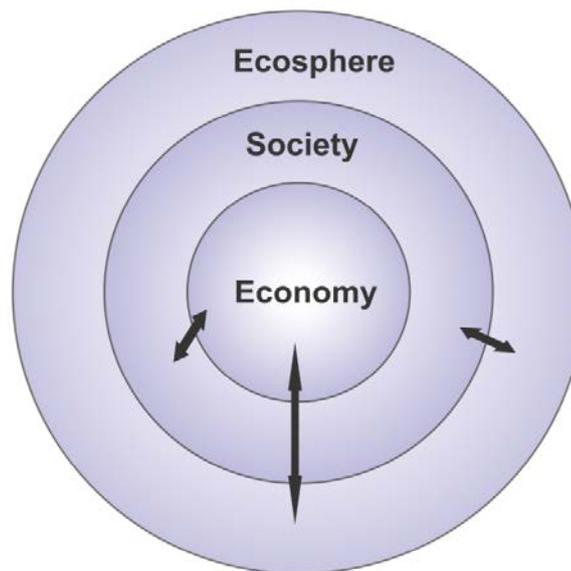
### 3.3.1 ALTERNATIVE INTERPRETATIONS OF SD

The Venn diagram of three interconnected circles, namely economy, society and environment, is the familiar conceptual diagram of SD (cf. Figure 3.1). It can be remarked that SD promotes an integrated and all-inclusive form of EE because of its interrelatedness with humankind, the biophysical surroundings and economics as three pillars of SD.



**Figure 3.1 The Venn diagram of the relationships between economic, environmental and social dimensions of SD**

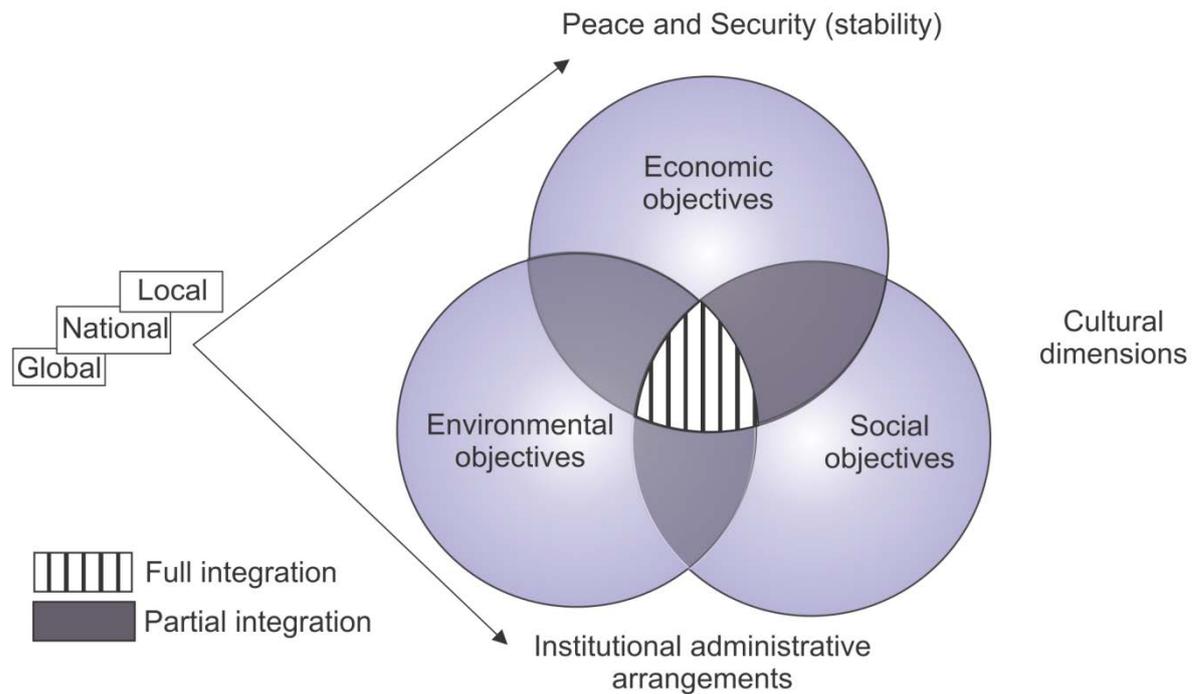
Webster (2004:40, 41) is critical of the three pillars of SD. He is of the opinion that it leads to a fragmented and false perspective in which economic growth goes unchecked. He proposes a concentric image of SD (cf. Figure 3.2) since he believes that the earth is a finite ecosystem with an ecosphere that encapsulates all human activity which is at risk if boundaries are broken. The economy is viewed as providing a service to society in order for it to develop.



**Figure 3.2 Webster's concentric image of SD (Webster, 2004:41)**

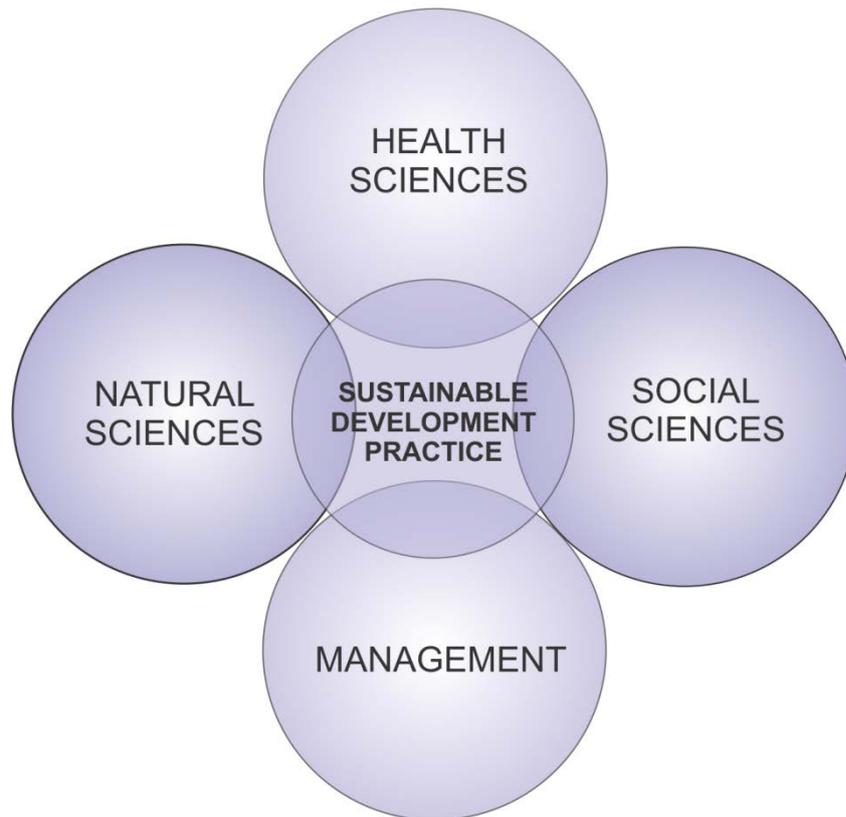
For Sauvé (1999:22) the conceptual scheme of SD represented by three interconnected circles is problematic, and regards the sphere of the economy as an outside society and not as an integral component of social choices. Sauvé also believes that this sphere is a supra-entity that governs the relationship between society and the environment, and it is in the economic sphere that development takes place.

Dalal-Clayton, Bass, Sadler, Thomson, Sandbrook, Robins, and Hughes (1994:6-8) state that SD means achieving a quality of life that can be maintained for generations to come because it is socially desirable (fulfilling cultural, material and spiritual needs fairly), economically viable (being self-supportive), and ecologically sustainable (maintaining the long-term viability of supporting ecosystems). National and local strategies must take different forms, but must be consistent between levels. It is their opinion that a compromise must be reached within the existing cultural and political circumstances, and institutional and administrative arrangements which are unique to a country (cf. Figure 3.3). This description and approach elaborates on the basic three spheres understanding of SD. It adds value to the understanding of SD since organisations are all unique with their own cultural and social agendas in unique settings around the country that need to be considered when dealing with living sustainably.



**Figure 3.3 The dimensions of SD (Dalal-Clayton et al., 1994:7)**

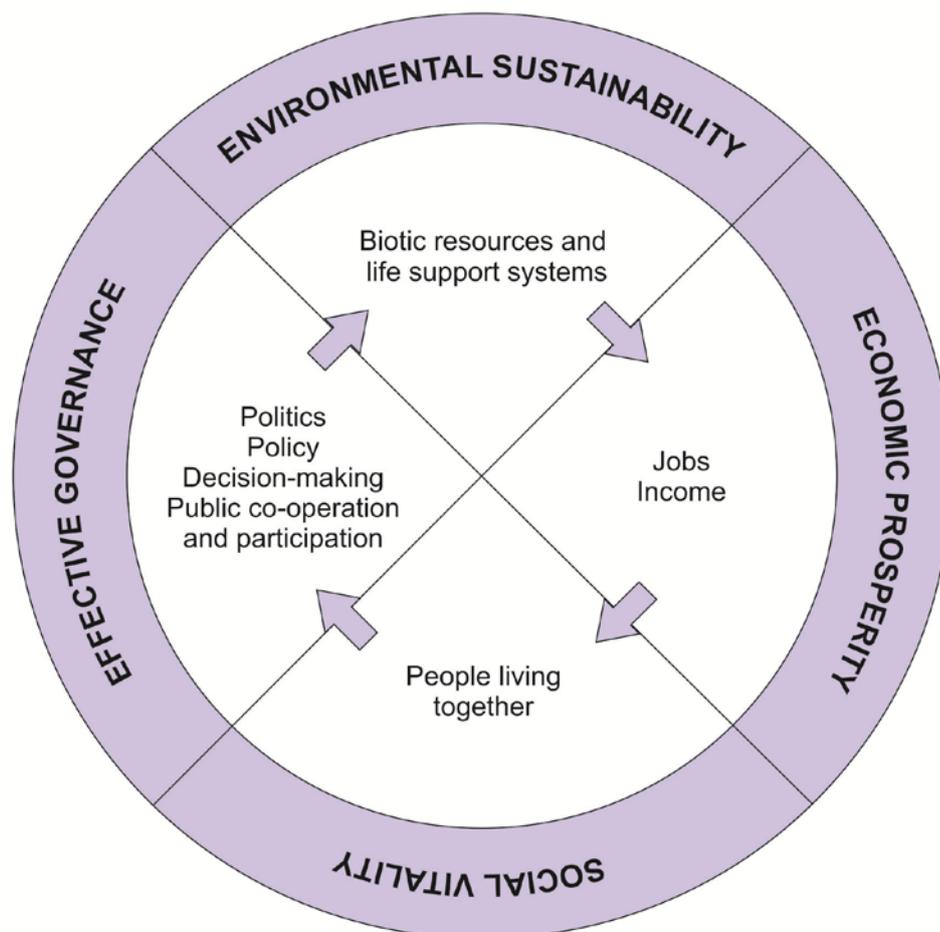
Extensive international experience gained by commissioners of the International Commission on Education for SD Practice has led McArthur and Sachs (2008:iii) to report that the challenges of SD require a new and more systematic approach to teaching, learning and problem-solving for development practitioners. McArthur and Sachs (2008:1-5, 9, 12) believe further that without comprehensive, cross-disciplinary training, the planning, design and implementation of integrated solutions that would promote SD result in unprepared practitioners and a need for “generalist” SD was identified. This view is of interest to this study because the role-players in an EMS, especially the principal and teachers, have cross-disciplinary training and this could mean that they are well prepared to implement an EMS. The practitioner is expected to understand the complex interactions among fields as well as coordinate and implement effectively among the insights offered by subject-specific specialists. A missing link between health sciences, social sciences, natural sciences and management was identified. This missing link is the SD practice (cf. Figure 3.4). In order to succeed in the practice of SD, it is recommended that the SD practitioner must be trained in competencies that integrate cross-disciplinary knowledge for practical problem-solving with management and leadership skills for effective implementation. The aim is to support future generations of professionals as well as those currently working in the field of SD. The report confirms that a strong global demand exists for a cross-disciplinary education system to train the next generation of SD practitioners.



**Figure 3.4 SD practice at the intersection of the four spheres (McArthur & Sachs, 2008:4)**

Management challenges imply that governance needs to be addressed as a fourth pillar of SD. Boojh (2003:8) describes how governance focusing on institutional frameworks was discussed at the negotiating table when policy was being finalised at the WSSD. One of the key outcomes of the WSSD was the issue of governance. It was acknowledged that international financial institutions should incorporate SD policies in their work within their mandates. Developed countries focused on national governance and developing countries insisted on global governance. According to Bachus (2005:320-325), governance is a term that refers to a framework of systems, organisations and relationships with a common aim to organise society. Governance for SD is the process of interaction by governments and other independent stakeholders with a common goal to move towards a more sustainable society. Stakeholder involvement is absolutely crucial for SD. It is the opinion of Bachus that governance and participation are both interlinked through the concept of civil society. Bachus (2005:339) refers to Chapter X of the Implementation Plan of the WSSD that highlights how participation is one of the tools to attain good governance, while good governance itself is a tool to achieve the final objective of SD. The UN's Plan of Implementation of the WSSD (UN, 2002a:2) states clearly that good governance is essential

for SD, and should be based on sound environmental, social and economic policies. By placing governance as a fourth pillar of SD (cf. Figure 3.5) it can be supposed that governance refers to a way of organising and managing a society's affairs, environmental affairs and economic affairs. Within a school as organisation, Roos (2010:58, 59) clarifies how school governance and the professional management of a school are two related but different activities essential for the healthy and effective functioning of a school. The principal is the person responsible for the professional management of the school and also because of the position held, as a member of the SGB. This means that the principal and SGB work in partnership. Public school governance in South Africa takes place according to descriptors in the South African Schools Act known as section 20 and section 21 schools (SA. DoE, 1996a:7-10). In essence it describes the functions exercised by SGBs on behalf of the public schools at which they have been elected. In effect, the only difference is that section 21 schools have additional financial responsibilities. This does not add significantly to the powers of SGBs but does add to their responsibilities.

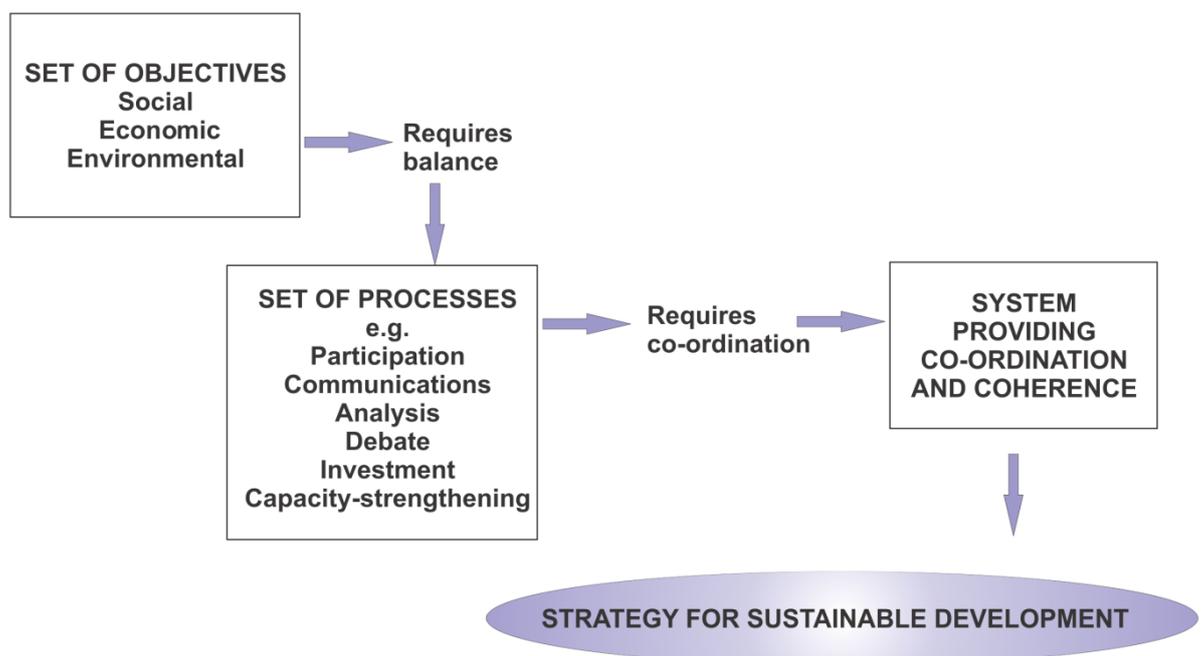


**Figure 3.5** Four pillars of SD (Adapted from John Fien's material for UNESCO, 2010c)

Despite differences in opinion, I regard SD as an interrelated and inclusive concept that deals with the economy, society, the environment, and governance/management that endorse EE.

### 3.3.2 STRATEGIES FOR SD IN DEVELOPING COUNTRIES: A CONTEXTUALISATION

Agenda 21 initiated the call for national SD strategies to be prepared so as to ensure socially responsible economic development that protects the environment for future generations. This call advised strategies to include a wide-ranging social, environmental and economic scope (a triple bottom line) (UNCED, 1992a). Since the call was made for national SD strategies, governments have committed themselves to the establishment and implementation thereof. The systematic approach to strategies for SD involves “A coordinated set of participatory and continuously improving processes of analysis, debate, capacity-strengthening, planning and investment, which integrates the economic, social and environmental objectives of society, seeking trade-offs where this is not possible” (cf. Figure 3.6). (OECD, 2001:11-16, 25).



**Figure 3.6 Rationale for a systematic approach to strategies for SD (OECD, 2001:13)**

The Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD) believe that any strategy uniquely developed in a country - or in the case of this study in a school as organisation - to fit its circumstances

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which applies the principles and which has a coordinated set of mechanisms and processes that ensure their implementation, “is a SD strategy and will have a good chance of success”. (OECD, 2001:11-13, 16). Similarly, Dalal-Clayton *et al.* (1994:26, 27) also listed principles that they recommended for national SD strategies. Both share similar principles that are discussed together.

The guiding principles for effective SD strategies are divided into strategy formulation and capacity development. Of relevance to this study are the following points that need to be considered by a school when developing their strategies:

- *Ownership, participation, leadership and initiative* can be interpreted as the school leaders taking the initiative to take ownership of the EMS implemented and ensure participation by all role-players. Participation implies involvement in, and shared responsibility for, the strategic process.
- *Broad consultation with all socio-economic groups* can be applied to the school society since all role-players in a school must be informed about, contribute to and be part of the EMS.
- The strategy for SD must include *economic, social and environmental objectives*. The strategy plan should be practical and modest, and it should integrate policies that reconcile the goals. This will ideally lead to plans and programmes for interacting sectors and interest groups.

Regarding capacity development, the school must

- *establish continuous monitoring and evaluation systems based on clear indicators to track and steer progress*. This refers to the last step of the *Education for Sustainable Living* project guidelines, since an evaluation must take place to judge the value of the EMS implemented. The school must be adaptive. It must monitor and evaluate the integral parts of the strategy, and the strategy must undergo changes subject to the evaluation.

It is safe to say that the principles recommended for strategies for SD integrate economic, social and environmental objectives. Participation by stakeholders and support are important for the success of such strategies. Over the last decade the inclination toward a focus on the management and practice of formal education has led to the establishment of whole-school programmes. These programmes focus on school development and are underpinned by the whole-school approach to sustainability that will be discussed later in this chapter (UNESCO, 2002:16; Henderson & Tilbury, 2004:7).

Since SD can be aided by education, according to Venkataraman (2009:8), the next section will focus on the relationship between education and SD.

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### 3.3.3 THE RELATIONSHIP BETWEEN EDUCATION AND SD: A CONTEXTUALISATION

Both education and SD are important areas of interest of the UN and this study. The 1948 Declaration of Human Rights stated that everybody has the right to education and from then on emphasised the importance of education. The second Millennium Development Goal<sup>26</sup> (MDG) addresses education. According to the UN, quality education takes into consideration the social, economic, and environmental contexts of a particular place and shapes the curriculum or programme to reflect these unique conditions (UNESCO, 2005:25, 26; UNESCO, 2010b). This echoes the point made by UNESCO since the UN-DESD equally addresses all three pillars of SD. By following these recommendations ESD can be promoted in schools. With five years short of the target, The Millennium Development Goals Report 2010 was compiled to assess the progress towards the MDGs. Available data from half of the sub-Saharan African countries has shown that in 2008 at least one in four children of primary school age was not attending school. This means that the future looks bleak with respect to promoting ESD in sub-Saharan African schools. If children do not attend school, they cannot be taught about the environment and SD. In order to also achieve the seventh MDG – environmental sustainability – the principles of SD have to be taught and learnt about before citizens can integrate them in the workplace. Despite this setback on the African continent, the rest of the world is on track to achieving these goals (UN, 2010:16-18).

The followers of the SD ideology proposed a reform of the entire educational system in order to establish this “new” approach to education in 1992. A document entitled *Reshaping ESD*, published by UNESCO and distributed at the Eco-Ed Congress, was intended as a follow-up to Chapter 36 of Agenda 21. It was drawn up at the World Congress for Education and Communication on Environment and Development (ECO-ED). During the opening address the Director-General of UNESCO stated that by incorporating SD concerns into educational processes, new educational content and structures would have to materialise. He referred to ESD as a cross-cutting approach that informs other subjects and disciplines with its values and emphasis, rather than “constituting a discipline in its own right”. This necessitated new programmes to accommodate the interdisciplinary content for different target groups. It also required that educational processes needed to be rethought and all possible participants in society needed to be involved. The panel on reshaping ESD discussed how UNESCO planned to take account of Agenda 21 in the educational sphere (Mayor, 1992). Prior to the

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<sup>26</sup> Eight MDG were adopted by world leaders present at the UN Millennium Summit in 2000, held in New York. They aim to achieve the goals by 2015. South Africa pledged its support to all eight Millennium Development Goals (UN, 2000:1-9).

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UNESCO undertaking on ESD, different perspectives regarding education and the environment existed, for example education *about*, *in* or *for* the environment.

In Australia, EE, described as *education for the environment*, can be traced to the work of Arthur Lucas in 1979. He clarified uncertainties and misunderstandings created by the different classes of programmes in the field of EE. He proposed that these misunderstandings could be overcome by referring to EE as one of, or any combination of, education *about*, *in* or *for* (the preservation of) the environment (Lucas, 1978:50-56, 63). According to Fien (1993:12-16), education *about* the environment aims at producing a knowledgeable individual and has as its objectives an emphasis on knowledge about the natural systems and processes, as well as the ecological, economic and political factors that influence decisions about how people use the environment. Education *about* sustainability is associated with aspects of environmental science<sup>27</sup> and management. The assumption is that increased knowledge will contribute to sustainable policy changes, thus reference is essentially made to EE (Pitt & Lubben, 2009:170). Sauvé (1996:18, 19) agrees with the latter statement by affirming that EE is closely associated with SD (cf. Chap. 36 pt 3 of Agenda 21). Education *in* the environment, by contrast, aims at a description of a pedagogic technique. In most cases the '*environment*' of education *in* the environment refers to 'outside the classroom', that is, the biophysical world. Education *through* the environment is used as a collective term to describe a variety of experiential approaches to EE. It makes use of the learner's experiences in the environment as a medium for education. This is a learner-centred approach to EE.

Fien (1993:5, 12-16), argues that it is only when the obvious intention of a programme is education *for* the environment that effective EE is actually taking place. Interestingly, Fien<sup>28</sup> further describes the term *education for the environment* as active learner engagement to resolve environmental questions, issues and problems within a programme of values, education and social change. Education *for* the environment aims at enhancing, maintaining or assisting the preservation or improvement of the environment for a particular purpose and

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<sup>27</sup> Environmental science involves the physical and biological environment around us. It is an interdisciplinary science that combines concepts and information to help one understand how the earth works, how humankind affects the earth's life-support systems and how one must deal with environmental problems. Environmental science involves both the physical sciences (physics, chemistry, biology [ecology], geology, geography, resource technology and engineering) and the social sciences (resource management and conservation, demography, economics, politics, sociology, psychology and ethics) since a scientific understanding of underlying environmental issues together with an awareness of the social aspects of environmental problems will help ensure that humans can alter their behaviour and so play a key role in solving current environmental problems (Miller, 2004:1,G6; McKinney & Schoch, 2003:3).

<sup>28</sup> Fien's description is based on an integration of the values of the New Environmental Paradigm (NEP) (cf. 4.2.7) and a socially critical orientation in education. *Education for the environment* is described as challenging the way that uncritical educational practices accept and reproduce the Dominant Social Paradigm (DSP) (cf. 4.2.7) as a regular way of interpreting people-environment relationships. Fien furthermore discusses a "red-green" vision for the future as lying at the heart of education *for* the environment. "Red-green" is the term Fien uses to describe an environmental ideology which incorporates ecological sustainability, distributive social justice and the direction of environmental management.

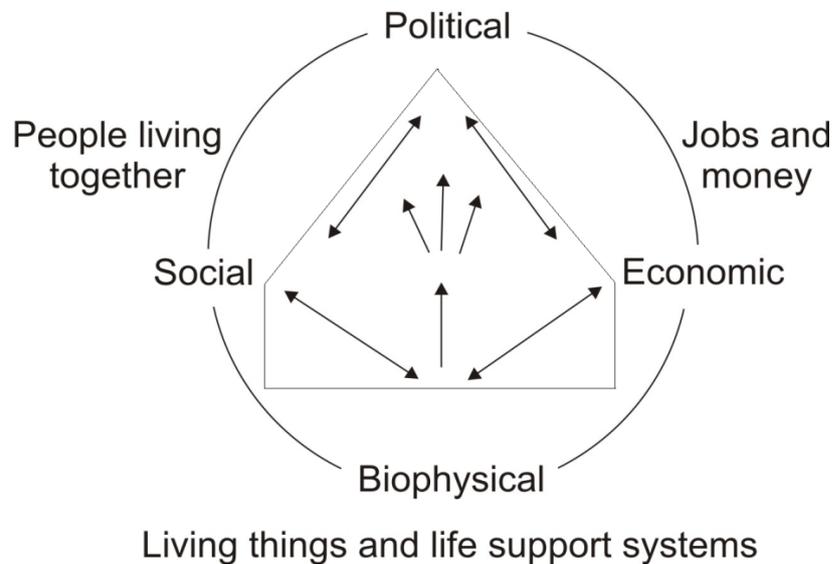
for humankind with behaviourist undertones. Education *for* sustainability, according to Ferreira, Lopes *et al.* (2006:973), has to involve “interdisciplinary” and “holistic” teaching that is able to promote deep learning as opposed to traditional superficial learning. Jickling (1997:95) disputes the idea of educating “for” anything. He argues that education “*for*” anything implies that education must strive to be “for” something external to education itself. I agree with the former authors because of the global and interdisciplinary nature of educating *for* a purpose, like the implementation of an EMS to promote education *for* ESD. I also agree with McKeown, Hopkins, Rizzi and Chrystalbridge (2006:9) who state that the nature of ESD requires giving people knowledge and skills for lifelong learning to help them find new solutions to their environmental, economic, and social issues. This is based firmly in the three pillars of SD and is education *for* SD. On the other hand, Wals (2007:36) maintains that regardless of whether you call the field EE, ESD, education for sustainability (EfS), sustainability education (SE), learning for sustainability (LfS), or something else, the trend should be a move toward changes in learning that are based on “reflexive responsiveness” and a “learning society” that is more sustainable than the present.

Of relevance to this discussion in particular and to this study as a whole is the Van Rooyen Model for education for sustainable environments. This model features two dimensions, namely education and environment. Van Rooyen’s proposal to heuristic (self-discovery), issue-based, systemic learning is aimed at being central to teaching and learning praxis in EE. It is his opinion that learners’ understanding of environmental issues requires systems thinking. Furthermore, they also need to be equipped with the skills to solve the environmental problems. These skills are needed to understand the systemic interaction of ecological, social, scientific-technological, economic, and political processes, as well as the fact that personal decisions and contexts are affected by the interdependence of one’s understanding, choices and actions. This brings me to Van Rooyen’s analysis of the concept ‘environment’. It is similar to the O’Donoghue model, it too recognises a holistic view of the environment and it also regards the bio-physical component of the environmental as being central. O’Donoghue’s model for the environment (cf. Figure 3.7) is about the interactions of social, political and economic dimensions that rest on a bio-physical base. It emphasises the importance of the bio-physical component of the environment. In EE this model recognises and explores the connections and networks between society, cultural and economic activities and political decision-making, and the state of the Earth’s life-support systems (Rosenberg, 2009:3, 4).

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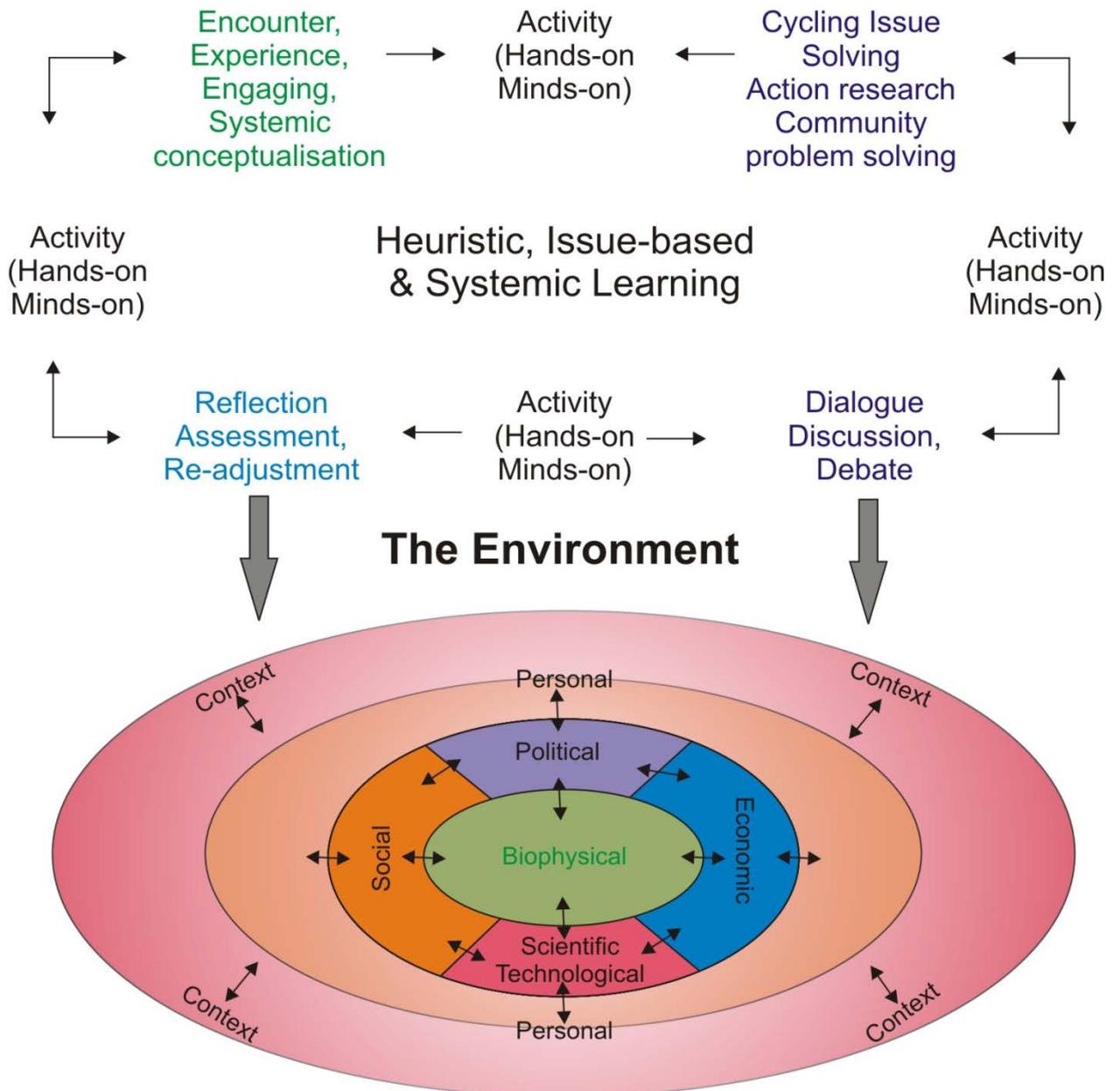
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 Power, policy and decisions


**Figure 3.7 O'Donoghue's model for the environment (Rosenberg, 2009:4)**

Van Rooyen's model, however, features seven dimensions of the environment (cf. Figure 3.8). The interrelated and interacting dimensions are the bio-physical, social, economic, political, scientific-technological, personal and contextual dimensions. Van Rooyen believes that each of the seven environmental dimensions should be seen as a system in itself, consisting of sub-systems changing over space and time. Since reality does not exist in compartments, the environment is regarded as a system-of-systems. It is dynamic, changes, moves, and develops, operating as a whole where sustainability is about systems (Van Rooyen & De Beer, 2007:3-5, 10).

## Education for sustainable environments (EFSE)



**Figure 3.8 The Van Rooyen Model (2006) for education for sustainable environments (Van Rooyen & De Beer, 2007:4)**

The deduction made from the above discussion regarding the relationship between education and SD is that, regardless of the name given to the study field of the environment within education, a systems approach must be thought of. A network of interrelations exists between the bio-physical, social, economic, and political dimensions that are also interrelated with our scientific-technological dimensions, within which we live within our own personal contexts.

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The following discussion of ESD provides more clarity on the concept.

### 3.3.3.1 ESD: A DISCUSSION

ESD has been described as “an emerging and dynamic concept encompassing a new vision of education that seeks to empower people of all ages to assume responsibility for creating and enjoying a sustainable future”. (UNESCO, 2002:7). McKeown (2002:13) is of the opinion that ESD must take into consideration the local environmental, economic, and societal conditions. It also implies that ESD will take many forms around the world. Pigozzi (2003:4) maintains that there is no one ‘right’ definition of ESD, but “... there will be overall agreement on the concept of SD that education addresses”. Lumby (2003:113) refers to an important aspect of ESD, being that the people who form part of the school community - learners and educators, parents and governors - are all involved in change whether they wish to be or not. Just how ESD within the school community was to be implanted is discussed by means of the UN-DESD initiative.

According to the UNESCO International Implementation Scheme for ESD (UNESCO, 2005:29-31), no universal models of ESD exist. The principles of sustainability<sup>29</sup> upon which ESD is based contain slight differences because each country defines its own sustainability and education priorities and actions influenced by the local context, priorities and approaches. Characteristics of ESD can be implemented in many ways, so that the resulting ESD programme reflects the unique environmental, social and economic conditions of each area. The characteristics of ESD:

- are based on the principles and values that underlie SD – that have been discussed;
- deal with the well-being of all three realms of sustainability – environment, society and economy as the pillars of SD;
- promote life-long learning that engages formal, non-formal and informal education;
- is locally relevant and culturally appropriate, and based on local needs, perceptions and conditions;
- accommodates the evolving nature of the concept of sustainability;
- addresses content, taking into account context, global issues and local priorities of an organisation such as a school;

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<sup>29</sup> ESD is based on ideals and principles that underlie sustainability, such as intergenerational equity, gender equity, social tolerance, poverty alleviation, environmental preservation and restoration, natural resource conservation, and just and peaceable societies. (UNESCO, 2005:27).

- builds civil capacity for community-based decision-making, social tolerance, environmental stewardship, adaptable workforce and quality of life, for example a school environment;
- is interdisciplinary as it is approached in the curriculum; and
- uses a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills that can be aided by the implementation of an EMS in a school.

Three essential characteristics of ESD are added to the list according to the UNESCO (UNESCO, 2011:3-9), namely competencies in ESD for teachers:

- *A holistic approach* that aims to achieve integrative thinking, inclusivity, and dealing with complexities. For example, the teacher must know the basics of systems thinking, and the ways in which the economic, social and environmental systems function and are interrelated.
- *Envisioning change* that is mastered by learning from the past, taking part in the present, and exploring alternative futures. For example, the teacher must know causes of unsustainable development.
- *Achieving transformation* by changing the way people learn, as well as changing the systems that support learning. In the latter instance an EMS would be an ideal inclusion for achieving transformation. For example, the teacher must know it is important to prepare learners to meet new challenges.

Related to these competencies that teachers must have are competencies that are important to enhance SD. They are not only geographical by nature, but also interdisciplinary, and therefore can be developed in collaboration with other subjects (Reinfried, Schleicher, & Rempfler, 2007:245). Five are listed as being most applicable:

- to think in systems and complex networks;
- to understand complex cause-effect relations and dynamics;
- to commit to environmental planning and projects;
- to flexibly apply different methods to solve problems; and
- to relate local and regional experiences to global phenomena.

According to UNESCO (2004:15, 25), education is primarily responsible for the transformation towards SD. More importantly, ESD must encompass and promote all forms of learning because it cannot remain a personal task and so active participation in social organisations and working to find structures and mechanisms more likely to reflect the vision of SD are essential. This is where all the role-players, for example in a school, are tasked to implement management models and approaches. The implementation of an EMS in a school is important since it may project that the school is acting sustainably through its sustainability policy and active group management that includes learner representation, among others (Martin, Dawe & Jucker, 2006:65). Combes (2009:216) refers to learning for sustainability, meaning that learning to make the world more sustainable calls for “a need for learning to be personally empowering and enriching and a response to learners’ diverse learning needs and intelligences”. These ideas were developed and supported by the Delors Report which highlighted four “pillars” or fundamental types of learning. These are described as foundations of education. The four pillars of learning are: to know, to do, to be, and to live together. A fifth pillar, suggested by educators at a United Nations International Children’s Emergency Fund gathering where an analytical process of the recommendations of the Delors Report (Black 1999:9) was reviewed, found that learning to transform oneself and society is a foundation of education. This pillar focuses on developing respect for the environment, for social solidarity and for a non-discriminatory gender-sensitive world. It suggests a cooperation of cognitive, practical, personal and social skills to bring about sustainability. This fifth inclusion, in my opinion, reflects directly on the suggestion of this study to implement an EMS in a school so that learners are taught how to live sustainably by being made aware of transforming themselves in a school society that then needs to be continued through life.

UNESCO (2005:29) affirms that schools have and can easily include SD as an integral part of the curriculum. Before the new millennium, EE was already described as an essential component of education. Since it involves interrelationships among people, society and the environment, it is important to include EE in a comprehensive educational framework (Sauvé, 1999:11, 30). Mbigi (1997:136, 137, 139) maintains that the education system in Africa omits to teach the collective social, economic, spiritual and political stewardship, since life is an inseparable whole and interdependent. It is Mbigi’s opinion that participation and group work should be central in the management of the learning process and the classroom to reflect the values of Ubuntu<sup>30</sup> (cf. 4.2.3.1). The task of collective learning is shared responsibility between the mentors, learners, the community and the family. Mbigi also feels that the current education systems lack a sense of shared accountability and shared agenda. A

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<sup>30</sup> Ubuntu is an African philosophical concept that is an expression of being. It is discussed in more detail in the context of chapter 4.

bottom-up and learner-centred approach in the collective learning process needs to be developed with a move toward learning by discovery (cf. 4.2.5). Therefore, a shared stewardship over the task of education implies the need to develop inclusive governance and a community approach to the management of schools. It will also require government policy innovation in education to ensure that the education system is integrated with other national development strategies. This makes sense since management challenges refer to both stewardship and governance (Bhagwut, 2003:24) where environmental stewardship refers to the duty to care for and manage nature's gift wisely and our productive resources for the future. Outdoor activities are an essential part of EE (Cunningham & Saigo, 1997:563). The Dakar Framework for Action states, "Education is ... the key to SD and peace and stability with and among countries, and thus an indispensable means for effective participation in the societies and economies of the twenty-first century." (UNESCO, 2000:8).

#### **3.3.3.1.1 THE EVOLUTION OF EE TO ESD**

The strong foundations of EE has aided in the evolution of ESD since the late 1970s when international thinking about EE changed. The changes in the field of EE occurred through changes in society, the economy, globalisation, and an increasing participation in the field of EE. Today EE and ESD are practised in the health sector, disaster relief and a wide range of other social and intuitional contexts (UNESCO, 2007b:2, 3). UNESCO regards EE as lying central to ESD. It states further that ESD must continue to highlight the importance of natural resources (water, energy, agriculture, biodiversity) and it must encourage new behaviours to protect the world's natural resources (UNESCO, 2009a; UNESCO, 2010b). UNESCO has engaged itself the most in defining the boundaries of EE.

A UNESCO report reveals that contemporary EE has "striven towards goals and outcomes similar and comparable to those inherent in the concept of sustainability" and that the roots of ESD are firmly planted in EE. Since EE has contributed greatly to SD narratives, it may explain why almost no mention was made of EE at the WSSD (UNESCO, 2002:9). Loughland (2006:27) is of the opinion that the inclusion of EE under the umbrella of sustainability has lead to its greater official recognition. Academics in the field of EE have criticised the association of EE with SD, even though the above discussion of declarations and summits have placed SD at the centre and promoted it as an important inclusion in education. Despite EE and ESD being related, they are believed to be different concepts that have become combined in recent discourse. Lotz-Sisitka (2004:47, 65), for example, is concerned about the 'virtual disappearance' of EE discourse. EE was the key focus in UN documents until the early 1990s. UNESCO's mandate to 'implement' Chapter 36 of Agenda

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21 meant that it emphasised the need to integrate environment and development concepts into all educational programmes, with a re-orientation of education systems *towards* sustainability. Furthermore, Lotz-Sisitka is of the opinion that a shift has occurred towards SD and ESD, as dominant narratives, at the expense of EE. ESD has become a broad term that encompasses a range of social and development issues that are all important to human development and education. UNESCO and IUCN documents have combined the discourse about EE and ESD and not enough attention is being paid to the environmental dimension of the ESD discourse, despite the environment being chosen as one of the key themes by UNESCO for its DESD. The concern, according to Lotz-Sisitka (2004:20, 68), is that it would be difficult to imagine 'ESD' without sound EE processes if the environmental focus disappears from 'SD'. The danger exists that the 'environmental' focus is the easiest to leave out. A balance of economics, social and environmental priorities needs to be achieved. Recently, Tbilisi+35 recognised that "EE processes support and champion ESD". They call on governments to support EE within sound ESD policy frameworks (UNESCO & UNEP, 2012:1), showing that EE is not in danger of disappearing.

Sauvé (1996:18, 19) claims that SD is the ultimate goal of EE and the term *EE for SD* is proposed. For others, SD involves specific objectives that should be added to those of EE, hence the expression *education for environment and SD*. For others still, the term EE as a *whole* includes ESD, therefore making it pointless to change the terminology. As the debate surrounding the term EE and education for environment is still continuing after 25 years, Le Grange and Loubser (2005:117) agree with Sauvé that the discussion concerning the relationship between EE and SD will not be resolved in the near future. Acknowledging that UNESCO is the main organ that pushes forward the discourse of ESD and the implementation of the UN-DESD (Lotz-Sisitka, 2004:66), the institutional narratives of WWF, WSSD, UNESCO and the IUCN have also endorsed the UN-DESD (UNESCO, 2002:9). Since ESD remains a key priority for UNESCO (UNESCO, 2009a), it is important to clarify the UN-DESD.

### **3.3.3.2 THE UN DECADE OF ESD (2005-2014)**

The emphasis on education as an indispensable element for achieving SD was initiated in 2002 by the UN General Assembly. The international community supported education being central to achieving SD (Combes, 2009:215). The UN declared 2005–2014 as the decade for ESD. UNESCO distinguished between EE and ESD. EE was defined as "a well-established discipline which focuses on humankind's relationship with the natural environment and on ways to conserve and preserve it and properly steward its resources". ESD was defined as

encompassing “EE, setting it in the broader context of socio-cultural factors and the socio-political issues of equity, poverty, democracy and quality of life”. UNESCO firmly differentiates between the two and believes that ESD should not be equated with EE. It is recommended that SD be integrated into other disciplines and cannot be taught as an unnoticeable subject because of its scope (UNESCO, 2004:16).

The overall goal of the UN-DESD, according to its international implementation scheme (UNESCO, 2005:6), is to integrate the principles, values, and practices of SD into all aspects of education and learning. The framework of the UN-DESD also put an equal emphasis on society, economy and the environment. UNESCO was designated to be the lead agency for the UN-DESD. UNESCO developed an International Implementation Scheme (IIS) for the Decade so as to strengthen the relationship between education and SD. The vision of the UN-DESD is found in the following objectives, to:

- “facilitate networking, linkages, exchange and interaction among stakeholders in ESD;
- Foster an increased quality of teaching and learning in ESD;
- Help countries make progress towards and attain the MDGs through ESD efforts;
- Provide countries with new opportunities to incorporated ESD into education reform efforts.” (Combes, 2009:216). Hence, the implementation of an EMS.

Peden (2008:21) feels strongly that ESD is a political initiative, designed by policy-makers to gain greater support than was ever achieved by EE. ESD has made its way into international agreements, national policies and education agendas, like the UN-DESD. I am of the opinion that in South Africa the government has not realised that it has already laid claim to the promotion of ESD within the education agenda and constitution. The DBE launched the Bill of Responsibilities for the Youth of South Africa campaign on 23 March 2011. It is a guide for learners and schools that outlines the responsibilities that correspond with the rights found in the Bill of Rights, that is, Chapter 2 of the Constitution of South Africa. The right to live in a safe environment assumes the responsibility to:

- promote SD, and the conservation and preservation of the natural environment;
- protect animal and plant-life, prevent pollution, not litter, and ensure that homes, schools, streets and other public places are kept neat and tidy; and
- in the context of climate change, ensure not to waste scarce resources like water and electricity.

It is evident that the three responsibilities listed refer directly to the promotion of SD and must be reinforced within schools, making learners aware that their rights and responsibilities toward the environment support a UN initiative (SA, 2011).

UNESCO's DESD is a world programme to re-orientate education around the three pillars of SD: environment, society (including culture), and economy. The hope is that by embracing these elements in a holistic and integrated manner, ESD will enable all individuals to fully develop the knowledge, perspectives, values and skills necessary to take part in decisions that will improve the daily lives of all individuals globally. UNESCO's vision for ESD is a world where everyone is presented with equal opportunities so as to benefit from quality education and learn the values, behaviour and lifestyles necessary for a sustainable future and positive change in society. Naturally the implementation of any programme like the UN-DESD will depend on the strength of the stakeholder commitment and cooperation at local different levels, together with networks and alliances (UNESCO, 2004:5). The similarity exists between the implementation of an EMS that also requires commitment by the role-players who manage the system, so that ESD can be promoted.

#### **3.3.3.2.1 ESD IN BELGIAN AND GERMAN SCHOOLS: TWO INTERNATIONAL CASES**

The indicators of the MOS-project and Eco-Schools programme schools discussed in chapter 2 (cf. 2.2.6) form part of ESD project initiatives in their respective countries. A brief outline is provided of the developments in Belgium and Germany that pertain to ESD.

##### **3.3.3.2.1.1 ESD IN BELGIAN SCHOOLS**

At Belgian federal level, political responsibility for SD was initiated in 1999. It was followed by a second federal plan for SD from 2004-2008. By law the Federal Council for Sustainable Development (FCSD) was established to aid the civil society organisations in the SD policy-making process. The FCSD's role is also to advise the federal government on sustainability issues. On 25 April 2007 a new article (7a) regarding SD was introduced in the Belgian constitution. Loosely translated it read that "In exercising their respective powers the Federal State strives to ensure that communities and regions take into consideration the objectives of sustainable development in its social, economic and environmental commandments, taking into account solidarity between the generations." This means that, where relevant, any policy should take into account principles of SD (Sleurs *et al.*, 2008:28).

Policy initiatives in Flanders were announced by the Flemish government as a draft note of the Flemish Strategy for Sustainable Development (FSSD) since 30 September 2005. The policy repeatedly refers to the role of education as a tool to achieve SD. SD is regarded as one process of social change because it is thought that through policy and management processes, attitudes, behaviours and practices of policy makers, businesses and consumers can be changed. SD is strongly regarded as being an issue of attitude. Therefore, authorities consider education for SD to be crucial. Very importantly, the then current Flemish Minister for Work, Education and Training, Frank Vandenbrouke, stressed in his policy paper that he would consider how Flemish schools could contribute to SD (Sleurs *et al.*, 2008:28, 29). The United Nations Economic Commission for Europe's (UNECE) Regional Implementation Strategy for the UN-DESD was translated into a Flemish educational context. Two objectives of the strategy include to "promote sustainable development through formal, non-formal and informal learning and to equip educators with skills for SD to in their teaching and educational activities". (Sleurs *et al.*, 2008:2; UNECE, 2004:2).

On 1 September 2010 the environment and SD was approved as one of the seven contexts of the new cross-curricular final objectives for secondary schools. Schools are not expected to solve sustainability issues, but opportunities must be created for learners to develop skills to work with others to find solutions to current environmental problems. In this way ESD can give direction to a different perspective on education that better equips people to tackle complex sustainability issues. Teachers can work on ESD through the educational practice of broadening horizons, making connections and integration. All these assumptions are meant to shape both the content and the process approach to ESD. Within the Flemish education system, attainment targets are minimum aims that must be reached by learners in all subjects in elementary and secondary schools. Cross-curricular attainment targets in all subjects are not required to reach a certain level and teachers only need to prove that they work on them within their subjects. For example, EE in secondary schools, which since September 2010 has become known as SD, is dealt with indirectly in subjects, but in elementary schools the cross-curricular attainment target in which environmental issues are dealt with takes place directly is world studies (i.e. knowledge of the world) (Craenhals, 2010a).

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### 3.3.3.2.1.2 ESD IN GERMANY

The Alexander-von-Humboldt Gymnasium in Hamburg (cf. 2.2.6.3.4) has formed part of the official UN project "Education for Sustainable Development" since 2009. ESD is currently addressed in nearly all the school law codes in Germany and is included in the syllabi of many subjects (Sommer-Guist, 2008). The more than 32 000 primary and secondary<sup>31</sup> schools in Germany implemented EE in all subjects, but in reality less than one percent of school lessons were dedicated to EE (Von Lüpke, Tapia & Blochmann, 2000:7, 8). The first generation of EE was based on the tradition of nature conservation education within the natural science subjects of Chemistry, Physics and Geography, focusing on the mutual dependencies within nature, but omitting the role of humankind. By the 1980s the second generation of EE in Germany saw the advent of "holistic learning" that included experience orientation and action orientation. EE formally split into two groups: EE in schools (led by independent environmental teachers) and outside of schools (led by ecological educationalists). EE became education about the world around humankind and humankind's identification with nature. In the 1990s EE was seen as a task and concern of society as a whole that shaped and was held responsible for its actions. School grounds were used for learning, making it an environmental model. In 1997 the Federal Government declared that EE was an "indispensable element of a precautionary policy to protect nature and the environment". The following year saw the Federal Government-State Commission for Education Planning and Research Promotion publish an "Orientation Framework-Education for Sustainable Development" headed by Professor Dr Gerhard de Haan. This framework was used in the northern states' schools, since each state's government is responsible for formulating its own education policies. Prof De Haan introduced the concept of 'design skills' as an objective of EE. The design skills focus was on interdisciplinary approaches, cooperative structures between educational organisations and authorities, anticipatory thinking, networked thinking, the ability for solidarity, thoughts on visionary and utopian concepts, and the promotion of creativity and imagination. Its success was based on the need for objective ecological knowledge, action skills, the reflection of its own and cultural values, as well as consideration for the needs of all involved to ensure SD (Von Lüpke *et al.*, 2000:17).

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<sup>31</sup> Germany has three types of schools: Grammar (Gymnasium) and Comprehensive schools (Gesamtschule) that allow for tertiary education study; and Vocational schools (Berufsfachschule) that allow for technical and trade study.

Due to the independent nature of 16 German Federal States' responsibility toward educational policies, the NGOs like the National Association of Publicly-Funded Training Centres in the Nature Conservation and Environmental Protection Fields – BANU (Bundesarbeitskreis der Naturschutzakademien) and the Association of Environmental Education Centres (ANU-Arbeitsgemeinschaft Natur- und Umweltbildung) drew up guidelines for nature and EE. The ANU 2000 project of the Working Party on Nature and Environmental Education advised environmental educational organisations all over Germany with regard to education for sustainability and helped them meet the requirements for the new tasks at hand (Von Lüpke *et al.*, 2000:17). Projects set up by the Federal Government and the Länder (States) have, in the opinion of Prof De Haan, helped SD, and EE is said to be more effective in Germany. Schools take environmental learning more seriously since it is included in their curricula, textbooks and class projects (Sommer-Guist, 2008).

German officials launch various projects based on the premise that children and teenagers want to get involved in projects outside the family and school. Within the school context an example of a German project launched over 2007/2008 was the "Hands-On Innovations, Technology and Sustainability - A Pilot Project". It was based on school workshops for SD in the Federal Land of Hamburg, organised by Prof Walter Leal Filho. Workshops for the lower secondary school levels were organised to facilitate the integration of "education for sustainable development" into the curricula. The workshops were designed to help the learners "gain specialised knowledge, gain insights, communicate and evaluate facts". The programmes were intended as introductions to ESD and were connected to subjects provided for in the curricula, such as nutrition, waste, energy, building and living (Sommer-Guist, 2008; UNESCO, 2010a).

The UN-DESD has been implemented in Germany with the support of the Federal Ministry of Education and Research and under the patronage of the Federal President of the Federal Republic of Germany, Horst Köhler. The subject Geography is particularly committed to UN-DESD, as well as Global learning, because of its contents and function that considers natural, economic, political and social interrelations. Each subject has subject specific standards that define learner competencies that ensure quality assurance. The World Wide Web informs the schools about German activities within the field of ESD and the UN-DESD. It contains an overview of themes and partners, competitions, newsletters, programmes, and other information that involves the UN-DESD. For example, the Hamburg Senate launched the "Hamburg Learns Sustainability" initiative in May 2005. It uses a logo to promote integration of the guiding principle of SD in all areas of education. Sixteen projects from Hamburg have been recognised as official Decade Projects since the beginning of the UN-DESD (UNESCO, 2010a; Bork, Hemmer & Czapek, 2012:1-7).

The Hamburg State Institute for Teacher Training and School Development (HITTSD) has undertaken a new project in schools. With the support of the Ministry for Schools and Vocational Education and the Ministry of Urban Development Environment the project "Climate at school" began in the 2009/2010 school year. It forms part of the Hamburg Climate Protection Concept and is based on the CO<sub>2</sub> reduction targets for Hamburg, i.e. until the year 2020 about 2 percent of CO<sub>2</sub> emissions in schools are to be saved each year (HITTSD, 2010).

### **3.3.4 AN EVALUATION OF SD**

From the discussion above relating to SD, I am of the opinion that the roots of ESD are firmly planted in EE. It is also clear that the environment, society and economy are widely recognised as the pillars of SD. The UN has also become instrumental in addressing education needs with the focus on SD. ESD is crucial in aiding schools to transform learners and society (the future learners) by means of initiating learning that develops respect for the environment. The task is a collective one where all the role-players in the school are involved. This is where the idea to implement an EMS in a school's teaching and learning practices as well as management are complemented by the vision of the UN-DESD, for example increased quality of teaching and learning in ESD, and incorporating ESD into education reform efforts, like an EMS.

## **3.4 WHOLE-SCHOOL APPROACHES TO ESD**

According to Henderson and Tilbury (2004:11), the 1970s and 1980s were responsible for a change in focus towards living more sustainably, within the formal education sector. As established from the discussion in this study so far, I do agree with Henderson and Tilbury that the mentioned focus has been driven by authoritative international documents and commitments, especially under the influence of the UN. These are responsible for encouraging reform in the formal education sector that emulate the sustainability agenda noted in the Tbilisi Declaration, Agenda 21, the Dakar Framework for Action and Local Agenda 21.

The slogan “*Think Global - Act Local*” is implemented through local plans of action according to Local Agenda 21. The connection between the latter and an EMS is made since both focus on a micro-scale, and deal with economic and social development, as well as environmental protection in a very practical way at local level. Both focus on working in partnerships, linking local issues to global impacts, a systemic approach that addresses the underlying causes, and the integration of social, economical and ecological issues (Stead, 2010:1, 2).

The 1990s saw schools take up a new role in society based on the call of the documents and commitments noted above. Some schools decided to improve their school grounds and use them for educational and environmental experiences. Others differed in their approach and focused on school development. This meant that school governance, pedagogical approaches, resource consumption and curriculum issues related to SD were prioritised. Educators could not deal with complex issues in isolation and so it was realised that due to the complex nature of SD the whole school community needed to be involved in matters of environmental learning (Henderson & Tilbury, 2004:11, 12). In order for a whole-school approach to be successful the CarbonTrust (2008:2) states that the school community must be encouraged to work together to achieve maximum results, for example, to use energy wisely. Also, the involvement of parents, learners, governing body members and senior staff members must provide them with applicable roles and activities. Positive spin-offs that have been identified after the implementation of a whole school approach include:

- improved resource management of schools (i.e. waste, water and energy reductions);
- raising environmental awareness of learners and educators;
- pedagogical approaches changed to become learner-centred approaches; and
- decisions at schools became more democratic whereby the whole school community has become involved. This means that the governing board, school management/principals, teachers, caretakers, parents and learners have a democratic say in decision-making (Henderson & Tilbury, 2004:12). All of these points are indicative of an EMS, as discussed in chapter 2.

One can, therefore, define a whole-school approach to SD as an approach that aims to include all aspects of the school in helping it to become more sustainable. This includes school governance, pedagogy, resource consumption, community outreach, curriculum development, and school grounds. Since the school is an organisation that provides a service to its learners, the resources (e.g. electricity) that provide this service are consumed by the school and have an impact on the environment. It is these day-to-day practices of the school that need to be included in the curricula so that schools that employ whole-school approaches follow through with what they advocate and also ensure that actions speak louder than words when it comes to their proclaimed sustainability values (Ferreira, Ryan & Tilbury, 2006:16, 17; Raath *et al.*, 2009:2). Ferreira, Ryan *et al.* (2006:18) together with Henderson and Tilbury (2004:45) list key features of a sustainable school that need to be noted:

1. *School leadership.* It places sustainability at the centre of school planning and practice and promotes democratic and participatory whole-school decision-making processes.
2. *Whole-school participation.* This involves undertaking school action and improvement plans.
3. Reciprocal community, family and stakeholder *partnerships.*
4. *Participatory learning approaches.* These promote skills and competencies for critical thinking, intercultural perspectives, participation and citizenship.
5. *Integration of EE and education for sustainability.* This can take place across all key Learning Areas in the *curriculum.*
6. *Hidden curriculum.* This reflects key messages and ideas supported by the taught curriculum.
7. Regular *professional development* for teachers, school management and programme partners and facilitators.
8. 'Greening' of the school and physical surroundings.
9. Classrooms within and *outside school boundaries.*
10. Reductions in a *school's ecological footprint.* This can be achieved through resource consumption and environmental improvements.
11. Regular *monitoring, reflection and evaluation* procedures. These are direct future actions. The school is not just the centre of learning, but is also a '*learning organisation*' itself.
12. *Practitioner research.* This encourages reflective practice of teachers and promotes improved performance.

These points are reflective of the EMS guidelines of three EMSs discussed in chapter 2.

Breiting, Mayer and Morgensen (2005:13) formulated guidelines for the European Commission to enhance the quality of ESD to make schools “real ‘ESD-schools’”. Of interest is that the quality criteria are threefold. Firstly, it deals with the quality of teaching and learning processes. The guidelines suggest: experiential learning; physical changes in the school; activities where learners must look for relations between the past, present and future; teaching in all disciplines that is based on finding relationships; multiple influences and interactions; the promotion of critical thinking and value-based opinions; action-based perspectives; democratic participatory processes; and interrelated subject matter in the curriculum. Secondly, the quality criteria regarding school policy and organisation suggest: a focus on ESD in the school mission and annual action plan; a whole school community informed of the relevance of ESD in the teaching and learning; school management that makes regular audits regarding the way forward to ensure sustainability; and internal evaluation of the ESD initiative at the school. Lastly, the quality criteria regarding the school’s external relations suggest: community cooperation as a resource for teaching and learning; a network between schools; and partnerships to compare ideas and information relevant to ESD.

All these guidelines speak of networks between role-players, participation, self-discovery and reflection that need to be considered when undertaking a whole-school approach to promote ESD. Some of the challenges are discussed next.

### **3.4.1 CHALLENGES FACING THE WHOLE-SCHOOL APPROACH**

Ferreira, Ryan *et al.* (2006:17, 18) mention teachers in Australia lacking skills with regard to dealing with sustainability at all levels of school management (i.e. in classrooms, school grounds, school governance and community partnerships), despite that country’s long involvement with whole-school approaches to sustainability. A solution implemented was to enrol pre-service teachers in initial training courses in Learning for Sustainability and the whole-school approach. A comparison can be drawn with South Africa regarding the Australian situation and solution mentioned earlier. In their research study Schudel, Roux, Lotz-Sisitka, Loubser, O’Donoghue and Shallcross (2008: 543, 552, 553) report how Rhodes University (RU) and the University of South Africa (Unisa) undertook contextual profiling research to advise course design developed for EE courses. Unisa’s contextual profiling revealed that all the schools represented in the research sample had established SGBs (represented by principals, teachers, learners, parents and community members). The profiling also revealed that:

- 93% of the teachers indicated that their schools had a school management policy.
- 28% indicated that their schools had an EE policy.
- 20% of these schools had an EE coordinator.
- EE is only taught at 28% of the schools.
- Only 21% of schools had used national guidelines for EE.
- The survey results indicated that although almost a third of the schools had an EE policy, only one-fifth used national guidelines for EE implementation.

RU contextual profiling revealed that some teachers reported poor relationships between their schools and communities. This was not true for small church and farm schools since they reported supportive relationships. Successful two-way interactions between school and community were reported. In church school and farm school communities, teachers were generally respected leaders in the community. Principals and SGBs provided the schools with considerable support. Parents (often illiterate) serving on SGBs required capacity building to enhance their ability to provide support. The research study found that good school-community relations were one of the keys to successful whole-school development and the environmental policy development that should fall within the whole-school development process. EE course developers argue that the participatory development of a school environmental policy has the potential to develop skills, relationships and changes that will contribute towards whole-school development.

I am of the opinion that South Africa needs to pay greater attention to EE implementation when referring to a whole-school approach context. This having been said, mention must be made of the National Policy on Whole-School Evaluation implemented to monitor and evaluate a school's performance since 2002. It is also my opinion that this policy not only provides the opportunity for acknowledging the achievements of a school, but it helps identify areas that need attention so that schools can continuously look for ways of improving (SA. DoE, 2001:iii, 3). This statement is motivated by the evaluation that must take place in schools based on indicators. These indicators include, among others, process indicators to show how well the school strives to achieve its goals. It includes the effectiveness with which schools try to ensure effective governance, leadership and management, safety and security measures, and the quality of teaching. Important indicators relevant to this study are excerpted below and contain questions applicable to this study.

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- (a) What the school does to ensure it functions smoothly. (*What does its environmental management policy look like?*)
  - (b) How the leadership and management of the school are directed to achieve the school's goals. (*What is the school's environmental commitment toward the environment?*)
  - (c) How school governance is conducted. (*Is it democratic?*)
  - (d) How the school ensures quality teaching, curriculum planning, and effective assessment of what learners are learning. (*How is ESD implemented in the curriculum?*)
  - (e) What the school does to ensure security and safety. (*How are pollutant resources disposed of?*)
  - (f) What support and guidance the school provides to help learners develop intellectually and personally. (*Do learners form part of the committees that deal with the school's Environmental Management?*)
  - (g) How the school seeks to encourage parental and community involvement. (*Is there a whole-school approach in place?*)
  - (h) How the school manages its resources. (*Are plans in place to reduce resource wastage?*)

A review of the National Policy on Whole-School Evaluation by teachers, parents, SGB members and other members of the school community can lead to decisions being made by these groups in collaboration, hence revealing sustainability as a community (Raath *et al.*, 2009:5). The contemporary manner of achieving this outcome is through the implementation of whole-school programmes.

### **3.4.2 ENVIRONMENTAL LEARNING IN WHOLE-SCHOOL PROGRAMMES**

Environmental learning in schools through curriculum work, school environmental management and community involvement forms part of a whole-school programme (Schudel *et al.*, 2008:553). According to Rickinson, Lundhlo and Hopwood (2009:14-21), environmental learning in the context of EE and ESD has different dimensions that forms part of a list of complex discussions when trying to define it. They discuss five dimensions forming part of the complex concept that involves more than just what it is about. The dimensions that I agree with, that encompass the study of environmental learning are: who is learning; what, where, why they are learning; and how they are learning. Furthermore, environmental learning is about relations between learners, nature and society as a heuristic

tool, meaning that there must be place for self-discovery through experiential learning. Schudel *et al.* (2008:543) reinforce the latter by stating that “for environmental learning to be meaningful, the context in which the learning takes place needs to be determined and taken into consideration.”

A teacher’s manual developed by the Delta Environmental Centre (DEC) elaborates on how a school can through the development of a “policy and management plan” achieve environmental learning (DEC, 2001:9):

- Integration of the environment into the curriculum.
- Management of school resources, for example using water, electricity, paper and the telephone more wisely.
- Provision of a clear framework around which EE can be organised in school to ensure that environmental activity is not fragmented, hence, an EMS framework can be beneficial here.
- Allow for holistic forward planning.
- Using each environmental day for a thorough investigation of the issues associated with it, for example Water Week and saving water.
- Having an opportunity to expose learners to a wide variety of EE methods and processes.

Ballantyne, Fien and Packer (2001: 30-31, 34, 36) undertook a research study regarding the impact of a school EE programme on primary school “student and family learning”. Learners in their responses indicated that they considered environmental issues an important topic, highly relevant to their lives, for example, caring more about the environment, knowing how to look after it, and understanding the dangers of pollution and littering. Furthermore, most parents interviewed admitted to having heard about the programmes, but did not know the nature of their children’s involvement and discussions were prompted by both parties. The parents interviewed did however indicate that discussions with their children influenced them to change their own environmental attitudes and behaviour. The research found that if the influence of an EE programme is to be extended beyond the classroom and into the community, parents need to be involved. This will mean that intergenerational communication will be enhanced and local environmental issues can be discussed within families. Features that a school can implement using EE programmes so as to impact learners and their local communities are suggested. Importantly, the following features facilitate and encourage the process of intergenerational communication and influence in EE:

- combining research activities, environmental experiences and class discussion;
- focusing on a local environmental problem;
- providing positive experiences which demonstrate to learners that they can have an influence in their own local environment, for example, reusing water from washing hands for the garden and establishing an indigenous garden in the school;
- involving learners' parents in activities such as homework assignments, research activities and class presentations;
- involving community members in programme activities by conducting surveys and interviews, presenting project reports and research findings in a public forum, having the programme reported in the local newspaper, asking local industries to demonstrate their environmental management strategies and involving local business and community groups in environmental action projects, for example Collect-a-Can's annual schools competition (research regarding relationships between social marketing strategies and school participation in environmental competitions by Mathabathe, 2006).

The above shows that a whole school approach to environmental learning is deemed necessary.

Established whole-school programmes, for example the MOS-project, or Eco-Schools, Green schools and Enviroschools projects, are influenced by environmental, educational and socio-political needs, cultural perspectives and interpretations of sustainability that are unique to the context of the country where a programme originates, leading to differences between programmes (Henderson & Tilbury, 2004:11, 12, 28). In South Africa, It is necessary to focus on the evolving nature of EE and ESD in the country's national education policy that affects the whole-school programmes implemented.

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## 3.5 EE IN SOUTH AFRICA'S CURRICULUM

In South Africa the 1990s ushered in a new political system. The African National Congress and its new government integrated EE at all levels of education and training, for all sectors. This showed that the need for developing an environmental course of action was not only validated by international initiatives like the Earth Summit of 1992. This section looks at the place of EE within the changing school curriculum from 1995 to 2012.

### 3.5.1 THE TEACHING AND LEARNING OF EE IN THE SOUTH AFRICAN SCHOOL CURRICULUM: A CHRONOLOGY OF EVENTS

Nationally, the 1995 White Paper on Education and Training as well as the 1996 Constitution referred to EE as being crucial and necessary in order to protect the environment for present and future generations. The 1995 White Paper on Education and Training highlighted the need for EE processes "involving an inter-disciplinary, integrated and active approach to learning" as "a vital element of all levels and programmes of the education training system, in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources". When the Constitution was adopted in 1996 it linked environmental issues to values underpinned by human rights and social responsibilities. It recognised the right to an environment that is not harmful to its citizens' health or well-being. The Constitution ushered in a national commitment to environmental action showing that EE was deemed important (SA. DoE, 1995:18; SA, 2001:54, 55; Rosenberg, 2008:58). It can be said that by linking 'environment' and 'education' in South Africa, EE contributed to transformation and development.

C2005 followed a learner-centred approach and was outcomes-based. C2005 prioritised the environment since it was one of five Phase Organisers<sup>32</sup> in the curriculum. The Phase Organiser *environment* was regarded by environmental educators as helpful for including EE activities in learning and teaching within all the Learning Areas (Le Grange, 2002:84). However, in 2000 the C2005 Review Task Team, appointed by the then

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<sup>32</sup> A phase organiser was a given element of policy. All phase organisers (Communication, Culture and Society, Environment, Economy and Development, and Personal Development and Empowerment) were present in some way in all eight Learning Areas, through analysing their Specific Outcomes. This meant that teachers had to cluster Specific Outcomes to Phase Organisers to ensure integration of the curriculum at different levels and this had to be attended to in one year (SA. DoE, 1997:25-26).

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Minister of Education, Kader Asmal, recommended that Phase Organisers be removed from C2005<sup>33</sup> (Chisholm, Volmink, Ndhlovu, Potenza, Mahomed, Muller, Lubisi, Vinjevold, Ngozi, Malan & Mphahlele, 2000:6) resulting in the demise of a strong direct focus on the environment.

The NCS implemented in January 2004 not only simplified, but also clarified C2005 (Dada *et al.*, 2009:13-18). The right of every South African citizen to a healthy environment was also upheld in the NCS, hence it was built on the vision and values of the Constitution of the Republic of South Africa. The NCS ensured that all Learning Area Statements reflected the principles and practices of *social justice, respect for the environment and human rights* as defined in the Constitution. By having the *environment* feature in the first principle of the NCS shows that there was a strong focus on the importance of the environment. The NCS upheld a vision of teachers and learners who were not only knowledgeable and multi-faceted but also sensitive to environmental issues. Both entities were also called upon to respond to and act upon the challenges to be confronted in the future. All Learning Areas, therefore, were provided the opportunity to contribute to learning about a healthy environment (SA. DoE, 2002a:1, 10, 11).

The Critical and Developmental Outcomes that are derived from the Constitution and found in the NCS documents described the learner who the education and training system aimed to create who would “Use Science and Technology effectively and critically showing responsibility towards the environment and the health of others”, “Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation”, and “Participate as responsible citizens in the life of local, national, and global communities”. (SA, DoE, 2002a:11).

An important policy that required teachers to identify and deal with environmental issues in their pedagogy was the Norms and Standards for Educators policy of 2000. It laid down the roles and associated set of applied competences of teachers, for example “Promoting the values and principles of the constitution particularly those related to human rights and the environment” and “Critically analysing the degree to which the school curriculum addresses barriers to learning, environmental and human rights issues”. (SA, 2000:10-12). This policy followed the promulgation of the White Paper on Education and Training five years earlier.

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<sup>33</sup> During the early 1990s an EEPI to include EE in new policies was supported by the EE Association of Southern Africa (EEASA) and the then DoEA. The EEPI introduced a participatory policy-making process to EE curriculum in South Africa between 1992 and 1995. EE was included in the national curriculum with the help of the EE Curriculum Initiative (EECI). The EECI was a state-civil society partnership project (1996-2000) that enabled staff from the DoE, provincial government education departments and EE practitioners in South Africa to work together to debate and define EE in the new school curriculum that emerged as C2005. It was in this curriculum that environment was described as one of six phase organisers (i.e. integration features of the curriculum). This inclusion meant that EE teachers did not have to battle to get EE included in the curriculum, but had to interpret environment in the context of the curriculum policy. The focus of the curriculum therefore shifted to environment as an organiser of curriculum activities. Teachers had the task of considering an environmental focus in the Learning Areas. This, however, was not to last because Phase Organisers were dropped after a review committee revised the curriculum in 2000 (SA, 2001:26; Lotz-Sisitka, 2002:97, 98, 109, 110; Rosenberg, 2008:58).

Environmental learning in the form of a principle, values, concepts and capabilities, remained a key focus in Learning Areas and subjects, even after C2005 was revised in 2000 to become the NCS. Dr Razeena Wagiet, the Environmental Adviser to the Minister of Education, was a key player who ensured that environmental learning remained on the agenda. Dr Wagiet stated that “EE processes have the potential to enhance a responsible ethic of sustainability in our learners, by developing the values and skills that steer our relationships with each other and with the Earth.” (SA, 2001:26) A donor-funded Learning for Sustainability Pilot Project (1997-2000) was run in two South African provinces, and focused on the professional development of teachers to enable them to enhance their skills for learning programme development before the change in curriculum (Lotz-Sisitka, 2002:97, 98, 109, 110; Rosenberg, 2008:58).

*The Manifesto on Values, Education and Democracy* drafted in 2001 was, in the words of the then Minister of Education, Professor Kader Asmal, “a call to all to embrace the spirit of a democratic, non-racial and non-sexist South Africa”. *The Manifesto* did not force transformation, but rather focused on, among others, ethics and the environment. The aim was to focus on recognising the value of natural resources and heritage, so that sustainable living may be practised in order for South Africans to live decent lives, both in the present and in the future. In other words, responsibility to conserve and respect the environment was promoted so as to ensure SD. The key factor in achieving a sustainable future, according to *The Manifesto on Values, Education and Democracy*, was the values that South Africans live by that influence how they relate to other people and to the environment (SA, 2001:3-5, 54, 55).

Through a bilateral agreement (2000-2002) the Danish government helped fund and implement a National EE Programme for General Education and Training (NEEP-GET) within the provincial education departments, the programme being launched in January 2001. The aim was to develop teachers to implement EE in the classroom. Through the NEEP, EE was integrated into the NCS’s eight Learning Areas in the General Education and Training band. The NEEP was not sustained and currently no policies or initiatives for EE are contained in the national and provincial DoE. The initiatives mentioned above represent the major national curriculum intervention in EE curriculum development work between 1992 and 2002 (SA, 2001:56; Lotz-Sisitka, 2002:9; Rosenberg, 2008:58).

According to the Centre of EE website (CEE, 2007), South Africa has a Framework for Action for the UN-DESD. The same website (CEE, 2008) also features a link to the development of the Learning for Sustainable Living programme that was developed by the Royal Society for Protection of Birds and Bird Life International and implemented in South Africa. The former Minister of Education, Naledi Pandor, committed her department to promoting the UN-DESD and the principles of SD in all levels of education (Segalwe, 2007). Despite this call, the new action plan by the country's government to improve the education system in schools, known as Schooling 2025, does not mention UN-DESD. Even though aiming to improve all aspects of education, for example teacher recruitment, learner enrolment, school funding, mass literacy and numeracy and overall quality of education, it makes no reference to ESD or environmental management. The DBE is finalising a comprehensive turnaround plan for teaching in schools called Action Plan 2014: Towards the Realisation of Schooling 2025, in which no reference is made to ESD (SA, 2012; SA. DBE, 2012a:1-4). However, 2011 saw the start of a national policy for ESD being developed according to the DBE website (SA. DBE, 2011t). Subsequently South Africa's DoEA signed a cooperation agreement with GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit/*German Society for International Cooperation*) who on behalf of the Federal German Ministry for Economic Coordination and Development is working with South Africa to design and implement a Programme called "Education for Sustainable Development" until 2013 (SA. DoEA: 2011).

In 2011 the national education policy was amended. The two NCSs, for *Grades R-9* and *Grades 10-12* respectively, were combined in a single document known as the *National Curriculum Statement Grades R-12*, and is viewed as an improvement on the NCS with greater clarity on what is "to be taught and learnt on a term-by-term basis." (SA. DBE, 2011b:iii). The NCS Grades R-12 represents a policy statement for learning and teaching in South African schools that consists of the CAPS, among others (cf. 3.5.3). This curriculum fulfils the recommendations of the Gaborone Declaration on EE processes in Southern Africa and beyond, for the next decade (EEASA, 2002:3, 5).

Owing to the fact that this study was undertaken when the NCS was still policy in 2011, it is deemed important to discuss where environmental learning features within the NCS (cf. 3.5.2), which was the national education policy at the time of the implementation of the EMS. Owing to the fact that the CAPS is phasing in from 2012, a discussion of where environmental learning features within CAPS (cf. 3.5.3) is necessary because of its relevance to the implementation of an EMS in schools.

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### **3.5.2 ENVIRONMENTAL LEARNING IN SOUTH AFRICA'S NATIONAL CURRICULUM STATEMENT (2002)/NCS: A CONTEXTUALISATION**

The inclusion of environmental issues in the national curriculum led to the integration of environmental learning in teaching and learning so as to promote knowledge of SD and a sustainable lifestyle. The DoE's 2002 streamlined and strengthened version of C2005 was written by South Africans for South Africans envisaging teachers who are sensitive to environmental issues and learners who show respect for the environment. The NCS introduced eight compulsory Learning Areas based on outcomes-based education, meaning that outcomes are to be achieved at the end of the process of learning. All Learning Area Statements reflected the principles and practices of social justice, respect for the environment and human rights as defined in the Constitution. The Learning Area content to be studied was not prescribed since the curriculum was to be interpreted and implemented in different contexts. The Learning Outcomes stated what all learners should know and be able to do. South African teachers played a multi-faceted role as mediators between learning, interpreters and designers of Learning Programmes and materials, leaders, administrators and managers, scholars, researchers and lifelong learners, community members, citizens and pastors, assessors and Learning Area/Phase specialists. An interpretation of the latter is the fact that from an environmental management perspective in a school, the role of the teacher is that of manager (SA. DoE, 2002:1, 4, 8-10; Gardiner, 2008:17, 18).

In South Africa, a primary school has three teaching and learning phases, namely the Foundation (Grade R-3), Intermediate (Grade 4-6) and Senior (Grade 7-9) phases. Primary schools end in Grade 7, meaning that Grades 8 and 9 learners attend a secondary school where the last two years of the NCS (Grades R-9) is also the curriculum followed by teachers.

- In the Foundation phase, in Grade R an informal setting for learning is used. In Grade 1-3 learning is based on a formal setting with one teacher teaching one grade the whole year through. In this phase there are three Learning Programmes, namely Literacy (referring to Languages), Numeracy (referring to Mathematics), and Life Skills. The themes used to teach the three Learning Programme range from seasons, weather, farming, vegetables, a healthy environment, animals and their homes, water, transport, my body to my family.
- In the Intermediate and Senior phase teachers are Learning Area specialists and teach across both phases. In both phases eight Learning Areas exist, namely Arts and Culture, Economic and Management Sciences, Languages, Life Orientation, Mathematics, Natural Sciences, Social Sciences, and Technology.

The Learning Outcomes of each Learning Area state the minimum knowledge, values and skills to be covered by learners by grade in each phase, but should not be all that is taught. Some of the Learning Outcomes of the Learning Area Statements refer directly to the environment (SA. DoE, 2002a: 13-15, 22-28). Reference to environmental learning in each of the Learning Areas' statements as well as their policy documents are discussed next.

### **3.5.2.1 ARTS AND CULTURE**

The Learning Area Arts and Culture covers a broad spectrum of South African arts and cultural practices and takes up the issue of environmental concerns in its content and assessment. Competency of the learning outcomes is shown through four art forms, being Dance, Drama, Music and Visual Arts (SA. DoE, 2002a:24; SA. DoE, 2002d:7). In the Foundation Phase the focus is on the learner in his/her own and local environment. In Grade R learners must imitate a variety of natural sounds in their own environment with music. Through the visual arts, learners must create what they see, perceive and experience in their own natural and constructed environment. In Grade 1 visual arts are used to explore the immediate environment, and explore, experience and creatively communicate patterns and textures found in the immediate and built environment. In Grade 2 the immediate environment is prominent. In Grade 3 movement ideas for dancing must come from their own environment (SA. DoE, 2002d:9-38).

In the Intermediate phase the environment features where learners must express themselves using resources from the natural, physical, social and cultural environment. In Grade 4 the visual arts are used to "share resources, choice of materials and negotiate choice of subject matter in a group project with other learners, with a focus on... the environment..." In dance learners are required to dance in different places (e.g. inside and outside, in the classroom, on stage, on wood, concrete, grass or mud), which describes how dance is affected by space and the physical environments. In drama environmental issues are enacted and learners have to use their own compositions of poetry and song to draw attention to current social and environmental issues. In Grade 6 the visual arts use natural, waste or found materials to make masks, crafts, artefacts, etc. Through the visual arts learners are required to draw on technology and nature in the environment to stimulate and communicate visual ideas (SA. DoE, 2002d:40-66). In the Senior phase, Grade 7s refer to the creation of art/craft/design works which demonstrate differentiation between the organic and inorganic aspects of the built and natural environment in design in the Visual Arts (SA. DoE, 2002d:80). It is evident from the above that the environment's sights and sounds, resources and physical setting can be used to master the four art forms and at the same time learn about the environment. In this Learning Area ESD can be promoted successfully.

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**3.5.2.2 ECONOMIC AND MANAGEMENT SCIENCES**

The Economic and Management Sciences Statement describes the Learning Area as a “study of private, public or collective use of different types of resources in satisfying people’s needs and wants, while reflecting critically on the impact of resource exploitation on the environment and people”. (SA. DoE, 2002a:27). According to the Economic and Management Sciences policy document (SA. DoE, 2002c:4, 5, 7, 8, 14), this Learning Area deals with entrepreneurial skills and knowledge needed to manage oneself and the environment effectively. It aims to promote productivity, social justice and environmental sustainability, as well as to promote respect for the environment, human rights and responsibilities. In the Foundation phase one of the overall focus points is entrepreneurship and the local environment. Typically the NCS for Economic and Management Sciences requires the learner to be made aware of who is involved in the production of goods and services in the local environment using local resources. Grade 1s are required to use artistic skills to design and produce environmentally friendly products that could be sold or exchanged in the community. Grade 3s are required to master the relationship between the economic and physical environment. In the Intermediate Phase the overall focus is on the relationship between different environments (social, political, natural and economic) (SA. DoE, 2002c:17, 18, 19, 20, 25).

In Grade 5, the first Learning Outcome deals with the interdependence between economic activity and the physical, technological, social, political and legal environments, discussed in the context of limited resources and unlimited demand. The fourth Learning Outcome deals with entrepreneurs who can encourage communities to take pride in their uniqueness and environment. It refers to exploring personal steps and attitudes to improve the standard of living, for example, using time and resources productively to promote a healthy environment. In the Senior Phase the environmental focus is on the need to master skills and values relating to business, social and environmental issues. Learning Outcome 1 deals with the interdependence between economic activity and the physical, technological, social, political and legal environments to address the problem of limited resources and unlimited demand. Learning Outcome 4 focuses on Entrepreneurs who can encourage communities to take pride in their uniqueness and environment, while making economic gains (SA. DoE, 2002c: 31, 33, 34). It is clear that environmental learning takes place in this Learning Area through the use of natural resources and consciousness of the natural environment and its place in the economic cycle. Not only can Economic and Management Sciences promote ESD, it can also be used as a basis for awareness of the EMS implemented in the school because of its environmental focus relating to business, social and environmental issues.

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### 3.5.2.3 LANGUAGE

According to the NCS (SA. DoE, 2002a:20), the Languages Learning Area Statement covers all 11 official languages ranging from Home Languages, First Additional Languages, to Second Additional Languages. The introduction to the Languages Learning Area (SA. DoE, 2002i:6-9, 83) describes how the Learning Area contributes to the curriculum by “providing a way of communicating information, and promoting the goals of science, technology and EE”. Language learning takes place through the integration of themes as it allows learners to build vocabulary related to the topic. One of the themes prescribed is the importance of human rights, environmental issues and environmental justice. It is in the Senior phase that learners are challenged with an outcome that requires them to be able to debate important issues, including human rights and environmental issues.

### 3.5.2.4 LIFE ORIENTATION

According to the NCS (SA. DoE, 2002a:26), the Life Orientation Learning Area Statement develops “skills, knowledge, values and attitudes that empower learners to make informed decisions and take appropriate actions regarding: health promotion, social development, personal development, physical development and movement, and orientation to the world of work. Together, these five focus areas of the Life Orientation Learning Area Statement address the human and environmental rights outlined in the Constitution”. Learning Outcome 1 focuses on Health Promotion, specifically where the learner is to make informed decisions regarding personal, community and environmental health. The Life Orientation Learning Area aims to enable learners to make informed, morally responsible and accountable decisions about their health and the environment since the environmental issues are the ones that affect the health and well-being of many communities. In the Foundation phase, Grade 1s are expected to explain steps to ensure personal hygiene and link these steps to environmental health. In Grade 2 they must be able to suggest and investigate actions to make the home and school environment healthier. In Grade 3 learners have to participate in a recycling project, and explain how recycling contributes to environmental health (SA. DoE, 2002g:4, 16, 17).

In the Intermediate phase, learners in Grade 4 are expected to be able to explore and report on links between a healthy environment and personal health. In Grade 5 they investigate the local environmental health problem using different data sources, and plan a strategy to address the problem. In Grade 6 they participate in problem-solving activities to address an environmental health issue to formulate environmentally sound choices and/or actions (SA. DoE, 2002g: 28, 29). In the Senior phase, in Grade 7, learners are required to evaluate actions to address an environmental health problem. They also participate in outdoor

adventure programmes through orienteering in different environments (SA. DoE, 2002g:40). Through teaching and learning of Life Orientation, learners master elements of environmental learning. Life Orientation can be instrumental in the EMS implemented at the school since through the problem-solving and evaluation tasks, learners can contribute to the functioning of the EMS.

### **3.5.2.5 MATHEMATICS**

Despite the Learning Area description for Mathematics not referring to the environment, it is significant to mention that the environment is considered throughout the phases. In the Foundation phase the environment is used as a context in which the learner has to count, estimate and calculate, for example to count animals in the environment with an awareness of animals at risk of becoming extinct, and interpret climatic conditions, like reading temperature and rainfall information. Typically in Grade 3, the learner must read, interpret and draw informal maps of the school environment and collect data in the classroom and school environment to answer questions (SA. DoE, 2002a: 15,21; SA. DoE, 2002f:4, 5, 8, 12, 27, 31).

In the Intermediate phase, environmental issues are also encouraged as a context for mathematical learning. Learners are required to use the environment to recognise, visualise and name two-dimensional shapes and three-dimensional objects, and collect data in the classroom and school environment (SA. DoE, 2002f:34, 48, 55). In the Senior phase, the learner will develop a sense of how Mathematics can provide solutions that sustain or destroy the environment, and/or promote or harm the health of others. The learner is expected to deal with data in significant social, political, economic and environmental contexts with opportunities to explore relevant environmental issues and show responsibility toward the environment and the health of others. When handling data the learner is expected to be able to pose questions relating to human rights and social, economic, environmental and political issues in his/her own environment (SA. DoE, 2002f: 66, 75, 88). The skill learnt in Mathematics can be used to aid the learner in undertaking calculations for the EMS audit.

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### 3.5.2.6 NATURAL SCIENCES

According to the NCS (SA. DoE, 2002a:22, 23), the Natural Sciences Learning Area Statement “promotes scientific literacy by appreciating the relationships and responsibilities between Science, society and the environment. It helps learners to understand not only scientific knowledge and how it is produced but also the environmental and global issues”. All three Learning Outcomes feature a reference to the environment, i.e. ... solve problems in an environmental context; ... interpret and apply scientific, technological and environmental knowledge; and ... demonstrate an understanding of the interrelationships between Science and Technology, society and the environment. The purpose of The Natural Sciences Learning Area is to promote scientific literacy by, among others, an appreciation of the relationships and responsibilities between science, society and the environment, and promoting environmental responsibility. One of the four main content areas is Life and Living. It focuses on life processes and healthy living, on understanding balance and change in environments, and on the importance of biodiversity. The competencies of Learning Outcome 3 include, among others, the assessment of progress in issues such as environmental justice, traditional and indigenous knowledge, and knowledge about environmental management and environmental issues (SA. DoE, 2002h:4, 5, 12). In the Foundation phase learners explore the world by observing and manipulating common objects and materials in the environment. The learner is guided to observe and describe changes, including cyclical changes that occur in the natural environment (SA. DoE, 2002h:23). In the Intermediate phase, Grade 5 learners have to identify positive and negative effects of scientific developments or technological products on the quality of people’s lives and/or the environment. Learners must also describe observable features of objects in the environment, animals, plants or features in the sky. In Grade 6, the learner must suggest ways to improve technological products or processes and to minimise negative effects on the environment. Ecosystems are discussed as self-contained areas dependent on the living and non-living environment (SA. DoE, 2002h:20, 37, 62). The Senior Phase learner is expected to examine and debate these issues in the scientific, technological and environmental context. Natural selection is discussed whereby it accelerates when the environment changes. Extinction, biodiversity and ecosystems in a changing environment are themes, as well as the environmental effects of mines. The environmental implications of using non-renewable resources and nuclear resources as energy sources are also themes (SA. DoE, 2002h:45, 64, 67-74). In this Learning Area ESD can be promoted successfully.

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### 3.5.2.7 SOCIAL SCIENCES

According to the NCS (SA. DoE, 2002a:23, 24), the Learning Area Social Sciences studies “relationships between people and between people and the environment”. These relationships vary over time and space. Social, political, economic and environmental contexts, and people’s values, attitudes and beliefs are factors that play an influential role. EE and human rights education are integral to both History and Geography. The Social Sciences Learning Area Statement encourages learners to ask and find answers to questions about society and the environment in which they live. All three the Learning Outcomes of the discipline of Geography take the environment into consideration. Learning Outcome 1 deals with Geographical Enquiry: The learner is able to use enquiry skills to investigate geographical and environmental concepts and processes. Learning Outcome 2 deals with Geographical Knowledge and Understanding, which the learner needs to be able to demonstrate. Learning Outcome 3 deals with Exploring Issues: The learner is able to make informed decisions about social and environmental issues and problems. These outcomes promote knowledge and understanding of the interrelationships between people, resources and the environment. In general, in Geography teaching and learning actions for a sustainable environment are considered as well as attitudes, values and actions in a world of constant social, economic, political and environmental change. In Geography, learners explore social inequality and forms of exploitation with regard to environmental and land issues, the decreasing availability of resources, and the deteriorating quality of the environment.

In the Foundation phase learners focus on people and the environment and become aware of issues in the local environment. The focus is on themes related to environmental learning: Grade R - Stories about familiar places in the area where the learner lives or places visited; and Direction; Grade 1 - Safe and unsafe places; and People’s experience of places. Grade 2 - National symbols such as the South African flag; A variety of housing types and their immediate environments; Availability of resources such as space, water, electricity and transport; Important places in the learner’s community and obvious physical features; The concept of a resource and the daily use of resources such as water, air, energy (wood, paraffin, coal, oil, electricity, food); Actions that could be taken to improve places in the local environment. Grade3 - Different types of land use in the local area (e.g. farms, residential area, forest, nature reserves, open spaces, recreational sites); Items the learner and family use regularly, and the resources and processes from which these items are obtained; Location of places on simple maps, and the position of places in relation to other places (e.g. beach, mountain, river); Change in the local environment: Concepts of pollution and its broad

effects; Managing waste: concepts of reducing, recycling and re-using waste (SA. DoE, 2002b:22).

In the Intermediate phase the themes related to environmental learning are mentioned by grade: Grade 4 - The history of transport and travel over time: from the earliest ways of transporting goods and people to the most modern on land, sea and in the air, including the environmental impact of different types of transport; Settlement features; Resources and services within a settlement (e.g. land, water, sewerage, waste services, education, medical, green/open spaces), and difficulties faced by those without access to resources and services; Food production in South Africa; Access to food and water; and Mapwork. Grade 5 - The role of the environment in shaping the societies and use of resources; Early Southern African societies until 1600: how the environment shaped these societies; The physical structure of South Africa; Climatic regions of South Africa; Resources; Population: distribution and density patterns in South Africa, and the natural and social factors; Health and welfare; and Mapwork. Grade 6 - Population distribution and density on a global scale; Climate and vegetation regions of the world; Trade and development (exploitation of resources); Development issues (environmental destruction); Environmental issues - the contribution of societies to the loss of biodiversity; and Mapwork. In this Learning Area ESD can also be promoted successfully. In the Senior phase themes related to environmental learning are discussed for Grade 7. Natural hazards (e.g. drought, floods, earthquakes, volcanoes and tropical cyclones): simple explanations of how natural hazards occur - physical processes, climate change, poor environmental management; The impact of hazards on people's lives - distinction between disasters and hazards; why some people are more at risk than others; who is at risk; management of risks and risk reduction - preventative measures (e.g. with regard to flooding, measures such as catchment management to improve the quality of rivers, wetlands, and reduce risks to human life and ecosystems); Population growth and change; Processes affecting population growth and change; and Mapwork (SA. DoE, 2002b:4, 5, 6, 81-90).

Peden (2008:17, 18, 21) states that disciplinary knowledge of both natural and social sciences is necessary for EE, but is of the opinion that the South African curriculum like ESD, places greater emphasis on Social Sciences than Natural Sciences. To substantiate this, research evidence obtained in some schools in Pietermaritzburg shows that the environment is rarely addressed by teachers other than those in Geography and Natural Science, even though it is supposed to feature throughout the whole curriculum. Within the two disciplines mentioned, the scientific focus is limited and little attention is given to the interaction between the Natural and Social Sciences. Within the curriculum, Natural Science and Geography do deal with the themes noted next, but they lack a specific and clear focus on key environmental issues of the 21st century, for example global warming, climate change, habitat destruction and extinction, and the related causes such as consumption and

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population growth. Peden proposes reinforcing EE at South African schools by selecting a few environmental topics to be addressed in depth in selected school subjects. The suggestion arises because currently these topics are not addressed in a “coherent, structured and critical manner”. A clear environmental focus within disciplines is suggested as a starting point for powerful, integrated knowledge where both teachers and learners deepen their understanding of the topic.

### **3.5.2.8 TECHNOLOGY**

The Learning Area Technology is defined as “the use of knowledge, skills and resources to meet people’s needs and wants by developing practical solutions to problems while considering social and environmental factors”. Learning outcome 3 focuses on the environment in the Intermediate and Senior phases. It reads: “Technology, Society and Environment: The learner is able to demonstrate an understanding of the interrelationships between Science, Technology, Society and the environment over time.” (SA. DoE, 2002a:28).

In this Learning Area learners are constantly made aware of the potentially negative impact that their solutions could have on the environment and on human rights. Throughout the Intermediate phase learners are made to reflect on whether what they have designed will affect the environment. The impact of technology on the quality of people’s lives and/or the health of the environment is a focus throughout Grades 4-6. In the Senior phase, the focus lies on whether a balance of natural, synthetic and recyclable materials is used. It investigates the environmental situation and whether the product and design will impact on the environment (SA. DoE, 2002e:4, 21, 29, 32, 34). It is clear that the impact of technology on the environment is seriously considered. Technology, when thought of in the context of the Van Rooyen model (cf. Figure 3.8), can successfully promote ESD and its practical nature can aid in the implementation of the EMS when referring to the choice of theme, for example waste and the development of waste reduction, reusing and recycling strategies for the school.

The environment has been included in South Africa’s NCS principles and as a theme in some of the Learning Areas. Despite the environment not being an individual subject, the NCS is connected with ESD. Peden (2008:13, 15, 20, 21) also refers to how ESD supports the approach of EE as a cross-curricula norm. This means that learners acquire discipline knowledge of the environment and are empowered to become critical thinkers, taking part in “contextualised, socially critical learning and problem-solving”, as recommended by ESD. Critique of ESD at school level is that the key concept of SD lacks clarity and a solid knowledge base.

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### 3.5.3 ENVIRONMENTAL LEARNING IN SOUTH AFRICA'S NATIONAL CURRICULUM STATEMENT (2011)/CURRICULUM AND ASSESSMENT POLICY STATEMENT (CAPS): A CONTEXTUALISATION

After the appointment of President Jacob Zuma in the 2009 national elections the DoE became the responsibility of two ministries, namely the Ministry of Basic Education and the Ministry of Higher Education and Training. The Minister of Basic Education introduced the CAPS (Grades R-12) as a “refined and repackaged” version of the NCS (Grades R-9 and Grades 10-12). CAPS, gazetted in March 2011, forms a comprehensive and concise policy document that replaces Learning Areas with subjects (SA. DBE, 2011s:3-8). Like the NCS, it ensures that all subjects reflect the principles and practices of *social justice, respect for the environment and human rights* as defined in the Constitution of South Africa. CAPS also does not feature the environment as a subject, but maintains it as a theme in the subjects. This ensures that it is connected with ESD since it also aims to produce learners who “use science and technology effectively and critically showing responsibility towards the environment and the health of others” and who “demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation”. (SA. DBE, 2011i:4, 5). The NCS's outcomes and assessment standards were reworked into general aims of CAPS. The specific aims of each subject, mark out the topics to be covered per term and the required number and type of assessments per term with the view to making it more accessible to teachers (SA. DBE, 2011s:7).

A discussion as to where environmental learning features within the school subjects within CAPS follow. It is important to note that the change from *Learning Areas* to *subjects* has meant that name changes were made in the subjects in the three phases, and that there is a reduction in the number of subjects in the Intermediate phase. Each phase is discussed separately next.

#### 3.5.3.1 FOUNDATION PHASE

The Foundation Phase maintains the same subjects as was policy in the NCS. The informal approach to teaching in Grade R is maintained, and in Grades 1-3 it is a formal setting for teaching and learning (SA. DBE, 2011s:9). The subjects are Home Language, First Additional Language, Mathematics, and Life Skills, comprising Beginning Knowledge (includes Social Sciences, Natural Sciences and Technology), Creative Arts (e.g. art, music and drama), Physical Education, and Personal and Social Well-being.

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**3.5.3.1.1 LANGUAGE**

In English Language in the Foundation phase language skills need to be mastered. i.e. listening and speaking; reading and phonics; and writing and handwriting. Regarding oral work in Grade R teachers are told to begin each morning with a brief whole-class oral activity. Topics suggested include talks about the weather chart, any special events for the day, and topical events, among others. This is an ideal platform for using the environmental calendar to discuss environmental days being celebrated. The Grade R organisation of language learning is based on principles of integration and play-based learning through learner-centred activities. With regard to English Language at Home level and English First Additional Language, level teachers have the freedom to use any story theme, and to ask learners to draw pictures and sing songs of their choice. In this case a theme related to environmental learning can be chosen. For example, in Grade 1 teachers are required to select two themes that will enable them to introduce and recycle vocabulary, and cover certain activities. They have to choose appropriate themes depending on the context (e.g. a farm, township and urban school) and the resources available. Examples of where environmental learning takes place in Grade 2 to promote ESD include performing a poem or song (e.g. I hear thunder), and playing language games (e.g. learners must think of the names of clothes they wear on a hot day/cold day) (SA. DBE, 2011a:8-10, 25, 33; SA. DBE, 2011c:23, 48). Language as a subject is the ideal platform for teachers to choose an environmental theme and promote environmental learning. The latter examples refer to the English language, but can also be applied to Afrikaans as home language and first additional language where, for example, weather and seasons are used as topics for oral discussions as well as themes ranging from trees to the outdoors (SA. DBE, 2011d:11, 23, 39, 53, 116; SA. DBE, 2011e: 18, 60, 61).

**3.5.3.1.2 MATHEMATICS**

One of the specific aims of Mathematics is “critical awareness of how mathematical relationships are used in social, environmental, cultural and economic relations”. (SA. DBE, 2011b: 8; SA. DBE, 2011f: 8). Regarding Mathematics, in Grade R the curriculum recommends that learners use a variety of different objects such as blocks, bottle tops, twigs and other objects found in the environment for learning. They are also required to identify and observe features in the environment. For example, a whole-class activity will entail the whole class determining the name of the day, the date, the number of learners present and absent, and the nature of the weather. Learners are also required to identify, describe in words and copy geometric patterns in nature, for example objects in nature that have a triangular shape. They therefore have to recognise and describe shapes and objects in their

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environment that resemble mathematical objects and shapes (SA. DBE, 2011b: 7-12, 14, 25, 26, 127). Similarly, in Grades 1 to 3, learners are required to identify and observe in the environment. In the content area of *space and shape (Geometry)* the specific content focus states that learners must be able to recognise and describe shapes and objects in their environment that resemble mathematical objects and shapes. In the content area of *measurement* the general content focus is on the selection and use of appropriate units, instruments and formulae to quantify characteristics of events, shapes, objects and the environment. Mathematical problem-solving and tasks are dealt with within an environmental theme. Teachers are advised to choose activities and patterns appropriate to each grade to ensure that environmental learning takes place and so promotes ESD. Examples provided to teachers include: in Grade 1 learners can make rubbings of patterns, for example patterns on leaves, bark on trees, etc. When looking for patterns of symmetry or patterns in general the examples are animals, for example cows, moths and butterflies, zebra, giraffe, leopards, birds, insects, or flowers and leaves. An example of a problem given in Grade 2 is: “35 learners and 1 teacher go on school trip to a nature reserve...” (SA. DBE, 2011f:1-36, 198, 287). In Mathematics, the environment is essentially required to be used during teaching and learning, showing that with good planning environmental learning within Mathematics can be successful.

### 3.5.3.1.3 LIFE SKILLS

In Life Skills, a specific aim is for learners to understand the relationship between people and the environment. In this phase learners learn about the environment through the following themes: seasons; weather, farming, vegetables, a healthy environment, animals and their homes, pets, plants, seeds, water, the night sky, using recyclable materials, rights and responsibilities in the environment, insects, life cycles, recycling, pollution, and types of disaster. The study area *Beginning Knowledge's* content and concepts are drawn from History and Geography, for example concepts like conservation, cause and effect, place, adaptation, relationships and interdependence, diversity and individuality, and change are studied. In Natural Sciences and Technology, the concepts of life and living, energy and change, matter and materials, planet earth and beyond are studied. The study area Personal and Social Well-being helps learners to make “informed, morally responsible and accountable decisions about their health and the environment” and teaches them about relationships with other people and the environment, including values and attitudes. In the Foundation phase, Life Skills is favourable for environmental learning because the free play outside involves water and mud play, gardening and caring for animals. This subject also makes use of recyclable material for its resources. Topics that promote environmental

learning in Grade R include healthy living, weather, seasons, water, fruit, vegetables, dairy and wool farming, healthy environment, festivals and special days, birds, reptiles, and wild animals. In Grade 1 the themes prescribed for teaching and learning for the year include: the weather, pets, plants and seeds, food, water, and the sky at night. In Grade 2 the themes include: what we need to live, healthy living, seasons, animals, animals and creatures that live in the water, animal homes, soil, our country, and life at night. In Grade 3 the themes include: health protection, rights and responsibilities, insects, life cycles, recycling, pollution, plants, the earth, disasters and what we should do, and animals and creatures that help us (SA. DBE, 2011g:8-20, 30-33; 42-45; 54-57). From the latter themes it is evident that in this phase a strong focus on environmental learning exists within the study areas *Beginning Knowledge* and *Personal and Social Well-being*, and ESD can be promoted with success.

### **3.5.3.2 INTERMEDIATE PHASE**

The Intermediate phase contains a reduced number of subjects, compared to the number of Learning Areas in the same phase in the NCS (SA. DBE, 2011s:9). The subjects are Home Language, First Additional Language, Mathematics, Natural Science and Technology, Life Skills (comprising Creative Art, Physical Education, and Personal and Social Well-being), and Social Sciences.

#### **3.5.3.2.1 LANGUAGE**

In English Language in the Intermediate phase language skills need to be mastered. Teachers are given the freedom to choose themes of their choice and so provide the context for language skills to be mastered. They are encouraged to use content or concepts that are contextual to their environment in both English Home Language and English First Additional Language (SA. DBE, 2011h:8-11, 31, 34; SA. DBE, 2011j:31). In English Language in Grades 4, 5 and 6 learners are expected to use a weather report as a theme to master listening and speaking skills (SA. DBE, 2011h:41, 66, 79). In English Second Additional Language suggested themes related to environmental learning for mastering grammar skills are listed as animals, nature/environment, places, and weather and seasons (SA. DBE, 2011k:30). In Afrikaans Home Language in Grade 4 learners are required to explain a natural phenomenon that can successfully promote environmental learning. In Grade 4 and 5 learners are also expected to use a weather report as a theme to master listening and speaking skills (SA. DBE, 2011l:22-24, 34). In Afrikaans First Additional Language in Grade 4 learners are required to talk about the weather and describe places (SA. DBE, 2011m:38). In CAPS, in Language as a subject the teacher can successfully include themes related to

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environmental learning, for example climate change, in the teaching and learning in this phase because skills and not themes are prescriptive.

### **3.5.3.2.2 MATHEMATICS**

In Mathematics a specific aim is to nurture critical awareness of how mathematical relationships are used in social, environmental, cultural and economic relations. Furthermore, the contexts for solving problems and handling data build awareness of social, economic and environmental issues. When dealing with mathematical skills, learners are directed to recognise objects in the environment and the contexts for solving problems and data handling are required to build awareness of environmental issues. Learners have to analyse graphs on environmental or socio-economic contexts. These graphs are provided by the teacher who can utilise them to deal with an environmental issue. A new topic in Grade 5 Mathematics and Geography is measuring temperature. Learners need to develop a sense of how hot or cold things are when described in degrees Celsius. In Grade 6 learners are taught to read digital thermometers, since they read in a decimal form (SA. DBE, 2011n:4, 8, 13, 15, 21, 22, 30, 58, 186, 266). CAPS has created an ideal platform to promote environmental learning by including an environmental focus when mastering mathematical skills.

### **3.5.3.2.3 NATURAL SCIENCES AND TECHNOLOGY**

In the Intermediate phase the content of Natural Sciences and Technology promotes understanding of the need for using “scientific and technological knowledge responsibly in the interest of ourselves, of society and the environment”. The three specific aims in Natural Sciences and Technology encourage learners to respect living things; gain scientific, technological and environmental knowledge and be able to apply it in new contexts and make connection; and understand the practical uses of Natural Sciences and Technology in society and the environment and have values that make them caring and creative citizens. Issues such as improving water quality, growing food without damaging the land, and building energy-efficient houses are examples of everyday applications to be mastered in the two disciplines. These aims compliment the drive toward SD practices. Knowledge Strands are used as organisers for the Natural Sciences (Life and Living, Matter and Materials, Energy and Change, Planet Earth and Beyond) and Technology (Structures, Processing, Systems and Control). In Grade 4 the themes where environmental learning can be promoted range from living and nonliving things, looking at what plants need to grow and

habitats of animals, to explaining the water cycle in terms of change of state of water. In Grade 5 plants and animals on Earth, food chains, and life cycles are favourable for systems thinking (cf. 4.2.7.2) and environmental learning. In Grade 6 photosynthesis, ecosystems and food webs, and renewable ways to generate electricity, among others, are themes studied (SA. DBE, 2011o:10-12, 19, 59). Environmental learning is successfully mastered in this subject since it teaches about biodiversity, values and ethics with respect to the relationship between humankind and the environment.

#### **3.5.3.2.4 LIFE SKILLS**

In the Life Skills curriculum Personal and Social Well-being is expressed as a study area containing three different but interrelated study areas. Personal and Social Well-being, Physical Education and Creative Arts are three foci. In the study area Personal and Social Well-being environmental learning features most prominently since it studies the self in relation to the environment and society. An aim of this subject is to guide learners to make informed and responsible decisions about their health and environment. The topics make up the knowledge content of this subject and each topic contains themes that allow for environmental learning. For example, in grade 4, themes include dangers in and around water: home and public swimming pools, rivers and dams and children's rights and responsibilities. In Grade 5 themes covered include water as an important basic need, healthy eating for children, and local environmental health problems. In Grade 6 caring for animals and people are themes that can engage environmental learning. In the performing arts and visual arts any theme that promotes ESD can be used since the natural environment can be applied as a muse for 2D art, and for 3D visual art recyclable materials can be used (SA. DBE, 2011p: 8-14). In its subtle way Life Skills can also be used to focus on environmental learning.

#### **3.5.3.2.5 SOCIAL SCIENCES**

In Social Sciences, History and Geography are taught separately. The History discipline encourages "civic responsibility and responsible leadership, including raising current social and environmental concerns". The Geography discipline studies the human and physical environment. It encourages human activities, what people do, how the environment affects them and how they affect the environment. The Geography curriculum aims to develop learners who, among others, are curious about the location of people and places in the world; how and why people, goods, water, land and air move and change; land, water and air

on Earth; what people do, how the environment affects them and how they affect the environment; and interdependence between climate, vegetation, wildlife, resource distribution, and human settlement and activity. The Geography project in this phase is mastered in Grade 5 and places a strong focus on field observation and research in local environment, since learners must observe and record the weather. Clearly environmental learning and systems thinking (cf. 4.2.7.2) feature here. Themes that are dealt with include: map skills (focus: Africa and World) in all three grades; food, farming and water in South Africa (Grade 4); weather, climate and vegetation, minerals and mining in South Africa, physical features of South Africa (Grade 5); and climate and vegetation around the world, population – why people live where they do and trade (focus: South Africa and world) (Grade 6) (SA. DBE, 2011q:8-20). From these themes it is also evident that in this subject a very strong focus exists on the environment and environmental learning can very easily be taught and learnt.

### **3.5.3.3 SENIOR PHASE**

Eight subjects are presented in the Senior phase, namely Language, Creative Arts, Economic and Management Sciences, Life Orientation, Mathematics, Natural Science, Social Sciences, and Technology. The discussion focuses on environmental learning in Grade 7.

#### **3.5.3.3.1 LANGUAGE**

As with the Foundation and Intermediate phases, language skills need to be mastered in English. The teachers are given the freedom to choose themes of their choice to provide the context for language skills to be mastered. In English Home Language, Afrikaans Home Language and Afrikaans First Additional Language teachers are encouraged to use content or concepts that are relevant to the interests of the year group, and they are advised to use different social settings, for example talking about events or people in the environment. In poetry learners are required to write about observations and experiences related to human beings, nature, and social issues (SA. DBE, 2011u:11, 47, 55; SA. DBE, 2011v:9, 11, 47, 55; SA. DBE, 2011x:22, 49, 55; SA. DBE, 2011y:11, 22, 49, 55). In English Second Additional Language suggested themes related to environmental learning for mastering grammar skills are listed as animals, nature/environment, places and weather and seasons (SA. DBE, 2011w:12, 34, 67). Owing to the freedom given to teachers in Language regarding choice of

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theme, it is my opinion that teachers can successfully include themes related to environmental learning in teaching and learning and so promote ESD.

#### **3.5.3.3.2 CREATIVE ARTS**

The subject Creative Arts studies art forms that comprise dance, drama, music and visual arts (including design and crafts). In Grade 7 the only place where environmental learning can feature is where learners are expected to show “concern for the environment by using recyclable materials” (SA. DBE, 2011z:8-22).

#### **3.5.3.3.3 ECONOMIC AND MANAGEMENT SCIENCES**

The subject Economic and Management Sciences is the ideal platform for promoting the implementation of an EMS because it deals with the impact of resource exploitation on the environment and on people. It also exposes learners to real-life skills for personal and community development, and promotes the idea of sustainable economic growth. In Grade 7 theme content that can be used in environmental learning and to create an awareness of an EMS is noted for each school term, but requires some effort and planning from the side of the teacher. In Term 1, when dealing with how to recycle and reuse goods to satisfy needs and wants, teachers can focus on how the school applies this. In term 2, when dealing with the budget, learners can take note of how much the school budgets for photocopying and investigate if reusing and recycling could lower the expense. In term 3, creating sustainable job opportunities can be viewed from within green job creation since the Tbilisi Communiqué requests stakeholders, such as teachers, to address the issue of green economies in ESD (UNESCO & UNEP, 2012:5). In term 4, sustainable use of resources can complement the discussions held in terms 2 and 3 around the themes identified (SA. DBE, 2011zi:8-15).

#### **3.5.3.3.4 LIFE ORIENTATION**

Two topics that can be useful for environmental learning within Life Orientation are *Health, social and environmental responsibility* and *Constitutional rights and responsibilities*. Life Orientation also aims to guide learners to make informed and responsible decisions about their health and environment, among others. In Grade 7 only two themes can be used for environmental learning, namely Constitutional rights and responsibilities, and Health, social and environmental responsibility (SA. DBE, 2011zii:8-15).

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#### **3.5.3.3.5 MATHEMATICS**

In the Senior phase, Mathematics also aims to develop a critical awareness of how mathematical relationships are used in social, environmental, cultural and economic relations. In Grade 7 environmental learning in Mathematics features collecting, organising and summarising data required to build awareness of social, economic and environmental issues in the learners' own environment. The learners have to work with environmental data and undertake an international survey using UN data for international social, demographic and environmental surveys (SA. DBE, 2011ziii:8, 33, 70).

#### **3.5.3.3.6 NATURAL SCIENCES**

In the Senior phase, the content of Natural Sciences promotes understanding of the need for using “scientific and technological knowledge responsibly in the interest of ourselves, of society and the environment”. Natural Sciences promotes acting responsibly towards the environment. Its content is found in four strands, namely: Matter and materials; Energy and change; Earth and beyond; and Life and living. In Grade 7 themes related to environmental learning include suitability of materials produced or used in local industries and the impact on the environment; environmental damage caused by accessing material, its use, waste products and pollution; energy wastage, natural supply; renewable and non-renewable energy; biosphere; habitats; and biodiversity (SA. DBE, 2011iv:11, 15, 27, 87).

#### **3.5.3.3.7 SOCIAL SCIENCES**

In Social Sciences the aims that apply to the Intermediate phase also apply to the Senior phase. The themes mastered in this grade that relate to environmental learning include: earthquakes, volcanoes and floods; natural resources and conservation in South Africa, the latter including management of resources and water in South Africa. The Grade 7 project deals with sketching a map of the local area (SA. DBE, 2011i:8-24).

#### **3.5.3.3.8 TECHNOLOGY**

Since Technology is defined as a subject that “involves the use of knowledge, skills, values and resources to meet people’s needs and wants by developing practical solutions to problems, taking social and environmental factors into consideration”, it can contribute to

environmental learning as it aims to nurture an appreciation of the interaction between people's values and attitudes, technology, society and the environment. In Grade 7 themes that help achieve this aim include: learning about recycling scrap metals and designing recycling schemes; use of natural resources to design and create emergency shelter for natural disaster victims (SA. DBE, 2011zv:8, 18, 20).

It is clear that most of the themes identified in the discussion of CAPS highlight the themes that the UN-DESD wants to promote through environmental learning, for example environment, water, development, sustainable use of resources, climate change, disaster reduction, and biodiversity. A greater shift toward SD should be integrated into the teaching and learning of all the subjects discussed and not just Geography, as noted by Reinfried *et al.* (2007:243).

### **3.6 CONCLUSION**

Chapter 3 discussed the origins, strategies and principles of EE, SD and ESD. It was established that ESD has its origins based in EE. The discussion around EE yielded an understanding of the fact that education and environment are both prominent concepts that evolved substantially through the involvement and role of the UN. No single definition exists for EE and for SD, for that matter. It was established that SD supports EE. It is an inclusive concept that deals with the economy, society, the environment, and governance/management. When dealing with ESD it involves a network of interrelations within and between the pillars of SD that function as a whole and need to be thought of as a system. Within the context of promoting ESD in a school the whole-school approach to SD aims to include all aspects of the school in helping it to become more sustainable, including, among others, school governance, pedagogy and curriculum development. It was also established that in South Africa the curriculum does promote ESD, but features more prominently as themes in some Learning Areas and subjects as indicated. The environmental concern receives prominence in the principles of the national curriculum that are based on the constitution of the country. Lastly, this chapter has found that environmental learning in ESD involves a process of learning to transform, achieved through experiential teaching and learning, and a whole-school approach when addressing environmental, societal, economic and management realms. Chapter 4 will deal with theories of systems thinking, as established in this chapter to be prominent in whole-school approaches and ESD, and theories related to management that are relevant to the implementation of an EMS.

*"The significant problems we face cannot be solved with the same level of thinking we used to create them."  
Albert Einstein*

# CHAPTER 4

## THEORETICAL FRAMEWORK OF THE STUDY

### **4.1 INTRODUCTION**

The previous chapter presented a discussion of ESD in teaching and learning. Chapter 4 focuses on a literature review of the theories underlying this study. Environmentalists urge citizens to think about what their basic environmental beliefs are and why they hold these beliefs, and that evaluating one's beliefs and being open to the possibility of changing them should be one of the most important lifelong activities for citizens (Miller, 2004:346). As a social scientist and in agreement with these views, I believe that researching social life involves researching a world of ideas and individuals, who tend to reflect upon, interpret and act within their environment. This will imply that people will begin to judge their beliefs and change them accordingly. It is exactly how individuals in a school interpret the world and interact with each other in that context when an EMS has been implemented that is of interest, since it becomes part of a multifaceted and constantly changing organisation (May, 2001:14). The purpose of this chapter is, therefore, to determine through a literature study what theories are relevant to this study pertaining to environmental learning and environmental management in education, management approaches and models for education management, and leadership styles in management.

### **4.2 ENVIRONMENTAL LEARNING AND MANAGEMENT IN EDUCATION: A CONTEXTUALISATION**

Mayer (2002:2) is of the opinion that EE is multi-faceted. It involves earthly matters, multiple disciplines and deals with real issues. The assumption is that teachers who share this

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viewpoint of EE do not reject disciplines and do not deny their role or importance. Teachers have the knowledge to know that problems are not solved by compartmentalising them into disciplines and that systems function beyond borders. Teachers who (consciously or not) adopt a particular paradigm, base their teaching and learning on that worldview<sup>34</sup> (Robottom & Hart, 1993a:597; Oulton & Scott, 2000:492). Kuhn explains the word 'paradigm' as a "constellation of beliefs, values, and techniques, and so on shared by the members of a given community" (Kuhn, 1970:10, 175), for example, in the communities of environmental learning and management in education. Due to the 'global', 'systemic' and interdisciplinary approach offered to teaching by EE, Mayer (2002:2) very importantly states that EE must allow for "comparison and co-operation between viewpoints, value judgments and disciplines".

Depending on an individual's viewpoint, one's paradigm will influence the way in which one manages a school and teaches EE. Also known as philosophical positions, theoretical frameworks or methodological paradigms (Schulze, 2005:59), paradigms influence not only the way people evaluate environmental issues, but also their views on the aims, methods and all other aspects of EE. For example, teachers' behaviour and environmental ethos are influenced by their own personal philosophy. In Schulze's (2005:57, 58) opinion teachers should, due to their role model status, be positive and show that they care for the environment. It can be reasoned that environmental ethics and philosophy play a far larger role in a teacher's behaviour than what is realised. Huckle (2008:342-345) poses two important questions regarding this matter that essentially deals with ethics and how to achieve sustainability<sup>35</sup>: '*What form of ethics, politics and governance should regulate social and environmental relations and what is their impact on ecological relations?*' In agreement with Huckle, it can be reasoned that a nature-centred eco-centric value and bio-centric value of non-human life should be adopted by humans. Furthermore, humans must not regard themselves as the most important entities of the universe, wanting to develop at the expense of the environment (anthropocentric), but should assume responsibilities toward humanity and the rest of the living environment. The impact of social and environmental relations on ecological relations is that a continued dependence on the ecological environment by humans could mean an end to diversity and sustainability if socio-environmental relations are not respected. It is comforting to read that Schulze (2005:57) maintains that approaches to EE change in response to changing perceptions and philosophies about humanity's interaction with all aspects of the environment. This could mean that if these approaches keep on changing in response to contemporary interactions between systems, EE could gain

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<sup>34</sup> The term 'paradigm' or 'worldview' when used in this study refers to the same framework of ideas that interpret a view of humanity.

<sup>35</sup> According to Sauvé (2005:30), sustainability refers to "maintaining life and social equity" and less with an "economist vision of sustainable development".

momentum and a “greener” future will prevail. In light of the latter discussion an overview will be given of the multiple paradigms applicable to ensuring that environmental learning and ESD are promoted when implementing an EMS in a school.

Multiple views exist on almost all aspects of environmental learning and management in education. The views influence people at large and the question arises as to whether a single or pluralistic approach should be followed at the expense of the other (Schulze, 2005:60). Higgs (1995:16) firmly believes that philosophers of education can support multiple perspectives. He acknowledges that it can be beneficial working within one perspective when it is chosen as the frame of reference. However, multiple perspectives are advantageous, since one learns from all the perspectives, thereby taking from each whatever is more helpful and valuable. Furthermore, a wealth of insight is to be gained from using multiple perspectives, since each has a unique contribution to make and, owing to the fact that a merger of similarities may exist, it may be of assistance to researchers to undertake their critical task more meaningfully. Oulton and Scott (2000:496) are also firm believers that a collection of paradigms, both carefully and communally discussed, can deliver the educational goals needed by teachers, learners, managers, researchers and lay people across the community. It is believed that multiple paradigms together with cross-disciplinary exposure will result in the combination of both, offering more than any of them could on their own because of the combination of traditions and ideological views. The following section critically discusses four paradigms that have influenced approaches to this study. Each one's relevance to this study will be motivated.

#### **4.2.1 BEHAVIOURIST LEARNING**

Behaviourists, also known as positivists, believe that reinforcement improves responses, and together with conditioning, behaviour can be modified, thus making it a simple form of learning (Woolfolk, 1998:247; Schulze, 2005:62). Behaviourist learning is a process whereby learners respond, with limitations to teachers as it involves an association between a stimulus and a response (Schunk, 2004:137; Sutherland, 1992:90). Behaviourists believe “unequivocally in the value of factual empirical information”. Within a school context, when referring to the principal, as leader, positivists view leadership theories with a focus on the measurable factors pertaining to effort, process and outcomes by the leader (Mentz & Xaba, 2007:54). This study does not aim to measure the outcome of the EMS implemented at the school by the principal and his/her colleagues, but aims to understand how it is implemented by all the role-players.

Behaviourist research in EE is deterministic and strives to control certain ways of thinking and acting by the individual being researched. This means that the development of critical independent thinking, that which education or EE for that matter aims to achieve, is contradicted (Robottom & Hart, 1995:3). The teacher holding a worldview within the behaviourist paradigm views him/herself as the authority of knowledge who works from EE outcomes that are enforced by a set curriculum and often taken for granted. The learners passively receive the disciplinary knowledge. Teaching and learning take place by means of prepared solutions to environmental problems through pre-existing sources of textual knowledge about the environment (Robottom & Hart, 1993a:599). This however, contradicts the outgoing curriculum's (NCS) critical outcomes that state that learners need to master outcomes so that critical thinkers are nurtured. They include, among others, the solving of problems and decision-making, using critical and creative thinking; working effectively with a team, group, organisation and community; organising and managing themselves and their activities responsibly and effectively; and collecting, analysing, organising and critically evaluating information, working as independent lifelong learners (SA. DoE, 2002a:8, 11). It also contradicts the incoming curriculum (CAPS) that is based on the principle of "active and critical learning", and the curriculum aims to produce learners that are able to "identify and solve problems and make decisions using critical and creative thinking" (SA. DBE, 2011b:5). It is clear that these critical outcomes cannot be achieved to their full potential when working from a behaviouristic paradigm, since the behaviourist way of thinking will contradict its principle of active and critical learning that is required to promote ESD.

### **4.2.2 THE SOCIAL LEARNING THEORY**

To a great extent, humans learn how to behave by observing and imitating the behaviour of others. This is done without personally experiencing any reinforcement and refers to social learning theory that is an extension of behaviourism (Berger, 2003:43). This is achieved when teachers pass on information to learners (who are regarded as unknowledgeable), reinforce positive behaviour (to be role models), and aim to change behaviour by focusing on knowledge, and values (Schulze, 2005:62, 63). The aim is that through modelling, learners will copy the teacher's behaviour. Furthermore, if learners believe that what they do is effective, then according to the social learning theory, they will be motivated to change themselves and their environment (Berger, 2003:43, 44). Despite this also being a positive outcome for environmental learning one needs to remember that if something is learned it can be unlearned (Berger, 2003:41) and this means that good habits can be changed by good and bad company. However, elements of this positivist view are maintained in this study since it is the eventual aim of education to shape human behaviour, especially toward

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responsible environmental behaviour (Robottom & Hart, 1993b:20, 21). The study does not aim to follow a positivist approach that focuses on the effectiveness of an education management programme (Robottom & Hart, 1993b:8), but will rather focus on how the EMS is implemented to promote ESD. A theory of learning that has been useful to past research in EE is the constructivist learning theory.

### **4.2.3 CONSTRUCTIVIST LEARNING THEORY**

Constructivists believe that all people learn mostly through the framework of what they already know and as active participants in the process of learning. As learners interact with their environment, they link information already learned and so construct new understanding and knowledge. It is important to note that in the constructivist theory, learning is supported by social interaction with fellow learners and adults (Woolfolk, 1998:277; Schunk, 2004:287). This refers to a socio-constructivist theory that implies that when a learning experience is planned, all those who form part of the curriculum are involved (Schulze, 2005:71). It is believed, therefore, that the constructivist paradigm will give learners the opportunity to construct their own ideas of the environment through participation in a group learning situation. This paradigm suits the African collective learning system. It is comprised of four practices: Learning by doing that refers to reflective action learning; learning as a collective effort that calls for interdependence; learning that involves teaching others; and learning as a social process that involves bonding (Mbigi, 2005:26, 27).

Constructivist learning is also said to ensure less superficial learning and more emphasis on deeper understanding by providing rich experiences that encourage learners to learn (Schunk, 2004:328). Learners do construct their own knowledge since the cognitive view holds that knowledge is learned, and changes in knowledge make changes in behaviour possible. This view holds that active learners are introduced to experiences where they acquire information so as to solve problems. By reorganising what they already know they achieve new insights (Woolfolk, 1998:247). According to Robottom and Hart (1993a:599), the teacher who teaches from a critical worldview can collaborate with learners who assume the role of active generators of new knowledge. For example, learners fulfil the role of problem-solvers by using text sources like electricity bills for critical environmental enquiry. They can establish, along with other information, what the carbon footprint of the school is, and then decide on action to reduce the environmental and financial effects, hence promoting ESD.

This study will consider the constructivist paradigm as a worldview when dealing with the curriculum since it envisages delivering a learner that shows respect toward the environment,

an ability to be an active and critical member of society, and one who solves problems as a member of a team using critical and creative thinking (SA. DoE, 2002a:8, 11). The NCS is coherent with the constructivist learning theory as it aims to produce learners who engage in, for example, social processes, critical self-reflection and interaction with the environment. Constructivism as a learner-centred theory is also well-suited to the principle of inclusivity within the national education policy (SA. DBE, 2011i:4, 5).

However, Loughland (2006: 36, 41, 42) states that the constructivist paradigm is well suited to research in EE because it aims to research what learners already know and then develop education upon that which is already understood. The critique is that cultural adoption of issues may be encouraged. For example, western perspectives may be encouraged since indigenous beliefs may not be taken into account by all groups. In light of this, this study aims to implement an EMS within South Africa and must be sensitive to this context. Relevant to this discussion is the emphasis by constructivist theorists on culture and symbols in the school as organisation, rather than a dominant place for the leader (Mentz & Xaba, 2007:50). Therefore, having considered these points, three perspectives on management in education and leadership are mentioned briefly, namely: the Vendanta perspective, the Chinese perspective on leadership and humanity, and the Christian perspective of educational management and leadership. The fourth, the African management philosophy perspective, will be discussed in more detail.

#### **4.2.3.1 PERSPECTIVES ON MANAGEMENT IN EDUCATION AND LEADERSHIP**

According to Mentz and Xaba (2007:57-59), Eastern perspectives have strongly influenced thinking on management. The first of the Eastern perspectives, Hinduism's Vendanta perspective, refers to a body of knowledge about the individual self, who is believed to possess an inborn potential and value system that directs human action and choices. It holds that the hierarchical order of a formal organisation is viewed as natural. Leadership and the hierarchical order are interrelated and the power obtained from this order enables the leader to influence others. It is the behaviour of the subordinates that proves the effectiveness of the school manager. The second Eastern perspective is the Chinese perspective on leadership and humanity. It emphasises that knowledge and skill acquired should be applied to serving the community. Wong (2001:49, 50) emphasises the morality of the leader. Moral leadership involves building a trusting relationship among teachers. If the leaders remain faithful to educating the youth they will gain respect of both teachers and learners. Furthermore, if school leaders are honest and truthful to their fellow teachers they

will build up mutual trust. The impact will be long-lasting, and is regarded as a new direction for educational leadership for the twenty-first century. According to Mulder (1990:92-98), the Christian perspective deals with a manager who, upon receiving and using the talent to lead, humbly renders service. Service is undertaken through love for others, respecting other individuals, and the authority gained is based on service. Leadership also implies that the manager has a responsibility to have a clear vision of the organisation's mission.

The fourth perspective is the African management philosophy perspective that is embedded in the African philosophical concept of Ubuntu. Ubuntu is not only a leadership or management technique, it is also an expression of being. Ubuntu is an isiZulu concept meaning 'personhood' and means that through our relationship with others we discover who we are. We cannot separate our humanity from the humanity of those around us. This means that the starting point of this African philosophy is social relations amongst equals. This refers to the saying: "Umuntu ngumuntu ngabantu", meaning a person is a person through other human beings. Although African cultures are diverse, they also show remarkable similarities, since community is the cornerstone in African thought and life (Khoza, 1994:122, 123; Mbigi, 2005:68-70, 75). The African management philosophy, therefore, supports the needs of the community, emphasising solidarity and interdependences, and promoting service to society. Fundamental to the African management paradigm are six practices of the African leadership paradigm, namely listening with respect; empathy; persuasion used to reach consensus; healing spiritual or emotional hurts; self-discipline; and personal consciousness so that while serving society it is done for the common good of all (Mbigi, 2005:218-223).

Mbigi (1997:7, 8, 12-14) describes a triple-cultural heritage in Africa that he believes the South African management theory and practices should use. He maintains that the problem is that the current South African management mind-set and practice is one-dimensional and ignores the Afro-Asian heritage. It is believed that higher performance levels could be attained by integrating the cultural heritage from Africa, Asia and Europe. The European heritage contributes to strategic planning and control, and its Western management systems contain the following organisational skills/features: hierarchical, exclusive shareholder ownership, formal consultation, efficiency, and a top-down approach. The Asian heritage manages the process and measures efficiency, and will add to better work methods, for example, best practice of TQM (cf. 4.3.1.5). The African heritage provides a better way of managing people and performance relationships through the spirit of Ubuntu. African (Ubuntu) management systems contain the following organisational skills/features: forums/Indabas, ritual/ceremonies, solidarity-Ubuntu, inclusivity, stakeholder shares governance, community bottom-up approach, and unconditional acceptance and respect of people. The Ubuntu principles that instruct people on how to work together include: the

principles of unconditional collective contribution, solidarity, acceptance, dignity, stewardship, compassion and care, hospitality, continuous consultation and consensus, the total principle of life being an indivisible whole, the principle of legitimacy, and the principle of inclusivity. Lessem (1994:18-22, 38) shares the same idea and describes how business in Southern Africa has evolved out of its cultural heritage.

Of relevance to the implementation of an EMS are four points discussed by Mbigi and Maree (2005:4-9) as outcomes of the Ubuntu management approach that focus on the development of co-operative and competitive people, perspectives, policies and institutions. As discussed in chapter 2, people are central to an EMS (cf. 2.2.5.3). Therefore, the training strategy should be holistic and focus on the strategic and economic issues facing the school. Better work organisation based on teamwork and co-operation where all the role-players are involved in working toward SD is crucial. When the EMS is implemented in a school all the role-players need to be informed and undergo a fundamental transformation that requires a total paradigm shift in their work so as to promote ESD. The school's environmental policy and the procedures that will be followed need to be made visible so that the school as a system can work together and focus on operational events. Inclusive and collaborative managerial practices of the principal and environmental coordinator need to be accompanied by school innovation, underpinned by bottom-up processes referring to participation and collective unity among teachers and learners, and the rest of the role-players who work toward a common goal of promoting ESD.

It is evident that the African management philosophy is suited to this study from within a constructivist paradigm since it complements the perspective of co-operative individuals who, through working together, undertake to follow a paradigm shift when new practices are undertaken that are driven by values that benefit the interchange between humankind and the environment. The critical theory paradigm is another alternative that can also be a worldview held by teachers.

#### **4.2.4 CRITICAL THEORY**

A sharp focus within critical theory, stemming from the work of Giroux, is the view that knowledge must be linked to the issue of power which is a means of achieving social transformation. At the core is the educational issue of teaching learners to think critically, to learn how to articulate their own experiences and to understand the need to work towards a more just society. Therefore, empowerment and emancipation feature strongly (Giroux, 1988: 7-10). These critical reflections on knowledge have had a great influence on views of the school curriculum (Nel, 1995:134).

According to the critical thinker, schools are to be recreated as democratic public spaces. Teachers are called upon to transform and help learners to acquire knowledge of societal structures and be able to reflect critically on these issues (Nel, 1995:136). According to Giroux (1988: 18-23), power, knowledge, ideology and schooling form complex interrelationships that are connected by a social and political nature. Curriculum theorists, teachers and learners are urged to reform the curriculum, thereby understanding that knowledge is the product of social construction. It also urged that the economic, political and social interests that different forms of knowledge may reflect need to be considered. Furthermore, teachers are encouraged to approach their teaching task systemically and not only change the content and methodology of the curricula. This aims to help learners to develop their full potential as critical thinkers and responsible participants in democratic processes. Janse van Rensburg views EE as a process of social transformation aided by critical and reflexive perspectives to allow for change (Janse van Rensburg, 1995:167, 168). This means that teachers, for example, must allow learners to reflect, examine and criticize environmental issues in groups, so that they acquire the confidence and are empowered to look for solutions to change the mindset of society. Furthermore, ideally it involves learners, teachers and community members taking part in collaborative investigations of real environmental issues in their local environments, something an EMS works towards. Its educational purpose is to be socially critical, and surfaces when investigations aim to uncover and make clear the values and interests of the individuals and groups who adopt certain positions with respect to the issue at hand. Its view of EE is education *for* the environment (Robottom & Hart, 1993b:23-26).

Critique with respect to this paradigm is that the critical pedagogy is focused on social transformation that develops an education for democracy and not an education that focuses on skills to satisfy economic demands (Nel, 1995:136). Thus, an aim of the critical theory in education is to empower learners to bring about change in society democratically. Credit is given to the fact that economic, political and social interests are considered, but of concern is that emphasis is placed on social aspects and no mention is made of ecological aspects. This shows that there is no holistic approach to teaching and learning when it comes to the environment and its sustainability. Despite this, this paradigm is relevant to this study since it focuses on collaborative participation in dealing with environmental issues, like environmental management in education that can bring about change to the immediate school environment.

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## 4.2.5 EXPERIENTIAL LEARNING AS A LEARNING THEORY FOR ESD

Experiential learning plays an important role in learners' development (Schulze, 2005:64, 65) since it allows for a hands-on learning experience (Ferreira, Lopes *et al.* (2006:947). According to Robottom and Hart (1993a:599), a teacher, as the organiser of experiences in the environment, exposes active learners to participate and learn through environmental experiences. Text may be used as a pre-existing source that provides guidance about environmental experiences. Fiore, Metcalf and McDaniel (2007:36) mention the work of ecological psychology specialist, JJ Gibson, who argued that not only must human behaviour be understood in its relation to the environment, but that the environment affects human cognition. More importantly, mention is made of Gibson's view of humans as being inseparably linked with the environment. In order to understand humans within this system, the environment must always be part of the analysis. The latter clearly refers to human behaviour and thinking influenced by their environment within an education context.

Philosopher John Locke, a behaviourist ahead of his time, believed that a child learns through experience and these experiences shape their characters. He regarded development as a continuous process and he supported a nurturing environment as a powerful means that can be used to shape the child. Locke's vision of a passive child has been rejected and replaced with an image of a child who is powerful and active (Berk, 2006:12). According to Schulze (2005:65-67), reflecting on the role of a teacher as a facilitator who helps individual learners to develop according to their own specific needs and to reach their innate potential, the 'whole' person should be actualised. Teachers use strategies and methods which include assessing the needs within a community and working with the community as a facilitator in an attempt to solve practical problems. They use enquiry and experiential learning with the learners, since the learners learn as they investigate problems in their own communities. This approach is what the NCS promotes (SA. DoE, 2002a:4-13), namely being non-authoritarian, learners learning in groups, broad and cross-curricular, active learning through experiences in the environment which the teacher creates, learners who investigate problems in their environment, and lifelong learners. However, in Schulze's opinion, and in contrast to CAPS implemented in 2012, the curriculum should be developed by the teacher. EE within the curriculum should include the development of resources aided by people, books, journal, worksheets, water and soil toolkits, etc. It is maintained that learners construct their own knowledge by means of experience and enquiry. This knowledge assists learners to reach an understanding of the world around them, since more experience means more learning. This is what was referred to in chapter 3 as a quality criteria guideline for an ESD school (cf. 3.4).

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## 4.2.6 THE INVENTIVE EDUCATIONAL PARADIGM

The inventive educational paradigm favours critical construction of knowledge and the development of relevant and useful actions. This paradigm focuses on the symbiotic relationship between humans, society and the environment. It calls for new educational practices whereby schools must be more open to the reality of the world outside and implement co-operative learning. Principle characteristics include critical construction of knowledge for social transformation and teaching approaches include teaching about basic and socially critical EE (Sauvé, 1996:17), also mentioned in the above discussions. Robottom and Hart (1993b:23-25) suggest four criteria points for socially critical EE:

1. involvement of learners, teachers and community agencies in collaborative investigations of the real environmental issues in their local area.
2. Schools working with communities to develop a new critical awareness of the roles that communities play in influencing the course of such issues.
3. Investigations that make clear the values and interests of various groups.
4. Investigations which are driven more by the nature of the unfolding of the issue than by prior commitment to teaching a body of knowledge/skills.

It is important to note that the third suggestion may bring forth the freedom to refer to a South African worldview, since this study involves schools and communities in South Africa that are multicultural. The four points listed are significant for this study because not only does an EMS require a holistic approach to promote ESD, but also requires many role-players to work together in order for an EMS to function optimally. Furthermore, an EMS calls for a move toward a more sustainable way of living that is achieved using innovative means that can be based on the inventive paradigm that relates to the immediate school environment and that can create a sense of awareness and relevance to environmental issues firsthand.

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## 4.2.7 SYSTEMS THEORY

Systems theory is defined as “several parts forming a whole” in a “complex structure of interrelated elements”. It is important for this study to understand how an EMS functions within a school as a system. Systems theory proposes taking note of and reducing complexity so as to explain the reasons why something works when it does and why not when it doesn't. Since systems theory facilitates both intradisciplinary and interdisciplinary communication, which in turn allows ideas to be exchanged across subjects viewed from different theoretical approaches, leading to a larger stimulus of the learning process. Therefore, a system consists of individual parts that can be understood separately. The whole cannot be understood completely without recognising the relationships among its parts (Trembl, 1995:265, 271, 273; Van Rooyen & De Beer, 2007:1).

In this study the systems theory approach, as discussed by Trembl (1995:276), refers to both holistic thinking and functionalistic thinking. The holistic approach focuses on what is within a system (be it a school or EMS), distinguishing between ‘the whole and its individual elements’. The functionalistic approach focuses on what is outside the system. This refers to the system's relation to its environment. Since the philosophy of environmental management has a holistic approach to decision-making (Hugo, Viljoen & Meeuwis, 1997:200), this holistic approach helps to establish a multidisciplinary analysis and interdisciplinary synthesis. According to Seiffert and Loch (2005:1199), environmental learning is approached in a holistic manner. It can, therefore, be said that systems theory is well suited for this study.

Theoretically, for example, in a school role-players who have been made aware of connections, will start to notice similarities and then develop a perspective that highlights connections. Hence they will understand and feel the need to change the complex situation at school. Consequently they will think more systemically once they see what their role and responsibilities are and know that the school's priority with the EMS is that it is interdependent. By developing an understanding of the relationship between elements within a system, the building blocks for learning are laid. Systems thinking highlights the relationships that connect systems to one another in different contexts (Seiffert & Loch, 2005:1199). Systems thinking also contributes greatly to sustainability literacy because it provides a perspective that enables learners to engage with the complexity of sustainability and the complexity of the world around them. Recognising the interconnection within systems and between systems, and exploring the relationships which these interconnections represent, is a learning pathway to systems thinking perspective (Strachan, 2009:85-88) that can be applied to a school with an EMS to promote ESD.

Since systemic thinking facilitates the understanding of complex systems, it is described as being a way of taking interrelations into account, and establishing patterns of change that represent a set of general principles. Furthermore, systemic thinking is essential for management in education because management deals with understanding and measuring according to the relationships between, for example, the physical, biotic, economic, social and cultural aspects. A holistic rather than a reductionist (mechanist) approach is encouraged (Seiffert & Loch, 2005:1197, 1199). It is, therefore, fitting to apply this theory to the functioning of an EMS in a school, especially since Trembl (1995:276) and Letseka (1995:294, 296, 305) agree that education as a practice and as an open system is complex. In fact, education is a system in a sense that it is a set of interrelated and interacting elements which function as a whole in order to achieve a common goal. On a large scale, the South African education system is regarded as an example of a complex system. Since schools are part of the whole social structure, they must not be treated in isolation from their socio-political and economic context.

Sterling (2003:38, 104-108, 269, 301, 416) as well as Seiffert and Loch (2005:1198) are of the opinion that sustainability requires a change of epistemology in education, among others, to help achieve a more sustainable world. Both agree that a paradigm shift is taking place within the Western cultural mechanistic and ecological worldviews. The mechanistic worldview, which is based on a metaphor of a machine, views external forces (nature) working on living organism (humans), therefore, viewing the two as separate. Also known as the DSP, the anti-ecological worldview regards ecological problems of our time as being rooted in the traditional values, attitudes and beliefs of our society that is anti-ecological (Dunlap & Van Liere, 2008:19). A realistic worldview that is argued must replace the DSP is the New Environmental (Ecological) Paradigm (NEP). According to Shafer (2006:122, 126), the two paradigms are in conflict between the call for continued growth and economic wealth and ecological sustainability. Supporters of the NEP argue that “unlimited growth within a finite ecological system is impossible”. They believe that humankind must live in harmony with nature. It can be said that the NEP is based on whole-systems thinking because it is holistic, global and ecological. Sterling (2003:44, 51) argues that whole-systems thinking helps to bridge the divide between the DSP’s thinking to a more “holistic, ecological worldview” in society as a whole. This, he argues, can support and validate the theory and practice of ecologically SD. Sterling maintains further that progress has been limited regarding systems thinking and systemic approaches to learning and research. Both have a central role to play in ensuring that EE and ESD are nearer at being holistic “modes of enquiry”.

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#### 4.2.7.1 STERLING'S ECOLOGICAL EDUCATIONAL PARADIGM

Sterling (2003:263-268) suggests an ecologically grounded educational paradigm. It is more systemic and a sub-paradigm of the NEP. The NEP refers to “living systems and relational view, wherein everything, including human agency, unavoidably participates in the dynamic condition and future of the whole because everything is part of the whole”. (Sterling, 2007:67). Whole systems thinking (cf. 4.2.7.2) is the philosophical basis of the ecological educational paradigm that is moulded by the “nesting and interrelated systems” framework of education paradigms as pointed out by Sterling. It means that what an organisation like a school does (educational praxis) is ultimately informed by its dominant view of reality (educational eidos/policy/theory) and its significant paradigm that refers to the way of knowing and sense of purpose (educational ethos). This viewpoint is consistent with the guideline steps given to the schools in this study that form part of the *Education for Sustainable Living* project. The reasoning is that if a school decides to implement an EMS in teaching and learning and management, it is advised to make it known by means of an environmental policy that is written and presented to the school. This in turn sets the tone for the desired effect that is to educate for SD - giving it a sense of purpose and meaning since the three key ideas for sustainable education are listed as extension, connection and integration. The educational paradigm (ethos) follows the idea of extension, and refers to ecological thinking, adapting the purpose of education (be it theory, policy, research and practice), and its relation with society and the ecosphere. It also takes on intuitive, inspirational, affective, practical and cognitive knowledge. Secondly, policy, organisation and management of the learning environment (eidos) refer to how the whole systems ideas might be reflected in systems change and management, organisational ethos, disciplines and departmental structures, curriculum content/theory and design, hidden curriculum, purchasing policy, and community links and relationships. Lastly, learning and pedagogy (praxis) refer to how whole systems approaches might be reflected in classroom or in community practice, and in teaching and learning methods. A systems view of the learner and teacher as well as the learning and teaching styles are also noted where the key idea is integration (Sterling, 2003:105, 116, 231, 263-268). Despite systems thinking being ecological, in a sense it is primarily about relationships and about understanding and managing complexity, and despite systems theory being necessary it is not enough to fulfil an ecological worldview. Learners and managers need to begin to think systemically.

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#### 4.2.7.2 SYSTEMS THINKING IN EDUCATION

Cloud (2005:225-228) suggests that one cannot teach about sustainability without teaching about systems thinking and its dynamics. He furthermore maintains that an aim of education for sustainability is to develop in children and adults new knowledge and new ways of thinking needed for social, political and economic prosperity, hence ESD. A worldview through which a child understands the world around him/her can materialise through systems thinking, system dynamics and the teacher as facilitator. Such a shift in worldview is made up of values, assumptions, education and experience. It is maintained that it is the task of teachers who are pursuing a sustainable future to teach about paradigm shifting within whole-systems thinking.

Sterling (2003:8, 38, 115, 231, 232) describes whole systems thinking as a combination of different philosophical beliefs, which includes systems thinking and ecological thought as discussed above. It has a holistic and ecological epistemology that is related to a whole-school approach (cf. 3.4). Whole-school approaches promoting ESD require holistic planning to ensure environmental learning. Both EE and systems thinking follow a holistic approach and are both 'ecological' since they deal with relationships between people and the environment, and with an understanding and managing of the complexity of relationships. The concern raised is that environmental teachers, in general, do not use systems theory and practice in their work. Reasons range from a lack of systems thinking found, in general, in curricula and ignorance among teachers about the true nature of systems thinking. The latter point is reiterated by Littledyke, Taylor and Eames (2009:3) and Wheeler (2005:225-228).

According to Sterling (2003:232), EE in the twenty-first century is taking more interest in systems thinking, and the systems thinking movement is taking greater interest in both education and sustainability. This is substantiated by the work of Wheeler (2000:1, 2) who in the introductory paragraphs of a book on education and sustainability, explains how the three pillars of SD are systems that need to be understood by means of systems thinking due to the connections and interconnections between the three. He stresses the necessity to cultivate systems thinking in the education system in order to ensure a sustainable future for all and a holistic thinking approach. Sterling, as referred to in this section, is the other driving force, calling for all to think more along the lines of systems when attempting to understand and respond to environmental issues. Clearly this is a move toward systems thinking and SD.

The Australian Research Institute in Education for Sustainability (ARIES) states that Education for Sustainability differs from the traditional approaches to EE in that it focuses on

more complex social issues. This requires people to have skills in “critical enquiry and systemic thinking” in order to explore the complex nature of sustainability (Henderson & Tilbury, 2004:8). Littleddyke *et al.* (2009:xi-3) state that Education for Sustainability must become a priority for everybody, but the reality is that the restriction of curriculum priorities have hampered any classroom development. In Australia, at national level, the government has since 2005 outlined the importance of education in the process of SD. Most recently researchers have called for a move from the passive form of EE to a more ‘social critical’ form. The view is that EE should be holistic, value-laden, action-oriented in nature, and reference is made to more systems thinking when considering environmental issues. The New Zealand government has shown a national commitment to education as a driving force of SD. Since 2007 the new national school curriculum has recommended sustainability as “a key integrating, future-focused theme in teaching and learning in all schools”. Wals (2007:35-37) reminds us that a basic aim of environmental learning, be it EE or ESD, is to ensure that people understand the complex nature of the natural and the built environments. Furthermore, in his discussion regarding learning systems, reference is made to a suggestion by Fritjof Capra that in order for a more sustainable world to materialise it requires people to “ ... become competent systems thinkers”.

According to Van Rooyen and De Beer (2007:1), learning to think systemically is critical in ESD. Systems thinking should be a fundamental guiding principle towards effective ESD. This requires different ways to teaching-learning strategies and to conceptualising the environment and sustainability issues: from parts to wholes (think holistically); from objects to relationships (interactions and interrelationships); from objective knowledge to contextual knowledge (to investigate or explore the patterns); from quantity to quality; from structure to process; from contents to pattern, all within the natural and the social systems.

Cloud (2005:225-228) further explains that a paradigm shift to ESD is rooted in experiential, learner-centred approaches to teaching and learning. In Cloud’s opinion, three relevant mind shifts that need to be made are suggested and proven to be necessary to move toward a sustainable future. They include the “Titanic syndrome”, “zero sum game” and “social trap”. The “Titanic syndrome” implies that the boat is sinking so we may as well go down first-class. The shift to be made is for learners to be made aware of intergenerational responsibilities and that the decisions they make will impact future generations. When Morris and Martin (2009:163, 164) refer to the mind shift that learning to move towards sustainability requires us to think not only “what *is* in a situation, but also to consider what *ought to be*”, it resonates that learners need to think about their choices and anticipate how their decisions might impact the future. In this way, through reflection, greater care can be taken for first-class sustainable living. This is the role of critical systems thinking and requires the learner and management to consciously face up to ethical issues arising from intergenerational

responsibility. Systemic practice can also be characterised as a process of social learning, since active learning changes the understanding and behaviour of those involved in the process.

The “zero sum game” implies that there are winners and losers in the game. The mind shift should be toward a “nonzero sum game”, since it will mean that all players are interdependent, and that in order to win, everyone must win. The “social trap” implies an attitude that echoes “Everybody is doing it, so why shouldn’t I?”. The shift should be a movement of collective action coupled with mutual responsibility for one another. In my opinion, a school that implements an EMS should apply all three ways of thinking in teaching and learning and in their EMS, so that a sustainable future can be enjoyed. Morris and Martin (2009:157) believe that learners (and management in my opinion) cannot deal with the problems of sustainability without learning to think and act systemically. For example, Tomkinson (2009:167) reports on a study to educate engineers for SD which used the systemic way to master the task using small groups. Learner-centred approaches like case studies, role play and problem-based learning were used. It was shown that complexity was successfully mastered through interdisciplinary or inter-professional education.

It is clear from the latter, and Sterling (2009:81, 82) agrees, that by developing an ecological sensibility, an understanding of interconnectivity and an ability to design and act integratively, greater attention will have to be given to more systemic sets of approaches. Within educational practices, it means that curriculum designers and teachers developing learning situations need to reflect indirectly in their design and clearly in their pedagogic approaches so as to establish if both are holistic, critical, appreciative, inclusive, systemic, creative, and ethical. Such learning will, ideally, be reflective, experiential, inquiring, experimental, participative, iterative, real-world and action-oriented, invoking ‘learning as change’ in the active pursuit of sustainability and in designing and developing sustainable systems - rather than merely ‘learning about change’ or ‘learning for change’ which is more passive on the way to a deeper learning response.

Strachan (2009:84) states that the established structures of the formal education system are resistant to change. The formal education system does not have a co-ordinated attempt to bring together the knowledge, skills and attitudes which learners gather through their education career so that they can use them to make better sense of the complex world we live in. He believes that developing the ability to think systemically gives learners of all ages the potential to maximise the application of their diverse learning experiences and contribute to how we can better understand our complex interconnected world. This statement requires a reflection on the chaos and complexity theories. The hope for South Africa’s curriculum implemented in 2012 is that the hidden order that exists within chaos theory will emerge. Letseka (1995:300-305) explains how order and turbulence are partners within the chaos

theory. Both give rise to a higher level of order within a system like the education system. Complexity theory is explained as a large system, like the education system, that is constantly changing and is concerned with dynamic interactions with components that are connected, and interact with each other.

Regarding this study, Seiffert and Loch (2005: 1200, 1201) are of the opinion that in order to achieve SD through environmental management one can adopt a systemic paradigm, and this needs to be supported by new environmental laws that are not vague. Furthermore, they believe firmly that the development of an efficient EMS is the only prospect for ensuring that humankind makes decisions that are responsible toward the environment. Of great relevance to this study is the advice given by Seiffert and Loch who advise managers to be mindful of the development of management plans. The implementation of such plans should include all the role-player's who form part of the process, so as to ensure a democratic character. It is also made clear that due to the increase in complexity in human-made systems, in the past and present, the same applies to the future. This means that humankind's relationship with its environment through the application of the systemic theory is nonnegotiable. Sterling (2003:301-303, 470) reminds us that the focus of the NEP regarding management is on systemic learning as change. Furthermore, learners, teachers and the whole school organisation form part of the learning system. They become a learning organisation that is based on trust, empowerment, power is assigned to small groups, a horizontal flow of power exists, self-organisation, a transdisciplinary nature exists, and encouragement of positive interaction takes place. Individuals are also valued as essential participants rather than contributors in a democratic process regarding management. Of importance too, is the fact that ecological management is linked to the educational curriculum and experience of the learners and teachers. According to Sterling (2009:77, 78), ecological thinking, in eco-philosophy, is described as systemic (relational) or connective thinking. This study will endeavour to follow this thinking because if we begin to explore *why* we do not think relationally, *how* we can think relationally and *what* it means to think relationally, it will mean coming one step closer to reaching a sustainable future through relational thinking. The next section will focus on the ecological systems theory.

#### **4.2.7.3 ECOLOGICAL SYSTEMS THEORY**

Bronfenbrenner's ecological systems theory describes how a child's development is influenced by the interacting and complex system of relationships, of both humans and the environment. He assumes that the interactions between a child and his/her family are the main focus of human development. The environment is described as the setting in which a

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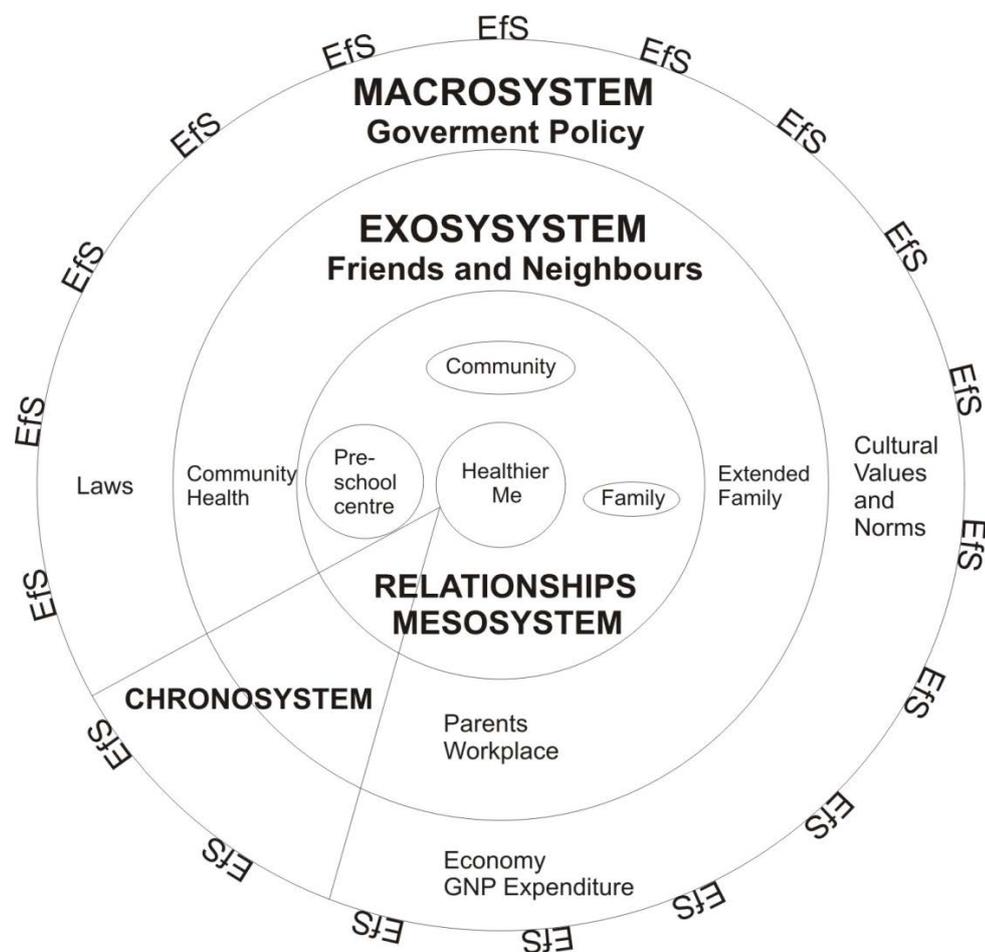
child spends his/her daily life, but it also extends beyond the home, school and neighbourhood, community (Bronfenbrenner, 1976:5; Berk, 2006:26, 27). Bronfenbrenner's bio-ecological systems theory assumes that a child's development is formed by his/her biologically influenced nature as well as environmental forces. Furthermore, Berk (2006:26, 27) describes how the interaction of the child in the immediate environment, termed proximal process, has a specific meaning. How he/she relates to the environment is relevant to this study since the interaction between the maturing child, his/her home environment and the larger community influences his/her development and decisions that will affect the natural environment.

Bronfenbrenner states that in order for development to occur, the child must engage in an activity. In order to be effective, the activity must take place on a regular basis and over an extended period of time. The reasoning behind this is for activities to become progressively more complex, over time, so as to develop effectively. These developmentally effective proximal processes must be initiated and responded to in both directions. The proximal processes are not limited to interpersonal interactions, but they can include interactions with objects and symbols that stimulate "attention, exploration, manipulation, elaboration and imagination" (Bronfenbrenner, 1999: 5-6). Bronfenbrenner also stresses how individuals learning in educational settings is a function of systems at a second level, that is, the importance of interaction among systems that are contexts or environments within which individuals live their lives (Bronfenbrenner, 1976:5).

Bronfenbrenner is described by Berk (2006:27-29) and Berger (2003:2, 3) as a leader in the systems approach. His theoretical approach consists of five concentric circles with the child in the centre (cf. Figure 4.1). All research, according to Bronfenbrenner (1976:5, 6; 1993:39-41) should consider mutual and dynamic relationships among all five the systems he identified, namely: intimate, interfacing, community, cultural and time, which he called microsystems, mesosystems, exosystems, macrosystems, and chronosystems. The belief is that systems can positively or negatively influence families and children. Together the system must make use of an *ecological approach* to study human development and provide a context of human development, beginning at the innermost level of the child's environment as discussed in each of the levels. Communities and social institutions are required to work at developing connections between the systems. This will mean greater positive influences on families and individuals. *Microsystems* are the innermost circle where interaction patterns shape the human development in the child's immediate surroundings. Relationships are bidirectional and include, for example, people (family), places (school, neighbourhood), events (religious ceremony) and interactions (peer groups). If the relationship in the microsystems breaks down, the possibility arises that the child will find it difficult to venture into and learn in his/her environment. In the *mesosystems* connections take place between

people and places in the microsystems, for example, a parent and teacher working together to educate a child. The *exosystems* surround and support the microsystems. For example, childcare facilities and flexible working schedules facilitate parents to bring up their child. *Macrosystems* influence all three former systems and range from cultural values, political philosophies, economic patterns, laws, customs, resources to social conditions. For example, countries that require high quality standards for child care ensure that children's rights are not infringed. *Chronosystems* emphasise the importance of historical time. When focusing on this study in our constantly changing environment, and considering the timing of environmental changes affecting and impacting on learners, it makes sense to educate and raise awareness about sustainable living. Berk (2006:29) elaborates further on how as a child gets older he/she selects, changes and creates his/her own settings and experiences, depending on his/her physical, intellectual and personality characteristics and his/her environmental opportunity. In light of this theory, this study finds association with developing connections between systems to ensure that exposure to environmental learning and management in South African primary schools can promote SD. In the ecological systems theory, children are products as well as producers of their environments (Bronfenbrenner, 1999:5), so both children and the environment form a network of interdependent effects (Berk, 2006:27-29), which is necessary for environmental learning.

Critique against Bronfenbrenner is that his systems theory does not refer to the biophysical environment that all individuals find themselves in. In the case of this study, by exposing learners to a whole school approach to ESD the learner should actively interact with the environment and develop an awareness of sustainable living as he/she matures and develops a value system. Littledyke and McCrea (2009:41-42) have added education for sustainability to Bronfenbrenner's ecological model as an "outer encompassing and penetrating lens". They identify education for sustainability-related influences for the *macrosystems* and *exosystems*. In the *macrosystems*, for example, a government policy or law regarding water restrictions can impact on a child's daily life by affecting his/her extra-mural activities. On an *exosystems* level the local park can provide a child with a focused space in which to live and learn.



**Figure 4.1 An education for sustainability adaptation of Bronfenbrenner's ecological model (Littleddyke & McCrea, 2009:42)**

The ecological model proposed by Bronfenbrenner and adjusted by Littleddyke and McCrea is an appropriate tool for understanding the contexts and systems within which an EMS is implemented in a school. It means that a system within a system exists and interaction may make the system whole. Having provided an explanation of Bronfenbrenner's theory, I would like to apply it in this study and suggest how it might be applied to the implementation of an EMS. To understand the whole system and its interactions means that one must understand the parts of the system and the interaction between them. This is what was discussed in chapter 2 when dealing with the EMS (cf. 2.3.2). This theory can be applied to a school as an organisation that has implemented an EMS, but viewing it from two planes. The role-players in a school are influenced by the interacting and complex system of relationships between themselves and the curriculum. The second plane is where an interaction and complex system of relationships exists between the role-players and the school environment that function as part of the EMS. The “*unifying theme*” that Van Rooyen and De Beer

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(2007:7) refer to, being in this case, ESD in teaching-learning experiences, is systems thinking, together with the framework of the environment as a system of systems (referring to Van Rooyen's model, cf. Figure 3.8) that involves systemic structure. Again reference, in my opinion, can be made to the integration between systems, interdisciplinary teaching and learning, interdependence and interconnectedness between systems, and holism (whole school approach). Ball (1990:165) describes management theories as being entrenched in human psychology because it focuses on individual participants, and it is also embedded in systems theory because it is part of a complex, interrelated, interdependent structure. It is important for this study to elaborate further on how the school, as an organisation, can adapt the management of their environment. A general discussion of theories of management and management in education will follow.

### **4.3 MANAGEMENT APPROACHES AND MODELS FOR EDUCATION MANAGEMENT: A CONTEXTUALISATION**

A theoretical background regarding the management of educational organisations is important since it is relevant to the EMS discussed in chapter 2. It is important to note that the management of a school and also its environmental management do not feature one all-embracing theory. This is motivated by a changing situation in schools, different ways of viewing problems, as well as the diverse educational organisations that exist, ranging from small rural schools to urban tertiary organisations (Bush, 2003a:25). Smit, Cronjé, Brevis and Vrba (2007:26, 28) agree that there is no "single best way" to manage and so it is necessary to look at different management approaches. Management has been shaped by environmental forces, namely social, economic, technological, political, international, and ecological forces. Although the corporate world and its functions fall outside the range of this study, it is necessary to mention that environmental management paradigms exist and form part of a theoretical framework. Some view the environment as an anthropocentric moral/ethical issue while others view it as a means of gaining financial benefits. A third paradigm views environmental management as a function of quality, referring to TQM, and a fourth paradigm added by Bhargava and Welford (1996a:15) considers the achievement of the wider principles of SD. They maintain that development must take the economy (profit), environment (planet) and society (people) into consideration and his viewpoint is based on the triple bottom line approach (cf. 3.3.2) and includes equity and futurity.

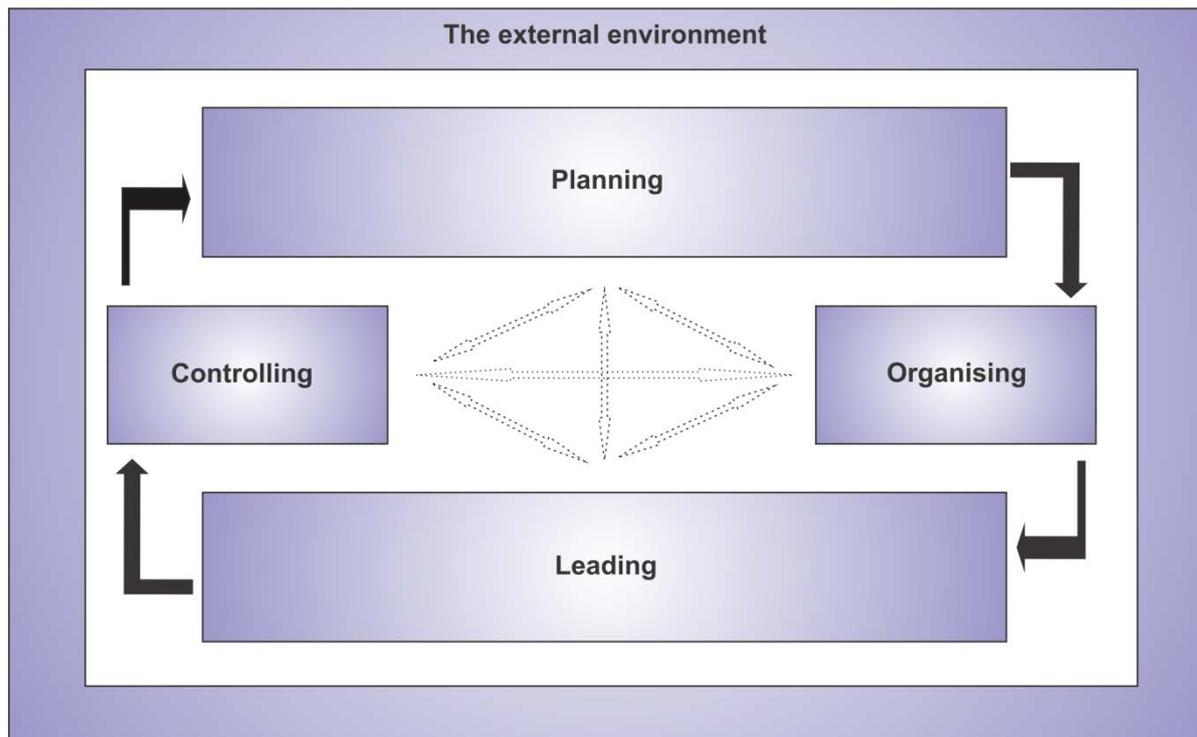
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It is deemed necessary to understand the management context of the education manager so as to understand what is happening in practice regarding management at the school. This reasoning is based on the work of Bush (2006:1-3, 23, 24), who maintains that when a school's principal or teachers make decisions, it is partly a reflection of that person's view of the school. These views are influenced by experience and attitudes brought about by the experience. What is often overlooked is the fact that such decisions are based on theories. Even though experience plays a role in influencing the decision-making process, it is theory that provides the underlying reason for decision-making. Theory is valuable and significant if it serves to explain practice and provide managers with a guide to action. It is argued that a frame of reference is needed to come to a decision as it provides insight. Personal experience is not enough as it does not include the insights of theorists, and when decisions need to be made in different contexts it values a broader awareness of theory and practice. Bush asserts that educational management deals with a study of how educational organisations, like schools, operate in practice. He maintains that if schools are to operate effectively and achieve their objectives, that leadership and management need to be given the same status of importance. Leadership refers to "the influencing of others actions in achieving desirable ends" and managing refers to "maintaining efficiently and effectively current organisational arrangements". It is suggested that theory is useful only as long as it has relevance to practice in education, making theory-for-practice more significant for managers in education. Theory should, in his opinion, be used to provide structure to managers when they make decisions and help resolve practical problems in schools.

Van der Westhuizen and Mentz (2007:66-68) refer to a school as a professional organisation where teaching and learning takes place. According to Smit *et al.* (2007:4-8), managers, in this case principals, are responsible for the success and sustainability of their schools. The success with which the school achieves its goals is dependent on the competence of its principal. Principals have to use the human, financial, physical and information resources at their disposal to help achieve their goals. They must activate and guide the school until the goals have been achieved, therefore, interrelated activities are engaged in, in order to achieve goals.

Smit *et al.* (2007:9-11) describe the complexity of the management process. It does not take place in a sequence, but management functions take place simultaneously. Management can be defined as "the process of planning, organising, leading, and controlling the resources of the organisation to predetermined stated organisational goals as productively as possible." Figure 4.2 depicts the complex process of management. The solid lines show how in theory the functions of management take place, and the dotted lines show how in reality management functions. It must be remembered that within the management process the four functions are found at all levels and in all departments of the organisation. *Planning* is

the management function that determines the organisation's vision, mission and goals, and the strategy to achieve all this. The *organising* management process entails organisational structure according to its particular needs. This entails allocating resources, delegating task and responsibilities, and establishing policies and procedures so as to achieve goals. *Leading* refers to managers using their influence and power to motivate the human resources of the organisation so as to achieve the goals set. Lastly, *controlling* refers to monitoring the performance and actions, as well as taking corrective steps to ensure that plans are on course to achieve the goals.



**Figure 4.2 A model of the management process (Adapted from Smit et al., 2007:9)**

Lastly, in education, models exist to explain management activities in schools. One such model is the management task-management area model. According to Van der Westhuizen (1991b:41-49), management consists of a number of tasks that need to be followed through. The latter refers to that which needs to be managed, also called the management area. The management task includes the components of the management process of planning, organising, leading, and controlling (cf. Figure 4.2). The management area refers to an area with its own structure according to which it functions and must be managed. The principal is responsible for managing each management area of a school in a balanced way. This research focuses on the environmental management task of the principal to ensure that teaching and learning as well as the school as a whole are managed to promote ESD. Approaches to management, management models and management styles will be discussed in the following sections.

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### 4.3.1 MANAGEMENT APPROACHES

This section discusses the management approaches relevant to this study. It includes systems theory of management, contingency management theory, an organisational approach to management, the learning organisation theory, and TQM.

#### 4.3.1.1 SYSTEMS THEORY OF MANAGEMENT

Management scholars based their ideas of organisations on the systems theory mentioned earlier (cf. 4.2.7). The systems theory of management views an organisation as a group of interrelated and interdependent parts with the purpose of staying in balance, and together the components ensure that the goals of the whole system are achieved. This means that managers need to view the organisation as a whole, not as individual parts, and then anticipate the effect of their decisions on all the parts of the organisation. In fact, the systems approach emphasises a shift from the individual and the group to the organisation as a whole. It does emphasise a balance to be maintained between the different parts of the organisation and between the organisation and its environment (Van der Westhuizen, 1991a:78; Smit *et al.*, 2007:38, 39; De Bruyn & Van der Westhuizen, (2007:292). De Bruyn and Van der Westhuizen (2007:292) maintain further that effective communication and a good understanding of the roles and responsibilities are central to the school as a system. It is also necessary that schools make their aims known and ensure that the whole school community support the aims. The total system aims must actively guide decisions. Smit *et al.* (2007:58-59) state that an organisation as an independent system is understood with the help of four concepts, namely open systems, sub-systems, synergy and entropy. The school can be a closed or an open organisation dependent on the interaction inputs with the external environment (Theron, 2007:86). According to Smit *et al.* (2007:58-59), a sub-system is a system within a system, for example the administration section of a school. This means that sub-systems can be studied separately, but also in terms of the organisation as a whole. Sub-systems are interdependent and affect each other. The outcome is that management needs to be informed of changes in the environment that will affect the system so as to adapt to the changes in time. Synergy refers to sub-systems that cooperate as interdependent components that complement each other and so become a productive whole. Entropy refers to the opposite of synergy, that is, the process of systems disintegration, when a system does not make the necessary adjustments to allow it to continue its existence in a certain environment.

Critique of the systems approach to management in a school is provided by Van der Westhuizen (1991a:126, 127). Principals are trained to manage and make decisions within a

prescribed process in the school as a system that follows the general systems approach. This is viewed as a denial of the principal taking personal responsibility and a denial of the unique nature of each situation. The view is that the systems approach gives a “limited and absolutised” view of one side of management that is considered to be unacceptable. The reasoning is that it is believed that humankind disappears in the systems, processes and rigidity of the theory. Human beings are believed to be holistic beings whose actions are not limited to fixed processes. In comparison, a school is a complex organisation that is multi-faceted by nature and cannot be limited to logical processes in a mechanical way. Management on the other hand is a logical and orderly activity in which formal and informal aspects and situations should be taken into account. The critique is that management cannot be applied in a rigid manner to each situation in the same way. It is believed that the principals’ views of humankind are also a factor in the management activity as each specific situation and circumstance should be taken into account. This refers to taking the multi-faceted nature of human kind into consideration. Behaviouristic and deterministic approaches deny principals the responsibility of making decisions that are normative and responsible. Having taken this into consideration, it is evident that the systems approach to management in a school needs to be considered by school management who implement EMS.

#### **4.3.1.2 CONTINGENCY MANAGEMENT THEORY**

Contingency management theory developed from systems theory. It is based on the idea that the application of the management principles depends on the particular situation that management faces at a given point in time. It means that each situation requires a different management approach in order to attain the goals of the organisation in the best possible manner (Theron, 2007:94). This theory also recognises that every organisation and manager is unique and that managers need to be flexible and adapt to the situation at hand by means of a single or a combination of solutions. In essence it means that managers in that situation must use multiple ways to complete, innovate and lead so as to reach their goals (Smit *et al.*, 2007:40, 41). According to Van der Westhuizen (1991a:80), this refers to situational management that requires the manager to have the ability to analyse different situations and to formulate and apply a management strategy that best fits the situation. This is what the guidelines of this study’s project refer to when they state the school must adopt the guidelines, and choose themes that are relevant to the school situation to work with during a school year.

### **4.3.1.3 THE ORGANISATIONAL APPROACH TO EDUCATION MANAGEMENT THEORY**

Modern management deals with guiding the manager to understand the nature of the organisation as well as the behaviour of individuals better (Van der Westhuizen, 1991a:89). The organisational approach to education management also reflects the history, social demands and organisational change, and rigidity when aiming for educational effectiveness (Averch, 1974:15, 16). The school system as a whole is described as being affected by rules, procedures and incentives that are synonymous to the school system. This approach is concerned with the role-players within the system since the school's reaction to change is its ability to adapt to the changing "clients", and with the implementation of an EMS, all the role-players will be affected. This approach believes that schools have multiple objectives, not just academic outcomes that impact on the satisfactory academic outcomes. The purpose is to understand the behaviour of the whole system. Van der Westhuizen (1991a:90) highlights the importance of organisational theory in educational management theory. It requires a thorough study of the school as an organisational unit that includes matters like organisational structure and climate and the role of people. This entails how the school changes and how and what happens to the role-players (learners, teachers, administrators and community as a whole) in it. Averch (1974:168) maintains that in this approach the school is said to have to satisfy multiple goals and demands from internal bureaucracies, from the community, from parents and learners. The resources and choice of processes in the schools are the result of past laws promulgated by government, and not from rational decision-making procedures. Characteristic of this theory is that the larger the educational bureaucracy the more centralisation, the less innovation and adaptation there is likely to be.

### **4.3.1.4 THE LEARNING ORGANISATION THEORY**

The learning organisation theory to management also has systems theory as its cornerstone, since it requires that a unit be formed that will lead to more appropriate action. The unit to be formed must embody the following fields:

- challenging one's assumptions and generalisations about the organisation and creating a new view of leadership. The leaders chosen must be stewards to the vision that entails a commitment to and responsibility for the vision with a systemic worldview;

- sharing a vision for the organisation since it encourages real “commitment and enrolment rather than compliance”;
- encouraging a good channel of communication within the organisation that leads to individuals thinking and acting together referring to team learning; and
- promoting systems thinking by means of deep-rooted mental modes that influence how we understand the world (Smit *et al.*, 2007:46, 47; Gupta, 2008:7, 10).

A learning organisation may then be defined as an organisation skilled at creating, acquiring, interpreting, transferring and retaining knowledge. It also changes its behaviour to reflect new knowledge and insights (Garvin, 2000:11), and this is done with the help of systems, mechanism and processes that are in place (Gupta, 2008:4). Organisations learn from many sources including their own experience, that in turn creates an organisational culture in which individuals support learning and all individuals of the organisation are encouraged to share knowledge, think critically and to take risks with new ideas. All individuals are valued for their contributions to the organisation (Smit *et al.*, 2007:438; Schermerhorn, 2011:43, 44). The organisational barriers of organisational culture and communication are called to mind here and need to be considered when managing an EMS so that they can be overcome and ensure systems thinking (cf. 2.2.4.1).

Furthermore, Smit *et al.* (2007:438) are of the opinion that organisational learning and knowledge management will have an increasingly important impact on organisations in the future, the reason being that they enhance an organisation’s potential to increase productivity, quality and innovation by changing the way that work gets done. Both contain a mixture of disciplines that range from economics and sociology to cognitive science. They deal with mental processes, and study organisations and communities rather than individuals. They are not theories, but can be described as a connection between different theoretical approaches and methodologies (Engeström, 2000:960). These are discussed next.

#### **4.3.1.4.1 ORGANISATIONAL LEARNING**

Organisational learning is the process that enables an organisation to adapt to change and move forward by acquiring new knowledge, skills or behaviours and thereby to transform itself (Smit *et al.*, 2007:438); Prange (1999:24, 25), Engeström (2000:967) and O’Keeffe (2006:19, 26) agree that after decades of research there is slow progress and disagreement among organisational theorists regarding organisational learning and the theories pertaining

to it. This means that contributions that clarify the processes or actions that make up the learning process are rare and weak. Despite this, Garvin (2000:19-21) describes organisational learning as a process that involves new knowledge and approaches, inquisitiveness, openness, and a willingness by managers to challenge assumptions. The stages of learning include: acquiring information, assembling facts, observations and data; interpreting information; and of relevance to this study - engaging in tasks, activities and new behaviours. When implementing an EMS, role-players in a school should ask:

- What new activities are appropriate to promote ESD?;
- What behaviour must be modified to promote ESD?; and
- How do we generate a collective response from the whole school?

Prange (1999:25, 39) critiques research in organisational learning by arguing that it lacks theoretical integration and that it does not produce 'useful' knowledge for practitioners, even though his later comments reveal that practicality and not usefulness should be the subject of discussion. Just how useful knowledge is in management is explained next.

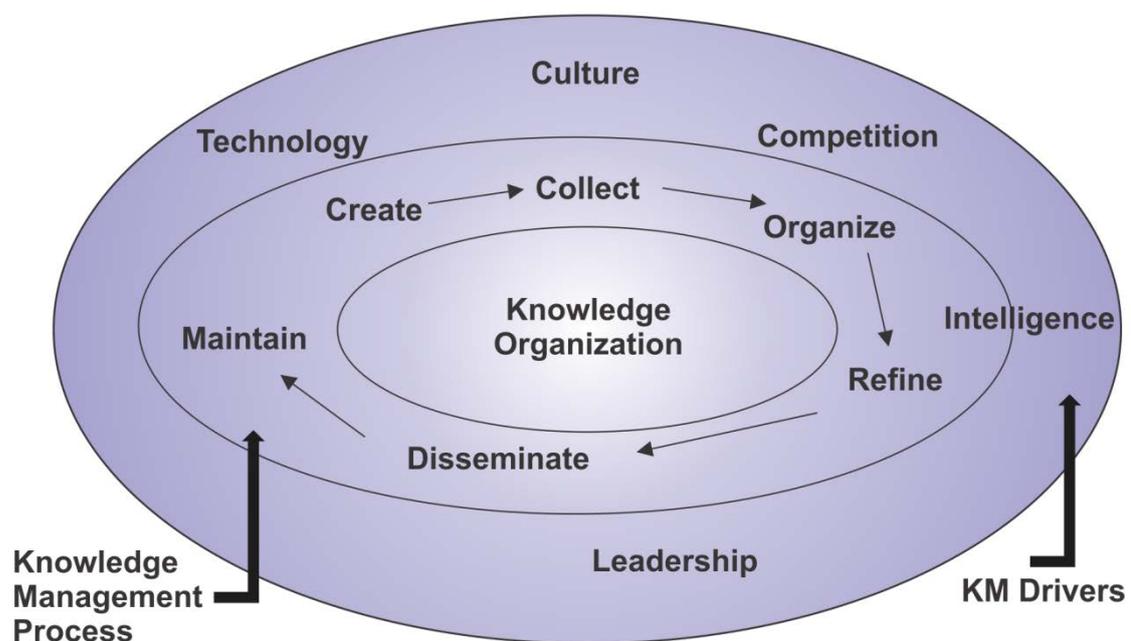
#### **4.3.1.4.2 KNOWLEDGE MANAGEMENT**

Even though the twenty-first century is known to host the knowledge society, one may ask how the knowledge is being used to the advantage of an organisation. Awad and Ghaziri (2007:25-31) elaborate further on the newly emerging, interdisciplinary business model of knowledge management that originates from the disciplines of business, economics, psychology and information management. Its relevance to educational organisations is found in its involvement of people, processes and technology. In the case of a school, the main focus is not about technology, but rather organisational management by management. Knowledge management is relevant to educating for SD since it challenges the traditional way of doing things. In trying to find answers to today's circumstances, knowledge management is about the process of capturing and making use of an organisation's collective expertise. For example, in a school this is done through:

- using accessible knowledge obtained from different sources, like the NCS and CAPS, among others;
- using tacit knowledge (i.e. knowledge in the teachers' heads - that preserves 95% of information in an organisation);
- promoting knowledge growth through the organisation's culture and incentive when they assume to take on an EMS and promote ESD; and

- transferring and sharing knowledge through the organisation, when teachers within a phase are aware of and discuss interdisciplinary similarities and associations.

The aim is for an organisation to view all of its processes as knowledge processes, represented as concentric circles working as a system. The conceptual structure of the knowledge organisation is shown in Figure 4.3. The knowledge management process involves a systematic circular movement that moves from knowledge creation to collection/capture, organisation, refinement, dissemination, and maintenance. This is supported by knowledge management drivers that include the organisational technology, culture, competition, intelligence, and leadership.



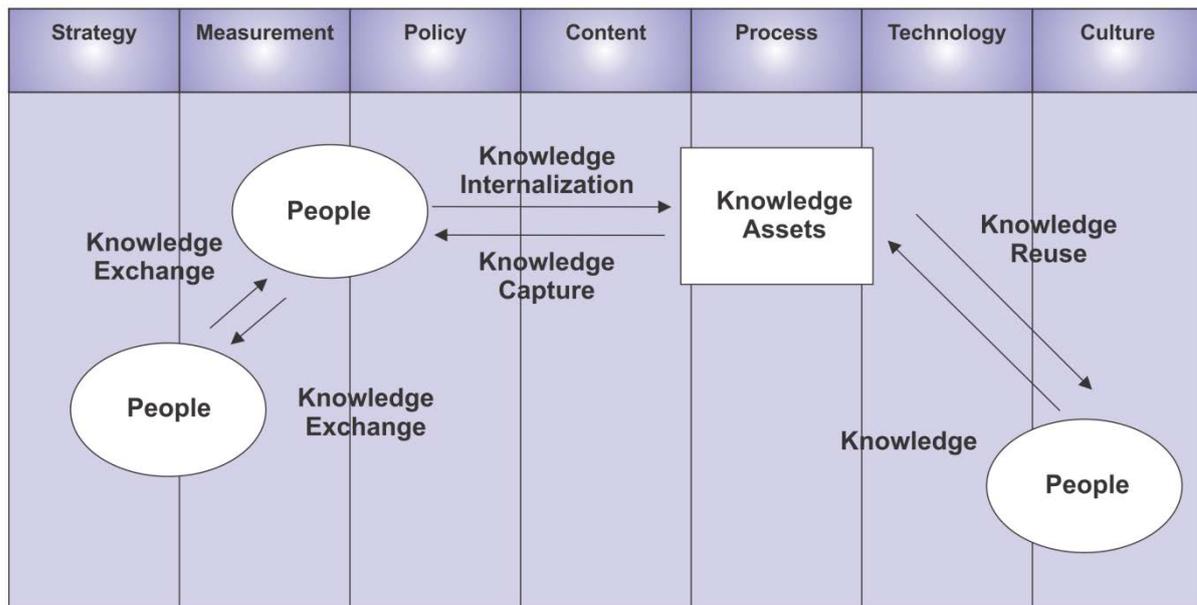
**Figure 4.3 Conceptual structure of the knowledge organisation (KM refers to Knowledge Management) (Awad & Ghaziri, 2007:30)**

The ideal knowledge organisation supports a holistic approach, for example teachers in a school with an environment where they are able to freely exchange and produce knowledge for the promotion of ESD (according to the EMS policy formulation) and implement strategies that will influence the school as a whole in a positive way. However, Awad and Ghaziri (2007:31, 84) also state that changing an organisation's culture is a time-consuming process since the individuals need to change their attitudes and behaviours in sharing their knowledge and not to accumulate it. This change of culture challenges knowledge

management. The challenge is to get everybody on board to adopt a new mind shift toward assuming the EMS implemented and promote ESD in their teaching and learning.

Small and Tatalias (2000:2, 3) describe the ideal knowledge management process (cf. Figure 4.4). Knowledge capture, reuse, and internalisation are activities critical to knowledge creation and innovation. The aim is for all these processes to build a learning organisation that can create, acquire, and transfer knowledge that in my opinion must compliment the curriculum and apply it to contemporary environmental issues. There must also be constant two-way communication between the role-players within the school for knowledge exchange to take place so that everybody knows what is being done and how it adds to the greater aim of promoting ESD. The elements that enable or influence knowledge-creation activities are discussed within the context of a school that has applied an EMS:

- Strategy refers to the school's and knowledge management's strategies and their commitment (cf. 2.2.6.1.2 Step 5);
- Measurement refers to the measures taken to determine if knowledge management improvement is taking place. This can take the form of tasks associated with the theme the school has chosen to focus on in a year (cf. 2.2.6.1.2 Step 4);
- Policy refers to the written environmental policy of the school (cf. 2.2.6.1.2 Step 1);
- Content refers to the subsection of the school knowledge base;
- Process refers to the processes that the staff at the school use to achieve the aims and goals of the school by implementing the action plan (cf. 2.2.6.1.2 Step 6);
- Technology refers to the information technology used to facilitate the identification, creation, and dissemination of knowledge within and outside the school. For example, making the school community aware of the environmental aim of the school by means of a visual announcement on the school property or by means of the weekly newsletter; and
- Culture refers to the school environment and context in which knowledge management processes must occur (also known as the values, norms, and practices).



**Figure 4.4 Ideal knowledge management (Awad & Ghaziri, 2007:31; Small & Tatalias, 2000:3)**

According to Kivrak, Arslan, Dikmen, and Birgonul (2008:88, 94), knowledge management's potential benefits can be achieved by implementing a coordinated knowledge management strategy. This strategy should be aligned with the organisation's overall strategy and objectives. Managing knowledge effectively gives an organisation the advantage of improving its performance, productivity, and it becomes a learning organisation. Organisations are by and large successful at collecting and storing knowledge, but it is widely recognised that knowledge retrieval and sharing are poor. This is a typical organisational barrier discussed in chapter 2, especially when referring to the strategy integration, communication, top management commitment, and structure of the organisation, to mention a few. Szulanski (1996:29-32, 37, 38) shares research findings regarding the difficulty of transferring knowledge within an organisation known as *internal stickiness*. The findings suggest that knowledge-related barriers are to blame. The recipient's lack of absorptive capacity (unable to incorporate outside sources of knowledge), causal ambiguity (unclear as to what factors drive the organisation and how they interact) and the strenuous relationship between the source and the recipient (this is dependent on the straightforwardness of communication and the closeness of the relationship between the two parties) are the most important obstacles to knowledge transfer within an organisation. Furthermore, the findings also reveal that organisations have no knowledge of what they know, because they do not understand how to learn what they know and less because they do not want to. This explains why when best practice does not transfer knowledge, a gap develops between what is known within the organisation and what is actually put to use.

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Knowledge management is not a discipline; it is a way of improving quality. Returning the focus to the implementation of an EMS in a school, it affirms again that all role-players need to be knowledgeable of what the school aims to do and how it aims, for example to promote ESD. The latter is also related to activity theory.

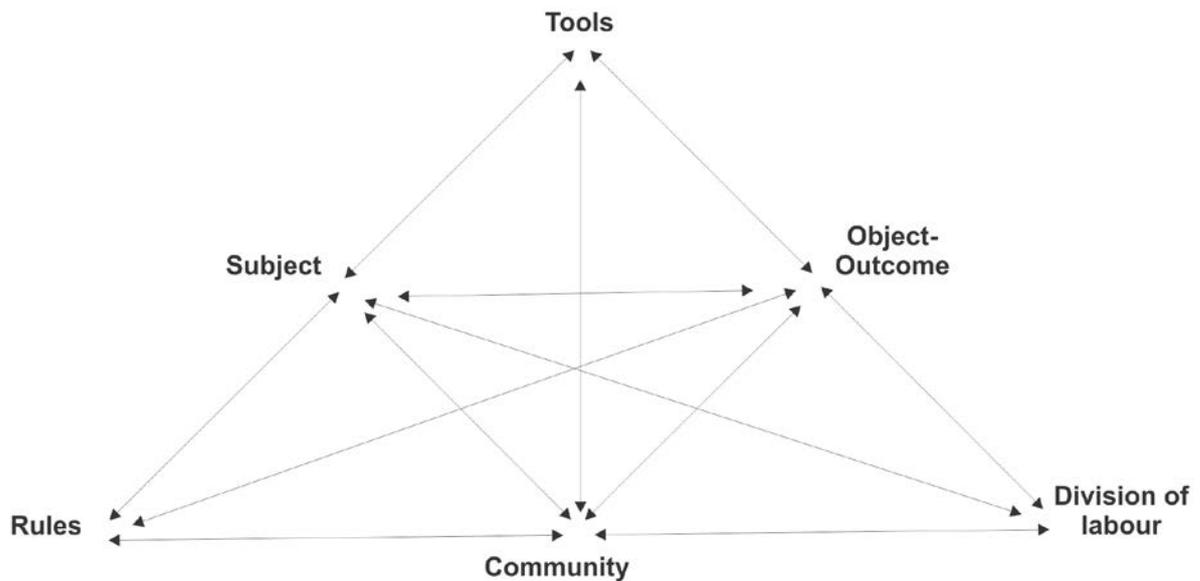
#### 4.3.1.4.3 ACTIVITY THEORY

When considering the school as an organisation that has implemented an EMS, it is felt that activity theory can help understand the organisational and sociological structures in place at a school and their effect on the work of all the role-players. Activity theory takes activity systems as its unit of analysis. The focus of activity theory is inter-organisational learning. Engeström's theory of expansive learning is developed within the framework of cultural-historical activity theory<sup>36</sup> (Engeström, 2000:961-964; Engeström, 2001:134-136), both of which will be mentioned briefly due to their relevance to this study.

Figure 4.5 shows Engeström's activity theory's activity systems framework. According to Engeström (2000:960), a new pattern of activity, of work organisation, comes to the fore within activity theory called *knot working*. The continued creation, connection, un-connection and coordination of relationships between the role-players become the focus of attention during an enquiry. Hence, there must be constant communication between the components of the system.

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<sup>36</sup> Cultural-historical activity theory originates from the 1920 and 1930 work of the Russian psychologists LS Vygotsky and AN Leont'ev and has evolved through three generations of research. Activity theory is today a global multidisciplinary research approach that is used to study and understand work. The third generation of activity theory is moving toward two interacting activity systems as a minimal model.

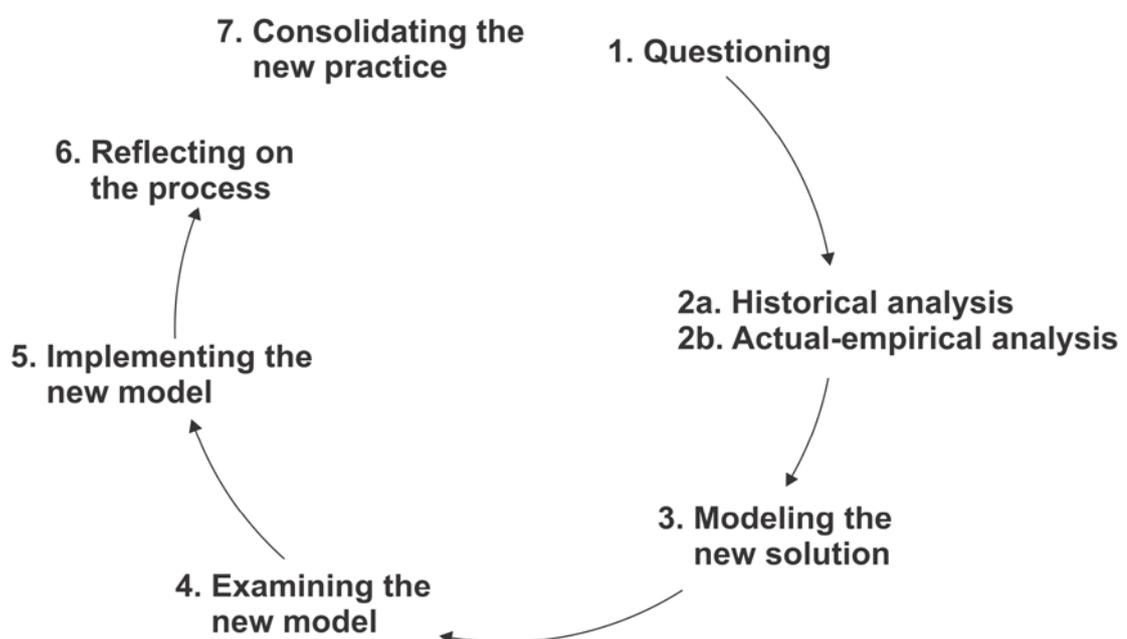


**Figure 4.5 Engeström's activity theory's activity systems framework**

A brief analysis of each component of Engeström's (2001:134-151) framework reveals six components that have been applied to this study. With respect to this study, the school as *subject* and the whole-school *community* who share a common *object* - to include environmental management practices and procedures in order to ultimately implement an EMS to promote ESD - and who use *tools* - NCS and CAPS and the EMS guidelines - to act on that object, transforming it to promote ESD. Hence, activity systems are driven by shared motives. Relationships in this system are driven by *rules* that can allow or hamper behaviour. *Rules* can be understood as principles of control. *Division of labour* within the system describes a horizontal division among community members, as well as a vertical division between power- and status-holders. *Division of labour* is understood as related to power within and between systems and the way in which work is allocated.

Engeström (2000:960; 2001:141) states that activity systems are in constant movement and that learning needs to take place in a changing mix of interconnected activity systems accompanied by inner challenges. Change is said to come about through cycles of expansive learning. Engeström (2001:139) describes expansive learning activity as the entire activity system in which the learners are engaged. It also produces culturally new patterns of work activity. Figure 4.6 illustrates the expansive cycle of learning actions (Engeström, 2000:968). It begins with actions of questioning the existing standard practice. It then proceeds to actions of analysing aimed at finding and defining problems and any contradictions. The third strategic action in expansive learning is *modelling* the new pattern of activity. This is followed by actions of examining and implementing the new model in practice, upon which a reflection of the process is made. Lastly a consolidation of the new

practice is made. With respect to expansive learning, Engeström (2001:137, 138) states that standard theories of learning are focused on processes where an individual or an organisation acquires knowledge or skills that brings about an observable change in behaviour. The seven point cycle shows similarities with the seven steps that serve as a guideline for schools in this study who implemented an EMS with the aim of bringing about a change that creates an awareness of promoting ESD. It is necessary to remember to look at who forms part of an organisation that is managed, since mention is made of interconnected activity systems. With the eye on improvement and commitment within a school system a brief look at TQM follows.



**Figure 4.6 Expansive cycle of learning actions**

#### 4.3.1.5 TOTAL QUALITY MANAGEMENT

TQM aims is to create an organisation committed to continuous improvement and refers to everybody who interacts with the organisation, both internally and externally (Smit *et al.*, 2007:41). According to De Bruyn and Van der Westhuizen (2007:298-302), TQM supports stakeholder participation, intrinsic motivation and systems theory. There is also strong criticism of the traditional management paradigm with its hierarchic structure and its top-down decision-making. The TQM is the reverse of traditional management. Here, managers manage from the bottom up and are the least important in the hierarchy. Teachers play a central role as they are regarded as the only ones who can deliver quality improvement to

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the learners, parents and community who have an important position at the top of the hierarchy. Teachers are also seen as necessary in supporting the ideas of top management. Top management on the other hand is expected to be less prescriptive and more supportive of its teachers. Teachers are empowered and they are free to improve the process of learning. The quality of the organisation is also influenced by its culture. Culture is made up of the beliefs and values that top management instil through their attitudes and behaviour. According to Smit *et al.* (2007:187), organisational structure follows strategy and involves the allocation of responsibility. It is the basic framework of formal relationships between responsibilities, tasks and people in the organisation. The structure layout will show authority and communication relationships between jobs and units. Within structure the involvement of role-players within an organisation is named. The models of education management are discussed next within the context of theories of education management.

### 4.3.2 MODELS OF EDUCATION MANAGEMENT

Hoyle (1986:1, 20) explains that theories of education management originated from organisation theory<sup>37</sup> and management theory<sup>38</sup>. Bush (2003a:27; 2006:3) describes three main characteristics of most theories of educational management and leadership that tend to be normative, selective and based on observation in educational settings. Firstly, the theories tend to be normative. This means that they tend to reflect beliefs about the nature of the educational organisation and the behaviour of individuals within them. For example, when it is claimed that decisions in schools are made after participative processes, they may be showing signs of normative judgments rather than analysing actual practice. Secondly, theories tend to be selective or partial. This means that they emphasise certain aspects of the organisation at the expense of other elements. It must be remembered that schools are too complex to be capable of analysis through a single dimension and so other theories should be considered. Thirdly, theories are often based on repeated observation of practice.

Many different theories of educational management have been presented in groups, with distinct approaches, categories and terminology, by many writers since the early 1980s. Bush considered elements of the work of Cuthbert, Bolman, Deal, Ellstrom and Sergiovanni when he classified the main theories into six main models of educational management based on organisation theory. Empirical evidence was obtained from British education especially in primary schools, and used to formulate the theories. Bush shares four elements that need to

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<sup>37</sup> Organisation theory is a theory for understanding the management component and provides the organising framework for a range of studies of schools (Hoyle, 1986:1, 20).

<sup>38</sup> Management theory is a practical theory with a narrower focus that is grounded in organisation theory. Management theories were developed for their applicability to schools and to the individual managers within them; hence, theory was applied to practice (Hoyle, 1986:1, 20).

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be considered when analysing the six models so as to distinguish between them. The four elements are: the need for clear goals or objectives that are driven by either organisational or individual purposes; the meaning and validity of organisational structures; the relationship between the organisation and its external environment; and the most appropriate leadership strategies or styles for educational organisations. The main theories of educational management are classified into six major models of educational management, namely formal, collegial, political, subjective, ambiguous and cultural. These are Bush's interpretations of the nature of organisations and management in schools. Bush also points out that theories and concepts can provide a framework for managerial decisions (Bush, 1995:18; Bush, 2003a:27-31).

#### 4.3.2.1 FORMAL MODEL

Formal models of education management refer to a number of approaches that assume that organisations are hierarchical systems. Together individual theories, known as structural, systems, bureaucratic, rational and hierarchical models, make up the formal models. In a school, principals are the holders of authority while teachers are responsible to department heads who, in turn, are answerable to principals for the activities of their departments. The hierarchy represents a means of control for leaders over their staff. A centralised systems means that schools are responsible to the higher powers, which are the school district<sup>39</sup>, provincial and national governments (Bush, 2003a:37, 38). The South African school system is characterised by hierarchical and authoritarian structures (SA. DoE, 1996a:3).

Bush (2003a:37-49) describes how the school is treated as a system where elements have organisational links with each other. A sub-division of the formal model is the *systems model* that stresses the unity and consistency of a school. The relationship with the environment can be closed or open. Another sub-division is the *hierarchical model* depicting a scenario where vertical communication patterns exist within the organisation. Information is passed down the hierarchy to subordinates who are tasked to implement decisions made by senior management. Hence the top-down managerial style means that goal-setting, decision-making and policy developed by the senior managers, are implemented by staff lower down in the hierarchy. The leader is the person at the apex of the hierarchy and is the central figure with whom parents and the community communicate. The dominance of the hierarchy is undermined by the expertise of the professional staff (Bush, 2006:7).

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<sup>39</sup> District refers to administrative areas found in each province of South Africa. District offices receive mandates from the provincial office of the DBE and then send directives to schools.

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Bush (2003b:50, 51) shares some weakness of the formal models within the South African context. Schools have formal written statements of their aims and objectives that are often unclear and general with no specifics as to how they are to be achieved. This contrasts the goal-seeking nature of this model. This model also describes decision-making as a rational process that in practice actually follows an irrational path due to human behaviour. The model also focuses on the organisation as a unit and ignores the contribution of the individuals within the organisation, since the principal is the central point of power who possesses all the authority. Within education the professional staff members show signs of tension between the demands of professionalism and hierarchy. In this model the goals are set by the principal who is the leader. Where the formal model features control by leaders in a top-down manner, the next model, the collegial model, differs in that power-sharing is promoted.

#### 4.3.2.2 COLLEGIAL MODEL

Collegial models assume that the school as an organisation is based on power-sharing among colleagues. Together the staff determines the school's policy and makes decisions through democratic representation. However, Bush (2002:21) warns against cautious optimism regarding the time taken to make decisions and the assumption that consensus rather than conflict will be the outcome. The size of decision-making groups is important in collegial management because everybody has to be heard. Collegial models assume that decisions are reached by consensus, giving the impression that all problems are resolvable because of the shared objectives and values of the staff members. This model features strong standards. An authority of expertise exists unlike the formal model (Bush, 2003a, 64-67).

The type of leadership associated with the collegial model is a participative leadership model. The principal, who is first among equals, uses the participative leadership strategies obtained after decision-making with his/her staff. The principal facilitates the participative process and values the contributions of the specialist teachers (Bush, 2006:8). The National DoE's 1996 Task Report echoes the points raised in this model. It states that management should not be seen as being the task of an individual, but instead as an activity in which all members of a school participate. The task report refers to *decentralising of decision-making* and *democratisation* of the ways in which schools are governed and managed. It does imply that teachers should be given greater decision-making power since they understand the needs of learners and of the local community. This "*internal devolution* of power" together with "transformational leadership" can lead to a self-management approach to developing

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education management dependent on the following elements: “Planning according to a value-driven mission; managing through participation and collaboration; developing the school as a learning organisation; and drawing on other levels of the system for support.” Also of relevance to this model is the *integrative* (all management processes and outcomes) and *collaborative* (*all staff and role-players*) approach to school change and management proposed by the Task Team. Decisions related to resource management, among others, are encouraged to take place based on common values, consent and consensus. It puts forward that goal-setting, policy-making, planning, budgeting and evaluation take place at all levels of the school, especially at senior staff level. Included are community representatives and wide consultation (SA. DoE, 1996b: 13-15, 29-32).

The strength of the collegiality models is that teachers are keen to participate more fully in the management of their schools. This affects the quality of decision-making since the principal does not have all the wisdom and so the level of expertise is increased. A strength also realised is that if teachers have been involved in decisions they ‘own’ the outcomes and this leads to effective implementation. Limitations to collegiality exist in practice. Democratic decision-making is slow and time-consuming. The process may also be compromised if staff chooses not to participate and then decisions are not made by consensus. Endorsement by the principals is also crucial for this model to be effective since they may not want to share power with colleagues (Bush, 2003a:55-57). This model thus emphasises shared objectives. The following model is characterised by conflict due to different interests.

#### **4.3.2.3 POLITICAL MODEL**

Political models in education management assume that policy and decision-making is a process guided by a process of negotiation and bargaining where conflict is common. It is common that teachers, who share the view regarding, for example, policy objectives, will develop and form alliances in order to achieve them. What happens is that dominant alliance groups increase their power and can tend to dominate, influencing the status of the principal. Power is the medium through which conflicts of interest are resolved (Bush, 2006:10, 11; Bush 2003a:89). Main features include a focus on group activity rather than the whole school as an entity as with bureaucratic and collegial models; the interest of the groups that is a priority, for example when trade unions interject to protect their members’ rights; the prevalence of conflict due to a pursuit of different objective; goals of the school are deemed unstable and so contested; decisions are made after bargaining and negotiation; and power is central (Bush, 2003b:57, 58). Bush (2002:22) refers to micro-politics in this model because it deals with political activity which takes place inside schools. The main focus is on

group activity as well as the interests of individuals that can lead to interest groups who want to follow their own aims. This may lead to conflict between groups, but conflict is viewed as a natural phenomenon. The leadership model linked to political models is transactional leadership since the principal is the main figure in the bargaining process. This refers to a “transaction” that takes place between principal and teacher. The principal, who requires co-operation from staff to secure effective management, can use his/her power in the form of promotions. This exchange may be beneficial to both parties, but such a transaction does not lead to “long-term commitment to the values and vision” set by the principal (Bush, 2006:12).

Limitations of the political models include: power and conflict tend to overshadow the core business of the school; the great emphasis on conflict leads to a neglect of collaboration that may lead to agreed outcomes; questions of values are raised, for example responsibility to teaching and learning (Bush, 2003b:59,60). This model assumes that goals may be contested by interest groups. The subjective model is discussed next.

#### **4.3.2.4 SUBJECTIVE MODEL**

The focus of the subjective model is on individuals within a school rather than the whole school. This is clearly a subjective approach. The emphasis is not placed on the aims of the school, but rather on the importance of the purpose of the individual, and the concept of leadership is de-emphasised. The individuals within the school are the driving forces who impose their values and experiences on the school. They interpret situations according to their perceptions, based on their background. These individuals are thought to have a selective and subjective perception of the school, meaning that situations have different meanings for each individual. The school represents the values and beliefs of the individuals rather than the real situation (Bush, 2003a:113, 114; Bush, 2003b:46). The subjective view is that “leadership is a product of personal qualities and skills and not simply an automatic outcome of official authority” (Bush, 2006:14).

Bush (1995:93-109) discusses strengths and weaknesses of this model. The emphasis on viewing individual meanings as important is a significant strength since teachers’ values and motivations are recognised. A limitation includes a large focus on the answerability of individual teachers rather than the accountability of the whole school. Accountability of schools and senior staff to groups and individuals outside of the school environment is less important. The model focuses on individual aims and personal qualities of an individual that are shaped by values, beliefs and goals, rather than positions of leadership as a result of an appointment. Leaders who are faced with ambiguities are followers of the ambiguity model.

#### **4.3.2.5 AMBIGUITY MODEL**

Ambiguity models refer to uncertainty, instability and unpredictability in a school's management. The inability of the school to order its priorities, together with decision-making that takes place within formal and informal settings with unstable participation, do not help to resolve problematic objectives. Major features of the ambiguity model include schools that are characterised by lack of clarity over objectives, uncomprehending processes, and unstable participation in policy-making due to inattentive participation by teachers in decision opportunities. Furthermore, the occurrence of unplanned decisions and decentralisation is common, causing the role of the leader to require change. Doubt about purpose arises due to unclear goal-setting that cannot be assessed. There is doubt about the power of the leader in unpredictable settings where formal authority is uncertain. There is doubt about experience since leaders are unable to learn from the consequences of their action in conditions of uncertainty. There is also doubt over success since it is difficult to measure the achievement of leaders. These doubts cast a shadow on the ability of leaders to control a school and they are regarded as facilitators. A strength of the model is that it separates problems and choices instead of following a rational decision-making process. Furthermore, it is described as a descriptive and analytical model that presents its supporters' views of management, rather than prescribing a certain way of management. A limitation of the ambiguity model is its contingent leadership model within the ambiguity model, where leaders are limited with respect to making informed choices due to the uncertainty of the conditions at school. Furthermore, the emphasis on the school's unpredictability counteracts the view that problems can be solved through a rational process (Bush, 2006:15, 17; Bush 2003a:134; Bush, 1995, 111-127). This model assumes that goals are problematic and unclear, unlike the cultural model where shared norms become cultural features.

#### **4.3.2.6 CULTURAL MODEL**

The cultural model stresses the informal aspects of schools, namely the values, beliefs, and norms of individuals in the school and not the official features that represent structure. This influences how individuals in the school behave and how they view the behaviour of others. Norms become shared traditions, which are communicated within the group and are reinforced by symbols and rituals (Bush, 2003a:156). According to Dimmock and Walker (2002:71), organisational cultures deal with more superficial practices that can comprise symbols, heroes and rituals. These can be managed and changed relatively easily, compared to societal (regional and local) culture that will need more time due to its slower

nature to change. According to Bush (2006:18, 19), the organisational culture that emerges is the result of shared norms and meanings of the members of the school that become behavioural norms and eventually a cultural feature of the school. This refers to a type of monoculture in a school with the common view held by teachers of ‘... this is the way we do things around here...’ This model is linked to a moral leadership model. This leadership model is based on the values, beliefs and attitude of the principal acquired from years of practice, as well as the culture of the school. Bush (1995:130-140) describes the main features of cultural models as placing a strong focus on the values and beliefs of the members of the school; shared norms and meanings lead to behavioural norms that become cultural features of the school; culture is expressed through rituals and ceremonies where symbols and rituals are a strong focus, be it verbal, visual or through behaviour; and they represent heroes and heroines who represent the values and beliefs of the organisation. The principal is also tasked with communicating the core values and beliefs within and outside the school.

Strengths of this model include the reinforcement of the human aspect of management when values and beliefs of participants are stressed, rather than structural elements. Furthermore, cultural models also provide a focus for organisational action, something absent in subjective perspectives, since leaders focus on influencing values in the hope of achieving support for greater ownership of new policies that are underpinned by common values, beliefs and rituals (Bush, 1995:130-140).

The National DoE’s 1996 Task Report encouraged all other role-players in the school, not just the principal, to develop and take ownership of the values and mission of the school. It is the task team’s opinion that involvement will produce commitment and if all the role-players in the school feel that they *own* the school’s mission and ethos, a true culture of teaching and learning as well as a supportive management culture can materialise. In light of the six models discussed above, it is interesting to note that the shift towards school-based management, as suggested in the 1996 Task Report of National DoE, highlights a shift to decentralised management. However, it does not mean that the focus will be on the individual, but that the development of managers, management and organisations needs to take place in an interrelated manner. This will ensure a participatory and holistic approach to the management of schools, as suggested by the Task Team for inclusive education management (SA. DoE, 1996b:8, 9). Rentoul (1996:1) states that upon reflection of his experience as a school leader he is able to identify the presence of all six models in his management practice. Similarly Bush (1995:150) experienced the same and goes on to say that all the models are somewhat limited as they do not fully portray the complexities of educational organisations. Rentoul (1996:2) believes that school leaders are unaware of the theory guiding their action, since he doubts that leaders consciously use a particular strategy

when they are in the thick of things. Rather, he is of the opinion that theorising does take place without it being acknowledged as such. Since leadership styles in management have been mentioned above, a brief review follows.

### **4.3.3 LEADERSHIP STYLES IN MANAGEMENT**

Management styles of school principals and management as an experiential approach for leaders are briefly reviewed so as to place the principal, as leader of a school, into context.

#### **4.3.3.1 MANAGEMENT STYLES**

Leadership/management style is the repeated pattern of behaviours shown by a leader. According to Schermerhorn (2011:320), the Hersey-Blanchard situational leadership model suggests that managers adjust their leadership styles. This is to be done depending on and relative to how able and willing the employees are. Four leadership styles, or behaviour patterns of the manager as observed by the follower, are described:

- Delegating style - refers to allowing the group to take responsibility for task decisions. It is described as both a low-task and low-relationship style. This style works best in the high-readiness situation with able, willing and confident employees.
- Participating style - refers to a sharing of ideas and participative decisions on task directions. It is described as a low-task and high-relationship style. This style works best in low-to-moderate readiness situations with able but unwilling employees.
- Selling style - refers to explaining task directions in a supportive and persuasive way. It is described as both a high-task and high-relationship style. This style works best in moderate-to-high readiness situations with unable but willing employees.
- Telling style - refers to giving specific directions and closely supervising work. It is described as a high-task and low-relationship style. This style works best in the situation of low-readiness with employees who are unable, unwilling and insecure.

The critique against this model is that limited research has been undertaken to support it. However, the theory supports the belief that leadership styles must change with its employees over time. It is also the view of Van der Westhuizen (1991a:82) that if the correct or different leadership styles are used in lower-readiness situations, employees will develop and grow in ability, willingness and confidence. This in turn allows the manager to become

less directive and more participative as the employees mature. However, the development cycle depends on the contact between the manager and the staff member. It is the manager who should determine the style which suits the situation and the employee should be placed in a situation that best suits his/her style. Related to situational management are management styles that leaders use.

Further research on management styles has revealed two dimensions of management, namely task-orientation and people-orientation. Task-orientation refers to managers who are intent on getting a task done and it also refers to the degree of decision-making and the actions of the manager concerning the task or work to be done. Other characteristics include: the plans and work to be done are outlined clearly, task responsibilities are assigned, clear work standards are set, task completeness urged and performance results are monitored. People-orientation is concerned with the needs and feelings of the people with whom managers are working. It refers to the degree of support given to the staff by the principal and alludes to supportive behaviour or actions. Characteristics of when a principal has a high concern for people include: action of warmth and supportiveness toward the staff, maintaining good social relations, respects feelings, is sensitive to individuals' needs and shows trust in staff (Van der Westhuizen, 1991a:97; Schermerhorn, 2011:317).

According to Schermerhorn (2011:317), a leadership grid developed by Blake and Mouton describes how leaders vary in tendencies toward people and production concerns. The *team manager* contains the preferred combination of high-high leadership. This leader shares decisions with the team members, empowers them, encourages participation, and supports teamwork. The *team manager* is the democratic leader. Focus is on building participation and support for a shared purpose. The *middle of the road* manager focuses on balancing work output and morale. An *authority-obedience* manager focuses on the efficiency of tasks and operations. This manager is an autocratic leader who acts in a command and control manner, emphasises task over people and retains authority and information. A laissez-faire leader is the *impoverished* manager. Little concern is shown for the tasks and the group make decisions. He/she has a 'do the best you can' and 'do not bother me' attitude. Focus is on the minimum effort to get the work done. The *country club* manager is the human relations leader. The focus is on people's needs and building relations.

These leadership styles provide brief insight into behaviour patterns of leaders. Relevant to leadership styles within an organisation are the different approaches that deal with the character of organisations and employees that also need to be considered.

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### 4.3.3.2 MANAGEMENT AS AN EXPERIENTIAL APPROACH FOR LEADERS

Chisholm and Warman (2007:323-325) explain how organisations are urged to make use of change management skills that are learned through experience in order to flourish. Change management is the ability to organise people to adopt new ways of doing things. Despite changing processes and technologies being an important management strategy, the core of change management entails people. In the context of this study the people include all the role-players within the whole-school system. Teaching staff are the role-players who are urged to implement environmental learning that promotes ESD. Changing the knowledge, skills and behaviours of the role-players working within the new environment of the school can take place through experiential learning. Experiential learning is regarded as being a powerful tool for managing change because of the involvement of people who are the role-players.

The underlying principles of change management stem from the work of Kurt Lewin who is recognised as the father of organisational development. Lewin developed the idea that if you want to understand a system, you must endeavour to change it because one cannot be separate from the system that one seeks to change (Scott, 2011:5). What is significant of Lewin's work is that he suggests that in order to change, the core of change management practice means that it is more effective to reduce the restraining forces than to increase the driving forces. In other words, people prefer an approach that includes information, incentives and involvement. In light of this, it is important that in order to build organisational change capability, the skills of principals, environmental coordinators and teachers need to be enhanced. This means that principals, environmental coordinators and teachers must implement best practice models for change planning and implementation. All role-players in a school, affected by change, are expected to support the change and increase personal resiliency that means they must be willing and able to adapt to the change (Chisholm & Warman, 2007:325-326, 333). An example of a management strategy implemented to bring about change is the Experience-Change simulation.

The Experience-Change model consists of a framework for planning and implementing change initiatives devised by leaders and managers. The principles that underlie the simulation are based on the work of Lewin, Schein, Nadler and Kotter who are regarded as notable change thinkers. The Experience-Change Seven-Stage model comprises two phases (Chisholm & Warman, 2007:327, 328):

Phase A. Planning at management level for change teaches participants to:

1. Understand the need for change and the forces driving and restraining the change.
2. Enlist key stakeholders to lead and support the change.
3. Develop a vision and strategy with the input of the employees.

Phase B. Implementation across the company teaches participants to:

4. Motivate employees by creating dissatisfaction with the status quo and so create a sense of urgency for change.
5. Communicate the vision and strategy.
6. Take action by changing systems and structures.
7. Consolidate gains by capitalising on momentum.

The seven steps discussed contain, in essence, guidelines of the steps used to implement the EMS in schools in the *Education for Sustainable Living* project (cf. 2.2.6.1). Clearly the Experience-Change model can be implemented at a school since Ball (1990:153, 156) informs that schools have been urged and obliged to imitate the standards of industrial management, and how management is firmly established as “the one best way” to run an educational organisation. Ball states further that management is an “all-embracing conception of organisational control” and has since the end of the last century played a key role in the evolving work of teaching. Management, as Ball describes, has a double existence. It is a theory that is to be learned and adopted, and it is a set of practices to be implemented and managed by managers. Sterling (2003:22, 217, 278) draws attention to a personal concern about the “political neo-liberal agenda” of management techniques that today still affects educational thinking, policy and practice. He maintains that the top-down managerial principle stands in contrast to education’s principle of caring. Sterling maintains that the current system of “neo-liberal, managerial education” is a form of “unsustainable education”. He suggests the application of sustainable education that challenges the limiting effects of characteristics of the DSP (cf. 4.2.7). Furthermore, Sterling is hopeful of the application of complexity theory toward business management. Complexity theory deals with how complex natural and human systems work. This new mindset in business management is beginning to question the validity of heavy top-down management and control, among others. This mindset sees organisation as a whole, with nature and humans interrelated and not separate as with the DSP.

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## 4.4 CONCLUSION

This chapter presented a literature review of the paradigms and theories relevant to environmental learning and education management for this study. The insight gained showed multiple perspectives do have a unique contribution to make to this study. Of significance for this study is the realisation that when educating for SD, role-players in a school must aim toward moving into a new paradigm of thinking. This involves thinking systemically whereby interconnections within and between systems need to be highlighted in disciplines when teaching and learning takes place, and this must be relative to what is being done in the school as an organisation by management. The systemic way of thinking will prompt holistic and functionalistic thinking, allowing for a realisation of an organisation's relation to its environment. Learning to think and act systemically can aid learners and managers to deal with sustainability. It was also established that according to the ecological systems theory children are both products and producers of their changing environment that is affected by education for sustainability. Thinking systemically means that all the role-players must know what their role and responsibilities are, as well as what the school's priority is since it is all interdependent. The learners find themselves in a school system that is embedded in an environment as system. Both are positioned within an EMS that has to undergo changes, that must ensure that collaboration and communication takes place so that learning within the system and between the role-players takes place. All the parts are interconnected to form a whole.

This chapter also reviewed management themes and established that management involves planning, organising, leading and controlling of the resources of a school as organisation. According to the systems theory of management, managers need to view an organisation as a group of interrelated and interdependent parts, aiming for a balance and ensuring that all the goals of the system are achieved through transparency and publicity. Relevant to the study is that the literature study revealed that organisations can change their behaviour to reveal new knowledge. This can be done through organisational learning since it allows an organisation to adapt to change, move forward and in that way bring about change as a result of acquired knowledge and behaviour. This is the ideal for schools who implement an EMS. It was also established that knowledge in an organisation needs to be organised well or it runs the danger of not disseminating the knowledge that it has. Reference is again made to systems theory and the need to think systemically. Interpretations by Bush of the nature of organisations and management of schools yielded six models of education management theory. Research established that these six models of education management can be collectively present in school management practices, revealing that management in a school takes place in an interrelated manner.

Lastly, this chapter has found through a literature study of paradigms and theories relevant to environmental learning and management, that whole systems thinking referring to holistic, global and ecological thinking approaches is required when dealing with role-players who form part of a group of interrelated and interdependent parts when dealing with management in a school as an organisation. In the following chapter I present the methodology and methods of this study.

*Here we need to remember that what in the end turns out to be feasible will itself be affected by the learning generated by the project itself: human situations are never static.  
Checkland and Scholes (1990)*

# CHAPTER 5

## METHOD OF RESEARCH

### **5.1 INTRODUCTION**

In this chapter, I discuss the methodology and methods of research used in this study. Following Leedy and Ormrod's (2005: 154) advice with regard to conducting a qualitative study during the planning of the research strategy, I was mindful of the research problem since it determined the methods of data collection and analysis that were used. I also identify and communicate the assumptions, beliefs, values and presuppositions that may have influenced the data collection and analysis. Thorough methods to collect, record and analyse the data were pursued during the research process, and I was also called upon to be open-minded when interpreting data. A multi-faceted description of the phenomenon is given so as to ensure completeness, and I aimed at consistency when reporting and presenting logical arguments. Having kept this in mind, the following aspects relating to the methodology are discussed in this chapter, namely the research approach and paradigmatic approach, method of research, data collection, data analysis, quality criteria, ethical issues, and limitations of the study.

### **5.2 RESEARCH APPROACH OF THE STUDY**

An attempt at defining qualitative research is complex. Merriam (2009:14-18) defines qualitative researchers as being interested in understanding the meaning people have constructed, to be exact, "how people make sense of their world and the experiences they have in the world". Ultimately, qualitative research aims to understand and interpret. Qualitative research is characterised by describing the process of meaning-making, describing how individuals interpret what they experience, aiming to achieve an understanding of how individuals make sense of their lives. Secondly, it is characterised by the researcher who is the primary instrument of data collection and analysis, and thirdly, the

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researcher gathers the data to build concepts in an inductive process. For the purpose of this qualitative study, inductive and abductive inferences will be made. Inductively the observation of a sample group can be used to draw conclusions about the population from where the sample comes (Leedy & Ormrod, 2005:32), and abductively the interpretation and re-contextualising of the phenomena within a conceptual framework will facilitate understanding of the implementation of an EMS in a school in a new way by observing and interpreting it in the new conceptual framework (Danermark, Ekström, Jakobsen, & Karlsson, 2002:80, 90-92). According to Creswell (2009:4) and Merriam (2009:64), qualitative research is designed to inductively build from particular to general themes, rather than to test concepts, hypotheses and theories, as the researcher makes interpretations of the meaning of the data. Lastly, qualitative research is characterised by a rich description of the qualitative inquiry. Despite this case study research being interpretative, it is also instrumental since it has as purpose to develop an EMS framework for primary schools. The study was undertaken to understand, interpret and perhaps improve on the current EMS to serve a purpose of promoting ESD in primary schools (Stake, 2005:445). The case study may help confirm or contradict generalisations made (Thomas, 2011:99) about the EMS implemented in the multiple cases.

The purpose of this qualitative study was to investigate and understand how an EMS is implemented at a farm, township and urban school respectively representing different primary schools in South Africa. The whole school was involved to identify indicators that contributed to the three primary schools' implementation of an EMS to promote ESD. The research methodology that includes the multiple case study research design and data collection method is structured in such a manner so as to answer the research question, namely *How is an EMS implemented in South African primary schools to promote ESD?* This research study required an analysis of the curriculum to explore how the environment is presently integrated in the teaching and learning of the curriculum to promote ESD, and *the identification of key indicators of the EMS in the township, farm and urban primary school that promote ESD*. A whole-school approach is considered, together with all the role-players in a school, to aid in *the design of an EMS framework to promote ESD in South African primary schools*.

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### 5.3 RESEARCH PARADIGM

According to Griggs (2000: 11), philosophy is “fundamental to the development and presentation of logical argument, the capacity to identify, analyse, and interpret published research results, and the ability to discuss method and theory in the context of the philosophical schools in which they originate.” Therefore, philosophy provides a framework for a researcher to make and evaluate observations. Since EE offers a ‘global’, ‘systemic’ and interdisciplinary approach to teaching, it must, according to Mayer (2002:2), allow for “comparison and co-operation between viewpoints, value judgments and disciplines”. Hence, the role and importance of the different viewpoints must not be rejected. As a social scientist I believe that researching social life involves researching a world of ideas and people, who tend to reflect upon, interpret and act within their context. It is exactly how people interpret the world and interact with each other that is of interest in a world that is multifaceted and constantly changing (May, 2001:14).

According to Merriam (2009:8, 9, 11), constructivism is a term that is often used interchangeably with interpretivism. Qualitative research is often located in interpretive research where researchers construct knowledge when interpreting an event with the purpose of describing, understanding and interpreting the reality in a certain context. In this sense, social constructivism assumes that individuals want to understand the world in which they live and work and this causes researchers to look for multiple views. The open-ended questions posed are of greater value since they allow for access to the participants’ views of the situation. My aim was to interpret the meaning of the participants’ responses (Creswell, 2009:8) using social constructivism as a worldview from which to work.

As an interpretive social scientist I am concerned with how role-players in a school interact and get along with each other. The interpretivist approach followed in this study entailed a “systematic analysis of socially meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds.” (Neuman, 2011:101, 102). Since the study requires an understanding and interpretation of how the EMS is implemented in primary schools, as an idealist I tried to understand how it was implemented in the schools from this perspective. I followed Neuman’s (2011:93) recommendation for producing social science knowledge that entails inductive observation, interpretation and reflection on what other people are saying and doing in specific social context, as well as simultaneous reflection on what my own experiences and interpretation are. I also followed the explanation of abductive inference by Danermark *et al.* (2002:90-92) in the sense that this reasoning is another way of expression, described as re-description or re-contextualisation, which entails description,

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interpretation and explanation of the EMS within the frame of a new context. It is done to give a new meaning to the already known phenomena. The aim is to discover connections and relations, “not directly observable, by which we can understand and explain already known occurrences in a novel way”.

Interpretivist epistemologies have been known to be characterised as hermeneutic and it is reasoned that “in order to understand the specific sentence, utterance or act, the inquirer must understand the whole”, despite Schwandt (2003:300-311) holding the view that the philosophies of interpretivism and philosophical hermeneutics are separate. Simply stated, the main theme of hermeneutics is that “the meaning of a part can only be understood if it is related to the whole” (Alvesson & Sköldberg, 2009:92). In the human sciences, both hermeneutics and interpretivism have been described by German philosophers (Danner, 1995:226) as the humanistic (*geisteswissenschaftliche*) tradition, originating in reaction to the influential philosophy of positivism at that time. Hermeneutics is also described by Danner as the “systematic, scientific approach to understanding”, and it is understood as the art of interpretation, meaning that one aims to express, to explain and to interpret. Hermeneutic understanding, therefore, deals with a need for understanding and interpretation. Within the human sciences, interpretivism aims to understand human action (Schwandt, 2003:295), and to comprehend the meaning of what is seen and heard (Danner, 1995: 221-223).

Interpretivism considers understanding to be an intellectual process, an epistemological understanding of understanding (*verstehen*). The interpreter (or researcher) working within this paradigm gains knowledge about the meaning of human action, and in an ideal world remains unaffected by and external to the interpretive process. Interpretivists argue that it is possible to understand the subjective meaning of action and necessary to do so in an objective manner. In order not to misinterpret the original meaning, interpreters are advised to step outside their historical frames of reference (Schwandt, 2003:298, 299, 300). Danner refers to the work of Otto Friedrich Bollnow who reminds us that it is not the individual who decides what the truth of an understanding of a statement is, but it is rather the subject matter itself, the objective side of understanding (Danner, 1995:238). Therefore, in this study, as the researcher and as an interpretivist, I understand that research is an interactive process shaped by my personal history, biography, gender, social class, race, and ethnicity and by those of the participants in the case studies (Denzin & Lincoln, 2003:9).

When working from an interpretivist worldview in this study the work of three philosophers is considered. Friedrich Schleiermacher’s theory holds that understanding happens by reconstruction. That is, the interpreter has to place him/herself completely in the position of the subject since the two need to become equal and become the other person. It is in this way that the interpreter can understand. Philosopher Wilhelm Dilthey maintains that

understanding happens by congeniality. In other words, the interpreter needs to remain him/herself, but has to possess the same abilities as the interviewee to be able to understand his/her message. Hans-Georg Gadamer does not agree with the two aforementioned philosophers' reasoning because in his opinion they claim that understanding reveals an issue in the exact way that the researcher intended. This study concurs with Gadamer because people always understand differently. Since the hermeneutic situation changes, the understanding changes, and the researcher's situation, as interpreter, is different from that of the author (Danner, 1995:225-228). Gadamer presents the idea of interpretive understanding in the philosophical hermeneutics, whereby the interpreter engages in a critical analysis or explanation of a text or human action, based on the hermeneutic idea of understanding its interpretation (Schwandt, 2003:300, 301). It is in this light that this study was conducted.

This study will endeavour to make sense of the relationship between the spoken thoughts and action of the participants who were interviewed at the primary schools in the multiple case study, after which the study will present the explanations of the interviewees by means of a text medium. This means that the focus will be on the actions of the interviewees, as well as on understanding what the interviewees do, so as to be able to explain what is happening or being done at the primary schools. The aim of the enquiry is to obtain knowledge which will be described and explained by means of this study (Kissack, 1995:252, 253). This study will be undertaken from within an interpretive paradigm that will work towards understanding in terms of "intentions, motives and stated reasons". By working within this paradigm this study is ideologically anticipating that activities within the school environment by role-players in the school who take part in environmental experiences will add an open-minded and progressive educational purpose (Robottom & Hart, 1993a:593, 597-599) to the EMS implemented at the school.

## **5.4 METHOD OF RESEARCH**

This section outlines the relevant literature that was reviewed as well as the empirical study.

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### 5.4.1 LITERATURE STUDY

The wide-ranging critical and integrative literature review (Mouton, 2001:179) was undertaken on themes focusing on EE and ESD in the curriculum, as well as the implementation, use and working models of EMSs in education and management within the theoretical research. The theoretical study's literature study also formed a basis for the interview questions in the qualitative research. Secondary data collection from pre-existing documents included, among others, government reports and policies, management models and environmental policies (Wellington & Szczerbinski, 2007:79). Databases such as EBSCOHost and ERIC were consulted as well as various primary and secondary sources. Keywords used include: *Education for Sustainable Development; Environmental Management Systems; education management; environmental management; management systems; school management; Sustainable Development, whole-school approach.*

### 5.4.2 RESEARCH METHODOLOGY

The case study method was used and is commonly used to answer research questions seeking to answer “how” or “why” questions (Yin, 2009:2). Leedy and Ormrod (2005:135) describe case studies as the collection of extensive data on the subjects being investigated. Since a case study serves to provide an in-depth description of a small representative group (Mouton, 2001:149) it was decided that it would enable me to examine the data closely within a specific context. The reason for choosing a case study was to gain an in-depth understanding of how the EMS is implemented in three types of schools, so as to discover what key indicators of an EMS each of the three primary schools representing South African schools have in place when promoting ESD. The three cases form part of an empirical inquiry that investigates the implementation of an EMS within the real life context of a school. Since quantitative methods provide limited holistic and in-depth explanations of social and behavioural problems in general on a macro-level, the case study was used in this qualitative study to observe the data on a micro-level (Zainal, 2007:1, 2). This case study research involves an in-depth study of a primary school's EMS, and as Rule and John (2011:7, 29) explain, a case study “generates an understanding of and insight into a particular instance by providing a thick, rich description of the case and illuminating its relations to its broader contexts”, resulting in an intense descriptive case study of a particular case. Thomas (2011:3) defines case study method as research that concentrates on one thing, looking at it in detail without trying to generalise from it. Meriting the latter definition, this study aims to design an EMS framework for primary schools, with a similar context to those in the cases.

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### 5.4.2.1 DEFINITION OF A CASE STUDY

Stake (2005:443), in defining case study, focuses on the unit of study, that is, the case, and defines case study as a choice of what is to be studied, using whatever methods to study the case, for example, analytically or holistically, repeated measures or hermeneutically, organically or culturally, and by mixed method, but always focusing on the case. Zainal (2007:2) focuses on the case study, in its true essence, and describes it as the exploration and investigation of contemporary real-life phenomenon through detailed contextual analysis of a limited number of events or conditions, and their relationships. Similarly, a case study is “an in-depth description and analysis of a bounded system” (that is a case) (Merriam, 2009:43), as well as a systematic investigation in order to generate knowledge (Rule & John, 2011:4). Yin (2009:18) defines case study research as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. In this research the primary school as an organisation is the context. Multiple cases are explored through in-depth data collection of multiple sources of information. In essence, this case study research is an in-depth examination of a broad amount of information about three cases for one period of time (Yin, 2009:29; Neuman, 2011:42).

### 5.4.2.2 TYPES OF CASE STUDIES

In defining case studies, Stake (2005:445, 446) distinguishes three types, the intrinsic, the instrumental and the multiple/collective case study. In an intrinsic case study, a researcher examines the case because it is interesting in itself and there is a need to better understand the particular case. In an instrumental case study, the researcher aims to explore a broader issue and provide insight into the issue or to redraw a generalisation. The interest stems from an external source. A collective case study is described as an instrumental study extended to several cases. The cases may be similar or dissimilar. Variety is important since the belief is that understanding them will lead to better understanding and the hope for better theorising about a collection of cases.

Rule and John (2011:9, 10) are of the opinion that all case studies are either intrinsic or instrumental or a combination of the two. I am of the opinion that this study is an instrumental case study since its focus is on the issue of the implementation of an EMS in primary schools and it examines three cases to explore the issue in depth. This means that a multiple/collective case study is the type in question, since the case of each of three different types of schools that make up the study sheds light on the issue. This study adopts

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a multiple case study design that is discussed next. Also, this case study is intensive and not extensive, and it adds depth to the bigger picture when it focuses on a single case.

### 5.4.2.3 RESEARCH DESIGN

For this case study design the five components of a research design were met. As discussed in chapter 1 this study aimed to research *how*, within the *Education for Sustainable Living* project, *an EMS is implemented in primary schools to promote ESD*. The study proposed to identify indicators that would aid in developing a framework for primary schools in South Africa to be used for the implementation of an EMS to promote ESD. The unit of analysis is a multiple-case holistic design using a within-case analysis. The multiple-case study will show how the implementation of an EMS is dependent on a whole-school approach. A cross-case analysis was undertaken that would aim to build abstractions across the three cases. An analytic generalisation, in which the ecological systems theory was used as a template with which to compare the empirical results of the cases (Yin, 2009:27-38, 59), was undertaken with the help of abductive inference.

According to Yin (2009:39, 54), in a multiple-case design similar results may be expected, but contrasting results can also be expected for foreseen reasons. This study features a multiple-case design because the contribution of the study is to develop an EMS framework for primary schools in South Africa. In order to accommodate, as far as possible, primary schools in a farm, township, and urban context - three types of schools found in the country - it was deemed sufficient to study one of each as representatives of the types. Yin affirms that analytic generalisations can be used whether the case study is a single-case or multiple-case. Merriam (2009:41) states that the unit of analysis characterises a case study and not the topic of investigation. Each of the three schools chosen to represent the three types of schools in South Africa is the unit of analysis, since each school was chosen on the basis of its uniqueness and characteristics that are shared by the type of school (representative). The aim was to study the holistic/global nature of the EMS implemented at the schools, and look for consistent patterns of evidence within and across the multiple cases. The multiple-case design features an in-depth study of each of three types of schools that eventually highlights similarities and/or differences between the EMSs of each of the three types of schools.

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#### 5.4.2.4 STRENGTHS AND LIMITATIONS OF CASE STUDY

According to Yin (2009:18) an in-depth inquiry case study helps to explore and describe the data in a real-life context, it has more variables of interest, relies on multiple sources of evidence, makes use of triangulation, and benefits from theory put forward to guide the data collection and analysis. Merriam (2009:51) states that the rich and holistic account produced by case study offers insights and expands the readers' experiences, thereby playing an important role in advancing a field like education's knowledge base. These strengths, together with others, cause the case study to be an appealing design for education.

Rule and John (2011:7) describe the strengths of case study as depth, flexibility, versatility and manageability. Depth is a strength since it allows for a great deal of detailed examination rather than superficial examination and focuses on complex relations within the case and the wider context around the case. This refers to intensive examination. A case study is also flexible in terms of what it studies since the unit of a case study can range from individual to collective and its data collection as well as data analysis methods can also vary greatly. A case study is also versatile since it can be used in combination with other research approaches. Lastly, a particular unit to study makes it more manageable. Case studies can also become too lengthy due to the detailed information about the case in narrative form (Neale, Thapa & Boyce, 2006:4; Merriam, 2009:51; Yin, 2009:122). According to Neale *et al.* (2006:4), an advantage of a case study is that it provides more detailed information when compared to other methods since the data collected from multiple methods, for example interviews, document reviews, observations, etc., is presented and provides a complete story. Neuman (2011:42) describes six strengths of case study that pertain to this study. *Conceptual validity* refers to how the case study has helped identify indicators pertaining to the EMS at each type of school that are of interest. The *heuristic impact* refers to how the case study has helped to learn about and discover how the EMS has been implemented at the schools. *Casual mechanisms identification* refers to how factors are interrelated and affect one another. The case study has the *ability to capture complexity and trace processes* over time regarding how complex management is. The case study aided me to *calibrate* or test the working EMS against lived experiences at the three schools. The case study has as strength the ability to *elaborate holistically* on the whole situation at a school by including multiple viewpoints from participants.

A case study limitation is generalisability, since a case study focuses on a single unit, but it must be remembered that a lot can be learned from one particular case (Merriam, 2009:51). Yin (2009:14, 15) discusses limitations to case study research. Firstly, reference is made to lack of rigour. Yin states that "too many times, the case study investigator has been sloppy" and has allowed biased views to influence the conclusions. Secondly, case studies provide

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very little basis for scientific generalisation since they use a small number of subjects, some conducted with only one subject, making generalisation from a single case questionable. These limitations, namely trustworthiness, credibility and generalisability are discussed later (cf. 5.7).

#### **5.4.2.5 THE ROLE OF THE RESEARCHER**

Merriam (2009:52) describes how qualitative case studies are limited by the sensibility and integrity of the researcher, who is the principle investigator. The researcher in many cases and in this study is the primary instrument of data collection and data analysis. Drawing on the latter, as well as the strengths of the case study mentioned above, and the in-depth nature of case study research understood by myself, it was deemed beneficial to undertake a pilot study to familiarise myself with the research method and more importantly to test the interview questions, among others (cf. 5.4.3). Researchers often rely on their own instincts and reliabilities throughout the study. Bearing this in mind, I endeavoured throughout this study to be mindful of my subjectivity. I also aspired to be receptive to opinions shared by individuals. Regarding the knowledge transfer, I was mindful of Stake's (2005:455) comments regarding knowledge transfer from researcher to reader. A researcher will "... pass on to readers some of their personal meanings of events and relationships and fail to pass on others. They know that readers, too, will add and subtract, invent and shape-reconstructing the knowledge in ways that leave it differently connected and more likely to be personally useful." I was mindful of passing on the participant's meanings as I interpreted them.

Before elaborating on the remaining sections of the empirical research, a brief explanation of the usefulness of the pilot study is given.

#### **5.4.3 PILOT STUDY**

The pilot study was a trial run for the main study. The purpose was to use the same kind of research group, but not the same participants for the trial research (Gillham, 2005:73). The pilot study researched one school that was required to be part of the *Education for Sustainable Living* project (cf. 2.2.6.1) because it was essentially the EMS promoting ESD implemented at the school that was the focus of the research. A primary school in the Free State was chosen. Most importantly, the pilot study was undertaken to assess whether the questions set had been designed in such a way as to elicit the required information from the

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respondents. This allowed for easier detection of the weaknesses in the questions. It also looked for ambiguities so that changes in the wording, focus and order of the questions being asked could be made so as to avoid complexity in the language, and to establish if exclusion or replacement of questions had to take place (Gillham, 2005:73, 74). As anticipated the pilot study helped to determine, for example, whether the questions asked were well-constructed so as to produce the required data. Undertaking the pilot study helped me to establish which questions needed to be adjusted to ensure they ‘tied up’ or ‘led’ to the following question. By means of the pilot study it was established that the questions directed to the learners in the focus-group needed to be simplified and made clearer. For example, the use of the words *EE* was replaced by *environmental learning* since it enabled the participants to better understand the questions. The pilot study also helped to look at the interview schedule as a whole and help to get a feel for the specific process of the schedule. It aided to identify prompts, and, very importantly, to perform a trial content analysis because the content analysis played a major part in the adjustments of questions that were part of the pilot study (Gillham, 2005:74). Hence the data collection methods and the effectiveness of the data collection procedures being used were piloted.

The pilot study was most useful in establishing that the choice of participants needed to be refined. I purposefully selected six Grade 6 learners to participate in the focus-group interview that used open-ended questions. They were chosen because they were the highest grade in the Intermediate phase that fitted within the criteria of the project. It was established that this choice was flawed since it did not represent the whole primary school pool of learners. For the main study it was therefore decided to conduct a focus-group interview with learners representing all the grades, those being Grades 4 to 7. I decided that since learners in Grades R to 3 could not articulate themselves in a focus-group interview, it would be sufficient to undertake an observation of this phase’s (the Foundation phase) classroom teaching and learning practice so as to establish how ESD is promoted in the phase. For the semi-structured interviews individuals who are participants at the school were interviewed using open-ended questions, namely the principal, a teaching staff member, a teacher who is the environmental committee coordinator, a garden staff member, a cleaning staff member, a governing body member and a community member (that may include a parent) since they represent the role-players in a school. Individual interviews were conducted to avoid intimidation. It was established from the pilot study that staff from the administration block and representative teachers from each phase needed to be interviewed as well, so as to establish how ESD was promoted at the school and how the EMS was implemented. The pilot study therefore helped establish how much data was needed, pertaining to both quality and quantity. Here reference is made to data’s depth (richness and substance), holism (multi-facetedness and connectedness), and liveliness (actual presence)

(Rule & John, 2011:72). A non-participant observation ensured that the researcher could determine what the school premises looked like by walking around the premises, visiting all classrooms and outbuildings. A reflective summary helped to identify characteristics specific to the school.

The pilot study highlighted the fact that purposeful selection instead of random selection of participants was necessary so as to gain the most knowledgeable responses (Merriam, 2009:77). The data was only handled by me as I collected, analysed and interpreted the data. I am of the opinion that by conducting a pilot study, it helped clarify the data collection methods used and helped identify indicators, among others, which the literature study also highlighted, thus supporting the trustworthiness of the study. This study, in my opinion, captured what is happening at the school since the interpretations of the reality at the school was obtained through the observations and interviews, within a relaxed and trusting atmosphere between participants and the researcher. The pilot study also helped ensure trustworthiness of the main research that was conducted at the three study schools. The triangulation established whether what the policy document (NCS) says must happen and that which the teacher says happens actually complement each other. It was tested through the classroom observations, teacher interviews and focus-group interviews with the learners. It was cross-checked during the interview with the teachers and learners, respectively. The analysis of the documents at the school dealing with the implementation of the EMS helped to cross-check the interview with all the participants at the school and the non-participant observation.

It was established that an interpreter had to be available to translate for those participants who were not proficient in English. Member-checking was undertaken to ensure that participants had the opportunity to revisit their responses, check it for accuracy and make amendments (O'Donoghue, 2007:178). Working through the teacher who was the environmental committee coordinator the transcribed focus-group interviews were sent as encrypted documents to the school via e-mail. The teacher was responsible for decrypting the file for the learners. All the individual interviews were mailed electronically, either directly to the interviewees or to the school, but the passwords for access to the text were sent to each interviewee's cellular phone via a short message service. A reply was requested to state approval or disapproval, with changes, as feedback. Therefore, the pilot study tested the data collection methods (interview questions and observations), data collection method, recording procedures and techniques. The results were used to revise the data collection methods and to refine all data collection procedures for the main study.

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#### 5.4.4 SAMPLE AND PARTICIPANTS

As stated earlier, a multiple case study with a selected representative sample group representing THREE South African primary schools that have implemented an EMS forms part of the study. Stake (2005:451) alludes to multiple case studies where purposeful sampling, “building on variety and acknowledging opportunities for intensive study” is followed in qualitative research. The study focused on each primary school’s EMS, as well as, according to the NCS, the teaching and learning at the school that promoted ESD from Grade R to Grade 7. It was required that each of the selected schools have a working EMS and be part of the *Education for Sustainable Living* project. The criterion was therefore that the schools be exemplar cases of the “phenomena under study” (Rule & John, 2011:22). This was done following Merriam’s (2009:82) suggestion that in case studies, sample selection occurs at the case level first and then by sample selection within the case. The three schools were therefore chosen randomly from the participating schools in the *Education for Sustainable Living* project within South Africa. This means that purposeful sampling was applied, since the selected schools were deemed information-rich cases for an in-depth study of the EMS and the schools and participants identified would best help the researcher understand the research question (Patton, 2002:46, 230; Creswell, 2009:178; Leedy & Ormrod, 2005: 206).

Further criteria in the selection of the sample are listed below (cf. Table 5.1).

- The schools were all primary schools meaning that they ranged from Grade R to 7, adhering to the requirement of the *Education for Sustainable Living* project.
- Following the explanation in Lincoln and Guba (1985:202), the sample size in purposeful sampling was determined by informational consideration. Since this study requires understanding of how the EMS is implemented in different schools, a representative of each of the three types was chosen.
- Each of the three schools chosen had to have a unique situation, namely be located in a township, on a farm, and in an urban area, so as to represent the three types of schools found around the country as township schools, farm schools, and former white Model-C schools (cf. 2.4) respectively (Gardiner, 2008:13).
- The schools were chosen from North West and Gauteng provinces following the criterion of convenience since they were the easiest to access under given conditions (Merriam, 2009:79). For example, the farm school required extensive travel time on a tar and gravel road.

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- The nature of the whole-school approach means that all the role-players forming part of the interrelated system at a school are part of the system, and in each of the three schools participants were chosen purposefully, since they had to be the most knowledgeable regarding environmental learning and the EMS.
  - The semi-structured interviews used open-ended questions for one member of the governing body, a teaching staff member, an administration staff member, a garden staff member and a cleaning staff member, a Grade 6 or 7 learner and a community member (this includes parents) involved at the school, as well as the principal and the environmental committee coordinator.
  - The focus-group interview at each school was undertaken with learners representing Grades 4 to 7 and was made up of both boys and girls.

In this study the environmental committee coordinator at each school assisted in the identification of each of the participants who were required for the each interview. From the list of participants provided they identified the person that they perceived to have the best knowledge regarding the study theme. The classroom observation was undertaken in the Foundation phase classrooms. The one-on-one interviews and focus-group interviews were conducted in an appropriate venue on the school grounds, being a vacant office and/or a vacant Information and Communication Technology (ICT) centre. The participants were accessible since I spent four days at each school and there were no restrictions to allowing individuals onto the school premises.

## 5.5 DATA COLLECTION

Qualitative data are data conveyed through words (Merriam, 2009:85). Despite Merriam (2009:42) stating that case study does not claim any particular methods of data collection or data analysis, elements of data collection applicable to case study include the sources of data (role-players in the school, actions, documents), methods of data collection (interviews, focus-group interviews, observations, document analysis), methods of data collection (interview diary, observation notes, audio-recorder, back-up camera recording) and the organisation of data (electronic files and paper organiser) (Rule & John, 2011:59).

Henning, Van Rensburg and Smit (2004:3) state that characteristics of qualitative research are *understanding* and *in-depth inquiry*. In agreement, Rule and John (2011:60, 61) state that qualitative research in the social sciences and humanities arose with the purpose of addressing an understanding of behaviour and experience, often from the point of view of the research participants, and the research is premised on the multiplicity (complexity) and

subjectivity of perspectives. In case study research the researcher does not want to influence the case under investigation, but rather attempts to understand it in its natural state and context and describe rich, textured and in-depth accounts of the case.

Qualitative data consists of interviews, observations and documents (Patton, 2002:4).

- Interviews undertaken in this study used open-ended questions. Probing yielded in-depth responses about the participant's knowledge. The data consists of verbatim quotations with a lot of context that can be interpretable.
- Observations in this study refer to descriptions of activities, actions, interpersonal interactions and other observable human experiences in the classroom and on the school property. Data consists of field notes that are rich, detailed descriptions, including the content within which observations were made.
- Documents used in this study are written material and other documents from the school, for example reports, records, photographs, and newsletters. The data consists of excerpts from documents captured in a way that records and preserves context.

Since the data collection methods provide the foundation upon which the study rests (Leedy & Ormrod, 2005:92-93) it is necessary to discuss the data collection methods. The course of the data collection process is captured in Table 5.1.

Table 5.1 Course of the data collection process

<b>Dates</b> Provincial DBEs both grant permission for research by 31 July 2011			
<b>Dates</b>	<b>School and Participants</b>	<b>Data collection method</b>	<b>Aim</b>
23-26 August 2011	<b>Township</b> Administration member, Cleaner, Community member, Environmental co-ordinator who is a Senior phase teacher, Foundation phase teacher, Gardener, Governing body chairperson, Intermediate phase teacher, Learner from grade 7, Principal	One-on-one interviews	Triangulation
	Group of learners representing the Intermediate and Senior phases	Focus-group interviews	
		Observations Document analysis	
6-9 September 2011	<b>Farm</b> Administration member, Cleaner, Community member/Governing body, Environmental co-ordinator who is a Senior phase teacher, Foundation phase teacher, Gardener, Intermediate phase teacher, Learner from Grade 6, Principal	One-on-one interviews	Triangulation
	Group of learners representing the Intermediate and Senior phases	Focus-group interviews	
		Observations Document analysis	
13-16 September 2011	<b>Urban</b> Administration member, Cleaner, Community member, Governing body chairperson, Factotum/ Intermediate phase teacher, Foundation phase teacher, Intermediate phase teacher/Environmental coordinator, Learner from Grade 7, Photocopy maker and cleaner, Principal, Senior phase teacher/Environmental coordinator	One-on-one interviews	Triangulation
	Focus-group of learners representing the Intermediate and Senior phases	Focus-group interviews	
		Observations Document analysis	

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## 5.5.1 DATA COLLECTION METHODS

It is common for a single study to use multiple methods for data collection. The choice is determined by the purpose of the study, the key research questions, research ethics and resource constraints rather than the factors fundamental to case study research as a form of enquiry. Case study researchers are advised to collect data from more than one source and to use more than one method for the purpose of triangulation (Rule & John, 2011:61, 63). Semi-structured interviews, focus-group interviews and non-participant observations were used to gain an understanding of how the schools implement the EMS and promote ESD. All these methods were used to help answer the objective: *What an EMS framework design should look like to promote ESD in South African primary schools based on the different types of schools selected in the case study.* Audio-recordings of the semi-structured and focus-group interviews were made by the researcher during the four-day stay at each school. O'Donoghue (2007:167, 178) suggests approximately two hours for the interview since "experience" shows that this is the length of time required to "elicit extensive and in-depth accounts". However, a one-hour interview was deemed sufficient so as to encourage participants to discuss their views in the relaxed school environment. Furthermore, O'Donoghue's suggestion was followed and the transcribed interviews were 'checked back' with the participants to ensure the interviews were accepted as a true representation of their views. A discussion of each of the data collection methods follows.

### 5.5.1.1 INTERVIEWS

Interviewing is the most popular method in qualitative research (Merriam, 2009:87). People are the sources when using the one-on-one interview and focus-group interview method. Purposeful sampling of the participants in the school, as sources, took place in this study. These people were purposively chosen to shed the most light on the case and so were most suited, most knowledgeable, were interested and had the most experience in the case to advance the purpose of the research. This also allowed for a trustworthy account of the case (Rule & John, 2011:63, 64).

#### 5.5.1.1.1 ONE-ON-ONE INTERVIEWS

Participants were asked to answer questions aimed at providing an understanding of how the EMS is implemented at the school and how environmental learning takes place there (cf. Addendum A). The interview took the form of a one-on-one discussion between myself and the participant (Rule & John, 2011:64). A semi-structured interview using open-ended

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questions was undertaken as deviations to the interview schedule are allowed when follow-up questions are asked to explore the comments of the interviewee (Merriam, 2009:90; Morrell & Carroll, 2010:82; Rule & John, 2011:65; Thomas, 2011:163), and with the access to probe into the participants' subjective experiences (O'Donoghue, 2007:166; Thomas, 2011:163). The interviews were conducted with the participants identified at the township, farm and urban school because a whole-school approach means that all the participants form part of the interrelated system at a school. The number of participants (cf. Table 5.1) differed throughout the three schools due to circumstances that arose, as clarified in chapter 6 (cf. 6.2.1-6.2.3). The same set of questions, known as the interview schedule, was used at all three schools since it was intended as such for standardisation, comparability and uniformity (Rule & John, 2011:65). Each of the participants listed was available for the interview, with some exceptions (cf. 6.2.2 & 6.2.3). Hence, overall, the principal, an administration staff member, a cleaning staff member, a community member, the environmental committee co-ordinator at the school, a Foundation, Intermediate, and Senior phase teacher (most often the Head of Department), a gardening staff member, the governing body chairperson, and a learner from Grade 6 or 7 made up the list of participants for the one-on-one interviews at each school, respectively. The environmental committee coordinator and the phase teacher were subject to an intense interview that focused on their role in the EMS implemented at the school, as well as their role in promoting ESD in teaching and learning. The aim of the interviews was to establish how the participants ensure or experience environmental learning takes place, and to establish how the EMS is implemented at the school. The interviews were used to help answer the following objectives: *How environmental learning is presently integrated in the school to promote ESD*; and: *What key indicators of the EMS in the school can be identified that promote ESD*.

#### **5.5.1.1.2 FOCUS-GROUP INTERVIEWS**

The learner participants were asked to answer questions by having a discussion with each other, facilitated by myself, in order to provide an understanding of how the EMS is implemented at the school and how environmental learning takes place there (cf. Addendum A). Despite having had success with the discussion between participants during the pilot study's focus-group interview, the same experience was not shared with the participants in the township and especially in the farm school. Participants from the farm school were reserved and did not converse easily with me, let alone with each other. The focus-group interviews were undertaken with six to eight learners representing Grades 4-7 at each school, since it was felt that instead of one-on-one interviews, learners' data would be richer and more meaningful to establish where and how in the curriculum they had learnt about the

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environment. According to May (2001:125), and Rule and John (2011:66), a typical focus-group interview involves between eight to twelve members who interact as participants in the discussion. Merriam (2009:93) states that since this data is socially constructed within the interaction of the group, a “constructivist perspective underlies this data collection procedure”. I was sensitive and attentive to the group dynamics since the age and status of the participants meant that the senior learners were capable of dominating the dialogue over the Grade 4s (Rule & John, 2011:66). I was attentive to applying the skill of encouraging all interviewees to contribute and not quieten down those who were inclined to dominate the conversation (Morrell & Carroll, 2010:83). The target group of this research was at least six learners (girls and boys) from each of the three schools respectively. This means that 18 learners formed part of the focus-group in total. The focus-group interviews were conducted separately at each school to answer: *How environmental learning is presently integrated in the school to promote ESD*; and: *What key indicators of the EMS in the school can be identified that promote ESD*.

#### **5.5.1.2 OBSERVATIONS**

The first-hand observations undertaken comprised of two parts. Firstly, non-participant observations took place in the Foundation phase classrooms (cf. 5.4.3), and I decided that observations in the classrooms during class time would help triangulate (Merriam, 2009:119) whether and how environmental learning was dealt with to help answer the objective: *How environmental learning is presently integrated in the school to promote ESD*. I merely observed as a non-participant. I tried to be as discreet as possible, keeping a low profile at the back of the classroom, making notes of my observations of the teacher and learners, remembering to overcome any bias or preconceptions before doing so. Being mindful of the observer effect, whereby my presence as researcher in the room might affect what I observe and hear (Morrell & Carroll, 2010:79), it was prearranged that I could visit any of the Foundation phase classrooms at any time without prior notification. An open-ended format was used to record what was considered significant (Rule & John, 2011:68) and this structured observation looked for particular kinds of “behaviour” related to environmental learning as it happens (Merriam, 2009:119; Thomas, 2011:165), as well as what teaching and learning support material was present in the classroom. I did not deem it necessary to review lesson plans and work schedules of the teachers since the teacher is required by the NCS to cover the curriculum. The literature analysis of the NCS and the interviews were deemed sufficient to triangulate how environmental learning takes place at the school. Secondly, I also conducted non-participant observation of the school premises so as to establish how the school premises (classrooms, outbuildings, yard, fields and gardens)

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reflect ESD. A reflective summary was given at the end of the observation, identifying characteristics specific to each type of school. Another aim of the observation was to *identify indicators that shed light on how the school premises promote ESD*. The physical setting, the participants, activities and interactions, visible conversations between people in the context and nonverbal behaviour, informal and unplanned activities, as well as the role of the observer in the scene were noted (Merriam, 2009:120,121). By spending four days at each school I felt that the length of time allowed participants to become familiar with my presence and so my timely presence limited any influence on the behaviour and responses of the participants (Rule & John, 2011:68). The non-participant observation was not only used to answer the following: *What key indicators of the EMS in the school can be identified that promote ESD*, but also to answer *What an EMS framework should look like to promote ESD in South African primary schools*, based on the different types of schools selected in the case study.

### 5.5.1.3 DOCUMENT ANALYSIS

A document analysis was undertaken of the components of the EMS implemented by each of the three schools in the case study, found in the documentation of the principal or environmental committee coordinator, since each school adopted an EMS to suit their specific circumstances. Access to the relevant documents of the schools did require patience and ethical care. Some schools were reluctant to share their files. Copies of documents were permitted and care was taken to note dates, context, status of documents and sensitivity to documents. Information not presented after requesting it, was handled delicately during the interviews (Rule & John, 2011:67). Cognisance was taken of the authenticity and accuracy of documents as part of the research process (Merriam, 2009:151). These include the minutes of meetings, reports, newsletters, agreements (O'Donoghue, 2007:167; Rule & John, 2011:67), the written declaration of commitment to the EMS, environmental policy, decisions taken regarding the chosen environmental themes for the school, the action plan, school newsletters, copy of the school's environmental objectives and targets; how the action plan is implemented and maintained, the evaluation mechanism and procedures in place. The independence of the documents, the fact that they were not altered by human motives, made them to be non-reactive and a beneficial data source (O'Donoghue, 2007:167; Merriam, 2009:139). This was undertaken to help answer the objective: *What an EMS framework should look like to promote ESD in South African primary schools*.

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## 5.5.2 DATA COLLECTION PROCEDURE

Prior to the data collection (cf. Table 5.1), permission was requested from and granted by the North West and Gauteng Provincial DoE (cf. 5.8.2), as well as the three school principals after a personal meeting was held with each principal respectively. At this meeting I briefed the environmental committee coordinator about the research that was based within the *Education for Sustainable Living* project. I explained how the research was to be conducted. I requested the person to liaise with me and I helped him/her to identify the participants. The need for an interpreter to be present to translate into the mother tongue of those participants who were not proficient in Afrikaans or English was also discussed as well as the fact that the interpreter had to sign a confidentiality agreement so as not to disclose any information from the interviews (cf. Addendum H). The liaising continued until the confirmation date for the research was received from the school principal. The consent forms were then issued to the participants by the environmental committee coordinator (cf. Addendum B & C). Upon arriving at the school, I finalised the times for the interviews. All participants presented their letters of consent before the interview commenced. All semi-structured one-on-one interviews and semi-structured focus-group interviews were recorded on audio-tape for verbatim transcribing, and as a back-up, the interviews were recorded on video-camera (no visuals were captured, only audio) due to experience gained from the pilot study where one audio-clip was not recorded due to a glitch. The video-camera recordings remain in safekeeping until such time that it will no longer be deemed necessary for the purpose of the study and will be destroyed. Recording the data included audio-recording, video-recording and note-taking (Rule & John, 2011:66).

The research took place at the time determined by the school so as not to disrupt the participants' (staff and learners) school day and extra-mural activities. Prior to the interview beginning, I explained the aim of the research as stipulated in the letter attached to the consent form that was addressed to the participants. It was followed by participants providing biographical information serving the purpose of establishing how long the participants had been at the school, how long they had been in the profession and what exactly their function was at the school (Gillham, 2005:17). The focus-group interviews began by explaining to the learners that they were to engage in a facilitated discussion with each other. The aim of the research was explained to them, as well as the consent form that they signed, so as to put them at ease. The non-participant observations in the Foundation phase classrooms and the non-participant observation of the school premises took place between interviews and during the course of the four days. The observations were done unaccompanied and then accompanied by the environmental committee coordinator. The duration of time between each school case research was a minimum of a few days and a

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maximum of two weeks. With the help of the environmental committee coordinator the respondents received an encrypted electronic copy of the transcribed interview and were invited to make amendments. After the latter process had been completed, the data was analysed.

## 5.6 DATA ANALYSIS

Allan (2003:8, 9) advises researchers to place a greater focus on analysis rather than just on an inspection of the data. According to Merriam (2009:175), the data analysis is the process of “making sense out of the data” and it involves consolidating, reducing and interpreting what the participants had to say, as well as what the researcher saw, heard and read. In this way a synthesis of the understanding of the EMS at the schools in the case study was obtained, and the indicators that play a role in the environmental management at the schools could be obtained.

Data analysis of the interviews was done so as to answer the research question. Since the data collected came from multiple sources, each set of data was examined separately and then collectively (Morrell & Carroll, 2010:124). The analysis of the document data was done because it helped identify issues or themes, and it allowed for triangulation of data or findings from other sources. The observational data included observation schedules, notes of what was observed containing my impressions and interpretations (Rule & John, 2011:80, 81). When collating the data the themes from the three schools were compared to determine if they corresponded with each other and this also aided in establishing whether the findings supported or contradicted each other.

Coding is an integral part of data analysis and refers to labels that highlight different themes within the data (Rule & John, 2011:77), but more than that, Saldaña (2009:3) explains that a code is a word or short phrase that “symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute” to text. Coding is a process of choosing labels and assigning them to different parts of data. Coding requires “intelligent, analytic and systematic decisions” about “what the data is saying”. The choices made during the coding process impact on all the analytical process that follow, namely the findings, explanations, conclusions and suggested recommendations (Rule & John, 2011:77). The codes were at times an exact repetition of my or the participants’ words, or even concepts from the literature (Merriam, 2009:178). The codes were made up as I worked through the data (Henning *et al.*, 2004:105) and so themes emerged from the data during the coding process. The labels assigned to the text as I read through the data became codes that were recoded and used to code other data. Despite some coding having been based on concepts in the

theoretical framework of the study (deductive analysis), I allowed the data to “speak” and “name” codes (inductive analysis), hence words and short phrases were used during coding. As the analysis proceeded, codes were grouped logically into categories with names. The construction of categories is “highly inductive” and saturation point was reached when no new “information, insights or understandings” were available (Merriam, 2009:183).

The process of working from codes to themes in case study research is called content and thematic analysis (Merriam, 2009:180; Rule & John, 2011:78, 79). In essence, content analysis is the analysis of text (Gillham, 2005:136). May (2001:191, 192) describes content analysis as the “frequency with which certain words or phrases occur in the text as a means of identifying its characteristics”. The more often a word or phrase is used the more significant it becomes, and categories will be generated that will be coded and may become themes. I therefore analysed the content of all the interviews, documents and observations to establish categories (from the coding of the raw data) and then interpretation of the data in terms of common themes relevant to the characteristics of the document’s content (Leedy & Ormrod, 2005:32; Merriam, 2009:205). In Saldaña’s opinion (2009:13), thematic coding is the outcome of coding, categorisation, and analytic reflection, as discussed above.

This multiple holistic case study collected and analysed data from three cases. It means that the content and thematic analysis of a within-case analysis took place for the township, farm and urban school, respectively. The within-case analysis treated each individual case as a comprehensive case, meaning it was “an intensive, holistic description of analysis of a single, bounded unit. Conveying an understanding of the case is the paramount consideration in analysing the data” (Merriam, 2009:203). This was followed by a cross-case analysis that involves an analytic generalisation across the three cases to identify indicators to be used in the design of an EMS framework within a primary school (Yin, 2009:38, 54-59, 156-160). The cross-cases analysis yielded indicators and themes, as well as an integrated framework based on a systems theory (Merriam, 2009:204). The reasoning is that since systems thinking aims to try and “avoid breaking up a complex web of social activity, it fits naturally with the holistic emphasis of the case study”. (Thomas, 2011:173). According to Saldaña, (2009:209) the analysed data can be presented in visual summaries of qualitative data and analysis into table, charts, matrices, diagrams, among others, that illustrate the contrasts and ranges of observation. It must be remembered that the details of each individual case may differ, but I attempted to build a general framework that fits the individual cases.

## 5.7 QUALITY CRITERIA

Being the primary data gatherer, conductor of the analysis, and the individual making inductive and abductive inferences, it is necessary that I address the matter of trustworthiness, credibility, dependability, transferability, generalisability, and triangulation.

### 5.7.1 TRUSTWORTHINESS

Morrell and Carroll (2010:77), bias and subjectivity make trustworthiness of the study difficult. I minimised this through the recording of all the interviews and member-checking that took place. In fact, Mears (2009:26) states that member-checking of the transcribed data and of the interpreted meaning of the researcher taken from the data, contributes to participant validation (Nieuwenhuis & Smit, 2012:138). The pilot study also added to the trustworthiness and credibility of data collection methods (Morrell & Carroll, 2010:112; Nieuwenhuis & Smit, 2012:138). The multiple data collection methods used helped to ensure trustworthiness and credibility. The observation of the state of affairs that participants discussed in the interviews verify the researcher's understanding and help to ensure the correct interpretation of the data (Nieuwenhuis & Smit, 2012:138).

When referring to the extent that the research findings can be replicated, yielding the same results (Merriam, 2009:220; Rule & John, 2011:104), it also denotes trustworthiness. Mears (2009:27) provides solid indicators of replicability. They are listed as: documenting and reporting each step in the research process, providing the rationale for decisions that are made, confirming that the data accurately reflects the narrator's perception of the experience, and the researcher must provide markers for others to follow in order to continue or extend the study. When Merriam (2009:221) points out that human behaviour is never static, it refers to the dependability of the study, since the researcher expects outsiders to also have results that are consistent with the data collected and results that make sense, and are dependable (Merriam, 2009:221). If a data collection method is not trustworthy, it cannot be credible.

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### 5.7.2 CREDIBILITY

According to Rule and John (2011:104), by claiming credibility the researcher is able to state that what was chosen as the focus to be studied was actually studied. This refers to the degree to which the case study has recorded the core of the case reality. In qualitative research credibility of the process (Mears, 2009:25) and of the findings of the study, is triangulated to confirm credibility (Merriam, 2009:213). When referring to credibility of interview research, Mears (2009:25) states that what is valid is the “degree to which it illuminates what it claims to inform” as well as what “credibly captures and portrays the meaning and significance” of the representative participants’ viewpoints of environmental learning and the EMS implemented at the school. Morrell and Carroll (2010:77) explain further that credibility refers to whether a data collection method confirms whether the data collected is appropriate for the conclusions that are being made. It refers to whether the method of data collection fits the problem, whether the sample fits the problem, how the data analysis is performed and whether it is appropriate, and whether there is sufficient evidence for any claims.

### 5.7.3 TRANSFERABILITY

Wagner, Kawulich *et al.* (2012:275) refer to whether the methods and results of a quantitative study can be applied to another context. The concern is whether the findings of a study can be transferred to the context of the reader. The reader notes the nature of the study, its design, procedures and results and evaluates whether these apply to things that they are familiar with (Laher & Botha, 2012:94). In my opinion, a reader of this study will experience the effect of transferability since I have supplied a detailed description of the research situation and methods. They can, therefore, establish whether the EMS framework can be applicable to their situation and so implement it at their school to promote ESD.

According to Merriam (2009:223, 224), the extent to which a study’s findings can be applied to other situations refers to its generalisability. This case study aims to “understand the particular in depth”. Qualitative studies do not assume to be generalisable in their purpose, rather they serve the purpose of generating in-depth, holistic and situated understandings of a phenomenon. The latter means that case studies typically examine a specific subject in a specific context and results are not necessarily applicable beyond that group. Bearing this in mind, this study was undertaken to design an EMS framework for primary schools who find themselves in the same context as those in the cases and can draw on the similarities of each case (cf. 5.4.2.3 – discussion regarding analytic generalisations).

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#### 5.7.4 TRIANGULATION

Triangulating not only helps to identify different realities (Stake, 2005:454), but triangulating the study with other methods helps to confirm the credibility of the process (Zainal, 2007:2; Creswell, 2009:191) and the trustworthiness of documents and personal accounts (Merriam, 2009:222). According to Morrell and Carroll (2010:77) as well as Rule and John (2011:109), triangulation involves using multiple data sources and methods to help ensure that the data collected is accurate and a true representation of what is being studied. This is done to clarify meaning and to “verify the repeatability of an observation or interpretation” (Stake, 2005:454). In this study triangulation was established through multiple data collection methods that included interviews, observations and documentation. Multiple participants were also used so as to collect multiple viewpoints from all the participants in the school about the same topic (Merriam, 2009:216; Morrell & Carroll, 2010:77). Aim one was attained through the analysis of the NCS and cross-checked by the interviews with the teachers and learners, as well as the focus-group interview with the learners, and non-participant observations. Aim two was attained through the analysis of the documents at the school dealing with the implementation of the EMS and cross-checked through the interview with all the participants at the school and the non-participant observation.

Merriam (2009:216) explains how in postmodern research triangulation is being reconsidered with a focus on crystallisation. This refers to a multi-faceted or multidimensional approach. Additional sources and methods show additional facets called crystallisation (Merriam, 2009:216; Rule & John, 2011:109). The study describes and analyses an emerging reality as seen through the eyes of the participants. What is described as findings is that which crystallises from the different data collection methods and data analysis (Nieuwenhuis & Smit, 2012:138). Triangulation remains the principal strategy to ensure trustworthiness and credibility within this study’s interpretivist perspective.

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### 5.7.5 CRITIQUE OF CASE STUDY QUALITY CRITERIA

Critique against case studies is that it is not thorough enough because case study researchers are said to be non-systematic when collecting data and bias is said to be allowed in the findings (Neale *et al.*, 2006:4, 16). Further critique by the latter authors is that it is difficult to generalise from one case to another. Case studies have also been accused of over-generalisation. The latter refers to a small choice of examples and without evidence, generalisations were made. The advice given by Yin (2009:15) is that when analysing case studies the findings must be generalised to theories, therefore an analytic generalisation will be undertaken as mentioned earlier.

The next section will address the conformability of the study that refers to concerns about my influence and biases, as researcher, on the study. It is addressed by disclosing the research process that includes ethical requirements, researcher positionality and limitations (Rule & John, 2011:110).

## 5.8 ETHICAL ISSUES

According to Merriam (2009:230), ethical practice amounts to the individual researcher's own values and ethics, despite conforming to the policies and codes of ethics of the NWU institution. The "protection of subjects from harm, the right to privacy, the notion of informed consent, and the issue of deception" were all considered by me ahead of time. Informed consent was deemed necessary because it was felt that participants had to understand what they were agreeing to (Thomas, 2011:69).

### 5.8.1 GENERAL ETHICAL ASPECTS CONSIDERED DURING THE RESEARCH PROCESS OF THIS STUDY

According to Merriam (2009:231), when interviewing the participants they may feel their privacy has been invaded, however, they may also be keen to share their knowledge and enjoy doing so. I asked the participants to share their knowledge and informed them that the interviews were confidential. I was mindful of respect for the participants as an important ethical aspect. Most importantly, I explained the purpose of the research, the methods used and that the interviews were being conducted to gather data so as to understand how environmental learning and environmental management take place at the school. All participating schools understood that there was a mutual benefit to be had from the research

since the EMS framework would be shared with them for their benefit. All participants were also assured of that they would be able to verify their statements through member-checking. All non-participant observations conducted at the school in classrooms and on the school premises were conducted with the awareness of those being observed and with no participation by myself. The documents used for data gathering were made available in some of the schools with reluctance during the data collection process. Lastly, Merriam (2009:232) draws attention to the fact that data analysis may present an ethical problem because the researcher is the primary collector of data and this may allow for bias. I protected the anonymity of participants during the encoding of the data by not using their names and endeavoured to describe the interpretation accurately as it emerged from the analysis.

I was also made aware of the advice given by Merriam (2009:234), who reminds the researcher that part of ensuring that the study is credible is that the researcher must be trustworthy in conducting the study in “as ethical a manner as possible”. This raises two ethical problems that Lincoln and Guba (2003:231, 232) refer to when dealing with case studies. On the one hand there is the question of how much of the researcher’s “self” should be allowed into the report, referring ethically to the fact that the researcher may allow him/herself more influence in determining the outcome than what should be the case. Secondly, the choice about what material to include and exclude is not to be made randomly, but deliberately and pertaining to the context of the research. Exclusions must be motivated.

### **5.8.2 PERMISSION**

The following steps were followed to deal with the ethical aspects of this study regarding permission:

- This study is part of the *Education for Sustainable Living* project and I independently obtained permission from the NWU’s ethical committee for both the pilot (number: NWU-00037-11-A2) and the main research study (number: NWU-00107-11-A2) for a scientific project with human participants (cf. Addendum D & E). This process involved a detailed description of research study process and its ethical aspects. I presented the ethics committee with the open-ended questions to be used during the interviews. I also informed them that I would facilitate the focus-group sessions and personally conduct the interviews.

- The project leader requested permission from the Gauteng and North West Provincial DoE as well as the three school principals to conduct research (cf. Addendum I). I obtained written consent from both the North West and Gauteng Provincial DoE (cf. Addendum F & G) to conduct research in the three schools and undertake the data collection.
- Letters explaining the aim of the research, interview process and focus-group process as well as the purpose of the data collection were presented to the participants (cf. Addendum B & C). The letter also explained my role as researcher, included contact details of my supervisor for any queries or if problems arose, as well as my purpose as researcher (Gillham, 2005:11, 12; Mears, 2009:38). Furthermore, the letter met research requirements that stem from three ethical principles for the protection of human research subjects, namely autonomy, non-maleficence and beneficence (Mears, 2009:34; Rule & John, 2011:112). Autonomy was established since participants were fully informed of the ethical aspects regarding anonymity with respect to no reference to names, and confidentiality with respect to access to the information that would be kept safe by me. The letter also referred to participants having the right to participate and to choose to withdraw from the study. Respect for participants was therefore upheld (Gillham, 2005:13). Participants were also informed that the findings would be published in my thesis and disseminated in articles. The letter also contained a request for learners who would be participating as well as their parents to provide signed consent before interviews and/or focus-group interviews could be conducted. Participants were informed that they would not be harmed by the interviews and it was made clear that the research interviews aimed to contribute to sustainable living and environmental management in their school. It was also made clear that the contribution of the study would be disseminated to the participating schools with the aim of benefiting schools (Mears, 2009:38).
- Submission of the signed documents was requested prior to each interview and the participants were asked whether they understood their involvement. A short summary of the aim, their role and the purpose of the research was shared with them whilst dealing with the formalities. I also informed the participants that my aim was to learn from each participant and that responses to questions would have no wrong or right answer. This clarification aided in showing that I assumed a transparent position, adding to the credibility of the study (Rule & John, 2011:113). Participants were then asked to provide their biographical information.

## 5.9 LIMITATIONS OF THE RESEARCH DATA COLLECTION

Since researchers are faced with choices that can affect a study and present a limitation to the study, the limitation noted in this study pertains to the choice of data collection methods for triangulation. I refer here to limited access in the sense that there was a lack of documentation made available by the school to be able to substantiate the interviews (Stake, 2005:459). This refers to the *Education for Sustainable Living* project file of the environmental committee coordinator, as well as to the files containing minutes of meetings held at the school that were not freely made available. When presented their content was thin. This limitation was not encountered during the pilot study. The impact was that I had to rely on documents that appeared on staff room notice boards and had to work from the few files presented. The impression was twofold. Either the minutes were regarded as being too confidential to share or the school was reluctant to reveal that its administration was not up to date. Since I was dependent on the good nature of the school, I maintained a good and respectful demeanour, remembering that a qualitative researcher is a guest in the private space of the world (Stake, 2005:459). A final limitation that needs mentioning is that I assumed that, since the primary schools were part of the *Education for Sustainable Living* project and had been trained in how to implement an EMS in a school, after two years of implementation a functional and well developed EMS would be encountered.

## 5.10 CONCLUSION

This chapter has provided a discussion of the method of research and has focused specifically on the case study design employed in this study. The research approach and paradigmatic approach, method of research, data collection, data analysis, quality criteria, ethical issues, and limitations of data collection were discussed in detail. Specific focus was placed on: the case study research design used; the data collection methods used, namely interviews (one-on-one and focus-group); non-participant observations and documents; the within-case and cross-case data analysis used; trustworthiness, credibility and triangulation as quality criteria; ethical issues; and limitations of the study. Chapter 6 will provide a discussion and interpretation of the data analysis.

*The more we study the major problems of our time, the more we come to realise that they cannot be understood in isolation. They are systemic problems, which means that they are interconnected and interdependent.*  
Capra (1996)

# CHAPTER 6

## RESULTS AND DISCUSSION

### **6.1 INTRODUCTION**

Chapter 6 presents a description of the data from the three schools in the study. The aim of the empirical research of this study was to examine the implementation of an EMS in three primary schools to promote ESD. The three schools chosen, namely a farm, township and urban school, represent the different types of schools in the country (cf. 1.5.4.1). All three schools formed part of the *Education for Sustainable Living* project, meaning that each had implemented an EMS at the school. Narratives, figures and tables are used to present the data. The purpose of this chapter is to present and discuss the analysed data collected during this study, and to address the research questions posed in chapter 1, namely: *How environmental learning is presently integrated in a township, farm and urban primary school to promote ESD; and what key indicators of the EMS in the township, farm and urban primary school can be identified that promote ESD.*

### **6.2 A MULTIPLE CASE STUDY: A CONTEXTUALISATION OF THREE PRIMARY SCHOOLS**

A contextualisation of each of the three schools is important since no two schools are alike and each case study is an in-depth study of a specific school. By providing a contextualisation of the situation of each school, a guide will be provided for other schools who classify themselves as township, farm or urban. In this manner such schools can draw on the similarities with one or parts of the three schools in this multiple case study. A reflection of each situation can, therefore, help schools to draw on the commonalities of their

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situation when compared with the case studies and aid them in promoting ESD in their teaching and learning, as well as implementation of an EMS.

### 6.2.1 TOWNSHIP SCHOOL

The school has 1447 learners from Grade R to 7. The school is a quintile 2 school. It is located in a ward with approximately 15 000 inhabitants. The community profile shows that approximately 85% of the inhabitants are unemployed (Anon., 2011:5). The school services the township community who are dependent on work from the mine, light industry and retail in the towns in the area. Formal housing, informal housing (shacks with the pit system) and low-cost housing surround the school. The learners come to school by foot, minibus-taxi, bus or car. Not one child was seen travelling to school on a bicycle.

There are two prefabricated classrooms on the premises and the rest of the buildings are brick. The buildings are either offices or classrooms and no school hall exists. The school is fenced and has no sports field, but a rocky outcrop on the premises could serve as a sports field. The rest of the surfaces, between classrooms, are paved. A library exists but is non-functional. The school has the following services, namely water, sanitation, telecommunications (Wi-Fi is available in the administration block), and electricity. Wall plugs are found in all the rooms. The school has one geyser, stove, microwave, refrigerator, and television, respectively, and heaters in all the offices. Eight computers, four photocopying machines and two printers are found in the administration block. The feeding scheme's kitchen is located in a brick building and has a gas stove with gas bottles locked away safely, as well as a washing machine. The school has two vegetable gardens and one indigenous garden.

All the participants who took part in the interviews have been present at the school since 2009, when the EMS was implemented. The school learners are from the African and Coloured population groups<sup>40</sup>. The teaching personnel are made up of Africans and Coloureds. The mother tongue taught at the school is Sepedi and English is the medium of instruction from Grade 4 to 7. English is not the first language of all the participants and despite this the learners indicated that their first language was English. The outcome was that throughout the interviews the learners had difficulty in expressing themselves, but still preferred to answer in English and not in their mother tongue. I found that at times they did not fully understand the questions. Questions often had to be rephrased so that they could understand them better. All the interviews were conducted in English except for one that

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<sup>40</sup> Statistics South Africa describes the population groups in the country as African, Coloured, Indian/Asian and White (Burger, 2011:17).

was conducted in Afrikaans. I could accommodate this due to my proficiency in both English and Afrikaans. Nobody accepted the offer to conduct the interviews through an interpreter, despite an assurance of confidentiality. All the other participants stated that English was their second or third language. It was only the gardener and cleaner who stated that English was their third and fourth language respectively, and it was these interviews that were challenging due to the language issue and so I found myself repeating questions and rephrasing.

The school has 42 teaching staff members. Three administration staff members, two interns and six groundsman, who act as cleaners, maintenance men and gardeners, are employed by the school. The principal teaches Sepedi and has an Honours degree in Geography. The governing body member, community member, principal and environmental coordinator/ Senior phase teacher all have a management qualification. All the teachers interviewed have a teaching qualification. The Foundation phase teacher teaches the same class the whole day. The Intermediate phase teacher is the Natural Science and Technology teacher and a member of the environmental committee. The Senior phase teacher is the Social Science, Life Orientation and Economic and Management Sciences teacher in the Senior phase and also the environmental co-coordinator/ Senior phase teacher, and the Acting Head of Department for Social Science, and Economic and Management Sciences. The administration office worker and cleaner have a grade 12 qualification. The gardener has some formal secondary schooling. A one-on-one interview was conducted with one learner from Grade 7 and the focus-group interview was undertaken with seven learners from the Intermediate and Senior phases. A discussion and interpretation of the analysed data follow this section of contextualisation.

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## 6.2.2 FARM SCHOOL

The school has 498 learners from Grade R to 7. The school is a quintile 1 school and is situated on historic land<sup>41</sup>. Some 140 households are found in the immediate settlement and a new informal settlement is growing on the outskirts. The learners' parents work on the surrounding farms, are either unemployed or have left their children with family whilst they work in the cities (Machobani, 2011). Formal housing and informal housing (shacks with the pit system) are located in the area. The school services the farming community from which learners come to school by foot, bus, bakkie (pick-up truck) or bicycle. Two prefabricated classrooms and one new brick building are being built. All existing buildings are even-numbered brick to prefabricated structures. The buildings are either offices or classrooms and no school hall exists. The school is fenced and has a sports field. The school is surrounded by dirt roads and is adjacent to farms, a residential area with a church and a cemetery. The school has the following services on the premises, namely water, sanitation, electricity and telecommunication. The toilets drain into an underground septic tank. No library exists, but a computer media centre has computer facilities without internet access, since the satellite internet communication is out of order. The school has electricity and wall plugs in all the rooms. It has one geyser, stove, microwave, refrigerator, and television, respectively. Heaters are found in some offices and classrooms. 30 computers, one photocopying machine and one printer are located on the school premises. The school has some grass lawns between buildings. The space between classrooms on the school quad is either filled with flowerbeds or paved surfaces. The feeding scheme's kitchen is located in a converted container and has a gas stove with gas bottles locked away safely. The school has one large vegetable garden and one indigenous garden. Telecommunications are often interrupted and the water is obtained from a borehole that is tested once a month.

The school learners are from the African and Coloured population groups. The teaching personnel are made up of Africans, Coloureds and Whites and the rest of the school personnel are African. The mother tongue taught at the school is Afrikaans. English is the medium of instruction from Grade 4 to 7. All the participants who took part in the interview have been present at the school since 2009, when the EMS was implemented, except for the Head of Department of the Foundation Phase who joined the staff in 2011. English is not the first language of any of the participants. The learners in the focus group stated their first language as Sepedi and Afrikaans. They wanted the interview to be conducted in English, their second language, but unlike the learner in the one-on-one interview who conversed

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<sup>41</sup> President Paul Kruger gave land to these people for their assistance against the British during the Anglo-Boer War (1899-1902). They are descendants of freed Malay slaves who trekked into the interior of South Africa with a trekboer named Malan in 1857. They intermarried with the Sepedi and call themselves Black Afrikaners (Machobani, 2011).

beautifully, I am of the opinion that they were reluctant to talk with each other or respond constructively to any question posed for discussion. It was difficult to get any response from them. The gardener and cleaner, whose first language is Sepedi, did not want an interpreter for their interviews because they preferred to speak in their second language, Afrikaans. The governing body member interview was conducted in the participant's first language of Afrikaans. The remaining interviews were conducted in English despite it being some participants' second language.

The school has 14 staff members: One administration staff member, one groundsman (the gardener who maintains the school grounds), and one cleaner. The principal does not teach. He holds a Higher Diploma in Education for Mathematics, Afrikaans, Natural Science and Biology, as well as an Advanced Certificate of Education in leadership and management. The governing body member (who also served as the community member for the interview because of the death of the treasurer<sup>42</sup>) is the deputy chairperson and formerly was a Mathematics and Natural Science teacher at the school. She is also head of the feeding scheme kitchen. All the teachers interviewed have a teaching qualification. The environmental coordinator is the Head of Department of the Intermediate and Senior phases. He is the Life Orientation and Sepedi teacher in both phases. The Foundation phase teacher teaches the same class the whole day and is the Head of Department for that phase. The Intermediate phase teacher is the Afrikaans and Social Sciences teacher for this phase as well as Grade 7. The administration office worker has a grade 12 qualification and a management assistant's diploma. The gardener and cleaner have some formal secondary schooling. A one-on-one interview was conducted with one learner from Grade 6 and the focus-group interview was undertaken with seven learners from the Intermediate and Senior phases. A discussion and interpretation of the analysed data follow this section of contextualisation.

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<sup>42</sup> Since the chairperson was unavailable, the time constraints and availability of community members meant that the deputy chairperson who is also a community member was interviewed to fulfil both roles.

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### 6.2.3 URBAN SCHOOL

The school has 1112 learners from Grade R to 7. The school is a quintile 4<sup>43</sup> school and is situated in an established middleclass residential suburb of a city with brick homes. It is serviced by tarred roads. The school services the city's suburban community who are dependent on work from the mines in the area, light industry, and retail in the city. Parents are employed by either primary, secondary or tertiary activities related to mining. At most a dozen learners come to school by foot and an average of ten uses a bicycle. A small group uses a minibus and the rest come to school by car. The school is fenced and has a sports field. All the school buildings, including the school hall, are brick and have electricity and wall plugs in all the rooms. The school has the following services on the premises, namely water, sanitation, electricity and telecommunication. It is equipped with internet communication in the administration block and a media centre that houses the functional library. The school has one geyser set at 55°C, a stove, an oven, a microwave, a refrigerator, a television, and heaters. The administration offices and sickbays have air purifiers. Seven computers, two photocopiers and five printers are among the electronics in the administration block. The school has grass lawns between the classrooms with a railing around its perimeter and flowerbeds to the sides. Walkways are paved and rainwater is channelled into gullies. Labelled indigenous trees are found around the parking area and the rest of the school perimeter. No indigenous garden exists.

The school learners are from the African, Coloured and White population groups. The teaching personnel are made up of Whites and rest of the school personnel are African. The mother tongue taught at the school is Afrikaans and the medium of instruction from Grade 4 to 7 is also Afrikaans. All the participants who took part in the interview have been present at the school since the implementation of the EMS in 2009, except for the Foundation phase teacher and the factotum/Intermediate phase teacher who started to work there a year later. Despite Afrikaans being the first language of all but two participants and the language of communication at the school, the interview with the cleaner and governing body member was partly conducted in English based on the participant's request for better self-expression. Despite Afrikaans being the photocopier/cleaner and cleaner's second language, they were comfortable to conduct interviews in their second languages (Afrikaans and English respectively).

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<sup>43</sup> Parents pay school fees from which the governing body teaching posts staff are paid.

The school has 26 teaching staff members on the department's payroll. The remaining staff of another 26 teaching staff members, five secretaries, 14 interns, and 14 groundsmen (who maintain the school grounds) and cleaning staff make up the workers employed by the school's governing body. The list of participants was the largest, consisting of 12 interviews. The governing body member is now the chairman and was a normal member of the governing body at the time of the implementation of the EMS. He holds a Masters degree in Education. A community member who owns the stationary shop on the premises is a retired nurse. The principal has no teaching duties, but has a higher education diploma, with Biology and Librarianship as main subjects. She also has a diploma in computer-assisted teaching and one in special needs teaching. All the teachers interviewed have a teaching qualification. Two environmental coordinators are present at this school. The one from the Intermediate phase, who teaches Mathematics and Natural Sciences, is Head of Department of Mathematics, Natural Sciences and Technology; and the one from the Senior phase teaches Economic and Management Sciences and English. The Foundation phase teacher teaches the same class the whole day. The factotum is also an Intermediate phase teacher who teaches Economic and Management Sciences and is the Head of Department for Sport Sciences. The administration staff member has a grade 12 qualification. The cleaner and photocopier/cleaner both have some secondary school qualification. A one-on-one interview was conducted with one learner from Grade 7 and the focus-group interview was undertaken with eight learners from the Intermediate and Senior phases. A discussion and interpretation of the analysed data follow this section of contextualisation.

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### 6.3 DATA ANALYSIS PRESENTATION AND DISCUSSION OF THE INTEGRATION OF ENVIRONMENTAL LEARNING IN A TOWNSHIP, FARM AND URBAN PRIMARY SCHOOL PROMOTING ESD

The analysis of the one-on-one and focus-group interviews, non-participant observations and document analysis regarding the integration of environmental learning is presented and discussed separately for the township, farm and urban school by means of a within-case analysis. Interviews were conducted separately with the participants at each of the three schools as discussed above (cf. 6.2.1, 6.2.2 & 6.2.3).

#### 6.3.1 A WITHIN-CASE DATA ANALYSIS DISCUSSION AND INTERPRETATION OF THE TOWNSHIP SCHOOL

The data analysis of the one-on-one and focus-group interviews and non-participant observations reveals the following discussion and interpretation of how environmental learning takes place in the township school to promote ESD. A schematic summary of the key indicators that inform how environmental learning takes place in the township school's teaching and learning is presented in Figure 6.1 after the discussion and interpretation.

- **Care for plants, no littering and cleanliness as understanding of environmental learning**

The interviews with the learners and teachers in the township school revealed that environmental learning is regarded as showing care for the environment, as was described by a learner: *“It means that we should learn how to take care of our environment. It means that we should not litter and plant trees to make our planet more lively”*, and by the environmental coordinator/Senior phase teacher who stated that: *“to respect our environment like for example if we can look at the issue of planting trees on its own.”*

The bio-physical component of nature is highly regarded since plants and trees are noted as a priority. Learners and teachers alike understand that learning about the environment is about caring for plants, the clearing away of litter and cleanliness. My interpretation is that since the school management decided to focus strongly on a neat and clean school,

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stressing a low tolerance for litter, it has become a definitive point of consciousness at the school.

- **Life Orientation, Social Sciences, Natural Sciences, English, Sepedi, and Life Skills as Learning Areas where environment is a focus**

The data points to an apparent consciousness of littering and an awareness of learning about recycling. Four Learning Areas within the Intermediate and Senior phases, namely Life Orientation, Social Sciences, Natural Sciences and Languages, English and Sepedi promote environmental learning, with the most emphasis coming from the Natural Sciences. According to the learners, *“Natural Sciences teaches about plants. Sometimes we go out in the yard and through the garden. And our teacher ... she would pick up flowers and give us examples of you know, tell us what should we do for the plants to grow.”*

Despite learning about recycling, no sorting skills are taught, although everybody has knowledge of the paper recycling project. This is evident in the responses of the learners and gardener: *“tL: Yes we recycle paper. R: Who does the sorting? tL: The helpers here at school. [tG: Ja en gaan dit by die dump gooi en dan sorteer<sup>44</sup>.]”*

Considering that the Learning Area Social Sciences (cf. 3.5.2.7) teaches about recycling, it can be deduced that emphasis has not been placed on and connection made to what is taught in the curriculum and what is practised at school. The fact that the classrooms only have one bin for waste in a school where a paper recycling project is common knowledge, is indicative of the lack of skills taught to the learners regarding the sorting of waste and becoming proactive and aware of SD, not to mention the lack of management and reinforcement from teachers who do not practise whole-school participation so as to take action and fulfil school action plans (cf. 3.4). In the Foundation phase Life Skills as a Learning Area addresses issues of the biophysical environment as well as saving electricity.

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<sup>44</sup> Translation: tG: *“Yes and go throw it on the dump and then sort it.”* [tL-township Learner; tG- township Gardener; R-researcher.]

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- **Responsibilities and difficulties**

The data analysis has revealed that the environmental coordinator/Senior phase teacher believes that it is the responsibility of a teacher to creatively address issues of SD in lessons. His opinion is that some Learning Areas like Natural Sciences and Life Orientation already address the environment and that teachers are responsible for ensuring it happens. He says, “... so it’s just up to the teachers to be creative to execute those plans...”

The Intermediate phase teacher is of the opinion that a classroom with over 60 learners is a factor that inhibits extra preparation for the inclusion of environmental issues since time is a constraint due to the logistics of a large class. She says, “*Sometimes it becomes difficult to include the extra things because we work all day and ... I have 64 learners... big numbers in our classes... We don’t have ... some of the text book we don’t have anything.*” It was established that the higher authorities, being the district officials of the DBE, send the work schedules<sup>45</sup> to schools and from that the teacher develops lessons. My interpretation is that the teacher makes no extra effort to add and address environmental issues to promote ESD despite the environmental coordinator’s request to do so as part of the EMS, because it is not prescribed from the district office of the DBE and in the curriculum it is not deemed essential. Unfortunately, the school library is non-functional and available resources cannot be accessed to facilitate further inclusion of environmental issues. The data reveals that participants interviewed, excluding the learners, are of the opinion that everybody connected to the school is in some way responsible for environmental learning. The majority regard the principal and teachers as being the most responsible. The environmental coordinator clearly appreciates that the environment committee also has an important role to play here. Of special interest is the Foundation phase teacher who states that “...*they must be people who are driving. And they must have some good ideas.*” The *they* refers to and is interpreted as the individuals from management and the teachers who are tasked to address environmental learning. The interpretation is that school leaders who are at the helm must keep up the momentum and ensure that ESD is integrated into teaching and learning and management. The opinion is interpreted as management who must ensure that sustainability is the focus of school planning and practice (cf. 3.4) to then promote democratic and participatory whole-school decision-making processes. Another point made is that the “*environmental management*” are the ones who should be “*supplying us with working material related to the job we are doing*”. This implies that the environmental committee should provide the ideas and resources for ESD. This will “*indicate that they are really taking care of our environment*

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<sup>45</sup> A work schedule is the year planner that provides the pace and sequence of activities for a Learning Area. It can also contain exemplars of lesson plans to be implemented in the year (SA. DoE, 2002b:2).

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*management system*", making the point that the efficiency of the committee and not the individual teachers will ensure greater promotion of ESD.

The Foundation phase teacher reveals that during morning briefings, teachers inform one another about issues related to ESD that they can then share with the learners. The principal also uses his capacity to speak with learners at assembly at least once a week about matters related to ESD. This refers to school leadership as a key feature of a sustainable school (cf. 3.4).

The data also reveals that the Foundation phase teacher believes that ESD was already taking place in the classroom before the integration of environmental learning into teaching and learning. She and her colleagues tried to discuss it with other teachers to see where it could be integrated when she says, *"When I hear about this integration of ... at school and environment and so on, as I say it came while some of us were doing it. Yes, so we tried to engage with other teachers to discuss this."* She is of the opinion that management had to provide support, especially since the teachers were tasked to plant seeds and monitor their growth so as to use the experience for the teaching and learning phase. Formal discussions and management support are integral in a school in order for a project to run successfully (cf. 4.3.1.1 & 4.3.3.1). Hence, the interpretation made is that everybody has a responsibility toward the inclusion of environmental learning. They also have a role to play and communication plays an important part among managers and teachers to create awareness. This was revealed in the literature (cf. 4.3.1.1), where effective communication and a good understanding of the roles and responsibilities were listed as being central to the school as a system.

- **Experiential learning**

The data reveals that experiential learning takes place in all three phases in primary school teaching. In the Foundation phase this takes the form of planting seeds, watering the plants and physical development activities outside the classroom. For example, *"They talk a lot about the garden. That they should be taken to the garden and see how the garden everything blossoms"*. In the Intermediate phase *"learners also visit one of the three gardens on the school premises to observe using the senses."* The Senior phase learner showed an interest to participate in more 'look and see' activities and not only using their imagination when he said, *"Yes, ... take a plant and pour water and see what happens and then you write down. I feel like the teachers, they are not taking us outside to do projects, in the environment, they tell us in class use your imagination, imagine this... But when you are outside you can see, you can feel, ok these things..."*

The variety of plants in the indigenous garden is testimony to a good teaching and learning resource for any Natural Science lesson. However, I deduce that teachers refrain from such

activities since the logistics of taking 60 plus children outside becomes daunting. Learners are taught skills like planting, pruning and making compost. They take these acquired skills home where they plant their own vegetables and so care for the plants that will supplement their meals. This is a valuable skill for the impoverished community who use this no-fees school. Of notable interest is the Soul Buddyz Club<sup>46</sup> that some learners belong to at school. Membership of this club has produced learners interested in the vegetable gardens and the well-being aspect of their community when they say that *“our teachers they volunteered and after volunteering, they even asked the people from outside the community to come and help us water the plants...”* The learners who are part of this club are also more conscious of their environment and pick up papers in the school yard. This is reflected in the following response: *“If the workers are not here, we water the gardens, we pick up the papers and then each and every school opening, we will tell... the whole school... what we did and I also tell them to pick up the papers before they go to classes.”*

- **Awareness to save water and electricity, no littering and be hygienic beyond the classroom**

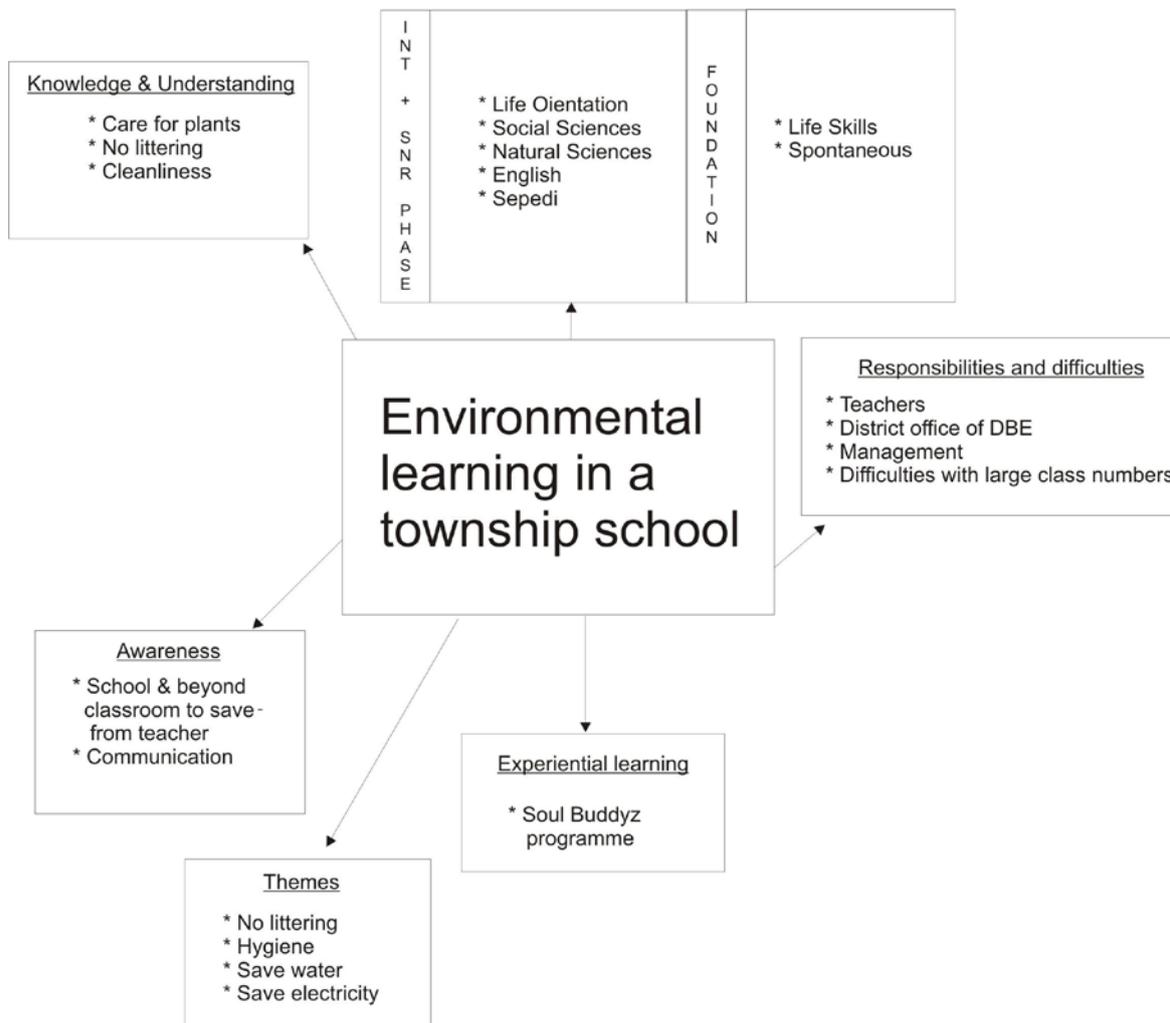
The data also reveals that the governing body and the community member are aware of the school having a low tolerance for litter and aim to keep the school premises clean: *“... as GB member, we committed ourselves that it must be zero tolerance for litter.”* The learners are aware of this aspect and together with the staff are also conscious of the need for hygiene. In general there is awareness among the learners to save water and electricity since the school has taught them not to waste. The Intermediate phase teacher is of the opinion that learners are taught about the interrelated nature of the biophysical world within its environment when she says, *“We teach these learners to respect their environment, they know that each and every living and moving things are connected to benefit from one another.”* This leaves me with the understanding and interpretation that the learners are taught to think about systems thinking (cf. 4.2.7) when they say, *“Yes... take a plant and pour water and see what happens and then you write down.”* This shows how interconnections can be discussed during reflective teaching and learning time. A learner adds, *“I have learnt that we do really have to take care of the environment. Because when the environment is dirty, there are more diseases.”* Furthermore, learners revealed that they are aware of saving electricity, personal hygiene and healthy habits. These are SD practices since they

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<sup>46</sup> Soul City South Africa is an Institute that aims to prevent and reduce the incidence of HIV/Aids and alcohol-related violence in South Africa's communities. One of the ways in which it tries to achieve its aims is by means of the Soul Buddyz Clubs programme, established in 2003. The project is a partnership between the Soul City Institute for Health and Development Communication, South African Broadcasting Corporation (SABC) Education and is supported by the National DBE. The Clubs are aimed at 8 to 14 year-olds, who get to become Soul Buddyz themselves by engaging in special material, activities, meetings and events that are run by trained Soul Buddyz facilitators (educators or librarians). Two club project themes of note are: caring for the environment, and vegetable gardens and soup kitchens (Soul City Institute, 2012).

try not to waste or litter, they are aware of cleanliness and using paper and other resources sparingly: *“To me and some learners, it helps because when we are at home and you see someone wasting something you say no don’t waste it and teach them to do the right thing. We use ... they tell us we should use it properly. Don’t waste, so that there can be many one day. So that another day I can use it again.”* Learners now become the teachers, hence life-long learning is promoted as a characteristic of ESD (cf. 3.3.3.1).

The interpretation is clear that ESD is promoted in the school and that sustainable living practices are being taught to learners and by learners to family members at home, outside the school context. It points to ESD and SD beyond the classroom. One observation that remains prominent in the Foundation phase classroom is the lesson dealing with family and the environment. It could be compared to Bronfenbrenner’s ecological systems theory because the interrelatedness of self, family and community in a sustainable society was discussed (cf. 4.2.7.3).



**Figure 6.1 A schematic summary of the key indicators that inform how environmental learning takes place in the township school’s teaching and learning**

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### **6.3.1.1 GENERAL OVERVIEW ANALYSIS OF THE WITHIN-CASE DISCUSSION OF THE INTEGRATION OF ENVIRONMENTAL LEARNING IN THE TOWNSHIP SCHOOL**

The data analysis shows that in the township school caring for plants, a low tolerance of littering and the upkeep of cleanliness and hygiene are bases for understanding environmental learning. In the teaching and learning of Life Orientation, Social Sciences, Natural Sciences, English, Sepedi and Life Skills as Learning Areas where the environment is a focus, the reinforcement to save water and electricity and to maintain hygiene has moved beyond the classroom, indicating that learners have been exposed to ESD. This has been aided by experiential learning using the indigenous and vegetable gardens in the school. The presence of a Soul Buddyz club that reinforces care for the environment has also contributed to ESD. The inclusion of environmental learning remains an issue as regards who is the responsible party for its inclusion in teaching and learning. The interpretation is that everybody is responsible for it in his/her Learning Area. However, there are two hindrances to the inclusion of environmental learning: If it is not included in the curriculum and if it is not an order from the district office of the DBE who mandates its inclusion, then time constraints, due to large learner numbers in classes, are named as limiting factors for its inclusion.

### **6.3.2 A WITHIN-CASE DATA ANALYSIS DISCUSSION AND INTERPRETATION OF THE FARM SCHOOL**

The data analysis of the one-on-one and focus-group interviews and non-participant observations reveals the following discussion and interpretation of how environmental learning takes place in the farm school to promote ESD. A schematic summary of the key indicators that inform how environmental learning takes place in the farm school's teaching and learning is presented in Figure 6.2 after the discussion and interpretation.

- **Caring for the biosphere as understanding of environmental learning**

The data reveals that learners list plants, animals, care for the environment, as well as the general biosphere as their understanding of learning about the environment, which can be interpreted as being taken from their point of reference, this being a farming community. The environmental coordinator/Senior phase teacher draws on his culture for an explanation of environmental learning and how it relates to SD practices when he says, "*...Well in my language you have to call it mapema, the way of life. I call it the way of life because you have to take care of yourself, the environment you live in, and then, the people who live in it.*"

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This same teacher further reveals his understanding of environmental learning when he explains his future strategy for environmental learning integration that entails examples of lesson plans for colleagues *“because picking up of papers, nurturing the garden, watering the garden, taking care of the orchard is integration of the environment.”* This substantiates the learner’s understanding of environmental learning.

- **Economic and Management Sciences, Sepedi, Technology, Social Sciences, Natural Sciences, Life Orientation, Maths and Life Skills as Learning Areas where the environment is a focus**

The learners list Economic and Management Sciences, Sepedi, Technology, Social Sciences, Natural Sciences, and Life Orientation as Learning Areas where they learn about the environment. For example, *“They’re always teaching us about the world and even in Social Science... teaching us where the seas are, environment.”* (cf. pt 4). The learners indicated that they do occasionally go outside to engage with the environment, but *“not so often.”* Of note is that the learners are positive about going to the vegetable garden at the school. *“We feel good because we are helping the people to eat and care for the environment.”* The learners are positive and enjoy planting because they say it is *“fun”* to do so. The gardener affirms that the learners visit the garden with the teachers. The administration assistant reveals that the environmental coordinator/Senior phase teacher who teaches Life Orientation takes the learners out to the vegetable garden. He also talks about teachers, learners and the gardener all being involved in the garden. The learners say that they not only plant, but get to eat of the vegetables once they have been prepared in the feeding scheme kitchen. The learners also have gardens at home and confirm that they work in those gardens. The principal explains how the vegetable garden is used in Mathematics teaching and learning where the learners measure surfaces in the garden. The Foundation phase teacher describes how learners in that phase go outside for teaching and learning. For example, *“... when we were doing recycling in grade three, we had to go out and make a compost, and... we even did a project where they, they took the plastics, the bottles, these two litre bottles, and they made some, hmm, flower pots and the like.”* The interpretation made is that teachers across the phases use the vegetable garden and school yard for teaching and learning by integrating what they have at the school into their teaching and learning themes. All of this forms part of self-discovery through learning (cf. 3.4.2 & cf. 4.2.5). This is made clear by the principal who states that the teachers have a curriculum to follow, but the teachers at his school have been given a choice to incorporate the garden into their teaching and learning activities when he says. *“So in other words the garden is there, compost heaps are there, community project, community involvement in the gardening, it’s there. ...What we try to do at school is to bring gardening ... And then educators are having the freedom of choice to use that in class.”* This shows that the principal allows a collegial

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model of management since teachers are enabled to decide how and when to include gardening or other themes in their lessons. The interpretation is that since teachers have been involved in the decision the implementation seems to be effective (cf. 4.3.2.2). In the Intermediate phase the teaching and learning support material used for explanations and reference comes from nature, in the form of sticks and the biophysical environment of the school.

- **No littering, saving water, electricity and paper, spring and arbour day : themes of awareness**

The data obtained from the learners reveals that the teachers and the principal tell them to save electricity and water. Examples include: *“They said if it is daylight you mustn’t light the light because it will waste electricity”*, and *“We must use a cup to drink ’cause we waste water, because the people don’t have water, so you must save water.”* The Intermediate phase teacher also tells how lights are switched off during the summer. The administration clerk states that he is also focused on saving electricity, the reason being that electricity impacts directly on his work. If water is wasted then more needs to be pumped from the borehole, which means that all other electronics run the risk of being shut down when the borehole pump is running. His photocopying duties are affected by electricity and he says he concerns himself with reusing paper. He also notes that the school tries to save on electricity with the daylight switch. *“I am the one who always tells them, Don’t throw the papers, don’t burn the we are having recycling (sic)... always show them how to do pages on both sides... and trying to save paper...A clear example of saving tissues. Normally, I don’t put tissue in the young ones’ toilets. I supply to the teachers. And the teachers just roll and put in all their classes and if a child says may I please go to the toilet, then the teacher will supply. That is how I am trying to save.”* The interpretation is that he promotes ESD and he is conscious of saving and influencing others to save as well by applying his management skills to manage the school resources and promote environmental learning (cf. 3.4.2).

The learners and the environmental coordinator/Senior phase teacher describe how cups are used at the taps for drinking so that water is not wasted. The environmental coordinator/Senior phase teacher also refers to some taps that have been blocked. The non-participant observation of the schoolyard affirms that mugs hang from taps and some taps are blocked, but enough taps are available for learners to use and so wastage is minimised. According to the Intermediate phase teacher and learners, the principal uses assemblies to communicate to learners to be careful of littering and to save water. It was also observed how the Foundation phase learners wash their hands in buckets and use the grey water for plants. However, an interpretation made is that despite the fact that water is a scarce commodity at the school, no visible attempt was seen or understood to exist that shows that

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the principal or any other staff member ensure that learners are made aware of saving water as a priority theme at the school.

The observation revealed that the school yard has, in my opinion, enough bins and the cleanliness bears testimony thereto. However, the cleaner and learners are aware that not all the classrooms have waste bins in them, especially since learners refer to “*Some classrooms*” as having bins. This was also witnessed in the observation. The cleaner states that only two teachers are responsible and empty their waste bins into the large bins in the school yard daily, namely the Social Sciences and a Foundation Phase teacher who happen to be the two participants of this research study. The interviews have revealed how these same two teachers include the environment in their own teaching and learning. The Intermediate phase teacher affirms that no sorting of waste takes place in the school - “*No not at all*”, and the cleaner confirms that everything gets thrown into one bin by stating that “*ons gooi bymekaar*<sup>47</sup>”. The interpretation made is that effective environmental learning is questionable since a school that promotes recycling does not even have either a waste bin in every classroom or sorting bins.

The principal and environmental coordinator/Senior phase teacher refer to important environmental calendar days that they celebrate every year. Arbour day and spring day are examples of yearly celebrations enjoyed during an environmental week. The interpretation made is that despite the yearly commemorations of these days taking place with trees being planted, no evidence exists from learners and teachers to prove that teaching and learning themes from the curriculum are planned for this time. The learners talk about playing on the jumping castles during the spring day celebration and a year group selling goods that are understood to be part of an entrepreneur’s day. The interpretation made is that the school lacks features of a sustainable school (cf. 3.4), for example, key messages supported by the curriculum. Also lacking is the use of environmental days for a thorough investigation of the issues associated with it (cf. 3.4.2) that would leave an impression on learners since the teachers have a greater awareness of these environmental days when compared to the learners.

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<sup>47</sup> Translation: “*we throw together*”

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- **Communication about ESD creates awareness**

The learners are aware of certain participants and role-players at the school who communicate messages to ensure that ESD is practised. The principal is noted for talking about looking after the environment in general. The administrative clerk is noted for his messages to pick up papers. The gardener is noted for reminding learners to drink water using a mug and not to play with plants. The Social Sciences teacher is noted for teaching about vast topics related to the environment. Of note is that learners belong to the Soul Buddyz Club (cf. 6.3.1), which is headed by a Foundation phase teacher at this school. The club not only creates awareness among learners to keep the school clean and not litter, but also engages the learners in positive activities and gets them to talk about social issues and the immediate environment that affect them. The interpretation made is that the participants and role-players at the school use communication successfully to make learners aware of the environmental issues at the school and in this way they promote ESD. This refers to whole-school participation as a feature of a sustainable school (cf. 3.4).

- **Environmental learning support groups**

The farm school receives support from the Japanese International Cooperation Agency (JICA) who meets with learners after school ever so often for workshops to empower learners and teachers. For example, *“people from JICA and another corporate, they came to train us how to plant carrot, how to plant cabbage. Because last time St X also helped us how to water the trees outside by planting in bottles with small holes.”* This is an example of professional development as a feature of a sustainable school (cf. 3.4). Evidence of the Saint X project can be seen in the fruit orchard where bottles are planted in the ground surrounding trees. Once the bottles are filled with water, the caps are closed and water is release from the perforated sides of the planted bottles, so as to water the trees and not lose water through evaporation. This can be interpreted as an example of experiential learning (cf. 3.4 & 4.2.5) aided by outside support groups or NGOs working to educate for SD.

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- **Responsibilities and difficulties**

The data reveals that the environmental coordinator/Senior phase teacher have asked teachers in the Foundation phase, Intermediate phase and Senior phase to incorporate the environment into their teaching and learning. The environmental coordinator/Senior phase teacher states that in every Learning Area and in each and every period there must be an integration of awareness of the environment. He says: “*Yeah, I asked them to do it, and I do monitor them in the classes... but, uhm, I felt it is very minimal, besides in SS and Natural Science it is automatic. But in Mathematics and other learning areas it is a little bit difficult for them to integrate but at least they mention it in their reports. I am so busy I cannot go to their classes...*” The interpretation is that as environmental coordinator he tries to achieve environmental learning by asking colleagues to include environmental issues and then monitoring their reports to see if this has been done (cf. 3.4).

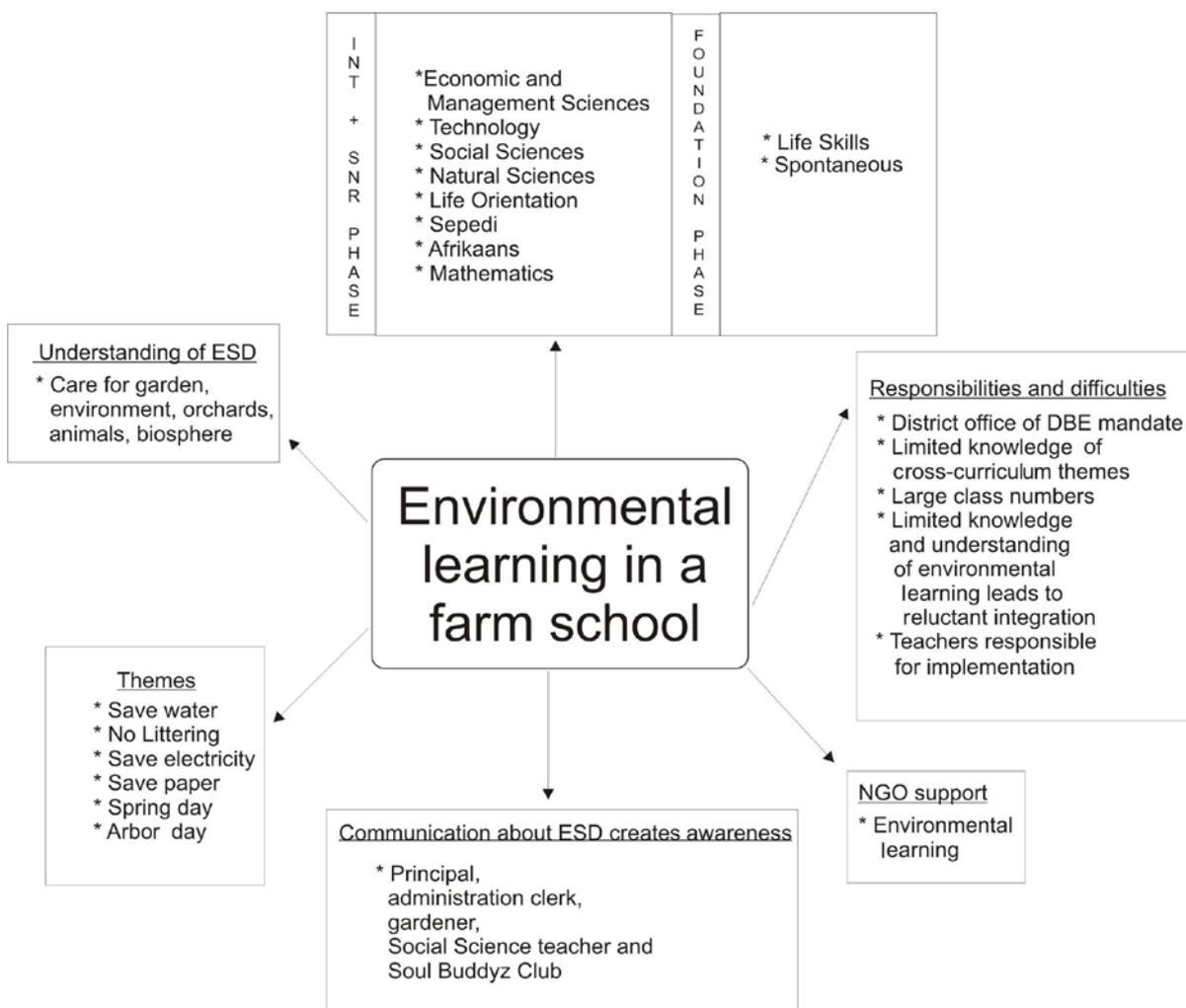
According to the Intermediate phase teacher, the district office of the DBE sends work schedules to teachers who are then responsible for the lesson plans. In my opinion it is at this stage that teachers, during the designing of their lesson plans, should implement environmental learning themes. The Foundation phase teacher states that dealing with environmental learning is easy in her phase since the Life Skills Learning Area does deal with the environment as a theme. For example, “*In grade R, there are themes, ... garden and bugs, where they go out and collect all the insects, ...more insects*”, “*grade one, we have respect for environment and animals*”, “*grade two, the importance of water, water purification and filtering, and then the sources of water, pollution, how they affect us...*”, and “*grade three we also have healthy living and then how to take care of our vegetables and our fruits and how to keep them... And then, we also have a milestone on recycling. Yes, so our learners learn about the compost and the recycling processes.*” (cf. 3.5.2.1). This phase also caters for experiential learning (cf. 4.2.5).

The Intermediate phase teacher states that in her phase teachers have tried, but they have not yet come round to getting the big picture and knowing which Learning Areas have the same themes. The interpretation made is that holistic planning and explaining by the environmental coordinator can ensure greater teacher understanding of interrelated themes in the curriculum. This can lead to involvement and communication among teachers if there is forward planning to ensure integration of the environment for environmental learning to materialise (cf. 3.4.2). It also refers to greater awareness, knowledge, attitudes, skills, and participation among teachers when dealing with the curriculum as objectives of EE that can be fulfilled (cf. 3.2.1.2.1). This same teacher states that she makes learners aware of “*preserving the environment*” in Social Sciences. For example, she tries to show learners National Geographic videos, but finds it difficult to show 50 learners a theme on biomes and

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the wetlands on a small television screen. She lets learners make “*collages on that so that they can take some of the things that they know about wetlands*”. In “*Afrikaans ... they planted things and see how it grew and they could eat it and that*”. The biggest problem she has is up to “*58 children in class*” and “*they step on the plants, They, it’s really a problem...*” Despite the environmental coordinator/Senior phase teacher stating that the teachers at the school are not teachers who teach outdoors, it is understood and interpreted that the number of learners in a classroom prevents outside learning activities. It is evident in the response: “*... you just can’t do everything. So all those other things are left behind because of the classes are too big.*” In Grade 5 Social Sciences the teacher teaches about energy and “*they had to do a poster on all the kinds of energy that we get.*”

Of interest is that the environmental coordinator/Senior phase teacher states that teachers at the farm school met the implementation of environmental learning with “*reluctance*”. He says they said that it was extra work. However, the Foundation phase teacher does not see the implementation of environmental learning as an extra load because it is easily accommodated for in her phase (cf. 3.5.2). The environmental coordinator/Senior phase teacher is also of the opinion that it does not entail extra work because Learning Areas like Social Sciences already integrate it (cf. 3.5.2.7). As the Head of Department he is aware of what all the Learning Areas entail and this proves what the Intermediate phase teacher mentioned above, namely that if everyone understands what everybody else is dealing with in their themes there can be greater efforts towards implementing environmental learning. Knowledge will bring about awareness and understanding. The environmental coordinator/Senior phase teacher states that Life Orientation and Natural Sciences have teachers who “*automatically tried to do this, other teachers we are still trying to make them integrate... Sensitise them.*” It is evident that if the Learning Area does not have a natural tendency to include environmental learning and if the district office of the DBE does not include it in work schedules then teachers are reluctant to include it in their lesson plans. The interpretation is that teachers respond best to a top-down management mandate (cf. 4.3.2.1). For example, Life Orientation and Natural Sciences accommodate the integration of environmental learning more easily due to the focus on, among others, environmental health and environmental responsibility (cf. 3.5.2.4 & cf. 3.5.2.6).



**Figure 6.2** A schematic summary of the key indicators that inform how environmental learning takes place in the farm school's teaching and learning

### 6.3.2.1 GENERAL OVERVIEW ANALYSIS OF THE WITHIN-CASE DISCUSSION OF THE INTEGRATION OF ENVIRONMENTAL LEARNING IN THE FARM SCHOOL

The data analysis shows that in the farm school caring for the biosphere is the basis of understanding of environmental learning among learners and the environmental coordinator. It is clear that the farming environment is taken as a point of reference for these learners. Environmental learning takes place in Economic and Management Sciences, Sepedi and Afrikaans, Technology, Social Sciences, Natural Sciences, Life Orientation, Mathematics and Life Skills as Learning Areas where the environment is a focus. There is awareness at the school concerning no littering, saving water, electricity and paper, as well as the celebration

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of spring and arbour day as themes of environmental learning. Communication about ESD creates awareness, showing that role-players in the school promote ESD by making learners aware of the environmental issues at the school. NGOs play important roles to support environmental learning at the farm school. The implementation complexities and difficulties in promoting ESD are identified as a request by the environmental coordinator to integrate environmental leaning into lessons that do not carry the same weight as the NCS and the mandate given to teachers by the district office of the DBE when work schedules are received. Teachers without a holistic view and knowledge base of the cross-curriculum themes in a phase result in greater communication between teachers having to take place, for greater environmental learning integration. The large numbers of learners in a classroom makes experiential learning difficult, and environmental learning is hampered by reluctance to integrate environmental learning because of a lack of knowledge and understanding.

### **6.3.3 A WITHIN-CASE DATA ANALYSIS DISCUSSION AND INTERPRETATION OF THE URBAN SCHOOL**

The data analysis of the one-on-one and focus-group interviews, non-participant observations and document analysis reveal the following discussion and interpretation of how environmental learning takes place in the urban school to promote ESD. A schematic summary of the key indicators that inform how environmental learning takes place in the urban school's teaching and learning is presented in Figure 6.3 after the discussion and interpretation.

- **Caring and preserving of the environment: understanding of environmental learning**

The data reveals that learners understand environmental learning as to be about caring for and preserving the environment. Learners are of the opinion that the knowledge they receive at school about the environment can help the earth to recover quicker and they can then also tell future generations about saving pointing toward life-long learning and promotion of ESD (cf. 3.3.3.1). The interviews also revealed that the non-teaching staff are aware of teachers giving learners messages about littering and the recycling of paper. For example, the community member was also aware of learners being engaged in learning projects out of doors. Examples are given of how learners engage with plants and insects, do measuring exercises outside on the quad, use waste to make objects for task work and produce sorting bins as a task project. Environmental learning has also filtered through into the administration office since the staff there and the cleaner who makes the photocopies have embarked on saving paper by reusing and recycling. This has proven successful since all

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the teachers apply the same rule when it comes to photocopies for learners' workbooks. In the Foundation phase, learners have set themes that deal with the environment (cf. 3.5.2), but the teacher places a greater focus on the environment by including the day to day weather occurrences or the insect craze in the lesson, which I interpret as real-time experiences. The Foundation phase teacher states that despite such things not being written into the lesson plans, they use nature as a way of explaining certain occurrences. The non-participant classroom observation in the Foundation phase bears testimony to how the local and regional environments are incorporated into the theme of the day, creating an awareness of the environment and so including environmental learning. The environmental coordinator/Senior phase teacher has found that by adding an environmental angle or component to a controversial section of work, for example apartheid, both learners and parents realise that apartheid and the new South Africa does not have to result in provoked feelings. The realisation now is that the environment is more important a focus since it was not treated with care during both eras and it is now interesting to discuss how each administration deals with environmental matters. The latter teacher also now plans for every term by looking at how she can include the environment in her Economic and Management Sciences as well as her English lessons. She says she finds it easy to include the environment in English because she used comprehension test pieces that deal with environmental issues. A decision by the deputy principal to avoid school activities that use and waste water shows a consciousness for the importance of water. If water sports are decided upon then the waterslide only gets filled up once. It can be interpreted that awareness regarding saving, care and respect for their environment's resources is present throughout the entire school.

- **Economic and Management Sciences, Natural Sciences, Life Orientation, Social Sciences, Maths, English, Setswana, Technology, and Life Skills are Learning Areas where environment is a focus**

The Learning Areas of Economic and Management Sciences, Natural Sciences, Life Orientation and Social Sciences are named by learners as the Learning Areas where environmental learning takes place. The environmental coordinator/Senior phase teacher is also the Economic and Management Science teacher. It is evident from the discussion above and involvement in the EMS her that she includes environmental learning in her lessons. The learners state that they learn about pollution, plants and animals, rocks and fossils (cf. 3.5.2.7). Special reference is made to Life Orientation where the learners have in the past made and also some are currently completing the task of making three recycling bins for paper, plastic and glass (cf. 3.5.2.4). In the Natural Sciences they also deal a lot with plants and pollution (cf. 3.5.2.6). Of interest is that Social Sciences have focused more on History. The reason could be that in the present term the learners are dealing with the

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History section, since that Learning Area consists of two disciplines taught separately and two terms are allocated to each discipline, respectively. In English their task was creative writing about the environment. The Factotum/Intermediate phase teacher who teaches Economic and Management Sciences deals with the issue of saving paper and reusing it in his subject context. He drives home the point of getting learners to write on the back of used paper when doing rough work and also to use the two bins in the classroom correctly. The document analysis of the environmental committee file reveals that in the commitment, integration of EE within Learning Areas was pledged. Furthermore, the focus in the Foundation phase was listed as recycling projects, and in Life Orientation paper turbines were to be made, as well as solar ovens. In Technology, themes on hygiene and cleanliness of the environment and in Setswana themes on water were to be addressed. In Economic and Management Sciences integration in a theme, for example, the influence of apartheid or democracy on the Environment was also to be addressed. The last two Learning Areas are those taught by the environmental coordinator/Senior Phase and it shows that the person who is involved in the implementation of the EMS is also the person who ensures that integration becomes a reality in teaching and learning, as the interviews bear testimony to this implementation. The interpretation made is that despite the school commitment to integrating environmental learning into teaching and learning being fulfilled, it has been a standing commitment for two years and a review has not been undertaken. The document analysis also reveals that in Technology themes on hygiene and cleanliness of the environment were also addressed as part of the environmental learning undertaking.

- **Learning inside and outside the classroom**

Learners reveal how they learn about plants and insects both inside and outside the classroom. At times they will complete tasks outside, but they do occasionally go and look for insects on the sports fields and sketch plants after being taught outside. This is evidence of experiential learning (cf. 3.3.3 & 3.4) as a strategy for a sustainable school and learning through the environment. Learners have made kites, volcanoes and sorting bins for recycling, the latter which had to be made from reusable waste products. The learners also refer to a period when they take part in physical education outside, a component of Life Orientation where activities take place on the sports field (cf. 3.5.2.4). The principal tells how in Mathematics the school quad is used for measurement taking and some learners together with a teacher take part in an enrichment programme, once a year, where they identify trees on the school premises. This is interesting since many of the trees on the premises are marked with numbered signs also indicating their Latin and South African names. The environmental coordinator/Senior phase teacher states that after a gathering such as Entrepreneur's Day and on normal school days learners are taught responsibility by having them stay behind to clean up the environment they used before being allowed to go home.

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This is interpreted as creating awareness of the environment and addresses the EE objectives and principles (cf. 3.2.1.2.1). The environmental coordinator/Intermediate phase teacher states that learners do learn outside, especially in her Natural Sciences classes when they deal with tangible themes like leaves (cf. 3.5.2.6). In Technology (cf. 3.5.2.8) they go outside to build and fly kites. The teacher also reveals that in the Foundation phase at times there are *waves of interest* that lead to a surge of interest in catching insects, something they experienced last year. Learners were told to do their own research to find out the names of the insects they had caught and teachers asked them questions such as: What happens to the food chain once the insect is removed? This is an example of enquiry learning. The Foundation phase teacher states that when dealing with her yearly planning, certain standard themes exist and environmental foci can be added. The environmental calendar supplied by the *Education for Sustainable Living* project is a huge help and furnishes her with knowledge about important environmental dates and can be regarded as providing greater awareness. The governing body member states that he is aware of the focus on the environment in the learning practices at the school since his children attend the same school and he picked it up in their tasks, but he does not see signs of it around the school. He is of the opinion that there is no environmental awareness present at the school. The Foundation phase teacher is of the opinion that despite environmental learning not being a subject, it can be integrated into teaching and learning. She refers to the new CAPS curriculum (cf. 3.5.3), which she feels will allow for more time to make learners aware of their environment and bring nature back into the classroom lessons. Environmental learning also takes place in the staffroom because the Foundation phase teacher states that the spontaneous environmental coordinator/Senior phase will make teachers aware of their wasting of electricity on sunny days, and they will consequently switch off lights burning unnecessarily. The interpretation made is that teachers who plan for and integrate environmental learning expose learners to the living environment outside their classroom where teaching and learning opportunities favour experiential learning.

- **Littering, waste sorting and 3R<sup>48</sup>s for paper: important themes**

A series of themes have emerged as being dealt with at this school. Littering is a theme the learners are made aware of because they are constantly being told to keep the schoolyard clean and are kept behind after a school day or fun day in order to clean the schoolyard. They also received new bins for the schoolyard in the third term. Learners are also told by teachers not to waste water and they have completed tasks dealing with water. The cleaning staff's attention has also been drawn to the importance of water and they are asked to

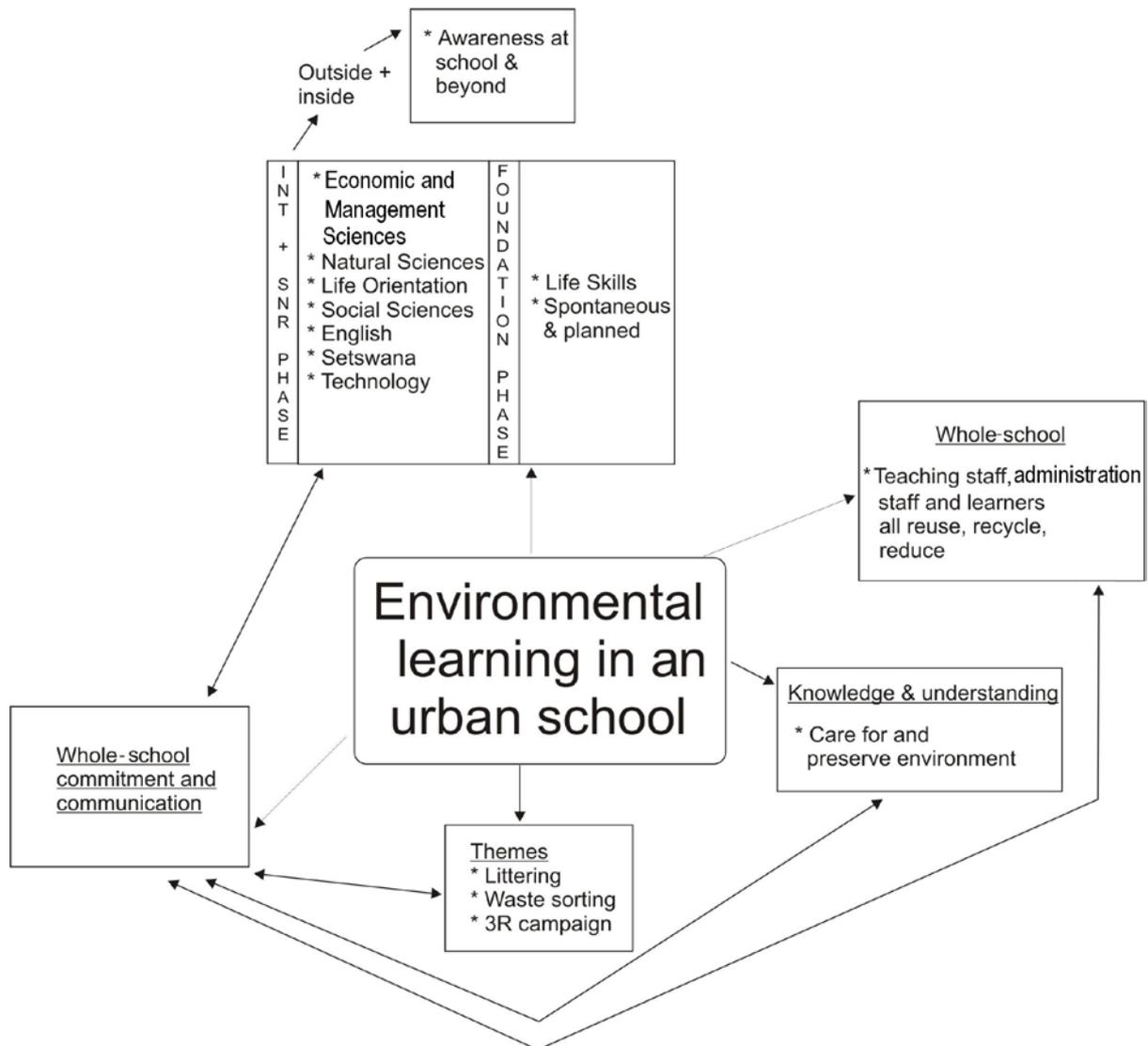
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<sup>48</sup> 3R campaign refers to Reduce, Reuse, Recycle.

ensure that taps are not left dripping. Learners are made aware of their use of toilet paper, since toilet rolls are kept in classrooms so as not to waste. The Foundation phase teacher states that during the staff morning meetings they are asked to remember their water and electricity consumption. This reveals communication of good practices among staff members. The learners reveal further that despite being told to save water and electricity the greatest awareness regarding the saving of energy comes from home. This could mean that parents are aware of their energy consumption for financial reasons. Learners are aware of their use of lights in the classroom since they switch on lights in classrooms that have curtains because the classrooms are dark. The interpretation is that staff as well as learners are aware of the environment and the focus of the school being on saving and not wasting. These are examples of sustainable living practices and an awareness of SD (cf. 3.4).

- **Awareness of paper recycling and communication**

Learners are not only aware of the plants at their school that must not be stepped on, but also extremely aware of the sorting bins in their classrooms. The classes sort paper for recycling. Some classes have up to three bins, one for waste, one for white paper and one for coloured paper. They are responsible for emptying the classroom bins into the large bags set aside for recycling on the school property. A learner also speaks of a task that made her understand how paper is recycled and how by-products are made from waste products. The learner is also aware of the paper they reuse at school, ensuring that both sides of paper are put to use. The Foundation phase teacher tells how she was made aware of the school's use of paper and mechanisms to save paper and sorting bins when she arrived as a new teacher in 2010. The fact that teachers and learners are told about recycling and saving of water, as well as to be attentive to littering during staff gatherings or during assembly is a clear indication that communication between the role-players features strongly at the school and is also indicative of the strategy used to implement the EMS so as to promote ESD (cf. 2.2.2 & 2.2.3). The non-participant classroom observations in the Foundation phase saw firsthand paper being printed on both sides and that sorting bins were located in the front of the classroom. The document analysis of the environmental committee file reveals that the implementation of waste awareness in teaching and learning was documented in the school commitment and detailed action plan, including the reduction, reuse, recovery and recycling of waste in teaching and learning and school practices. These have been addressed and fulfilled as revealed in the interviews and observations. The interpretation is that the school is successful in maintaining a whole-school commitment toward saving and recycling that is understood and practised by learners and staff alike.



**Figure 6.3** A schematic summary of the key indicators that inform how environmental learning takes place in the urban school's teaching and learning

### 6.3.3.1 GENERAL OVERVIEW ANALYSIS OF THE WITHIN-CASE DISCUSSION OF THE INTEGRATION OF ENVIRONMENTAL LEARNING IN THE URBAN SCHOOL

In the urban school there is a commitment to environmental learning and the promotion of ESD. The understanding is that environmental learning entails the care and preservation of the environment. This is seen through the teaching and learning in Life Skills in the Foundation phase, and Economic and Management Sciences, Mathematics, Life Orientation, Social Sciences, Natural Sciences, English, Setswana and Technology in the Intermediate and Senior phases, in that the curriculum and themes identified by the school address environmental issues. Learners learn and apply their knowledge and skills both inside and

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outside the classroom, using the environment outside for learning purposes. Commitment by the role-players at the school and communication between teaching and non-teaching staff have alerted the participants in the school to how paper can be saved and recycled, In this way it has become common practice for everybody to implement the principles of SD by committing to save, recycle, and so make a difference environmentally and financially. This was all made possible through communication, awareness and commitment within a whole-school approach to integrating environmental learning into teaching and learning.

## **6.4 DATA ANALYSIS PRESENTATION AND DISCUSSION OF THE KEY INDICATORS OF THE EMS IN THE TOWNSHIP, FARM AND URBAN SCHOOL PROMOTING ESD**

The analysis of the one-on-one and focus-group interviews, non-participant observations and document analysis regarding how the EMS is implemented in each of the three schools is presented and discussed separately for each of the three schools by means of a within-case analysis. Interviews were conducted separately with the participants at each of the three schools (cf. 6.2.1, 6.2.2 & 6.2.3) and the researcher undertook observations throughout the duration of the research period at each school.

### **6.4.1 A WITHIN-CASE DATA ANALYSIS DISCUSSION AND INTERPRETATION OF AN EMS IMPLEMENTED IN A TOWNSHIP SCHOOL TO PROMOTE ESD**

The data analysis of the interviews, non-participant observations and document analysis reveal the following discussion and interpretation of how the EMS is implemented in the township school to promote ESD as well as a discussion and interpretation of the indicators (cf. Table 6.1) compiled from the analysis.

- **Decision to implement EMS –personal and prescriptive**

The interview with the principal revealed that he implemented the EMS because of his personal convictions that led him to believe that teachers, parents and learners had to be involved and because, *“When the department decided that care must be shown about the environment, it came in as a big helping hand so that we decided then as a school to say how, how best can we include it in our lessons.”* This can be interpreted as being a decision based on a whole-school approach to management (cf. 3.4) and knowledge of systems

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thinking (cf. 4.2.7 & 4.2.7.2) because the principal has a qualification in Geography and management, and understands that complex systems are interconnected. The second deciding factor was based on a top-down management decision, a common characteristic of EMS implementation (cf. 2.3.2).

- **Knowledge of the implementation- disseminated and no communication**

The governing body, community member, learners and administrative staff member did not have any knowledge of the EMS that had already been implemented at the school for almost two years. The decision taken by the school principal was to begin integrating the environment with the teaching and learning activities or “*lessons*” as he calls it. The decision to implement environmental learning in the lessons bears testimony to why the teachers but not the rest of the participants at the school have knowledge of the EMS. More importantly, the environmental committee that disseminated this information to the teaching staff was the same committee who, according to the teacher, deals with the cleaning of the school site as well as the vegetable gardens. The cleaning staff member’s knowledge of the EMS is based on his point of reference being hygiene and a litter-free environment, both adopted by the school. The data reveals that the cleaner lives out his “*care for the environment*” “*by supporting the idea of environment, environmental management. Even by telling our younger staff about it.*” He does this by reprimanding younger staff for littering - hence, creating awareness - and “*teaching them that they are growing to learn to be responsible in individuals*” – hence, communicating a message. Despite there being a strong focus on hygiene, the Foundation phase learners are provided with soap at their wash basins but not the adult staff, Intermediate and Senior phase learners. The interpretation is that all the role-players in the school need to be informed of the implementation of the EMS.

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- **EMS composition and functioning- interconnected and shared responsibility**

The principal revealed that the EMS functions through the environmental committee that is made up of teachers, groundsman and learners. No evidence exists that learners actually form part of this committee. The committee was established after the principal assessed the school's state of affairs in relation to its environment, discussed the challenges identified at school with his staff, asked for volunteers to belong to a committee, decided on plans to meet the challenges with a shared responsibility, and asked everyone to be ready to accept directives from the committee to meet the environment challenges identified. The shared responsibility points to a collegial management approach in education (cf. 4.3.2.2). The principal views the functioning of the EMS as a task of all the individuals who form part of the school. He mentions that the parents and staff, learners and groundsman must also have a say in what needs to be done at the school. This body of role-players is a direct reference to the whole-school approach where every role-player must be involved (cf. 3.4). Of interest is the governing body member's understanding of the EMS, as he refers to environmental management as being part of the school. According to his understanding, it deals with the aesthetical side of the school being its cleanliness, green vegetation and safety. The deeper understanding is not known since the governing body member said that the EMS existed at the school when he joined. The interpretation made is that information is not being carried over or communicated to new governing body members about existing projects and management decisions. It is an organisational barrier (cf. 2.2.4.1). The same applies to new staff members who are not informed of the EMS.

- **EMS policy and action plan - systems thinking and the ecological systems theory**

The environmental policy was written by the principal and the environmental coordinator/Senior phase teacher and adopted by the school. In the principal's opinion, having the school adopt the environmental policy implies it was the product of everybody at the school. The interpretation is that this is a top-down management approach based on a formal management model without stakeholder participation (cf. 4.3.2.1) and is not what the EMS implementation guidelines for the *Education for Sustainable Living* project recommend (cf. 2.2.6.1.2). Themes chosen that were observed at the school are greening of the school, referring to the vegetable garden (already established at the school for some years), conserving nature by saving water, and keeping littering at bay. Parents are also expected to maintain the same commitment to the environment at home. The school policy is on display on a school wall near the front office. Despite the environmental policy being officially unveiled and in plain sight, it is only written in English and only the cleaner refers to it. The learners, governing body member and community member are not aware that it

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exists. The interpretation is that if it had been made more conspicuous and written in Sepedi it might have created a greater awareness. The interpretation is motivated by the fact that a large board stating 'Save water' written in English, Afrikaans and Sepedi is placed at the entrance to the school. This poster has created an awareness among the cleaner, learners and groundsman who use water sparingly and maintain taps so that water is not wasted. This may be interpreted as the interconnected nature of language as a medium of positive communication. The environmental policy reflects systems thinking since it acknowledges the school's pledge to "*positive response to nature's demand to uphold greening as a symbol and commitment to support life and stabilise the co-existence of other members of the ecosystem.*" Its four goals reflect an endeavour to create an environmentally sustainable future; the promotion of internal awareness of environmental issues with its staff, learners and community; the creation of a safe and secured learning environment for all without any discrimination; and to teach learners, staff members and community to respect the environment.

The environmental committee and the principal drafted the action plan and shared it with the staff. The environmental committee also ensure that the goals of the action plan are maintained during their discussion meetings. The goals and challenges are regarded as ongoing as they try and 'win the battles'. The action plans are communicated to learners when they are told, for example, to pick up papers and not litter. The school policy reveals a declaration aimed at using the vegetable garden to support those in need, who form part of the larger ecosystem. This shows insight into systems thinking and the ecological systems theory (cf. 4.2.7.1-3). The environmental committee's goal is to ensure a sustainable future, creating awareness for environmental issues in a clean and safe learning environment where the school shows respect for the environment. The themes chosen reinforce what the data from the interviews have highlighted in that litter must be kept to a minimum and wastage must be minimal. The maintenance committee therefore check for leaking pipes, environmental calendar days are celebrated, resource management is upheld and a vegetable garden is used for teaching and learning as well as for the nutritional benefit of learners.

- **Raising awareness and using communication as a tool**

The data reveals that a two-way communication channel exists between the teachers and the learners when dealing with the environment. Learners are asked to share their opinions with regard to dealing with environmental issues. The environmental coordinator/Senior phase teacher is of the opinion that the EMS has created an awareness of prioritising the environment since the classroom and school have less visible litter and therefore is cleaner.

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The governing body member and the community member made insightful and meaningful comments, both referring to the need for greater awareness of the environment at the school. The former is of the opinion that awareness must be raised among the community and learners through planting plants as a form of environmental management. The latter is of the opinion that the EMS for ESD must be placed on the school agenda, since learners must know that actions like collecting plastics and recycling are acts of environmental management. These are important points since the learners have knowledge about recycling at the school but do not take part in all the processes involved.

Communication is an important indicator to have surfaced in the data. For example, the principal noted that since the implementation of the EMS awareness of the environment has reached beyond the school. Parents comment to him about best practices they are taught by their children. The governing body member furthermore states that since the implementation of the EMS, an improvement has been witnessed regarding the repairing of taps so as to stop wastage. The deduction made and interpretation is that individuals have gained knowledge, are aware and have changed their attitude, to name a few of the objectives of EE that are applicable here (cf. 3.2.1.2.1). The responses also allude to their understanding of environmental management, namely that it entails contact with nature, greening nature and that the whole process must be tangible and visible to learners and the community, be it in the garden activity or through recycling practices. Another reference to awareness can be made here. The Intermediate Phase teacher also reveals that despite an attempt being made at assembly to change the attitude of learners toward litter, more should be done. This is interpreted as creating awareness and fulfilling the objective of EE.

- **African management philosophy and collegial management in education**

The principal states that environmental learning is important in his management because cleanliness reveals pride and this can be interpreted as that he feels that the clean school is a reflection of him and of how he manages the school. The principal describes his management style as being consultative and both formal and informal. The staff are asked for their inputs and he requests their opinions in order to make decisions. This refers to African management philosophy (cf. 4.2.3.1) and collegial management in education (cf. 4.3.2.2). The environmental coordinator/Senior phase teacher and the Foundation phase teacher confirm that staff are requested to give their opinion and they “*feel good*” and “*support*” this. This team work can also be interpreted as feeling part of the discussion, especially when decisions are made. When involvement has been a factor, better support is achieved. It also refers to participation as an objective of EE (cf. 3.2.1.2.1).

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- **Prioritisation**

According to the governing body member the environment is discussed at SGB meetings, but not the management of the environment. It is interpreted that maintenance issues related to the school, such as the toilets and related health threats, as well as issues arising from the environmental committee meetings are discussed, but not strategic environmental management issues related the EMS. This relates to a lack of communication of information between components of the organisation within an EMS structure (cf. 2.2.3).

- **Environmental committee- awareness, communication, commitment**

The data reveals that an active environmental committee exists in the township school. The environmental coordinator/Senior phase teacher volunteered to implement the integration of environmental learning at the school. He is also the Social Sciences, Life Orientation and Economic Management Sciences teacher in the Senior phase and has a personal interest in cleanliness, safety and nutrition. The environmental committee meet once a term and share their concerns and issues with the rest of the staff at morning briefings in the staff room. The issues at hand become a focus or the theme to be addressed. They inform and involve all the teaching colleagues to take part in competitions that pertain to the school's vegetable garden. The committee welcomes suggestions from teachers' experiences in their respective Learning Areas. The committee decided to take on the issue of littering and bought bins for each classroom. They also placed bins in the school yard at approximately every 20 m to facilitate easy access to the bins for learners and to promote waste management. They also focused on the issue of hygiene in the Foundation phase where learners can wash their hands from a large washing bucket situated outside each classroom. This ensures that the small children do not waste water when using taps and they are monitored by teachers. The use of water containers with a tap and reusable mug along the passage outside classrooms also shows their drive toward not only saving water from a running tap, but also to make learners aware that their actions imply 'use only as much as you need.' This was also observed during break times. I interpret this as the promotion of ESD (cf. Table 6.1). The environmental committee and principal use the daily briefing to exchange ideas about litter awareness and other relevant environmental issues. No clear answer was given as to how environmental learning is discussed with colleagues. The understanding is that this takes place during morning briefings, however, I did not, however, observe this during morning briefings. The environmental committee and principal in their discussions with staff emphasise the conservation of water, electricity and the recycling of paper. The conservation of water is visible as mentioned above and the observation evidence reveals how some taps were permanently closed, as the environmental

coordinator/Senior phase teacher stated (cf. Table 6.1). The data also points to evidence that twice per term the environment committee meet with the gardener who is in charge of the vegetable garden, which is a priority for the environmental committee.

The township school analysis yielded a list of indicators that reveals how the township school implements the EMS. Each indicator is clarified. The table also contains negative indicators that indicate shortfalls in the EMS (cf. Table 6.1).

**Table 6.1 Indicators of the EMS in the township school**

Indicator	Interpretation
Decision to implement EMS – personal and prescriptive.	This reveals a whole-school approach to management, knowledge of systems thinking and a top-down management approach to EMS implementation.
Knowledge of EMS implementation - disseminated and no communication.	All the role-players in the school need to be informed of the implementation of the EMS.
EMS composition and functioning - interconnected and shared responsibility.	All role-players must be involved in the composition functioning of the EMS. Information about existing projects and management decisions must be carried over or communicated to new governing body members as well as new staff members. Ideally this should be done on a yearly basis.
EMS policy and action plan - systems thinking and the ecological systems theory.	The guidelines of the <i>Education for Sustainable Living</i> project recommend whole-school participation in the policy formulation. Greater awareness within the school seems to be needed of its EMS policy and action plan. In its compilation it shows insight into systems thinking and the ecological systems theory, since ESD is promoted through management decisions to, for example, use the vegetable garden as well as the feeding scheme for teaching and learning.

Raising awareness and using communication as a tool.	Despite a raised awareness and change in attitude, greater communication and awareness are needed to ensure that more is done, for example sorting and recycling, to ensure that all role-players participate and work toward a common goal.
African management philosophy and collegial management in education.	Staff are given a voice and they participate in discussions and decisions.
Prioritisation	The management needs to prioritise environmental management issues related to the EMS.
Environmental committee - awareness, communication, commitment.	The environmental committee have addressed waste management, hygiene and saving water at the school by demonstrating commitment and ensuring a greater awareness. There is also a space for communication between teachers during morning briefings to address these issues with the hope that dissemination will take place between teachers and learners.
Principal and environmental coordinator/ Senior phase teacher have an inherent personal interest in the environment.	Both these individuals have taught or teach Geography that deals with the relationship between humankind and the environment. This can be interpreted as a reason why an inherent interest exists in caring about implementing environmental management.
Functional environmental committee.	Environmental committee meet regularly and maintain continuation of projects and themes.
Themes that emerged in the teaching and learning and that stem from the EMS implementation are: waste management referring to a low tolerance of litter, saving water and energy, reinforcing hygiene, and greening of the school, referring to the vegetable garden.	Hygiene is a theme that is stressed at the school as prevention due to the socio-economic setting of the school situation, since informal settlements lack hygienic facilities and this leads the school to plan for preventing the spread of illness. Choice of detergents is guided by effectiveness to kill germs and so promote hygiene. However, staff, Intermediate and Senior phase toilets have no soap for washing hands.

Indigenous garden.	Traditional indigenous herbal plants used for teaching and learning.
Learners are aware of their teachers' actions, who lead by example when it comes to caring for the school environment.	Positive behaviour of teachers who lead by example.
Waste management strategy – refuse bins every 20m in school yard.	Waste management in the school yard is addressed.
Wash basins with soap for Foundation phase.	Hygiene and water saving strategy in school yard in Foundation phase only.
Morning briefing.	Communication of waste awareness during morning briefing in staff room is effective.
Daily assembly with learners.	Daily assembly where it is communicated not to litter.
Vegetable garden and indigenous garden.	Greening theme involves both gardens. The vegetable garden is used for the school's feeding scheme, and both are used for teaching and learning and allows for systems thinking.
Functional environmental committee.	Regular environmental committee meetings twice a term.
Electricity is not an important theme.	Not all learners in informal settlements have electricity and it is not in their milieu, but they are conscious of it in their classrooms.
Drinking mugs at taps.	Mugs are used for drinking water from a 10 litre container with taps installed along school courtyard perimeter.
School awareness campaign - 67 minutes for Mandela.	Community commitment to help clean school and so ensure community participation.
Fundraising committee undertake a plastic bread bag collection project.	Not all participants are aware of the recycling drive due to lack of communication
Paper recycling.	Funds are raised, but there is a lack of awareness among role-players in the school.
Maintenance repairs to toilets.	High municipal bill shows that financial factors play a role in environmental management decisions.
Open channel of communication with principal.	Leads to sharing of ideas.

Hierarchical management.	Staff talk to supervisors, heads of department and have an open-door policy with the principal.
Morning briefing.	Morning briefing is a communication platform that serves to address social, education and environmental issues.
Rain gauge in vegetable garden.	Used for teaching and learning.
Good maintenance work, no leaks.	No water wasted and no financial implication.
Reusable plastic plates and mugs for feeding scheme.	Environmentally friendly option.
Water saving awareness board at school entrance.	Effective since water mechanism is in place.
Dettol <sup>49</sup> hygiene posters.	Hygiene posters in classrooms create awareness among teachers and learners.
School pledge for greening is laminated and mounted on a school wall for viewing.	Effective awareness and communication strategy even though only in English.
<b>Negatives</b>	
Problem	Interpretation
Limitless paper consumption for photocopying.	Financial grant as quintile 2 school spells disregard for reducing, recycling and reusing paper.
No compost is made.	School obtains fertiliser free of charge and misses out on a teaching and learning opportunity for learners.
School waste is burnt on the property.	No service delivery. There is awareness of the contravention by participants, but no alternatives are sought and a disregard for leading by example (behaviourist norms – cf. 4.2.1). There is no waste management strategy regarding waste collection from the school by the school management or environmental committee.

<sup>49</sup> Dettol is the trade name for one brand of hygiene products manufactured by Reckitt Benckiser Healthcare (UK) (RB, 2010).

The community member, principal, governing body member and environmental coordinator/Senior phase teacher all have a management background, but fail to manage the EMS	Management expertise is not utilised to maximum to work with EMS and ensure its effectivity.
No sorting bins are found in the classrooms or on the school premises to support the recycling project.	This is ineffective for the recycling project.

#### **6.4.1.1 GENERAL OVERVIEW DISCUSSION OF THE WITHIN-CASE ANALYSIS OF THE IMPLEMENTATION OF THE EMS IN THE TOWNSHIP SCHOOL**

The data analysis of the EMS implemented in the township school has revealed a list of indicators summarised in Table 6.1 above. The general summary is that an environmental committee has shown effectiveness in maintaining the continuation of themes chosen at the school. A lack of awareness and communication between all role-players in the school is evident in participants who are not aware of the EMS and the themes implemented at the school that have arisen because of the implementation of the EMS. The school did commit itself to an EMS. The principal assessed the school situation himself and together with the environmental coordinator/Senior phase teacher wrote a commitment declaration. Even though the environmental policy pledge was officially unveiled it is deemed ineffective because the learners and the rest of the staff were not part of this process. This proves why the governing body is not aware of the EMS implementation. Community involvement in the school is deemed good since days like “67 minutes for Mandela” ensure community commitment and community participation in cleaning the school. The themes chosen for inclusion in teaching and learning and as a result of the EMS are reflective of the socio-economic realities in which the school finds itself, namely waste management, referring to a low tolerance of litter, saving water and energy, reinforcement of hygiene, and greening of the school, referring to the vegetable garden. The school’s plan of action reveals that the environmental committee asked the teachers to implement the action plans in their activities. The environmental committee also addressed issues of saving water that was filtered through to the gardeners who ensured the maintenance of taps. No self-evaluation of the EMS has taken place at the school.

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## 6.4.2 A WITHIN-CASE DATA ANALYSIS DISCUSSION AND INTERPRETATION OF AN EMS IMPLEMENTED IN A FARM SCHOOL TO PROMOTE ESD

The data analysis of the one-on-one and focus-group interviews, non-participant observations and document analysis reveal the following discussion and interpretation of how the EMS is implemented in the farm school to promote ESD, as well as a discussion and interpretation of the indicators (cf. Table 6.2) compiled from the analysis.

- **Themes - Vegetable gardens, electricity, water**

Three themes emerged from the farm school as important foci. The vegetable garden, electricity and water are prominent. The vegetable garden, also used for teaching and learning, is of great importance for the feeding scheme, since the school is a quintile 1 school in an impoverished community. The vegetable garden supplements the feeding scheme and contributes to the nourishment of the learners' families when there is an abundant harvest. According to the Intermediate phase teacher, the "...vegetables. *They usually use it in the kitchen or sometimes when there is a lot, we would give it to the children to go home, take home.*" The community member/ governing body member elaborates on how the vegetable garden must be in the school to maintain the learners' good health. The interpretation is that the healthy vegetables maintain a healthy diet for the impoverished learners. The gardener, who is in charge of the vegetable garden, decides what to plant, but he is supported by the principal who timeously brings seedlings and plants to maximise the vegetable garden produce. The governing body/community member is of the opinion that from what she witnesses at the school, learners do save water and are therefore aware of its shortage. The Intermediate phase teacher shares how there are short-lived successes when it comes to the implementation of the hygiene campaign by Dettol. "*At first learners use the soap and water to wash their hand, but then the novelty wears off.*" I observed how the collapsible bags of water were not filled by teachers and the soap was not replaced. My interpretation is that the hygiene project is not managed well since teachers are not assigned a responsibility to maintain the filling up of the collapsible bags and soap that would otherwise reinforce awareness. That project could very well compliment the *Education for Sustainable Living* project if managed by the environment committee. The data analysis has highlighted that when the environmental coordinator/Senior phase teacher states that "*...energy saving and water, then water was part number one, since our water is from the borehole, sometimes it is contaminated*", it encapsulates the focus at the school. When the water testing indicates pollution or if no water is available learners are sent home so as to prevent a hygiene issue.

The school relies on borehole water to be pumped for consumption, and this means a great reliance on electricity. Electricity needs to be saved, especially during winter surges that affects the borehole pump and cuts off the computer or photocopier energy supply.

Learners are taught to save electricity and implement the 'lights off policy on a sunny day', but teachers and learners fail to switch off lights at the end of the day, since it becomes the task of the gardener at the end of the school day. The interpretation is that both teachers and learners are not committed to a drive to save electricity and the promotion of ESD is not prioritised.

The environmental coordinator/Senior phase teacher's idea to pump borehole water into the holding tank that towers above the school has saved the school on their electrical and water bill because the gravitational fall is enough to let the sprinklers work and water the vegetable garden. The interpretation is that this practice not only requires management decision-making, but the whole process of having to manage the pumping of a valuable resource that applies a law of nature to make it efficient for irrigation, can be incorporated into the teaching and learning of Economic and Management Science, Natural Sciences, Social Sciences, Technology, and Mathematics.

- **EMS - communication and awareness**

The data shows that the principal is of the opinion that the engagement with the environment - that I interpret from the interview as the vegetable garden that was present before the implementation of the EMS - brought awareness to the parents and learners that in such a farm school situation they must work with their wealth, this being soil and water. An awareness of what the environment provides is evident in the vegetables (and nutrition) that the garden provides for the learners and their families. In the opinion of the principal, the school has been met with challenges in that the learner numbers have increased, meaning that teachers also have more commitments that need to be addressed. This is challenging the previous close involvement with the vegetable garden and the way things were, and this now influences the EMS.

The data has shown that the non-teaching staff members are aware of the EMS, but not the teaching staff. Nonetheless, the teachers implement environmental learning in their teaching and learning practice, despite not knowing about the EMS *per se*. Since the environmental coordinator/Senior phase teacher decided to speak to all the teachers personally and tell them about "*curriculum involvement*", my interpretation is that his decision - based on his experience and option that "*if you hold a staff meeting, they look at it as a threat*" - has meant that the holistic whole-school integration understanding, regarding the integration of environmental learning and the implantation of an EMS, was not conveyed to the teachers,

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since individuals were targeted. This shows that more attention needs to be given to management and communication aspects (cf. 2.2.4.1), especially since the teaching staff were not made aware of what the EMS entails and how it was to be implemented within the school to promote ESD. The environmental coordinator/Senior phase teacher admitted that the staff lacked knowledge of the EMS. He affirmed that when he provided staff with feedback from workshops, they did show signs of interest, but he was of the opinion that *“even if I am the only one it does not make an impact”*, meaning that there was a lack of unity and coherence among the staff to work together to ultimately promote ESD through the EMS.

The data is also clear in pointing out that the environmental coordinator/Senior phase teacher called meetings to target specific Learning Areas, namely Natural Science, Life Skills, Technology, and Social Sciences, and encouraged those teachers to integrate an awareness of the environment. Since he is Head of Department in the Intermediate and Senior phase in the farm school he has a holistic view of the curriculum within all the Learning Areas and he had the best knowledge of and insight into where ESD could be best promoted. The shortfall is that not all the teachers were made aware of the EMS and were not asked to be creative and implement environmental learning in their Learning Area, which would have been more effective and within the principles of the whole-school approach. The interpretation made is that communication with the staff was not fully effective. The environmental coordinator/Senior phase teacher placed the burden on himself to disseminate and instruct specific teachers on where to focus on environmental learning, perhaps based on his experience of making it less threatening and perhaps to make it more inviting, showing that environmental learning can easily be accommodated in some Learning Areas. The whole school needs to be informed of the action plan of the school’s EMS (cf. Step 5 in 2.2.6.1.2).

- **EMS composition and the functioning- lack of knowledge and understanding**

The environmental coordinator/Senior phase teacher is of the opinion that the EMS of the farm school is composed of the SMT. The question arises as to what his understanding of an EMS is since the Intermediate phase teacher’s understanding of the EMS implementation, in her opinion, is to supply food to the children and the community. The interpretation is that the participants do not have an understanding of what the EMS fully entails. The principal states that the core business of the school is teaching and learning, and if it includes preserving and conserving the vegetable garden (farming activity) that is synonymous with the area, then also integrate it into the lessons. This is where the idea of promoting ESD is interpreted. However, the principal cannot provide a clear articulation of the composition and the functioning of the EMS in his school. His understanding of an EMS originates from his

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frame of reference as manager of the school because data obtained from a document analysis shows that he regards the school environment as “*sanitation, electricity, classroom equipment, ventilation, natural light supply, water supply, playground, sports facilities, road safety, general safety and first aid kit. HIV/AIDS programmes, the vegetable garden and nutrition programmes are being implemented as part of the health promotion initiatives.*”

The data shows that the EMS implementation is shared among the staff, but it is coordinated by the environmental coordinator/Senior phase teacher, who holds meetings with teachers and encourages the implementation of environmental learning. There is uncertainty as to whether the school has an environmental policy. The document analysis only shows records of policies pertaining to tobacco, bullying and health. It is interesting to note that only the administration clerk, principal and environmental coordinator/Senior phase teacher are aware of an environmental policy that on paper does not exist, but that the principal refers to the environmental coordinator/Senior phase teacher as being “*more knowledgeable*” and the “*project leader*” regarding the environmental management. The interpretation is that the EMS has been assigned to one person to administer and run, therefore, not making it a whole school collaboration throughout management (cf. Step 2 in 2.2.6.1.2). This is in contrast to what a whole-school approach to management entails. The principal views the environmental policy and health policy as one. It is deduced from the data that he has approached the implementation of the EMS from the departure point of the vegetable garden. This is confirmed from the documents analysed, which state that the vegetable garden and nutrition programmes are being implemented as part of the health promotion initiatives. The principal states that learners need to know about “*healthy living, healthy lifestyle, what types of foods to eat and things like that*”. In the interview he confirms that his understanding of environmental management and health promotion go hand in hand, as indicated above. His reasoning is that you preserve and manage the environment so that you can benefit from it, like the vegetable garden that produces food for the learners and community. The interpretation is that the principal bases his management of the EMS on the steps of the health-promoting schools policy that lists a poor environment and hygiene, nutrition problems and unsafe water, among others, as the points of reference for his management.

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- **Environmental committee – set-up**

The data has revealed that because the staff members are limited in a farm school, the duties of committee members overlap and not many committees can exist. In this farm school the environmental coordinator/Senior phase teacher referred to the environmental committee as being dysfunctional, but the interpretation made was that what was actually meant is that the environmental committee does not function optimally. This is evident in the mixed reactions to the responses to questions around the environmental committee during the interviews. The data reveals that the safety committee is performing the duties of an environmental committee, for example, checking that learners do not damage plants in the gardens, the picking up of papers, and securing the perimeter, among others. The fundraising committee deals with recycling and fundraising. It is evident that because of the nature of the school, committees are multifunctional and that a stand alone environmental committee as was suggested by the *Education for Sustainable Living* project was not established due to the aforementioned reasons.

- **Action plan - department policy takes priority**

The data reveals that since the school is part of a health promotion pilot study, it regards the implementation and functioning thereof as being a priority. Having said that, the fulfilling of the work schedule from the district office of the DBE is also a priority and other foci are seen as add-ons, like the integration of environmental learning. The environmental coordinator/Senior phase teacher states that the school is on track with their water and energy action plan, but that they need to deal with waste management so as to stop burning waste. The aim is also to carry on with health promotion and to fulfil the curriculum duty that is the core business at the school, namely, teaching and learning. In this school's case the inclusion of the vegetable garden stems from the past and environmental learning is seen as a beneficial addition. The data does not reveal any form of notification to the participants about the school's action plan. The interpretation is that step 5 of the *Education for Sustainable Living* project EMS guidelines was not taken into consideration specifying who does what, how and when, for example (cf. 2.2.6.1.2).

- **Understanding of whole-school approach**

It can be clearly understood from the data what a whole-school approach refers to. The consensus is that everybody, not just one person, and every grade must be involved in activities at the school. The school is understood by the participants as a whole and as part of the environment. In practice as a system, there is no whole-school approach as to how

the EMS is implemented and managed. Despite the participants affirming that management should play a key role in promoting environmental learning so that it becomes a reality, the interpretation made from the discussion above is that there is a lack of awareness, understanding, and communication between participants regarding the functioning and implementation of the EMS. In the long run there is a lack of understanding of how everybody should be involved in promoting ESD through the implementation of the EMS.

- **Project shortfalls due to lack of coordination and communication**

The data has pointed to a lack of reinforcement of the recycling programme begun at the school. Learners and staff are aware of the recycling programme and the one bin in the computer room, but the implementation and management are not carried through and are questioned by the teachers. For example, some classrooms were observed not to have a single waste bin. Some teachers improvised and used reused cardboard boxes for waste, which reveals that a positive learning experience can be taught from that action. There are no sorting bins in the classrooms or offices. Teachers feel that more awareness and communication are needed. One teacher was of the opinion that the implementation is carried through in such a manner because the environmental coordinator/Senior phase teacher has too many coordinating duties and teaching duties. His commitments keep him back. The interpretation is that the EMS cannot be managed and coordinated by one person. On the other hand, the environmental coordinator/Senior phase teacher's point of view is that the curriculum needs are many and he cannot implement too much because the teachers see it as an extra work load. The other evidence of poor management and lack of coordination is that all the waste at the school that is not collected by the municipality gets burned. Everybody is aware of the practice. If proper management and coordination were in place, the practice of burning could be avoided and other sorting measures put in place before waste collection eventually arrives. In 2009, at the time of the implementation of the EMS, waste management was placed on the agenda for discussion. Two years later the matter has still not been addressed. This points directly to a lack of focus toward TQM (cf. 4.3.1.5) where the quality of the organisation is influenced by the culture of the school, the beliefs and values that top management, among others, and role-players, like teachers who are aware of waste being burnt, do not have a role to play as deliverers of quality improvement.

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- **Influence of role-players in management**

The data reveals that the majority of participants are of the opinion that the principal, environmental coordinator/Senior phase teacher and teachers, followed by the rest of the participants, in that order, have the most important role to play when it comes to the implementation of the environment in teaching and learning. In essence some feel it is everybody. Two teachers are of the opinion that the principal needs to become more involved and it is interpreted that he needs to be more assertive regarding the implementation of the EMS in the school. The environmental coordinator/Senior phase teacher is of the opinion his position does not carry any weight and that if the principal would take up the implementation of the EMS as a priority, the teachers would take it more seriously. The interpretation made is that a top-down management (cf. 2.3.2) is needed at the school in order to address the implementation of the EMS, even though it is authoritarian. The interpretation made from the interviews is that the principal has employed a delegating style of management that characteristically results in poor relationships (cf. 4.3.3.1). Another teacher is of the opinion that the environmental coordinator/Senior phase teacher has the passion, but that the principal needs to communicate with the staff and be the driving force behind the EMS. It also implies that the principal has not bought into the idea of the EMS because of his lack of support and motivation. The gardener implies that more communication is needed from management to address environmental issues. The principal describes his management style as being consultative and it is evident since teachers are given the opportunity to voice their opinions during meetings. The interpretation made of the principal's own views are conflicting in comparison to the latter discussions. The principal hints at following a collegial model of management (cf. 4.3.2.2), even though it emerged that teachers, especially the female teachers, resort to having meetings outside of the formal meeting, meaning that participation during formal meetings is actually poor. A teacher's opinion is that the staff do not want to get involved and this can be interpreted as a means of shying away from committing themselves. The result is that consensus is reached, but not everybody is in actual fact pleased or in agreement. The perception exists that by asking questions, some staff feel that colleagues are intimidating them or intimidate the principal. These refer to internal school issues between staff.

The farm school analysis yielded a list of indicators that reveals how the farm school implements the EMS. Each indicator is clarified. The table also contains negative indicators of shortfalls in the EMS (cf. Table 6.2).

Table 6.2 Indicators of the EMS in the farm school

Indicator	Interpretation
Themes - vegetable gardens, electricity, water.	A farm school situation determines the resources viewed as necessary for functioning.
EMS - communication and awareness.	The whole school needs to be made aware of the EMS and action plans need to be communicated to all the role-players.
EMS composition and the functioning - lack of knowledge and understanding.	All role-players need to be informed of plans and policies implemented at the school so that everybody is aware of what they are working towards.
Environmental committee set-up.	A clear understanding of what the role and function of an environmental committee is needs to be established and then decided whether it is viable for the school situation.
Action plan - department policy takes priority.	The policies and notices from the DBE take priority above the inclusion of environmental management as a personal value.
Understanding of whole-school approach.	There is a lack of understanding of how everybody is involved in promoting ESD through the implementation of the EMS.
Project shortfalls due to lack of coordination and communication.	There is a lack of collaboration within the school toward activities that will promote ESD.
Influence of role-players in management.	Teachers and the SMT need to work together and united toward a common goal.
Indigenous garden present at school.	Established because of requirement for a competition, used for teaching and learning, but not maintained.
Water saving irrigation mechanism in fruit orchard.	Used for feeding scheme and teaching and learning.
Holding tank on tower.	Used to irrigate vegetable garden and has potential for inclusion in teaching and learning.
Vegetable garden.	Used for feeding scheme and teaching and learning.
Compost heap.	Ecological intervention saves purchasing fertiliser and used for teaching and learning.
Water harvesting.	Used for irrigation and reserve water source.

Drinking taps spillage runs into flower beds.	Water saving strategy.
Many refuse bins on school yard.	Litter is under control.
Daylight switch on school property.	Energy saving mechanism.
Newspaper clippings and learners poster used as resources in classrooms.	Learners are made aware of and taught about current world affairs.
Reusable plastic plates and mugs at feeding scheme.	Environmentally friendly option.
Bicycle transport.	Used by learners who live further than 5 km from school.
Environmental calendar days are celebrated.	Spring day and arbour day celebrated.
Limit placed on paper for printing and toilet paper is controlled.	Financial management strategy leads to limits placed on paper, as well as copying on both sides and size reductions to save paper and printing costs. Teachers control learners' use of toilet paper. It is supplied on demand.
<b>Negatives</b>	
Problem	Interpretation
Unsuccessful hygiene drive with Dettol soap.	No reinforcement and maintenance by teachers.
One recycling bin.	The single bin is housed in a computer room that is not easily accessible.
Non-functional library.	This inhibits teachers and learners from accessing information that can promote ESD.

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#### **6.4.2.1 GENERAL OVERVIEW DISCUSSION OF THE WITHIN-CASE ANALYSIS OF THE IMPLEMENTATION OF THE EMS IN THE FARM SCHOOL**

The data analysis of the EMS implemented in the farm school has revealed a list of indicators, summarised in Table 6.2 above. The general summary is that the school is committed to a health promotion policy because it is part of a pilot study that takes priority since it comes from the DBE. The guidelines of the *Education for Sustainable Living* project have not been fully addressed, let alone applied. This is because of the management decision and the principal's understanding that the school had to address environmental matters under the umbrella of the health promoting school programme which was to be infused into the school curriculum – as required by the *Education for Sustainable Living* project - and so contribute to the development of healthy learners and school communities. The themes, therefore, focused on were the vegetable garden, electricity, and water because of the relevance of these resources for the farm school and farm community. It was established that the implementation of the EMS required better understanding from the participants regarding its composition and function. Greater communication, action and collaboration were identified as shortfalls among the staff and management for the successful implementation of the EMS that lacked a whole-school approach within a system where teachers need to deal with large classes and many responsibilities regarding management and the curriculum. The school also lacked a period of self-evaluation to establish what could be done to improve its situation in the future.

#### **6.4.3 A WITHIN-CASE DATA ANALYSIS DISCUSSION AND INTERPRETATION OF AN EMS IMPLEMENTED IN AN URBAN SCHOOL TO PROMOTE ESD**

The data analysis of the one-on-one and focus-group interviews, non-participant observations and document analysis reveal the following discussion and interpretation of how the EMS is implemented in the urban school to promote ESD as well as a discussion and interpretation of the indicators (cf. Table 6.3) compiled from the analysis.

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- **EMS awareness through communication**

The data reveals that two environmental coordinators, one from the Intermediate phase and the other from the Senior phase, made learners and teachers aware of the EMS. Both environmental coordinators communicated to the staff in general in the staffroom and to teachers individually. Through personal contact with staff ideas were shared and they suggested that the colleagues themselves should see how they could work more sparingly. Seed was planted and colleagues had to use their own initiative within their job realm to see how they could be more efficient with resources. For example, the administration staff were asked to think of ways in which they could save paper in the office. The photocopier/cleaner was asked to think of what should be done with used ink cartridges, and the teachers were asked to think about introducing sorting bins for paper in their classrooms. The Foundation phase teacher tells how a child convinced a parent to implement sorting bins at home after the learner was exposed to this way of life in the classroom. This proves that ESD was promoted beyond the classroom. The interpretation made is that the staff and then learners were made aware of the school's recycling action plan. The school staff now watch their consumption of paper, and sort their waste for recycling. This was established through communication of ideas and the implementation of the action plan.

- **EMS implementation- support, awareness, systemic thinking and communication**

The principal identified two teachers as the environmental coordinators to attend the *Education for Sustainable Living* project workshop. One teacher is a self-confessed environmentalist. The principal gave the teachers freedom to implement the EMS as they saw best, and allowed them to address the staff regarding its implementation. The principal also supports the ideas and initiatives of the two environmental coordinators. According to her the secret is that the two environmental coordinators are goal-directed: "*doelgerig en ek dink dit is die geheim*<sup>50</sup>." Her opinion is that the manner in which the environmental coordinators implemented their ideas (simplistically) and because they were always involved, meant that it did not place an extra burden on teachers. The interpretation made is that the principal follows a typical delegating style of management (cf. 4.3.3.1), and she implements TQM (cf. 4.3.1.5), which supports role-player participation (staff), intrinsic motivation (given by the principal) and systems theory (for example, the functioning of the whole school toward the 3R campaign around paper). It also shows that she manages from the bottom up and supports the environmental coordinators (teachers) who play a central role in the implementation of the EMS.

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<sup>50</sup> Translation: "*purposeful and I think that is the secret.*"

The two environmental coordinators developed a text information sheet for new teachers to read through at leisure. This contains the specifics about the school's position regarding the EMS and the themes taken on board. It shows continued systems thinking (cf. 4.2.7) on the part of the environmental coordinators who think of connections that need to be made and keep everybody aware of how the school's functioning is interrelated. The data also reveals that strategies were devised by the administration office workers to save paper in the office. The principal also states that she uses assembly time in the school hall to address issues related to environmental management, for example, reprimanding learners when the toilets are untidy. The interpretation is that the principal has an open channel of communication with her staff and is aware of developments at the school - also thinking systemically. The photocopier/cleaning staff member states that in the past there was no awareness of wastage, but after having worked at the school for 19 years she has now been taught to recycle paper. The interpretation is that the EMS has created awareness amongst staff to save and so they promote ESD.

The Foundation phase teacher is of the opinion that constantly making everyone aware of sustainable living helps ensure the implementation of the EMS. The manner in which it is done creates awareness and these are the constant reminders that the environmental coordinator provide. The governing body member who has children at the school shares that his children's tasks have made him aware that environmental learning is prominent at the school. The interpretation made is that ESD is being promoted at the school. In the Foundation phase teachers use an environmental calendar to alert them to important environmental dates, but the awareness stems from the integration with the curriculum themes. For example, when water as a theme is addressed, its awareness is highlighted not only by reading books but also by applying the theme around the school premises. The school uses its weekly newsletter to print interesting facts about the environment. An example was seen in the environmental committee file. The school also has clip frames mounted on the passage walls that are used to display religious, motivational and environmental messages. Some classroom windows also contain laminated messages like, *"It is our duty to keep our school clean"*, *"Be friendly and make other people happy."* The interpretation made is that there is a conscious awareness of environmental learning at the school, be it visible or through teaching and learning. There is also a concerted effort to ensure that everyone is informed of what happens at the school referring to systemic thinking and communication.

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- **EMS implementation process - two environmental coordinators make decisions, plan and carry out task via contact communication**

In the data the environmental coordinator/Intermediate phase teacher describes how she and her colleague arranged a feedback meeting to inform the staff about the EMS. The two environmental coordinators informed teachers why the school was adopting certain action plans and this is interpreted as a means of creating awareness and relevance toward a request for implementing an EMS so as to make it significant. The data also reveals that after realising how easy it was to implement environmental learning in her Learning Areas, the environmental coordinator/Senior phase teacher spoke about the EMS to everyone in general and then approached teachers individually to find out what their Learning Area curriculum involved. The aim was to share ideas on what they could do. It is noted that everyone was positive.

The two environmental coordinators started a committee and *they* developed a policy and started an environmental committee file. The data revealed that the two environmental coordinators decided *together* what to implement at the school based on the *Education for Sustainable Living* project workshop, other courses they had attended, and the movie *The 11<sup>th</sup> Hour* that made them realise that a mind shift was necessary for a better future for everybody. The interpretation made is that they employed purposeful thinking regarding what the situation of the school was and decided what would be a functional and significant undertaking. This alludes to step three of the project that requires environmental questioning of the school situation (cf. Step 3 of 2.2.6.1.2). However, the difference here is that two environmental coordinators were the participants who contributed. They decided it was necessary to address the problem of the school's high electricity account. They decided that water needed to be saved and paper recycled. The interpretation here is that the themes were chosen by two teachers who established that these were avenues worth exploring from their perspective because they had been influenced by, for example, the movie *The 11<sup>th</sup> Hour* and their worldview. It shows characteristics of Sterling's Ecological Educational Paradigm (cf. 4.2.7.1) because they decided that their focus would be on making learners aware of their actions (educational ethos). It is explained by their decision not to allow their school to become one that generates waste, but rather create awareness that we pollute and change needs to take place (their dominant view of reality/educational eidos). The only preventative waste-generating project that the learners, teachers, governing body member (in his capacity as a parent) affirm they are all aware of was initiated to make a difference and create awareness, i.e. the collection of used batteries. All this is a result of communication because the two environmental coordinators conveyed the message to everyone in the school and it was also published in the weekly newsletter. Furthermore, they shared their worldview and concerns with the staff, asking them to rethink their paper consumption and use of electricity.

The environmental policy was written by the two environmental coordinators who together decided that awareness creation was their point of departure. *“Ek en juffrou X het saamgesit en ons het gedink ok en dit is waarop ons ons gaan commit. Ons gaan commit om die leerder bewus te maak daarvan.”*<sup>51</sup> This shows that the initiative and direction of focus for the school EMS came from *both of them*.

The environmental committee was established with interested teachers who volunteered to help with recycling and the environmental coordinator/Intermediate phase teacher chose to look for *“vrywilligers... wat ’n passie het om die omgewing te bewaar.”*<sup>52</sup> Both environmental coordinators decided to address the recycling of paper, saving electricity, and planting trees as the three themes for the school. The environmental committee consisted of five members at that stage. They decided against creating a composter because of their perception that it would become a rat vector in a residential suburb. The problem they encountered with waste removal led them to donate the funds to charity so that someone else became responsible for waste collection. The interpretation made is that when taking part in recycling there need not be a financial gain for the school, but it can be turned into a charitable deed.

The whole teaching staff were informed in the staffroom that donated boxes were to be placed in everybody’s classrooms for waste paper and that once full they were to be taken to a central point. The cleaning staff were approached and told to pay attention to the use of electricity and to switch off all unnecessary appliances, lights, fans and the like. This is evident in the data because the cleaner refers to the environmental coordinator/Intermediate phase teacher and photocopy maker/cleaner who always talk about the matter. This shows that the staff are attentive and communicate the same message of awareness. The data shows clearly that the momentum for environmental learning and the implementation of a sustainable EMS are driven by a dynamic environmental coordinator/Senior phase teacher. This individual states how *her* next plan of action for the new year is to introduce a new committee within the Learner Representative Council, called the environment committee. Her aim is to bring about a mind shift within the learners, but it must come from within them, not because they are told to do so. *“Hulle moet self begin dink in daai rigting. Hulle moet ’n mind shift hê. Hulle moet begin self dink hoe gaan ek die omgewing bewaar.”*<sup>53</sup> This shows clearly that her aim is to promote ESD. Furthermore, she has tested the waters and established that learners are interested and she nurtures in them the ability to come up with their own ideas to make a sustainable difference. This is evident in her response: *“Hulle is baie positief en opgewonde so volgende jaar definitief gaan ek die komitee aanstel en dan*

<sup>51</sup> Translation: *“Miss X and I sat together and we thought ok and that is what we are going to commit to. We will commit ourselves to make the learner aware of it.”*

<sup>52</sup> Translation: *“volunteers who have a passion to preserve the environment”*

<sup>53</sup> Translation: *“They must begin to think in that way by themselves. They must have a mind shift. They themselves must begin to think how am I going to protect the environment.”*

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*gaan ons die komitee, gaan besluit wat gaan die beste plan wees onder die krane? Want hulle het 'n voorstel gemaak: ons moet dalk nie emmers vat nie maar eerder langwerpige bak wat maklik uit staal gemaak kan word, wat langwerpig is dat hy twee handvatseltjies het, dat twee leiers hom gelyk kan dra, en leegmaak want hy kan meer water vat 'n emmer gaan oorloop. Jy weet laat hulle kom met idees. Ek wil hê omgewingsbewaring moet saak maak.*"<sup>54</sup>

She also plans to get parents who are boilermakers involved with the making of these water collection buckets. She also plans to teach them skills, for example, to decoupage the buckets.

The data has also revealed, once again, how effective management at the school - the fact that every Thursday the teachers have a phase meeting - has lead to effective communication amongst colleagues. The environmental coordinator/Intermediate phase teacher tells how she asks for a chance to speak and reminds teachers to implement the environment, specifically environmental protection, in their lessons and they are requested to tell the environmental coordinators of tasks so that photos can be taken of the tasks for the environmental file. She says " ... jy weet hulle implementeer dit in hulle lesse, en personeel weet as hulle iets spesifiek oor omgewingsbewaring, 'n taak of 'n projek doen, dan moet hulle ons sê dan gaan neem ons foto's en goed van die projekte self."<sup>55</sup> The interpretation is that effective management and communication channels are present at the school (cf. 2.3.2 & 2.4) that allow for a certain consciousness about implementing environmental learning in teaching and learning. The outcome has been that teachers now plan for different assessment opportunities to the extent that, for example, a Life Orientation exam is not written. The mark will be obtained from the sorting waste bins task that the learners needed to make and talk about in their presentation, which I witnessed. The environmental coordinator/Senior phase teacher is of the opinion that she is happy with the status quo. This inherent satisfaction with the state of affairs is enough motivation for her that what is taking place is successful and, therefore, there is no need for evaluation.

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<sup>54</sup> Translation: "They are very positive and excited so definitely next year I will appoint the committee and then the committee will decide what will be the best plan under the taps? Because they have made a suggestion: we should perhaps not take buckets but rather oblong containers that are easily made from steel, that are oblong with two handles, that two leaders can carry simultaneously, and empty because it can take more water - a bucket can overflow. You know let them come up with ideas. I want environmental conservation to matter."

<sup>55</sup> Translation: "...you know they implement it in their lessons, and staff know if they do anything specific about environmental conservation, a task or a project, then they must tell us then we will go and take photos and things of the projects themselves."

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- **EMS functioning and composition-principal perceptions based on lack of participation and governing body's perceptions based on lack of communication**

The data reveals interesting findings pertaining to communication correspondence and loopholes regarding the functioning and composition of the EMS. The data shows clearly that the two environmental coordinators have conveyed the message of environmental learning and the EMS in the school. Due to her delegating style of management the principal has pledged her support to the two staff members and states that without support success will not be achieved. The interpretation is that she feels confident that from what she sees happening at the school the EMS is successful in the capable hands of her two staff members. This also speaks volumes regarding her open-door policy with staff and learners and her collegial management style (cf. 4.3.2.2). However, her perception is that the EMS must be driven by the environmental coordinators with her support. From a manager's point of view, the principal's opinion is that the EMS must be reviewed once every two years so as to align it with the school and provincial policies. Regarding the composition of the EMS the principal is of the opinion that the governing body, SMT and the safety committee are involved in the EMS. This is due to her experience with the safety committee's intervention to get waste bins for refuse removal at the school - a potential health hazard. My interpretation is that her association with waste management and the safety committee, in her understanding, means they are part of the EMS, which they do influence, but they are not the role-players who ensure that it functions on a daily basis in the way the two environmental coordinator do.

The fact that throughout the interview the governing body member stated pertinently that he had no knowledge of the EMS or environmental policy was interesting to analyse. The finding was that environmental coordinator/Intermediate phase teacher did inform the governing body of the EMS and its plans. In fact, one of the governing body members organised water bottles for the tree planting project. Most importantly, the environmental committee file recorded that the school's governing body chairperson and principal signed two separate commitments in 2009 for the implementation of the EMS. (The exemplars were provided by the *Education for Sustainable Living* project.) The school called it their "*environmental protection*" policy and other sections refer to it as conservation. Due to the fact that the environmental policy was not formally adopted and communicated with pageantry to all the role-players at the school, a visible awareness was not created for the governing body member, who was already a member of the committee. The fact that the governing body member was not the chair at that stage means that he was not personally involved with the signing of the commitment. As the interview progressed he finally started to vaguely recall something about the EMS, but nothing more. The interpretation made is that with the implementation of an EMS, noticeable awareness and communication are necessary

so that as many role-players as possible become informed. Also, with the transition of elected governing bodies everybody must be informed of the policies and EMS implementation. This integration strategy is regarded as an organisational barrier (cf. 2.2.4.1). Furthermore, the outcome is that with a regular yearly evaluation of the state of affairs at the school, the reviewed EMS can be introduced to the whole school on a yearly basis, preferably at the start of the school year. This refers to the school management plan for the year that must take cognisance of the EMS action plan for the year so as to perhaps deal with the same issues or projects.

- **Whole-school awareness of environment by two environmental coordinators**

The data reveals that the learners, teachers, administration staff, cleaning staff and principal are all aware and conscious of the themes chosen by the two environmental coordinators. This is evident in the learner responses that refer to the two environmental coordinators' learning areas that teach them to save and live sustainably. The interpretation is that it is a clear indication of the promotion of ESD through environmental learning. The rest of the staff are aware that the principal has delegated the duty of the EMS to the two environmental coordinators and that with her support they implement it well. Furthermore, the data provides evidence that the staff are conscious of their use of electricity. For example, lights were left burning in the administration block late one afternoon and it was reported to the administration office the next day. The cleaning staff are also conscious of switching off appliances in the staff kitchen. This shows SD. The conviction of the two environmental coordinators has rubbed off on all the role-players who were made aware of the importance of energy saving.

Among the learners an incentive that works successfully in the Foundation and Intermediate phases is the sticker and stamp initiative. Learners who perform good deeds are rewarded by their teacher or other staff members who witness them. Rewards are accumulated on a sheet and the relevant learners are then rewarded at the annual prize giving with a service delivery certificate. The principal is also involved and rewards the learners who visit her office with complete sticker or stamp collections. The data also reveals that the participants are aware of the meaning of a whole-school approach, but they do not identify themselves with its practice. My interpretation is that what takes place at the school calls to mind a whole-school approach to ESD (cf. 3.4).

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- **Themes: Save, reuse, and recycle paper, save electricity and water**

The data shows that the initial appeal to the administration staff regarding ideas on saving paper yielded further communication within their department, with the principal and the photocopy maker/cleaner. It also filtered down to the teaching staff. Reference is made to the identification of the issue of a lot of paper being used and wasted. The idea began by reusing paper printed on one side, classified as 'waste paper'. It resulted in a system where phase heads check all notes that go out for printing. They make suggestions as to how space can be saved on the page and look at other technical issues, as well as language and content. Teachers indicate whether the notes can be printed on 'waste paper' because the learners will paste the irrelevant side down in their books. They also indicate that back-to-back copies can be made or paper can be reduced in size. It resulted in a saving of paper. At a stage such 'waste paper' was also donated to the school, but they had to cut it into A4 sheets. However, they do still use such paper for drawings in the Foundation phase. as I witnessed such examples displaying learners' work on the classroom windows. In this way the school saves, reuses, and recycles paper.

There is also structure in place at the school regarding what must be done with waste and used batteries, and teachers are knowledgeable about this. The interpretation is that it is attributed to the order in procedure given by two environmental coordinators. In the Foundation phase grey water from learners' wash basins is used to wash the classroom floor and then water the plants. The staff, especially the cleaning staff, have been sensitised to, and are aware of, switching off unused appliances so as to save electricity. The photocopy maker/cleaner reveals that after having been at the school for the past 19 years she now sees learners not wasting water as much as in the past, and that the school now saves on paper. She says they have become wiser and more committed to saving. This is a reflection of ESD promotion. The whole commitment toward saving electricity and water involved reducing the geyser's thermostat to 55°C and making the whole school more conscious of their use of both resources. It resulted in a saving of R6 411.00 on the water and lights account for 2009 - 2010. The factotum also reveals that a better management decision to water the school grounds every third or fourth day has saved water. The fact that they have changed to energy saver globes also means that fewer globes are replaced. These are the three prominent themes that were addressed at the school, but the list provided in the environment committee file as school commitments were all addressed. In my observation I witnessed the painted refuse bins and polystyrene containers used in the tuck-shop. The interpretation is that the school commits itself continuously to the commitments set two years ago and has made the action plans/commitments part of their day-to-day school life.

The urban school analysis yielded a list of indicators that reveals how the urban school implements the EMS. Each indicator is clarified. The table also contains negative indicators that indicate shortfalls in the EMS (cf. Table 6.3).

**Table 6.3 Indicators of the EMS in the urban school**

Indicator	Interpretation
EMS awareness through communication.	The two environmental coordinators approached the staff to implement recycling. This was passed on to learners meaning that environmental learning was taking place and ESD promoted.
EMS implementation - support, awareness, systemic thinking and communication.	There is a conscious awareness of environmental learning at the school, a concerted effort to ensure that everyone is informed of what happens at the school referring to systemic thinking and communication.
EMS implementation process - two environmental coordinators make decisions, plan and carry out tasks via contact communication.	Two environmental coordinators with conviction manage the EMS implemented to promote ESD.
EMS functioning and composition – principal’s perceptions based on lack of participation and governing body’s perceptions based on lack of communication.	The interpretation made is that with the implementation of an EMS, noticeable awareness and communication need to take place so that as many role-players as possible become informed.
Whole-school awareness of environment.	The school practises a whole-school approach to ESD spurred on by two environmental coordinators with consciousness thereof.
Themes: Save, reuse, and recycle paper, save electricity and water.	The themes are still implemented continuously on a daily basis to promote ESD.
Messages on walls and windows.	Clip frames and laminated A4 slogans adorn the school walls and windows with positive messages about caring for oneself, one’s neighbour and the environment, showing we can be stewards of the planet, e.g. “Be friendly and make other people happy” and “Your neatness says a lot about your character.”

Water saving strategies.	Irrigate school property at three or four day intervals.
Save, reuse and recycling paper.	This commitment/action plan creates awareness from within management jobs to classroom practice, e.g. back-to-back copies on school's code of conduct available in foyer, newsletters, activity sheets, among others.
Indigenous trees like the spekboom / <i>Portulacaria afra</i> / elephant's food.	These trees are labelled and new ones planted. The choice of tree is also beneficial for everybody at school.
Railings around lawn.	This strategy prevents lawns being eroded by footpaths.
Energy saver globes used.	A green alternative that benefits the school financially.
Newsletter is a comprehensive communication medium.	It contains occasional environmental messages and tips.
Pine gel detergents are used.	This is an environment friendly choice.
Geyser's temperature was turned down to 55°C.	A realisation that the school can benefit financially without disrupting its functions.
Second-hand clothing store.	This corresponds well with SD principles.
Two sorting bins in classrooms and one full set outside stationary shop.	This decision creates awareness, teaches the learners to sort, and promotes ESD experientially.
The grade Rs use reusable containers in their classrooms and their quad and have planted shrubs in old tyres placed on the school grounds.	Visible example of how to reuse is presented to learners.
Waste battery harvesting.	This is an example of how the school wants to make a difference by ensuring safe disposal of a potentially harmful product.
Hygiene posters with soap in toilets.	Six steps to wash hands and protect yourself from germs are displayed and soap is present.
Toilet paper is kept in the classrooms and not in the toilets.	Toilet paper saving strategy.

<p>The Natural Science class has examples of water filters, food chain posters made by groups. A snake is found in a terrarium, many sections of animal skeletons and preserved animals are found.</p>	<p>Examples of tasks related to environmental learning.</p>
<p>Functional media resource centre.</p>	<p>Equipped media centre exists with books, internet, work areas, globes, television, etc. The theme of the week was “My body” with a model of the internal organs.</p>
<p>Aesthetic waste bins.</p>	<p>Colourful waste bins are found on the Intermediate and Senior phase quads, as well as upstairs at the end of the passage.</p>
<p>Dettol hygiene posters and an environmental dates calendar in the classroom and on the notice board in the staff room.</p>	<p>These posters and calendars create awareness for the promotion of ESD.</p>
<p>Foundation phase classrooms with wash buckets all have soap and towels next to them.</p>	<p>The message of hygiene and saving water is promoted.</p>
<p>The printing room has special boxes for cartridges and waste paper, as well as shelf areas for reusable paper.</p>	<p>This reinforces the reuse and recycling drive.</p>
<p>The learners’ service chart shows spaces for sticker accumulation.</p>	<p>This is an incentive for ESD.</p>
<p>Environmental committee file follows guideline from project EMS workshop and has evidence of EE integrated in teaching and learning.</p>	<p>The guidelines that were addressed are proven by the data discussed above, namely that ESD can be promoted. Photo evidence exists in the file of Learning Area tasks completed by the learners, e.g. in Life Orientation wind turbines were made by folding paper and solar ovens were made.</p>

Negatives	
Problem	Interpretation
No half-flush toilets in newly built cloakrooms.	SD planning is a shortfall here, but it is attributed to the fact that the toilets were donated and they did not want to sound inconsiderate.
No waste bins seen in Foundation phase play area.	Learners need to become familiar with waste bins to create a culture of waste disposal.
Discreet feeding scheme uses throw-away packaging.	The reason for this is that sandwiches are donated by parents.
Majority of learners use vehicle transport and less than 12 use bicycles.	There is talk that the bicycle shed will be made smaller or done away with.
Self-evaluation undertaken.	The practice of self-evaluation can lead to further ESD promotion on a higher level both in management and in teaching and learning.
Evidence of soil erosion on the school grounds.	Two areas of erosion need to be addressed and can be included in teaching and learning.
Water from drinking taps spill out into channels.	Water drained away, but new action plan is to let water fall into buckets that the learners will carry away and use for watering.

#### 6.4.3.1 GENERAL OVERVIEW DISCUSSION OF THE WITHIN-CASE ANALYSIS OF THE IMPLEMENTATION OF THE EMS IN THE URBAN SCHOOL

The data analysis of the EMS implemented in the urban school has revealed a list of indicators summarised in Table 6.3 above. The general summary is that the school promotes ESD through the implementation of the EMS by two committed environmental coordinators. Support, awareness creation, systemic thinking and communication are factors that characterise the implementation of the EMS at this urban school. The guidelines of the *Education for Sustainable Living* project were adopted by the school to meet their management style and needs. The principal delegated the EMS implementation to the two environmental coordinators and they took the lead. These two environmental coordinators addressed the school's commitment to many action plans that they fulfil; they addressed community involvement through a tree planting initiative; environmental awareness as raised through the communication of messages around the school and in the school newsletters;

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the major themes identified are the 3R campaign regarding paper, saving electricity and water as action plans; and they ensured that environmental learning was integrated throughout all Learning Area tasks. A shortfall is that they do not evaluate their progress yearly. Overall, this urban school demonstrates a whole-school approach to ESD as deduced from the analysis and interpretation.

## **6.5 A CROSS-CASE SYSTEMS ANALYSIS OF HOW ENVIRONMENTAL LEARNING AND AN EMS ARE INTEGRATED IN A TOWNSHIP, FARM AND URBAN PRIMARY SCHOOL PROMOTING ESD**

A cross-case systems analysis of an EMS implemented in a township, farm and urban school, based on Bronfenbrenner's ecological systems theory using abductive analysis, is illustrated in Figure 6.4. A discussion drawing on the cross-case conclusions of the EMS implemented in the three primary schools is presented so as to provide a general overview of the analysis.

### **6.5.1 GENERAL OVERVIEW DISCUSSION OF THE CROSS-CASE ANALYSIS OF THE IMPLEMENTATION OF THE EMS IN THE TOWNSHIP, FARM AND URBAN SCHOOLS**

The cross-case analysis has revealed that in the microsystem and mesosystem the participants are all interconnected. However, in the township school a prominent connection exists with the principal and environmental coordinator; in the farm school the prominent connection is with the environmental coordinator and in the urban school the prominent connection is with the two environmental coordinators when dealing with the implementation of the EMS in the school (cf. Figure 6.4).

Regarding how environmental learning is presently integrated in a township, farm and urban primary school to promote ESD, the analysis shows how in the chronosystem, the fact that different Learning Areas address environmental learning throughout the year at different intervals, proves it does take place. In the exosystem the township and farm schools show an awareness for saving water and electricity, brought about by environmental learning. Both schools also have a low tolerance of littering. Of interest is the fact that the township school shows an awareness of hygiene, but not the farm school that is part of the pilot study

for a health promoting school. The farm school also does not support its principal's understanding and management strategy that addresses the EMS and the health promoting schools programme as one because he views them as such. The farm and the urban school share a similarity by way of communication since it raises awareness among and between teachers and learners. In the urban school the 3R campaign is operational throughout the school due to all the role-players working/learning at the school and is driven by awareness through the communication described earlier. Experiential learning does take place in the urban school, as well in the township with the help of, for example, Soul Buddyz, and in the farm school it is aided by NGO support groups. In the Foundation phase of the farm school experiential learning takes place, but due to the large numbers of learners in each class in the Intermediate and Senior phases, teachers do not apply this strategy of teaching and learning regularly. This was identified as a difficulty in the farm school as well as in the township school. Another difficulty or restriction for the farm school is the fact that not all teachers have a holistic knowledge of the curriculum. Both these schools share similarities regarding teachers who are considered to be responsible for integration of environmental learning into teaching and learning, especially where Learning Areas are inclined thereto. The district office of the DBE is also seen as have a dominant say over what must be taught and this takes precedence over any attempt to implement another focus. In the macrosystem of all three schools care for the environment was identified as an environmental value (cf. Figure 6.4).

Regarding what key indicators of the EMS in the township, farm and urban primary school can be identified that promote ESD, the analysis shows the indicators listed in Tables 6.1-6.3 as features of the exosystem. The most significant outcomes of the analysis appear in the exosystem and macrosystem. In the exosystem of the township school, the fact that an environmental policy was adopted by the school and a functioning environmental committee is present are prominent indicators of the EMS in that school. In the urban school the fact that they too have an environmental committee and two environmental coordinators who are committed and have conviction are two indicators that drive the EMS in that school. In the macrosystem of the township and farm school the socio-economic conditions of each have influenced their choice of theme and they have both adopted greening as a theme due to the need for a vegetable garden. In the urban school the constant communication of the action plan and the awareness it creates has made this a prominent indicator in this school. All three schools do not undertake an evaluation of their EMS (chronosystem) and this is regarded as a shortfall because reflection would mean streamlining and strengthening of the EMS implemented at the schools (cf. Figure 6.4).

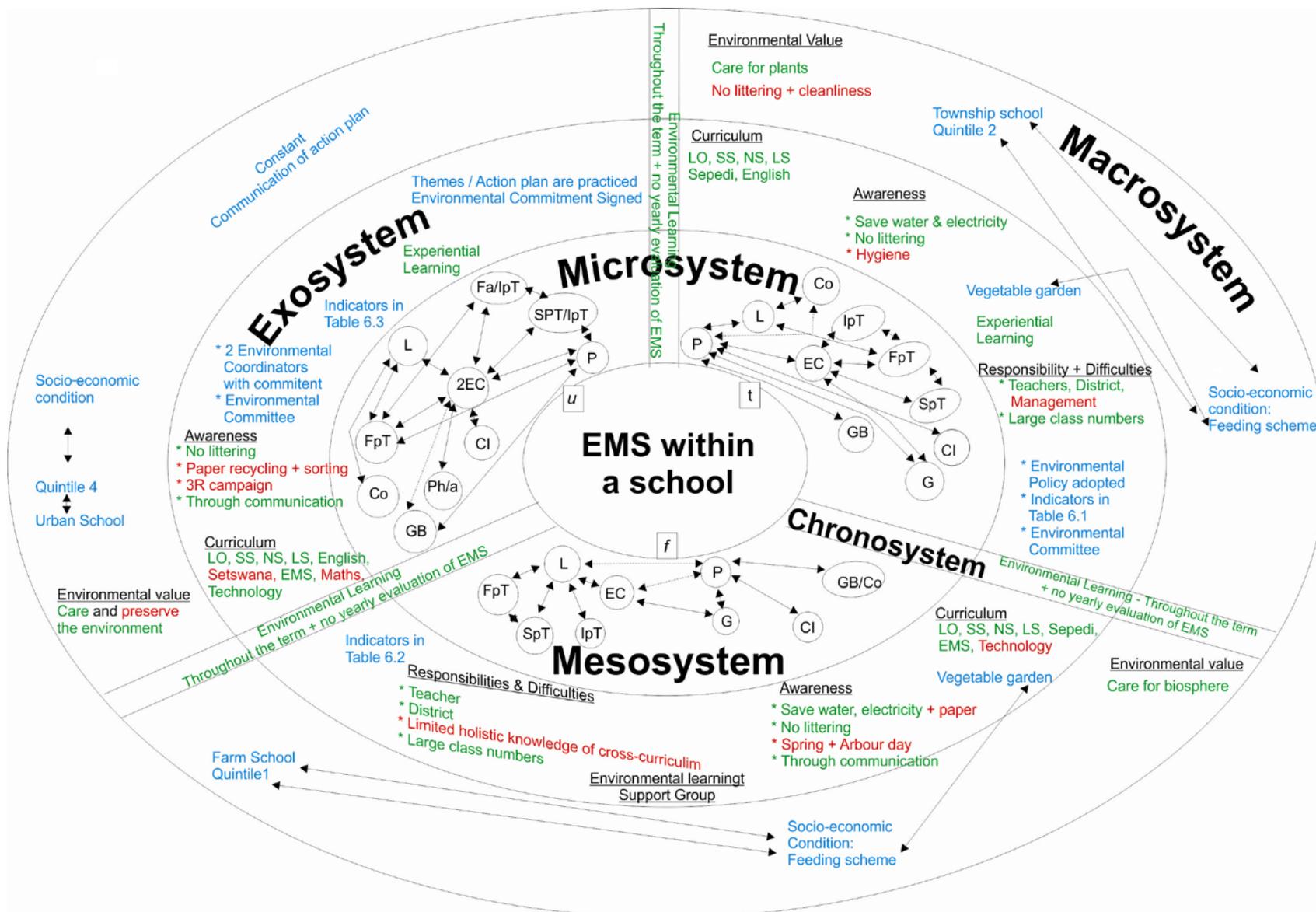


Figure 6.4 A cross-case systems analysis of an EMS implemented in a township, farm and urban school (Adapted from Bronfenbrenner's ecological systems theory.)

## Key

Administration member	A
Cleaner	Cl
Community member	Co
Community member/Governing body	Co/GB
Economic and Management Sciences	EaMS
English	Eng
Environmental coordinator/Intermediate phase teacher	EC/lpT
Environmental coordinator/Senior phase teacher	EC/SpT
Factotum/ Intermediate phase teacher	Fa/lpT
Farm school	<i>f</i>
Foundation phase teacher	FpT
Gardener	G
Governing body	GB
Intermediate phase teacher	lpT
Learners	L
Life Orientation	LO
Life Skills	LS
Maths	Ma
Natural Sciences	NS
Photocopy maker and cleaner	<i>Ph/Cl</i>
Principal	P
Township school	<i>t</i>
Urban school	<i>u</i>
Sepedi	SeP
Setswana	SeT
Similarities	
Social Sciences	SS
Technology	Tech
Unique characteristics/differences	
Less prominent connection	←-----→
Prominent connection	←====→
Text font variation	Blue/Black

## 6.6 CONCLUSION

Chapter 6 has presented a description of the data from the three schools in the study. Narratives and figures were used to present the data in a within-case and cross-case analysis for the multiple cases. The data was analysed and discussed under the research aims, namely: *How environmental learning is presently integrated in a township, farm and urban primary school to promote ESD; and what key indicators of the EMS in the township, farm and urban primary school can be identified that promote ESD.* The next chapter will provide a synthesis of the research. It will present the findings of the study and the contribution of this study to research.

*You have issued us the challenge. We will not disappoint you.  
Wangari Maathai [1940-2011]  
Green Belt Movement founder and first African female Nobel Peace Prize laureate.*

# CHAPTER 7

## SYNTHESIS: PROMOTING EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)- THE IMPLEMENTATION OF AN ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS) FRAMEWORK IN SOUTH AFRICAN PRIMARY SCHOOLS

### **7.1 INTRODUCTION**

This chapter synthesises the study and will address the research question and research aims of the study. The research aims will be addressed by means of an explanation and analysis of the literature described in the previous chapters, together with a reflection on the data presented in Chapter 6. Analytical statements will also be used to justify the explanation and analysis through cross referencing to the data in Chapter 6 and the literature study in the preceding chapters. The chapter will conclude with an EMS framework designed for South African primary schools, highlighting its purpose and indicating who could benefit from it. The design of the EMS is discussed on the basis of a schematic representation with discussion.

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## 7.2 THE IMPLEMENTATION OF AN EMS FRAMEWORK IN SOUTH AFRICAN PRIMARY SCHOOLS TO PROMOTE ESD

In order to address the research question; '*How is an EMS implemented in three South African primary schools to promote ESD?*' this section will provide analytical statements to synthesise the insights gained through this study in order to attain the research aims. The analytical statements represent justifications of the claims that could be made from the three cases in this study.

### 7.2.1 HOW ENVIRONMENTAL LEARNING IS PRESENTLY INTEGRATED IN THE MULTIPLE CASE STUDY SCHOOLS TO PROMOTE ESD

The first research aim: '*How environmental learning is presently integrated in a township, farm and urban primary school in South Africa to promote ESD*' is addressed in this section by means of an explanation and analysis of the three primary schools, and a general discussion based around the two analytical statements.

***Analytical statement: Environmental learning is integrated in the case study schools through the NCS, and the status quo can be maintained through CAPS.***

The multiple case study revealed that environmental learning is integrated in teaching and learning at each of the three schools in this study.

- Environmental learning takes place in the Foundation phase's Life Skills Learning Area. This was evident from the data where the learners in this phase were in contact with the outdoors on the school property. In the farm school, for example, when the theme of recycling was studied, the learners were taught how to make compost on the school property (cf. 6.3.2) and in the urban school learners undertook recycling projects (cf. 6.3.3). In the township school the biophysical environment was observed to be incorporated into the daily lessons and learners were also being taught to make compost (cf. 6.3.1). In the NCS, as discussed in chapter 3 (cf. 3.5.2), themes ranging from seasons, weather, farming, vegetables, a healthy environment, animals and their

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homes, water, transport, my body to my family, set the scene for the implementation of environmental learning. Environmental learning also features prominently in the specific aim of the subject Life Skills in CAPS (cf. 3.5.3.1.3 & 3.5.3.2.4). Learners are taught to understand the relationship between people and the environment. Environmental learning about the environment takes place through themes such as seasons, weather, farming, vegetables, a healthy environment, animals and their homes, pets, plants, seeds, water, the night sky, using recyclable materials, rights and responsibilities in the environment, insects, life cycles, recycling, pollution, and types of disaster. It is evident that these themes in this phase place strong focus on the environment, and when integrated in teaching and learning can promote ESD (cf. 3.5.2).

- In the Intermediate and Senior phases the Learning Areas where environmental learning featured most prominently in the three schools, according to the data, were Life Orientation, Social Sciences, and Natural Sciences. This was not surprising since in the NCS these three Learning Areas' statements mark out an environmental focus. For example, the five focus areas of the Life Orientation Learning Area Statement address the human and environmental rights outlined in the Constitution (cf. 3.5.2.4). The Natural Sciences Learning Area Statement "promotes scientific literacy by appreciating the relationships and responsibilities between Science, society and the environment" (cf. 3.5.2.6), and the Learning Area Social Sciences statement states that it studies the "relationships between people and between people and the environment" (cf. 3.5.2.7). As discussed in detail in chapter 3 (cf. 3.5.2), each Learning Area contains themes where environmental issues are addressed. In CAPS, the latter three Learning Areas, with name changes in the Intermediate phase and as subjects, all address the environment in their specific aims. In the Intermediate phase, Life Skills guides learners to make informed and responsible decisions about their health and environment (cf. 3.5.3.2.4). In Natural Science and Technology learners are called upon to understand scientific, technological and environmental knowledge and be able to apply it in new contexts, as well as understand the practical uses of Natural Sciences and Technology in society and the environment and have values that make them caring and creative citizens (cf. 3.5.3.2.3). In Social Sciences the specific aims of Geography in CAPS are applicable to the Intermediate and Senior phases where knowledge, understanding, and care for the environment with the realisation of the interrelatedness of humankind and the environment feature (cf. 3.5.3.2.5 & 3.5.3.3.7). In the Senior phase Life Orientation guides learners to make informed and responsible decisions about their health, environment, subject choices, further studies and careers (cf. 3.5.3.3.4). In Natural Sciences' Earth and Beyond, knowledge about Life Sciences

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and Geography leads to themes related to ecosystems, climate change and resources being dealt with, among others (cf. 3.5.3.3.6).

- The data revealed that in each school all the learners understood “environmental” to mean care for the environment. It is evident from the NCS and CAPS explanation above that the curriculum is inclined to do that, as discussed in chapter 3. From the nature of the specific aims and themes in the Learning Areas and subjects, a suggestion is also deduced that humankind and the environment are interrelated. This means that in teaching and learning a consciousness toward systemic thinking is necessary (cf. 4.2.7.2) so as not to compartmentalise themes.
- In the farm and urban school, the Learning Areas: Economic and Management Sciences, Technology, English, Sepedi, Afrikaans, Setswana, and Mathematics were identified as mediums that addressed environmental learning. From the discussion in chapter 3, Economic and Management Sciences’ statement in the NCS and CAPS describes the studying of different types of resources as well as the impact of their exploitation on the environment and people (cf. 3.5.2.2 & 3.5.2.3). The focus of Economic and Management Sciences’ tasks is to contribute to personal development and the promotion of sustainable economic growth as well as the development of the community. This focus is nestled comfortably in the third pillar of SD (cf. 3.3.1) and compliments the promotion of ESD. Technology in the NCS aims to use knowledge, skills and resources so as to meet people’s needs and wants. This is fulfilled by developing practical solutions to problems that take social and environmental factors into consideration (cf. 3.5.2.8). In the Intermediate phase in CAPS, Technology is taught as one subject with Natural Sciences (see above). Of note is the fact that the knowledge strands used as a tool for organising the content of Technology are listed as structures, processing, and systems and control, referring to some degree to systemic thinking, especially since in the Senior phase this subject contributes towards learners’ technological literacy by giving them opportunities to appreciate the interaction between people’s values and attitudes, technology, society and the environment (cf. 3.5.3.2.3 & 3.5.3.3.8). In the NCS, a theme that is prescribed in Languages is the importance of human rights; environmental issues and environmental justice (cf. 3.5.2.3). This theme was addressed in the schools in this study. For example, in the urban school a water pollution task was developed in Afrikaans. In Languages, CAPS allows teachers to use themes or topics of their choice to teach vocabulary and language structures within meaningful contexts. It is here that teachers can creatively include themes related to environmental learning. In Mathematics, the NCS states that mathematical relationships are used in social, environmental, cultural and economic relations (cf. 3.5.2.5), meaning that when learners in the farm and urban school

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measured outside surface areas, the required practice was implemented. In CAPS, the focus remains “a critical awareness of how mathematical relationships are used in social, environmental, cultural and economic relations”, showing that the school property can be integrated in teaching and learning to promote an awareness of the environment. Overall, the NCS and CAPS are mediums through which environmental learning can be implemented so as to promote ESD. This was successfully undertaken in all three schools throughout teaching and learning.

- In the township school it was noted that environmental learning features strongly in the practice of experiential learning since the indigenous garden and vegetable garden are used in all three phases. Furthermore, a great awareness to save water and electricity, a zero tolerance of littering and a consciousness of hygiene exist in the school. These are themes that evolved from the EMS and are not only taught by teachers, but learners put them into practice beyond the classroom (cf. 6.3.1). In the farm school learners have been taught, practised and are aware of saving water and electricity. In the farm school environmental learning is also promoted by the principal and administrative clerk. *Soul Buddyz* creates awareness amongst learners to keep the school clean and not litter. These whole-school participants use communication successfully to make learners aware of the environmental issues at the school and in this way they promote ESD (cf. 3.4). The farm school is also supported by a NGO who through workshops and experiential learning empower learners and teachers. In the urban school environmental learning is promoted through not only the teaching and learning practice but also, for example, through all participants being aware of saving and recycling paper, and restriction on water use during fun day activities. Learners also have to clear areas of litter after sports activities.

***Analytical statement: Interdisciplinary curriculum knowledge is a central factor to the success of a whole-school approach to environmental learning, where policy requirements and awareness creation are significant factors for ESD promotion.***

- The data in chapter 6 highlights that the Heads of Department, who happen to be the environmental coordinators at all<sup>56</sup> three the schools, have knowledge of the cross-curricular themes because of their appointment as quality controllers of the curriculum

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<sup>56</sup> In the urban school the environmental coordinator/Senior phase teacher is not a Head of Department. In the farm school the Foundation phase teacher is a Head of Department, but not an environmental coordinator.

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in their phases. It is also important to note that the Learning Areas taught by the environmental coordinators are those that have an inclination, according to the curriculum requirements, toward accommodating environmental learning and that their areas of expertise are those in this study identified as those where environmental learning take place. For example, in the township school the environmental coordinator teaches Social Science, Life Orientation, and Economic and Management Sciences (cf. 6.2.1), in the farm school the environmental coordinator teaches Life Orientation and Sepedi, and he is the Head of Department for both the Intermediate and Senior phases (cf. 6.2.2). In the urban school the environmental coordinator in the Intermediate phase teaches Mathematics and Natural Sciences (cf. 6.2.3). The inference made is that the environmental coordinators, who teach subjects that one can subjectively and critically say they are interested in and passionate about, are key to the implementation of environmental learning. This reasoning is twofold: Firstly, because their position as environmental coordinator influences them to include it in their teaching and learning, and secondly, because of their interdisciplinary knowledge they see where it can be implemented - practising it themselves - and they advise other teachers to do so. My supposition is that if in the Intermediate and Senior phases every teacher has knowledge of what the others are doing in their respective disciplines, implementation of environmental learning could be more effective. I say this because they could become more efficient when dealing with a theme and the promotion of ESD within and throughout the whole school. For example, the Mathematics and Language teachers can choose themes that relate to themes studied simultaneously in other disciplines. My point of departure for this reasoning is the fact that the *modus operandi* is such in the Foundation phase (cf. 3.5.2). If teachers have interdisciplinary knowledge they will meet this characteristic of ESD by approaching the curriculum in this manner (cf. 3.3.3.1) and they can implement this using holistic planning.

- In chapter 6 this study has shown that teachers in the township and farm school follow the mandates received from the district office of the DBE very seriously. If the district office of the DBE does not state the mandate in their work schedules for them to implement environmental learning, then it is not addressed (cf. 6.3.1 & 6.3.2). This implies that teachers do not realise that both the NCS and CAPS call upon them to address environmental learning, because they call upon the respective Learning Area Statements and subjects to reflect the principles and practices of *social justice, respect for the environment and human rights*, as defined in the Constitution (cf. 3.5.1 & 3.5.2). The data revealed further that in both these schools teachers feel restricted by large learner numbers in their classes. This factor affects the whole-school approach to promoting ESD. The fact that teachers are faced with large learner numbers in each

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class means that the logistics of having to plan and execute an experiential learning experience outside of the classroom with over sixty learners is a daunting task. Another reason given is that due to all the marking, teachers do not have time to prepare for the implementation of a new focus that is interpreted as “extra”, such as environmental learning, especially since the work schedules do not include them, neither do they have a functional school library to assist them. According to the data, the teachers in Intermediate and Senior phases in the farm school are believed to be reluctant to implement environmental learning because it is regarded as extra work. This was not the case in the urban school when teachers were asked. My interpretation is that the farm school teacher makes no extra effort to add and address environmental issues to promote ESD despite being requested by the environmental co-ordinator to do so as part of the EMS. This is because of the limitations mentioned earlier and because it is not prescribed by the district office of the DBE and is not deemed essential in the curriculum of some Learning Areas (cf. 6.3.2). This in my opinion does not fulfil the characteristic of ESD that states that individuals need to build capacity for community-based decision-making (teachers taking a stand to promote ESD in their teaching and learning), environmental stewardship (teachers as managers of their environments), adaptable workforce (it is here that teachers can plan their work schedules to promote ESD), and quality of life (quality of life will be achieved if the principles of SD are taught to learners) (cf. 3.3.3.1). This was not the case in the urban school. The reason for this is attributed to the outcome of the data analysis findings that shows how in the urban school teachers were constantly being monitored by the environmental coordinators who planned for the incorporation of environmental learning into their EMS action plan and through awareness and communication at phase meetings to ensure the action plans were implemented (cf. 6.3.3).

- What I found lacking in the farm and township school but present in the urban school with respect to the implementation of environmental learning is based in the learning organisation theory (cf. 4.3.1.4). Since this theory requires that a unit be formed that will lead to more appropriate action, it is this “unit” being missing among the teaching staff in the township and farm schools that prevents teachers from doing more to promote ESD. Also, systems theory is a basis of this theory, and not all teachers in these two schools are aware of the school’s action plan and its implementation throughout the school, referring to systemic thinking and holistic thinking (cf. 4.2.7 & 4.2.7.2).
- The conclusion made is that the teachers in the urban school are guided by a new view of leadership. driven by committed and passionate environmental coordinators. These two coordinators lead as stewards with a vision that entails a commitment to and

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responsibility toward ESD. This is deduced from their holistic knowledge and awareness of environmental learning at the school and shows a tendency toward a systemic worldview that entails SD throughout the school. The inference is that ESD is promoted throughout this school because the awareness, participation and general whole-school approach they have adopted show that everyone is conscious of caring and preserving for the future, and they all manage for the future. Their approach points toward an ecological educational paradigm with consciousness of systems thinking (cf. 4.2.7.1).

- In the township school morning briefings are used for teachers to inform each another about issues related to ESD that they can then share with the learners. The principal also uses his capacity to talk to learners at assembly at least once a week about matters related to ESD. This shows school leaders are involved in the promotion of ESD (cf. 3.4). The practice of discussing environmental matters with staff and learners is taken further in the urban school where communication was identified as a factor that affected environmental learning. The environmental coordinators' constant communication with and awareness of all the role-players at the school (except for the governing body), are evidence to the fact that the objectives of EE are being practised. All the participants *participate* in environmental learning and the promotion of ESD (as discussed above), all are taught sustainability *skills (through the 3R campaign), the attitudes of participants have been changed* (this is noted in the awareness to save paper), all have gained *knowledge* through environmental learning in the Learning Areas and all are *aware* of their actions (cf. 3.2.1.2.1). All these actions are in effect a show of a whole-school approach to ESD (cf. 3.4) since it refers to experiential learning, physical changes brought about to the school interpreted as the 3R campaign, teaching and learning that look for relations between the past, present and future, teaching in all disciplines that is promoted by systemic thinking and critical thinking, as well as addressing interrelated subject matter in the curriculum.

## 7.2.2 KEY INDICATORS OF THE EMS IMPLEMENTED IN THE MULTIPLE CASE STUDY SCHOOLS THAT PROMOTE ESD

The indicators identified in chapter 6 from each of the three schools are presented in Table 7.1, 7.2 and 7.3 below. These indicators represent characteristics noted in the EMS of each of the three schools.

***Analytical statement: SD, as an interrelated and inclusive concept, comprising the economy, society, the environment, and governance/management, endorses the objectives of EE within an EMS when reviewing the indicators identified in a school.***

This study aims to promote ESD by implementing an EMS in a school as organisation. The indicators identified in chapter 6 have been clustered according to the four pillars of SD. The discussion in chapter 3 (cf. 3.3.1) has revealed that from my perspective, SD does not only entail an interrelationship between humankind, the environment and financial factors, but more importantly a fourth dimension that bears weight in the interrelationship, namely the role of management, referring to the manner of governance. From the discussion in chapter 3, a holistic and interdisciplinary approach to EE is necessary and education plays a central role in the promotion of EE. Since the UN declarations and meetings promote systemic thinking skills in EE and especially the integration of teaching and learning in education as an essential and practical part of environmental management, I am of the opinion that the four pillars of SD endorse EE and, deducing from the findings of this study, that the objectives of EE (cf. 3.2.1.2.1) are nested in an EMS. The objective of dealing with evaluation ability does not feature in the findings of this study, but it features strongly in the literature as a recommended feature of an EMS (cf. 2.2.1; 2.2.2; 2.2.6.1.2; 2.2.6.2.2 & 2.2.6.3.2). The indicators identified in the three schools are clustered according to the four pillars of SD. Each pillar of SD has been assigned a colour. The different degrees of shading of each colour correspond across the three tables to indicate a similarity (cf. Tables 7.1-7.3). Despite there not being evidence of an interrelationship between the four pillars in the study, the literature has revealed that all four are interconnected to ensure SD (cf. Figure 3.5). The design of the EMS framework will elaborate further on this point (cf. 7.2.3). The tables also indicate the five objectives of EE identified for each indicator (cf. Tables 7.1-7.3 \*A=Awareness; \*K=Knowledge; \*At=Attitude; \*S=Skills; \*P=Participation) and the inclusion of evaluation (\*E=Evaluation) since it features strongly not only as a recommended feature of an EMS, but it is a key feature of a sustainable school in a whole-school approach to ESD (cf. 3.4.1).

**Table 7.1 Indicators of the EMS implemented in the township primary school that promotes ESD**

Township school			
Environmental	Social	Economic	Governance
Systems thinking (*K) and ecological systems theory	Dissemination - Knowledge of EMS implemented (*K)	Quintile 2	Management approach to EMS - Top-down implementation - Hierarchical management - Collegial management in education (*P) - African management philosophy
Low tolerance of litter (*At) - Waste management strategy: refuse bins every 20m	Communication - Daily assembly with learners (*A) - Morning briefing - Open channel of communication with principal	Fundraising committee (*P) - Recycle plastic bread bags - Paper recycling	Whole-school approach to management (*P)
Save water (*At) - Drinking mugs at taps (*A) - Maintenance repairs to toilets	Role-players interconnected and share responsibility (*P)	Reusable plastic plates and mugs for feeding scheme (*K & A)	Prioritise environmental management
Save electricity(*At) - Conscious	Raise awareness (*A) - 67 minutes for Mandela (*P) - Rain gauge in vegetable garden - Water saving awareness board at entrance to school. - Dettol hygiene posters		Functional environmental committee (*P)
Greening: (*K) - Vegetable garden - Indigenous garden	Commitment - School pledge for greening mounted on a school wall (*A)		
	Inherent interest in environment (*At)		
	Hygiene(*K) - Reinforced - Wash bucket in Foundation phase		
	Behaviourist learning (*At)		

\*Each pillar of SD has been assigned a colour. The different degrees of shading of each colour correspond across the three tables to indicate a similarity.

\*A=Awareness; \*K=Knowledge; \*At-Attitude; \*S=Skills; \*P=Participation; \*E=Evaluation.

**Table 7.2 Indicators of the EMS implemented in the farm primary school that promotes ESD**

Farm school			
Environmental	Social	Economic	Governance
Greening: (*K) - Vegetable garden - Indigenous garden	Communication - Action plans - Knowledge and understanding of EMS (*K)	Quintile 1	Environmental committee duties (*P)
Save electricity (*At) - Daylight switch	Raise awareness (*A) - Of action plans - Newspaper clippings and learners' posters used as resources	Reusable plastic plates and mugs at feeding scheme (*K & A)	Influence of role-players in management (*P)
Save water (*At) - Irrigation mechanism - Holding tank on tower - Drinking taps spillage runs into flower beds - Water harvesting(*A)		Limit placed on: - Paper for printing - Toilet paper (*K & A)	
Compost heap (*S)			
Low tolerance of litter (*At)			
Bicycle transport			
Environmental calendar days are celebrated (*A)			

\*Each pillar of SD has been assigned a colour. The different degrees of shading of each colour correspond across the three tables to indicate a similarity.

\*A=Awareness; \*K=Knowledge; \*At-Attitude; \*S=Skills; \*P=Participation; \*E=Evaluation.

**Table 7.3 Indicators of the EMS implemented in the urban primary school that promotes ESD**

Urban school			
Environmental	Social	Economic	Governance
Systemic thinking (*K) and communication	Communication used: - To raise awareness (*A) - By two environmental coordinators (*P) - Messages on walls and windows (*A) - Weekly newsletter (*A) - Hygiene posters with soap in toilets	Quintile 4	Management (*P) - Principal: lack of participation and delegating style of management - Governing body: lack of communication
3R campaign (*At & *S) - Limit paper use - Two sorting bins per classroom - Four sorting bins outside stationary shop - Grade Rs reusable containers and shrubs in old tyres - Waste battery harvesting (*A) - Printing room has special boxes for cartridges, waste paper and reusable paper	Awareness (*A) - Whole-school - Examples of tasks related to environmental learning - Functional media resource centre - Aesthetic waste bins - Dettol hygiene posters - Environmental dates calendar in classroom and on staff room wall - Learners' service chart (*At)	Geyser's temperature turned down to 55°C (*K)	Whole-school approach to ESD (*P)
Save electricity (*At) - Energy saver globes	Hygiene - Foundation phase wash buckets (*K)	Second-hand clothing store (*K)	Environmental committee file follows guideline from project EMS workshop (*P)
Save water(*At) - Irrigation strategies	Behaviourist learning (*At)	Limit placed on: - Paper for printing - Toilet paper (*K & A)	
Greening: - Indigenous trees (*K)			
Railings around lawn (*A)			
Pine gel detergents (*K)			

\*Each pillar of SD has been assigned a colour. The different degrees of shading of each colour correspond across the three tables to indicate a similarity.

\*A=Awareness; \*K=Knowledge; \*At-Attitude; \*S=Skills; \*P=Participation; \*E=Evaluation.

### **7.2.3 WHAT AN EMS FRAMEWORK SHOULD LOOK LIKE TO PROMOTE ESD IN SOUTH AFRICAN PRIMARY SCHOOLS**

The third research aim: '*What an environmental management systems framework should look like to promote education for sustainable development in South African primary schools*', is addressed in this section by means of an explanation and analysis of each of the three schools, and a general discussion based on the analytical statements.

The *Education for Sustainable Living* project provided guidelines to schools in the project to use and adapt in their implementation of the EMS (cf. 2.2.6.1.2). The outcome of the implementation and functions of EMS in each type of school is reflected on in the following discussion.

***Analytical statement: Socio-economic factors and organisational structure within a semi-functional whole-school approach are characteristic of the EMS implemented in the township school to promote ESD.***

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- This study has shown that the township school in the case study has a working EMS that I have described as semi-functional. The reason for this inference is that not all the participants are aware of the EMS that aims to promote ESD at their school. There is, however, awareness and knowledge of environmental learning among learners, and teachers do promote environmental learning in their teaching and learning because it is part of the curriculum. The vegetable garden and indigenous garden allow for the practice of experiential learning that is a learning theory for ESD (cf. 4.2.5). Of note is that the governing body, community member, learners and administrative staff member did not have any knowledge of the EMS implemented at the school for almost two years, showing that the school lacks in knowledge management. Knowledge management communication is not functioning between role-players with regard to the environmental management. The outcome is that knowledge management (cf. 4.3.1.4.2) needs to be prioritised in the school, since awareness of environmental management can lead to the process of capturing and making use of an organisation's collective expertise and everyone can contribute to effective environmental management. The environmental committee who disseminated the information to the teaching staff is the same committee who deals with the maintenance of the school environment and the vegetable gardens. This environmental committee has knowledge of the importance of the greening campaign because of its importance for the feeding scheme. The vegetable garden was a feature in the school before the implementation of the EMS and is a reflection of the socio-economic influence of the area it finds itself in. These socio-economic factors have also influenced the school's consciousness on hygiene as a theme. The fact that the school receives all its funds, due to its quintile ranking, also means that it does not have to request parents to pay school fees and it has not lead school management to limit the use of paper being used for photocopies or to monitor the Wi-Fi costs for connectivity. Despite this, the school is focused on hygiene and a litter-free school, but does not address the latter by, for example, making the recycling project prominent in the school so as to address and abandon the practice of burning waste. It also does not provide hand soap for staff or learners. Of significance is the commitment declaration and environmental policy drawn up by the principal and environmental coordinator who are both Geography teachers and have management qualifications. It reflects systems thinking (cf. 4.2.7.2) from two individuals who have knowledge of a subject that studies the interrelationships between humankind and their environment, by acknowledging the school's pledge to a "positive response to nature's demand to uphold greening as a symbol and commitment to support life and stabilise the co-existence of other member of the ecosystem." (cf. 6.4.1). The school's pledge of commitment mounted on the wall does create awareness creation for English-speaking individuals at the school, but its
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shortcomings are twofold. It lacks constant awareness creation or revision that can lead to changes in attitude when the whole school participates. Secondly, the school has a participating style of management that compliments the people-orientated style of management, with the principal as team manager (cf. 4.3.3.1) who can unite all toward a common goal within the African management philosophy perspective that is reflected in the Ubuntu expression of being (cf. 4.2.3.1). This school values the contributions of its staff since everybody has the opportunity to be heard (collegial management). The inference made is that since staff participated after being asked to review the environmental policy (that they did adopt), such a repeat exercise can lead to greater participation, awareness, change in attitude, and interest in promoting SD. The process is facilitated by the principal and the environmental committee who already proved that they accommodate the participative process and value the contributions of the teachers (cf. 4.3.2.2). If teachers can become part of the latter process and maintain their close responsibility toward higher powers, these being the district office of the DBE and CAPS, they can promote ESD with much more vigour.

- The township school's management does view the school as a whole, but treats it as individual components. The school as a whole is not aware of its different components. For example, the governing body chair does not know about the environmental management at the school and not everyone is aware of the plastic bread bag recycling drive or the recycling campaign at school. Another point is that individuals are aware of the waste being burnt at the school, but have not spoken out against this practice, proving that they have not achieved a balance between the different components of the school and between the school and its environment. Their decision to maintain the status quo in this respect influences learners' acceptance of such practices as the norm. There is effective communication and a good understanding of the roles and responsibilities of committees and role-players at the school, but knowledge and communication about, for example, an action plan like recycling, is not materialising within the system. This refers to systems theory of management (cf. 4.3.1.1). The desired effect is that the EMS implementation needs to change behaviour to reflect new knowledge and insights (cf. 4.3.1.4) that must be communicated to all the staff. The interpretation made is that information is not being carried over or communicated to new governing body members about existing projects and management decisions (cf. 2.2.4.1). The same applies to new staff members joining the school who one can deduce are not being informed of the EMS. The inference made is that there must be constant communication between the components of the system as described by Engeström's activity theory (cf. 4.3.1.4.3).

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- Community involvement in the school is deemed to be good since days like “67 minutes for Mandela” ensure community commitment and community participation in cleaning the school. The themes chosen for inclusion in teaching and learning and as a result of the EMS are reflective of the socio-economic realities that the school situation finds itself in, namely waste management referring to a low tolerance of litter, saving water and energy, reinforced hygiene, greening of the school, referring to the vegetable garden used for teaching and learning, together with the indigenous garden. The school’s plan of action reveals that the environmental committee asked teachers to implement the action plans in their activities. The environmental committee also addressed issues of saving water that has filtered through to the gardeners who ensured that maintenance of taps was done. No self-evaluation of the EMS has taken place at the school.

***Analytical statement: The farm school is characterised by an EMS managed together with health promotion, by one multitasking environmental coordinator within a hierarchical school structure.***

- The farm school, within a teaching and learning context, has Heads of Department who are knowledgeable of their phases. The environmental coordinator was effective in speaking with teachers and requesting them to implement environmental learning in their teaching and learning. Despite this, the inference made is that in the farm school the knowledge management process does not function optimally. Teachers were approached to implement environmental learning, but no evidence exists of follow-up communication. The workload of the environmental coordinator (Head of Department of two phases, teacher and member of committees) appears to be responsible for the lack of dissemination and flow of knowledge creation, collection, organisation, refinement, dissemination, and maintenance (cf. 4.3.1.4.2). The organisation’s culture is such that the lack of open communication between staff members needs to be overcome by a change in attitudes and behaviours in sharing their knowledge instead of accumulating it (cf. 4.3.1.4.2). The ideal would be for this school to revisit its knowledge management process (cf. Figure 4.4) that would benefit the EMS. The inference made is that, pertaining to the EMS, the farm school’s organisational culture, of which the teachers form part, is not conducive to encouraging sharing of knowledge, thinking critically and taking risks with new ideas for new action plan themes. The fact that teachers, especially female teachers, do not contribute during formal meetings but afterwards discuss among themselves means that the organisational barriers of

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organisational culture and communication need to be overcome (cf. 4.3.1.4). It also alludes to the fact the teachers find themselves in a school with an authority-obedience type manager who acts in a command and control manner (cf. 4.3.3.1) that is not conducive to the implementation of an EMS where there needs to be more communication and collaborative work among colleagues. These are typical barriers to EMS implementation called organisational culture and communication barriers (cf. 2.2.4.1). The principal who follows a delegating style of management has delegated the EMS to the environmental coordinator (cf. 4.3.3.1).

- In the farm school a clear hierarchical model of education management exists on two levels. Firstly, the principal follows a hierarchy model of management and the staff has created a culture of non-participation. Secondly, the teachers and the principal feel that they are responsible to higher powers, being the district office of the DBE and the national education policy, following the formal model of education management (cf. 4.3.2.1), therefore they promote teaching and learning, and correctly so, and only then deal with environmental management. The principal has approached environmental management implementation together with the health promotion programme, meaning that the pilot study programme in which he found himself involved due to the request by the DBE, required a different management approach so that he addresses both health and the environment. It alludes to the contingency management theory developed from systems theory (cf. 4.3.1.2).
- The role-players at the school need to ask themselves, What new activities are appropriate to promote ESD in this farm school?; What behaviour must we as teachers modify to promote ESD?; and How do we generate a collective response from the whole school? In this way organisational learning can enable the school to adapt to change and move forward by acquiring new knowledge, skills or behaviours (cf. 4.3.1.4.1) to promote ESD. What the school needs is TQM where teachers are empowered to improve the process of learning (cf. 4.3.1.5) so as to further accommodate experiential learning as a learning theory for ESD (cf. 4.2.5), where learners can still be involved in the vegetable garden and indigenous garden. It is a fact that in this farm school the natural resources play an important part in the functioning of the school and will continue to be important to themes of focus.

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***Analytical statement: The urban school's EMS is characterised by two committed environmental coordinators who create awareness and maintain communication flow through change management.***

- The urban school has followed the systems theory of management (cf. 4.3.1.1) because the school has proved in its choice of the 3R campaign as theme that it is interrelated and interdependent in its manner of getting all the role-players behind the same cause. The 3R campaign created a balance and ensured that everybody on the school property worked toward achieving the set goals. The two environmental coordinators viewed the school as a whole, and through their action plan, for example, of saving electricity, the effect of their decision and action affected the whole school, since everybody participated in working toward a common goal. Of significance is that the two environmental coordinators maintained an effective and continuous flow of communication among role-players, for example the note given to new teachers to inform them about environmental management in the school. They did not, in my opinion, make their aims known, either in every term or year. What also needs to be addressed is the establishment of better informing platforms for the governing body, especially with the transition when new committees are elected, since a loophole was identified. The integration strategy that needs to be addressed together with communication fragmentation are known organisational barriers (cf. 2.2.4.1).
- The two environmental coordinators encouraged the open and continuous channel of communication within the school. The fact that they reminded teachers to regularly include environmental learning in their teaching and learning, spoke with the administration staff and cleaning and garden staff through the factotum/Intermediate phase teacher, led to these individuals thinking and acting together about promoting SD. Their initiative led to team learning and it promoted systems thinking because especially the administration and cleaning staff, who also did photocopying, realised that their actions could make a difference, not only environmentally, but financially as well. This shows insight into the application of learning organisation theory to management (cf. 4.3.14). More importantly, the two environmental coordinators practised change management by bringing about changes to the school's management. They acquired skills learned through the experience gained from implementing the EMS and witnessed success in promoting ESD, or what they called environmental protection (cf. 6.4.3 & 4.3.3.2). This was brought about by the delegating style of management of the principal who placed the EMS responsibility on the shoulders of the two environmental coordinators (cf. 4.3.3.1).

- Furthermore, this school followed the example of a learning organisation that by creating, acquiring, interpreting, transferring and retaining knowledge, it also changes its behaviour to reflect new knowledge and insights as can be seen in what the two environmental coordinators learnt at the workshop and after assessing how much electricity the school saved by lowering the thermostat on the geyser and switching off appliances. This type of information needs to be shared with parents and communicated in the school newsletter. It helps to change behaviour and promote ESD beyond the classroom. Organisational learning has taken place since this school has adapted to change and moved forward by acquiring new knowledge, skills or behaviours and thereby transformed itself (cf. 4.3.1.4.1). The school made use of experiential learning as a learning theory for ESD and so plays an important role in learners' development by allowing for a hands-on learning experience (cf. 4.2.5). The inference made is that knowledge management process involving a systematic circular movement that moves from knowledge creation to collection, organisation, refinement, dissemination, and maintenance (cf. 4.3.4.1.2) was the most visible here because the two environmental coordinators' strategy was not only to approach role-players in the school to remind them to implement environmental learning, but they would also convey short informal messages in the staffroom at random. The objectives of EE are prominent here, namely awareness creation, knowledge creation, change in attitude, skills acquisition, and participation by all the role-players. Evaluation does not feature (cf. 3.2.1.2.1). The interpretation made is that although the school's commitment to integrating environmental learning into teaching and learning was fulfilled, and an EMS being implemented, commitments have been standing for two years and an evaluation has not been undertaken.

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### 7.2.3.1 WHO WILL BENEFIT FROM THE EMS FRAMEWORK?

The EMS framework designed for this study is significant because it not only addresses a South African aim to promote ESD, but also fulfils the international call of the UN to promote ESD. I refer to the WSSD's Summit Plan of Implementation that encourages the improvement of social and environmental performance through an EMS. It also calls for the integration of SD into education systems at all levels of education so that education can be promoted as an agent for change (cf. 2.3.1). The purpose of this study is to get schools to implement an EMS and use it as a tool to promote ESD as proposed by the UN (cf. 2.3.1). This EMS framework aims to target three types of schools in South Africa so as to identify unique features in those schools that need to be addressed in order to promote ESD in primary schools nationally by means of an EMS.

### 7.2.3.2 DISCUSSION OF THE DESIGN OF THE EMS FRAMEWORK FOR SOUTH AFRICAN PRIMARY SCHOOLS ON THE BASIS OF A SCHEMATIC REPRESENTATION

Even though each case in this multiple case study, namely a township, farm, and urban school, is specific, the designed framework fits the individual cases, being primary schools. I acknowledge that a case study limitation is generalisability, but a lot can be learned from one particular case and in this study it was from three primary schools (cf. 5.4.2.4). Furthermore, even though external validity concerns itself with the extent to which a study's findings can be generalised and applied to other situations, this study's EMS framework, in my opinion, is applicable to other primary schools. The reason is that, despite being different in their type, these schools all implemented an EMS using general guidelines from the *Education for Sustainable Living* project to promote ESD. These are all based on general management strategies (cf. Chapter 2 & 4), as well as the curriculum (cf. Chapter 3) that are applicable to all schools. With this in mind, this study looked at an in-depth, holistic and situated understanding of how an EMS is implemented in a primary school in a specific context. Understanding that the results are not necessarily applicable beyond the three schools that form part of the case study, the framework serves the purpose of assisting the three schools to better implement the EMS at their school, and it can also serve the purpose of assisting primary schools who find themselves in the same context as those in the cases, who can draw on the similarities of each case to assist them with a more functional EMS.

The EMS framework designed for the three primary schools features a focus on environmental learning and the management of the EMS (cf. Figure 7.1). The EMS

framework seen in Figure 7.1 consists of an outer framework of the EMS (left) within which the central EMS framework is nestled (right). I decided to design the framework for environmental learning based on CAPS since the NCS Grades R-12 that comprises of CAPS is being phased in from 2012 (cf. 1.2), despite this study being conducted whilst the NCS was being used (cf. 3.5.2 & 3.5.3). The contents of Figure 7.1 will be elaborated on briefly next.

The EMS is based on a whole-school approach to promoting ESD. In the central framework (cf. Fig. 7.1 - right) the role-players in the school must all have knowledge and understanding of the EMS, as well as apply systemic and holistic thinking skills. It is recommended that environmental learning promote holistic thinking within themes in place and time, using local, national, regional, international and global scale thinking; knowledge and understanding acquisition, skill development, and values and attitude competencies; human and environmental relations, economic dimensions, decision-making and sustainable behaviours; and a systemic approach that is based on experiential learning. The role-players must all strive to fulfil the five objectives of EE in their respective undertakings and ensure that evaluation is included as an additional objective. The environmental committee must be made up of the role-players, consisting of the principal, governing body representative and all the Heads of Department in the school, in other words, the four or five individuals who are knowledgeable about the management of the school, and/or the teaching and learning component of the school. The ideal is that they all work together to then liaise with their colleagues who report to them. In this way the EMS can maintain momentum. The aim is to do away with the responsibility of being an environmental coordinator, and prevent one person from being the committed coordinator on whom the responsibility of implementing and EMS rests. What is important is that these three “groups” communicate the awareness about the environmental management to their respective groups. The principal will maintain communication and participation with the administration, cleaning and gardening staff. The governing body will maintain contact with the community at large, and promote the school’s environmental plan in its endeavours regarding environmental management, thus publicising it throughout the school and beyond. For example, the Bill of Responsibilities for the Youth of South Africa that outlines the right to live in a safe environment assumes the responsibility to promote SD, conserve, preserve and protect the natural environment, among others (cf. 3.3.3.2) can be promoted. The Heads of Department are the most knowledgeable about the curriculum in their phase and they meet regularly with teachers in their respective phase. They discuss work schedules and lesson plans and can also approach the inclusion of environmental learning. They will be able to address experiential and constructivist learning, and focus on knowledge and skills acquisition strategies with the theme chosen by the school to promote ESD. The environmental committee is not to be prescriptive to

colleagues, but rather see how in their respective areas of expertise they can, together, promote ESD. Top management is expected to be less prescriptive and more supportive of its teachers, since teachers are the influential units of the school who actually hold the power of promoting ESD. For example, in the urban school (cf. 6.4.3) and the township school (cf. 6.4.1) examples were given of how awareness created in the classroom was disseminated at home and brought about sustainable living. In this way everyone will participate and help fulfil the Rio Declaration that refers to environmental issues being best handled with the participation of all concerned citizens to achieve SD (cf. 3.2.1.3.2). Furthermore, teachers can play a more prominent role in promoting ESD if their competencies in ESD (a holistic approach, envisioning change & achieving transformation), as well as competencies that are important to enhance SD, for example, thinking in systems and complex networks, among others (cf. 3.3.3.1), are developed.

It is also important to take note of the school context so that they use the school environment maximally, as well as the school setting that influences the social and environmental factors of the school community, together with the learners' interests and experiences. All the role-players must strive to be role models and lead by example in their attitudes so as to be a positive influence. The subjects that will have the greatest impact regarding environmental learning are listed, but the rest of the subjects also need to be incorporated and addressed. The school needs to assess its situation and this must be undertaken by the environmental committee. They will establish in what direction they want to take the school to promote ESD. A list of important points of implementation is provided as a guideline.

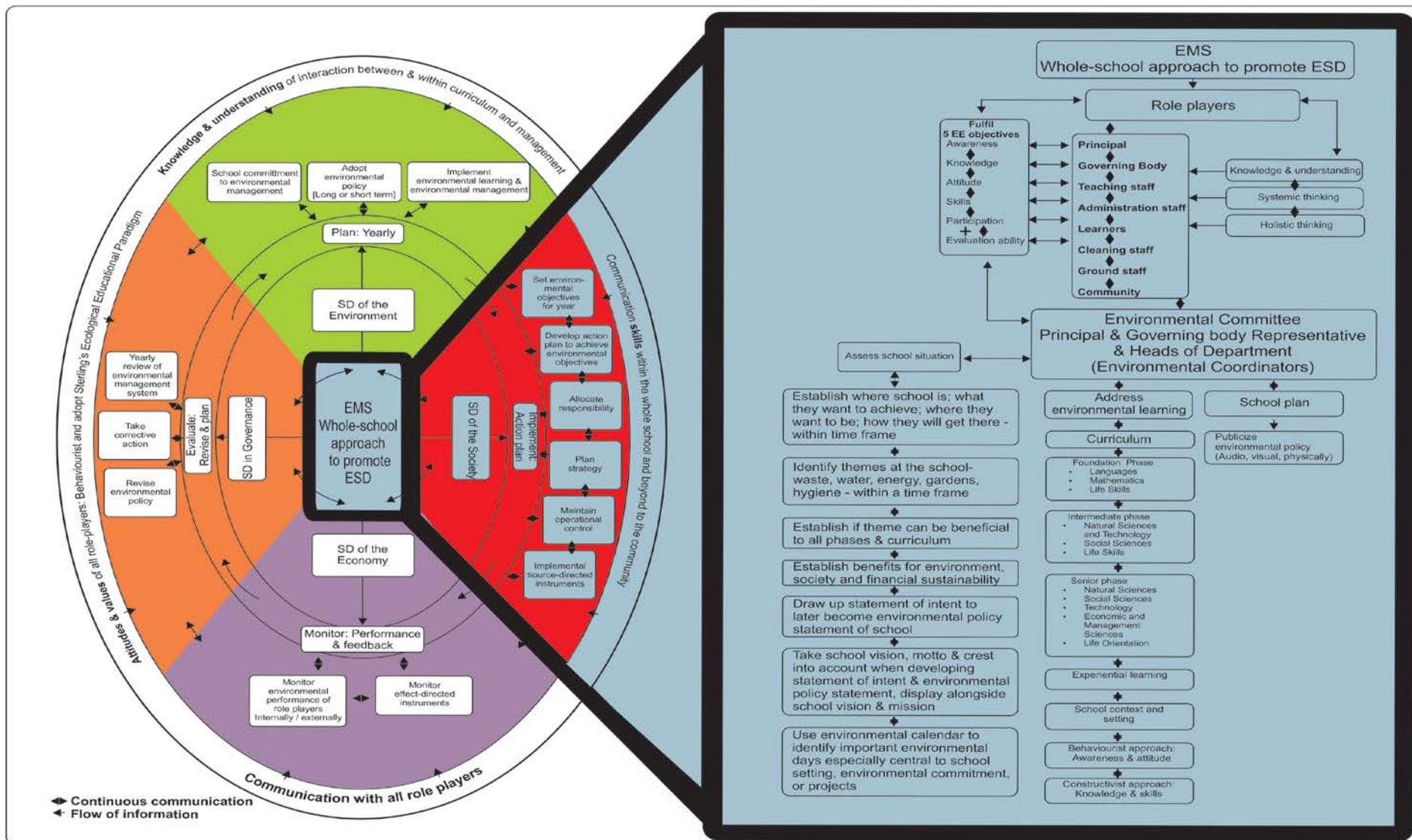


Figure 7.1 The EMS framework showing a whole-school approach to promoting ESD

All of the above is based centrally within the outer framework (cf. Fig. 7.1 - left) that must keep the four pillars of SD in mind and motion. There must be continuous communication and flow of information between all the role-players and management stages in both sections of the framework (cf. 4.3.1.4.3), where communication skills, knowledge and understanding of the interaction between and with the curriculum and management, as well as attitudes and values of role-players, must be conducive to promoting ESD. It is vital that yearly planning is undertaken. The school must commit, formally adopt and implement the EMS. The implementation of the action plan involves setting objectives that need to be reviewed yearly. Schools will decide how many themes they can accommodate in a year and year-on-year the old and new themes should run concurrently, so as to maintain sustainability and continuity. Role-players will be invited to take part and they will plan the implementation of the action plan, be responsible for its implantation in teaching and learning or throughout the school as organisation. The ideal, for the success of implementing an EMS, is to implement a double, top-down and bottom-up approach. The top-down refers to the environmental committee and the bottom-up refers to the role-players to whom the implementation has been delegated with the cooperation and participation of the environmental committee. The ideal effect for promoting ESD is that there will be greater participation of role-players and it will promote feedback (cf. 2.2.1.3). The environmental committee needs to maintain operational control. Source-directed instruments can be used, for example, behaviour-directed slogans around the school or messages of awareness creation at assembly. It is important to monitor the environmental performance of the role-players in the teaching and learning and in the environmental management. Effect-directed instruments can also be monitored for practicality and effectivity, for example, rain harvesting. Very importantly, the EMS must be evaluated on a yearly basis. The literature refers specifically to “audits, measuring and reviewing” as being necessary requirements of an EMS (cf. 2.2). This is to ensure that corrective action can take place and so that the environmental policy can be revised to amend the sustainable journey that the school finds itself in. The evaluation exercise is necessary so that the EMS can be tailored for each school and so that sustainability of the EMS can be ensured.

It is important that the township, farm and urban school as well as other primary schools who find themselves in similar contexts, must be aware of the impact of their socio-economic situation (quintile ranking) and number of learners in the class that influence the practicality of, for example, experiential learning. EMS organisational barriers that need to be given attention and sidestepped are organisational structure, top management commitment, lack of communication in EMS implementation and communication, organisational culture, strategy integration, strategy complexity, and management style (cf. 2.2.4.1). I suggest that when the framework is implemented, change management skills that are learned through experience

in order to flourish be used. The reason is that the yearly evaluation will direct the schools focus and so the school will need to adapt to new ways of operating. It will make them grow in knowledge and skills acquisition and change the behaviours of the learners' experiential learning (cf. 4.3.3.2). Again all the role-players should also apply systemic and holistic thinking practices to their duties. In this way a relationships will exist between systems theory and the implementation of an EMS into a school organisation as a system.

### **7.3 CONCLUSION**

In this chapter I addressed the research question and aims through a discussion of the data, literature study and theory. I focused on my contribution to promoting ESD by discussing the design of an EMS framework for primary schools in South Africa on the basis of a schematic representation (cf. Fig. 7.1). During the discussion of the design of the EMS framework for primary schools the purpose as well as who could benefit were discussed. The implementation of this EMS framework for primary schools is characterised by the whole-school approach to ESD. In Chapter 8 I will provide a summary of the literature study and empirical research. The contribution of this study and recommendations for future research will be stated. The limitations of this study will be indicated and a reflective summary will conclude the chapter.

*Education for Sustainable Development is a task that the world must fulfil in cooperation.  
National Action Plan for Germany, UN-DESD, Berlin (2005)*

# CHAPTER 8

## SUMMARY, CONTRIBUTION, RECOMMENDATIONS, LIMITATIONS AND CONCLUSION

### **8.1 INTRODUCTION**

In Chapter 8 I conclude the study by providing a summary of the literature study and empirical research undertaken. The contribution of this study to new knowledge, which also includes recommendations for further research, is stated. The limitations of this study are noted and the chapter ends with a conclusion.

### **8.2 PURPOSE OF STUDY**

The purpose of this study was to understand how three South African primary schools implemented an EMS to promote ESD and to establish what indicators of the EMS are present at the schools. The EMS is based on a whole-school approach and takes the environment into consideration in all the elements of school life, ranging from teaching and learning to management. The main purpose of this study was to design an EMS framework for the three primary schools in the case study (and for schools who find themselves in similar contexts) with the aim of implementing environmental management and promoting ESD after identifying key indicators in the schools. Since the format of the MOS-project was adapted for schools in South Africa (cf. 2.2.6.1) I feel that the EMS framework presented in this study can also be adapted by the different types of schools in South Africa, especially given that the framework was the result of research undertaken in South African schools and applicable literature.

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## 8.3 SUMMARY OF LITERATURE AND EMPIRICAL RESEARCH

In chapter 2 an EMS as an approach towards promoting ESD was discussed. The chapter revealed that an EMS can be described as a management tool designed to help a school improve its awareness of and control over environmental impacts that require structure with good communication channels between role-players. Also implemented within a school and EMS is a method of integrating environmental care by the inclusion of themes related to the curriculum, and management practices. The EMS can serve as a tool to manage the environmental performance of the school.

Chapter 3 focused on the origins of EE to promote ESD and established that ESD has its origins based in EE and that SD supports EE. It was also found that environmental learning in ESD involves a process of learning to transform, achieved through experiential teaching and learning, and a whole-school approach when addressing environmental, societal, economic and management realms. Thus, when dealing with ESD it involves a network of interrelations within and between four pillars of SD that function as a whole and need to be thought of as a system. Within the context of promoting ESD in a school, the whole-school approach to SD as an approach aims to include all aspects of the school in helping it to become more sustainable. It includes, among others, school governance, pedagogy and curriculum development. It is also established that in South Africa the curriculum does promote ESD, but features more prominently as themes in some Learning Areas and subjects.

Chapter 4 presented the theoretical framework of the study. Of significance to this study is that a new paradigm of thinking is necessary for promoting ESD. Thinking systemically is suggested so as to promote holistic thinking and functionalistic thinking, allowing for a realisation of an organisation's relation to its environment. The interconnections within and between systems need to be highlighted in disciplines when teaching and learning take place, and this must be relative to what is being done by management in the school as an organisation.

In chapter 5 the method of research of this study was explained. The interpretivist research paradigm was explained, as well as the case study design that was employed. Specific focus was given to: the case study research design used; the data collection methods used, namely interviews (one-on-one and focus-group), non-participant observations and documents; the within-case and cross-case data analysis used; trustworthiness, credibility and triangulation as quality criteria; ethical issues; and limitations of the study. The chapter explained how a multiple case study design was used and why.

Chapter 6 presented the results and discussion by using narratives and figures to present the data and to describe the data from the three schools in the study. A within-case analysis for the multiple cases was used to analyse and discuss the research aims, namely *How environmental learning is presently integrated in a township, farm and urban primary school to promote ESD*, and *What key indicators of the EMS in the township, farm and urban primary school can be identified that promote ESD*. A cross-case systems analysis of an EMS implemented in a township, farm and urban school was undertaken based on Bronfenbrenner's ecological systems theory.

Chapter 7 contained a synthesis of the study by presenting the contribution to knowledge by means of an EMS framework that promotes ESD when implemented in South African primary schools as revealed in two figures.

This chapter concludes the study by summarising the literature study and empirical research. It also summarises the contribution of this study to new knowledge, which also includes recommendations for further research. The limitations of this study are indicated and the chapter ends with a conclusion.

## **8.4 CONCLUSIONS OF THE EMPIRICAL STUDY**

- Ideally the positive environmental impact of any EMS implemented in a school as organisation is that a “systematic and comprehensive approach to environmental management” takes place (cf. 2.2), but this systematic and comprehensive approach was proved contrary in practice in the case study schools. This study has shown that an EMS, when implemented in a school, despite been given guidelines to work with, does not follow a rigid path of implementation. It is in fact a management tool that requires planning and organising to fit the context of the school and the management style of the principal. The EMS, as a management tool, is designed to help a school improve its awareness of and control over its environmental impacts (cf. 2.2.4.2).
- The EMS requires a team effort and constant awareness creation, communication and commitment among role-players. Therefore, the EMS requires the involvement and commitment of everybody in management for its successful implementation. Whole-school dedication toward the implementation of the EMS is necessary. Lack of support from a management team member will mean that the implementation process is subjected to difficulties (cf. 2.2.4.2).
- The EMS also leads to the implementation of environmental objectives that have been decided upon, after assessing the school situation. These are then chosen and the

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implementation occurs through teaching and learning, and management practices. Importantly, a review of achievements needs to be undertaken at the end of a set time period, ideally at the end of a school year, something that the schools in the case study omitted to do.

- It can also be concluded that the implementation of an EMS may give rise to the establishment of good environmental management practices if care is taken to follow sound management practices.
- Also, EE in schools should be fundamentally linked to the EMS. This was observed in the themes chosen by the schools. Therefore, active learning through EE and support by management at a school that implements an EMS can ensure the promotion of ESD through environmental teaching and learning. The latter was visible in the indicators identified for each type of school in chapter 6 (cf. Tables 6.1-6.3), and in chapter 7 the indicators clustered according to the four pillars of SD (cf. Tables 7.1-7.3) also highlighted how the objectives of EE were addressed in the three schools.

## 8.5 CONTRIBUTION OF THE STUDY

- In order to promote ESD in South Africa, my primary contribution to research is a framework with guiding indicators for teachers and school management that proposes the inclusion of EE objectives, evaluation and systems theory when implementing an EMS in the township, farm and urban primary school studied.
- The secondary contribution of this study is that the knowledge gained from the multiple case study shows that:
  - The guideline in the *Education for Sustainable Living* project recommending one environmental coordinator to lead the EMS should in fact become the responsibility of the environmental committee consisting of the principal, heads of department and governing body representative who then, as a team, disseminate to and participate with the role-players in the action plan to promote ESD through the EMS (cf. Figure 7.1).
  - From the framework designed for this study, the components of the management process play a central role in the implementation of an EMS. A sound management system and structure need to be present when implementing environmental management.

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- A whole-school approach with role-players who are made aware of and are knowledgeable of the EMS, united can promote ESD.
  - This study also contributes to in-service teacher training since these practising teachers can through workshops be taught how to implement an EMS to promote ESD, and the knowledge about EMS gained from this study can be disseminated at pre-service teacher training level, in environmental management modules. This addresses the support given by the representatives of the Tbilisi +35 communiqué who promote developments in pre-service and in-service teacher education programmes to enhance teachers' competencies in ESD (UNESCO & UNEP, 2012:6). This research study further compliments the Tbilisi +35 initiative that also supports the enrichment of "research and innovation on ESD through the involvement of higher education institutions" in developing countries (UNESCO & UNEP, 2012:4).

## 8.6 LIMITATIONS OF THE STUDY

This study undertook research in three primary schools in South Africa that formed part of the *Education for Sustainable Living* project. All the participant schools implemented an EMS. A limitation is that due to time constraints and the research design not all the schools who took part in the project were part of this study. The research outcomes would have been interesting, but it would also have meant that a quantitative or mixed methods study would have had to been undertaken.

### 8.6.1 RESTRICTIONS IN RESPECT OF DATA COLLECTION METHODS

The greatest restriction regarding the interviews that I encountered was the persistence of participants to speak English, which is a second or third language for some, instead of making use of an interpreter. This interpreter would have, in my opinion, ensured that richer data could have been analysed. Also, in a future study, when using documents as a method to collect data, I will have to request teachers to allow me access to their year planners and/or lesson plans to see how they plan for environmental learning so as to obtain greater insight into their integration. Regarding the focus-group interviews, I would recommend that a focus-group interview be undertaken with the various participant groups consisting of, for example, governing body members, among others, as was done with the learners from

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Grade 4-7. Focus-group interviews, in my opinion, would ensure a rich and meaningful data source.

## 8.7 RECOMMENDATIONS FROM THIS STUDY FOR FURTHER RESEARCH

Despite this multiple case study's findings being based on the understanding of how a township, farm, and urban school implement an EMS in a primary school to promote ESD, the framework will be shared with the DBE (as required by the permission granted - cf. Addendum G) who are in the process of finalising a policy for ESD for schools in South Africa. The results of this study will be formally presented to the DBE so as to inform and encourage them to consider mandating the implementation of an EMS. The aim is that the EMS will aid in the promotion of ESD and aid as a tool to mitigate the effects of Climate Change. The framework may provide insights into the policy makers and in turn influence policy development around ESD promotion. I understand that the case study findings are not meant to be generalised, but further research may be undertaken in EMS in schools and the insights gained from this multiple case study may be useful.

It is important that schools in South Africa that were not part of the *Education for Sustainable Living* project are made aware of how environmental management and the implementation of an EMS can promote ESD and also contribute toward school management.

I would also recommend a study of the school as an organisational unit. It would include matters like organisational structure and school climate, among others, but with a focus on how the EMS has influenced role-player perceptions, behaviour, or even values. Furthermore, research studies into establishing how the organisational structure and school culture have been affected by an EMS implemented in a school will also be meaningful. It is also recommended that future research studies take into consideration that data collection sources for triangulation will not always be freely available and that other avenues need to be explored, for example, reviewing available secondary sources like newsletters and working documents found on the notice boards in staff rooms (Rule & John, 2011:111).

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## 8.8 REFLECTION ON THE RESEARCH STUDY

A study like this should require no justification because it was undertaken to ensure that all living beings can live sustainably together by implementing environmental management into their daily tasks. A school as an organisation of learning, in my opinion, has a duty to educate for SD so that not only care for the environment, but respect, appreciation, conservation, to name a few, can be promoted. Learners can be exposed to learning experiences where solutions can be found to the problems of today, on a local, national and international scale.

I have learnt that the promotion of ESD in a developing country like South Africa requires commitment from the individual, right through to the government authorities, in any organisation. I have also learnt that the implementation of an EMS is faced with challenges and it requires constant attention and management. It needs to be on everybody's agenda and needs to be a work in progress. Achieving SD is not a point that can ultimately be reached, rather it is a continuous task that grows and undergoes changes. Following this study, as a teacher, I would strongly consider developing resources specifically for the promotion of ESD, for teachers to include in lessons, based on the curriculum themes. I have realised that in reality many teachers have to teach large classes and need resource assistance. In this way the EMS implemented in a school can receive support, assist and motivate teachers. I would research how teaching and learning with such teaching and learning support materials can facilitate teachers who have large classes, making environmental learning more educational and enjoyable. As a researcher I would furthermore like to investigate whether and how such support materials are used by teachers to assist them and whether they are effective learning and teaching aids for learners. A qualitative study could help research how ESD has been promoted among teachers and learners who have implemented the EMS.

The framework designed for this study will be presented to the three schools that formed the multiple case study. Attention will be given to providing each school with detailed feedback regarding the findings of the study based on their context. The feedback will not only be disseminated with all the participants, but to all the role-players in the school.

## 8.9 CONCLUSION

This study aimed to answer a research question: *How is an EMS implemented in South African primary schools to promote ESD?* It endeavoured to answer this question by explaining how environmental learning is presently integrated in a township, farm and urban primary school. It was established that the national education policy accommodates environmental learning. The research question was also answered by showing what key indicators of the EMS in the township, farm and urban primary school can be identified that promote ESD. These indicators included examples within teaching and learning as well as management strategies that relate to improved communication within a school as organisation. Lastly, this study's aim was to contribute to knowledge by designing an EMS framework to promote ESD in South African primary schools.

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UN **see** United Nations.

UNCED **see** United Nations Conference on Environment and Development.

UNECE **see** United Nations Economic Commission for Europe.

UNEP **see** United Nations Environment Programme.

UNESCO **see** United Nations Economic and Social Council.

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ADDENDUM A:

INTERVIEW QUESTIONS

**SEMI-STRUCTURED INTERVIEW WITH OPEN-ENDED QUESTIONS**

**Biographical information**

The researcher will take note of the following regarding the participant:

Male or female
Participant's first language
Participant's second language
Age (55+; 55-40; 40-30; 30-22)
Number of years at the school
Number of years of teaching experience
Qualifications and subject major
Learning Area that participant teaches
Position held in the school
Number of years held as Environmental Committee coordinator.
How did appointment as Environmental Committee coordinator come about? Was it a voluntary decision?

**Administration staff, cleaning staff & ground staff member**

What do you do at the school every day?

Who decides what you must do?

Who do you report to?

What is your involvement in the school's management of its environment? Please elaborate by giving examples.

How are you mindful of water, waste, energy, gardens in your work. Please elaborate by giving examples.

Are you aware of the school's EMS and its implementation? Elaborate on your awareness.

How was it implemented?

What role did you play?

What does whole school approach to environmental learning mean to you?

What to your knowledge has been done at the school to ensure that the children learn about and care for their school environment? Please elaborate by giving examples.

How would you describe your involvement in the school's aim of ensuring environmental learning? Please elaborate by giving examples.

Thinking within your job description, what has been undertaken at the school, that shows that it has become environmentally conscious?

Do you think that environmental learning is important for management and education? Please elaborate your standpoint.

Do you find a difference in the school since the implementation of the EMS? Please elaborate by giving examples.

Has management ever asked you to be mindful of the environment in your work when dealing with water, waste, energy, and the school gardens? Elaborate when this has happened. Elaborate how it has happened. Elaborate why it has happened.

Have you found a difference in the learner awareness of the environment since the implementation of the EMS? Please elaborate by giving examples.

Have you ever been made aware of the use of any products that are environment friendly that relate to your work? Please elaborate.

What waste do you dispose of?

How you dispose of the waste?

In your opinion, does a the principal; environmental committee coordinator; teachers; admin personnel members; cleaning staff members; ground staff; governing body; community or learners, have an influence over whether teaching and learning about the environment takes place in the school? Please elaborate on who or what would make a difference.

Share your opinion on whether the implementation of the EMS at the school has created an awareness of prioritising environmental learning in teaching and learning? Please elaborate by giving examples from your experiences.

Share your opinion on whether the implementation of environmental learning at the school has created an awareness of prioritising environmental learning in teaching and learning? Please elaborate by giving examples from your experiences.

Other relevant aspects that come from the narratives will also be explored.

Since the implementation of the EMS at the school, how has it affected your job and the learners?

What is your standpoint regarding the implementation of an EMS in the school? Elaborate.

Other relevant aspects that come from the narratives will also be explored.

### **Community and governing body member**

What is your involvement in the school's management of the environment, if any? Please elaborate by giving examples.

How was the EMS implemented at this school?

Are you aware of the school's EMS and its implementation? Elaborate on your awareness.

How was it implemented?

What role did you play?

How would you describe your involvement in the school's aim of ensuring environmental learning? Please elaborate by giving examples.

What to your knowledge has been done at the school to make learners aware of sustainable living? Please elaborate by giving examples.

What has been undertaken since the implementation of the EMS at the school that shows that it has become environmentally conscious?

What does whole school approach to environmental learning mean to you?

Do you think that environmental learning is important for management and education? Please elaborate your standpoint.

Do you think that environmental learning is important for education? Please elaborate your standpoint.

Have you found a difference in the school since the implementation of the EMS? Please elaborate by giving examples.

Have you found a difference in the learner awareness of sustainable living since the implementation of the EMS? Please elaborate by giving examples.

How has the implementation of the EMS at the school influenced the awareness of prioritising sustainable living in the school? Please elaborate by giving examples from your experiences.

What is your standpoint regarding the implementation of an EMS to ensure Education for Sustainable Development?

In your opinion, does a the principal; environmental committee coordinator; teachers; admin personnel members; cleaning staff members; ground staff; governing body; community or learners, have an influence over whether teaching and learning about the environment takes place in the school? Please elaborate on who or what would make a difference.

What to your knowledge has been done from your side at the school to ensure that environmental learning becomes a reality in the school? Please elaborate by giving examples.

From a management perspective, when and how does the environment get discussed on the agenda of your (governing body or other) meetings? Elaborate with examples.

If you had to inform an outsider about the EMS used at your school how would you describe to him/her the composition and functioning of your school's EMS? Elaborate as far as possible with examples.

Share your opinion on whether the implementation of environmental learning at the school has created an awareness of prioritising environmental learning in teaching and learning? Please elaborate by giving examples from your experiences.

Elaborate on who at the school has created an awareness of prioritising environmental learning in teaching and learning? Please elaborate by giving examples from your experiences.

In (governing body) meetings have you ever asked teachers, or staff, to be mindful of their environment in their work when dealing with water, waste, energy, gardens.

How would you like the school to be mindful of water, waste, energy, gardens in your work any changes to their environment?

What would you like to see or have done at the school that would ensure that teaching and learning about the environment features more prominently at the school? Elaborate with examples.

Other relevant aspects that come from the narratives will also be explored.

### **Environmental coordinator**

What does the term environmental learning mean to you?

How did your appointment as Environmental Committee coordinator come about? Was it a voluntary decision?

How did you discuss the implementation of environmental learning with your colleagues, with respect to teaching and learning and the NCS? Please elaborate by giving examples.

How do you ensure that environmental learning takes place in your lessons? How was/is planning done; inside and outside the classroom? Please elaborate by giving examples.

What has your experience been with respect to implementing environmental learning into your teaching and learning. Please elaborate by giving examples.

What has your colleagues experience been with respect to implementing environmental learning into their teaching and learning? Please elaborate by giving examples.

How did you motivate colleagues to implement environmental learning into the Learning Areas that refer and do not refer to the environment in the outcomes? Please elaborate by giving examples. Did you refer to the four themes?

How was it discussed? What steps were taken? Please elaborate.

Describe, with as many examples as possible, how your school plans for and executes the integration of environmental learning into the daily teaching and learning, inside and outside the classroom. Please refer to examples from the learning programme and work schedule.

How has the implementation of environmental learning been met by colleagues in their teaching and learning practice. Provide examples.

How has the implementation of environmental learning been implemented?

How has the implementation of environmental learning been approached by colleagues in their teaching and learning practice? Provide examples.

Provide examples of how the classrooms have been adapted to promote an awareness toward the environment.

Provide examples of how the school grounds have been adapted to promote an awareness toward the environment.

How has your school property been used in teaching and learning about the environment?

What does whole school approach to environmental learning mean to you?

How has the implementation of the EMS been met by colleagues in their teaching and learning practice. Provide examples.

Have you ever asked teachers, and staff, to be mindful of their environment in their work when dealing with water, waste, energy, gardens. When and how?

What is your view/opinion on the importance of environmental learning for education? Please elaborate.

To your knowledge how and when do your colleagues deal with environmental learning in the classroom? Please elaborate by giving examples from your experiences.

If you had to inform an outsider about how your school implements environmental learning in teaching and learning, what would you have to say? Elaborate as far as possible with examples.

How does the environment committee function at the school. Elaborate on its composition, and role.

What does the term Environmental Education mean to you?

What does the term Education for Sustainable Development mean to you?

What does the Decade of Education for Sustainable Development (2005-2014) mean to you?

How would you describe your schools management style?

**Teaching staff member (and environmental coordinator-who is also a teacher)**

How have you contributed toward the implementation of the EMS in the school? Please elaborate by giving examples.

How was the EMS implemented at your school? Please elaborate on the process by giving examples.

How would you describe your involvement in the school's establishment of an EMS aimed at ensuring environmental learning? Please elaborate by giving examples.

What have you done and what are you doing at school by means of teaching and learning, to ensure that environmental learning takes place in your lesson? Please elaborate by giving examples.

How do you ensure that environmental learning takes place in your lessons?

How or by whom were you told about implementing environmental learning into your teaching and learning?

Provide examples of how in your lessons you have focused on the environment?

When and how do you plan to include environmental learning into your teaching and learning in lessons (work schedule).

Why do you include the environment into teaching and learning?

What have you done and what are you doing at school to make learners aware of environmental learning and sustainable living?

What have you done and what are you doing at school to make staff aware of environmental learning and sustainable living?

Do you refer to the environment of current affairs in your lesson? Provide examples.

What is your standpoint regarding the implementation of an EMS?

What has been undertaken since the implementation of the EMS at the school that shows that it has become environmentally conscious?

How has your school property been used by you and others in teaching and learning about the environment?

What does whole school approach to environmental learning mean to you?

If you had to inform an outsider about the EMS used at your school how would you describe to him/her the composition and functioning of your school's EMS? Elaborate as far as possible with examples.

What type of support, if any, have you received from the *Education for Sustainable Living* project with respect to guidance, support and the running of the EMS? Elaborate.

Do you have any contact with other schools and staff members within SA and abroad that have also implemented an EMS? Elaborate.

In your opinion, does a the principal; environmental committee coordinator; teachers; admin personnel members; cleaning staff members; ground staff; governing body; community or learners, have an influence over whether teaching and learning about the environment takes place in the school? Please elaborate on who or what would make a difference.

Share your opinion on whether the implementation of the EMS at the school has created an awareness of prioritising environmental learning in teaching and learning? Please elaborate by giving examples from your experiences.

Who at the school has created an awareness of prioritising environmental learning in teaching and learning? Please elaborate by giving examples from your experiences.

Has management ever asked you to be mindful of your environment when dealing with water, waste, energy, gardens?, When and how? Provide examples.

How are you mindful of water, waste, energy, gardens. Provide examples.

Do you think that environmental learning is important for management and education? Please elaborate your standpoint.

Do you find a difference in the school's management since the implementation of the EMS? Please elaborate by giving examples.

Do you find a difference in the learner awareness of the environment and sustainable living since the implementation of the EMS? Please elaborate by giving examples.

How has the implementation of the EMS at the school, it influenced the awareness of prioritising the environment and sustainable living in the school? Please elaborate by giving examples from your experiences.

What is your standpoint regarding the implementation of an EMS to promote ESD?

Other relevant aspects that come from the narratives will also be explored.

### **Focus-group Interview and learner**

What does the term environmental learning mean to you at school?

In which Learning Areas did you learn about the environment? Give me examples.

What have you learnt at school about the environment? Tell me, in what context(s) was this learnt?

Are you aware of your school's policy toward the environment? Elaborate your response.(i.e. When and how did you become aware?)

In which contexts have you learnt about the environment at school? Give me examples.

Tell me more about what you have learnt in class during a lesson about how to live sustainably. Give me examples from this year.

Tell me more about what you have learnt in a lesson outside the classroom about how to live sustainably. Give me examples from this year.

What would you still like to know/learn about how to live more sustainably?

Have your teachers or principal or any staff, asked you to be mindful of your environment when at school when dealing with water, waste, energy, gardens. Elaborate when and how, why ?

How are you mindful of your use of water, waste disposal, energy, gardens at school? Provide examples.

Do you think that learning about the environment is important at school? Give me an example of why you say so.

Have all your Learning Areas motivated you to live more sustainably? Elaborate.

Do you think that your school has created a greater awareness to living more sustainably over the past year by implementing the environmental policy?

Can you think of any school related experience that has made you change your thinking about the environment? What was the cause and what has the result been?

Who at school has made the greatest impression on you regarding the importance of the environment we live in? Why?

Who at school has made the greatest impression on you regarding the importance of sustainable living? Why?

What does the term Sustainable Development mean to you at school?

What have you done at school within lessons and on the premises that is related to the environment?

What have you done at school within lessons and on the premises that is related to living more sustainably?

Are you aware of your school's EMS? Discuss how and how you are involved.

How was the EMS implemented at your school?

Are you involved in the school's management of the environment? Please elaborate by giving examples.

How would you describe your involvement in the school's aim of ensuring sustainable living? Please elaborate by giving examples.

What to your knowledge has been done at the school to make learners aware of sustainable living? Please elaborate by giving examples.

What has been undertaken since the implementation of the EMS at the school that shows that it has become environmentally conscious?

How has your school property been used in teaching and learning about the environment?

Other relevant aspects that come from the narratives will be explored.

### **Principal**

Why did you decide to implement an EMS in the school? Please elaborate by giving examples.

How was the EMS implemented at your school? Please elaborate on the process by giving examples.

How would you describe your involvement in the school's EMS aimed promoting ESD? Please elaborate by giving examples.

What have you done and what are you doing at school to make learners and staff aware of the environment? Please elaborate by giving examples.

What have you done and what are you doing at school to make learners and staff aware of sustainable living? Please elaborate by giving examples.

What have you done and what are you doing at school to make learners aware of the environment and sustainable living? Please elaborate by giving examples.

What has been undertaken since the implementation of the EMS at the school that shows that it has become environmentally conscious?

To your knowledge how has your school property been used in teaching and learning about the environment?

What does whole school approach to environmental learning mean to you?

If you had to inform an outsider about the EMS implemented at your school how would you describe to him/her the composition and functioning of your school's EMS? Elaborate as far as possible with examples.

Do you think that environmental learning is important for management? Please elaborate your standpoint.

Do you think that environmental learning is important for education? Please elaborate your standpoint.

As the principal, how would you describe your management style?

Do you find a difference in the school's management since the implementation of the EMS? Please elaborate by giving examples.

Do you find a difference in the learner awareness of the environment since the implementation of the EMS? Please elaborate by giving examples.

How has the implementation of the EMS at the school influenced the awareness of prioritising sustainable living in the school? Please elaborate by giving examples from your experiences.

What is your standpoint regarding the implementation of an EMS to ensure environmental learning?

In your opinion, does a the principal; environmental committee coordinator; teachers; admin personnel members; cleaning staff members; ground staff; governing body; community or learners, have an influence over whether teaching and learning about the environment takes place in the school? Please elaborate on who or what would make a difference.

Share your opinion on whether the implementation of the EMS at the school has created an awareness of prioritising environmental learning in teaching and learning? Please elaborate by giving examples from your experiences.

Who at the school has created an awareness of prioritising environmental learning in teaching and learning? Please elaborate by giving examples from your experiences.

What type of support, if any, have you received from the *Education for Sustainable Living* project with respect to guidance, support and the running of the EMS? Elaborate.

Do you have any contact with other schools, principals and staff members within SA and abroad that have also implemented an EMS? Elaborate.

Have you as principal, ever asked teachers, etc. staff, to be mindful of their environment in their work when dealing with water, waste, energy, gardens. When and how? Provide examples.

How are you mindful of water, waste, energy, gardens in your work. Provide examples.

Other relevant aspects that come from the narratives will also be explored.

ADDENDUM B:

LETTER TO PARTICIPANTS EXPLAINING THE AIM OF THE RESEARCH,  
INTERVIEW PROCESS AS WELL AS THE PURPOSE OF THE DATA  
COLLECTION WITH CONSENT FORM (ADULTS)



**CONSENT TO PARTICIPATE IN DOCTORAL RESEARCH BY THE NORTH-WEST  
UNIVERSITY (POTCHEFSTROOM CAMPUS)**

Dear Sir / Madam

I, Ms Luiza de Sousa, am a lecturer in education at the North-West University (Potchefstroom Campus). I am presently doing doctoral research on Education for Sustainable Development. XXXXXXXX Primary School is involved in the *Education for Sustainable living* project that is funded by the Flemish government in collaboration with the Vrije University of Brussels and the North-West University (Potchefstroom Campus). XXXXXXXX Primary School has implemented an Environmental Management System at the school that is based on a whole-school approach meaning that all the elements of school life take the environment into consideration. It is important for this research to include your views, in line with the whole-school approach, since you have been exposed to the implementation of the Environmental Management System at the school.

The aim of the research study is to address the following research question: How is an Environmental Management System implemented in South African Primary Schools to ensure Education for Sustainable Development?

The main objectives of this study are to:

- To explore how environmental learning is presently integrated in the South African curriculum so as to ensure Education for Sustainable Development.
- To identify the key indicators of the Environmental Management System of the Primary Schools in the case study that promotes Education for Sustainable Development.
- To design an EMS framework that promotes Education for Sustainable Development in South African Primary Schools based on the different types of schools selected in the case study.

The purpose of the research study is design an Environmental Management System framework for South African Primary schools in order to promote Education for Sustainable Development.

You are invited to participate in a research study conducted by myself that will be recorded on camera. I would be most grateful if you would agree to be interviewed in the week X - X XXXXXXXX 2011. This will involve your participation in an interview meaning that you will take part in a discussion with me regarding environmental learning and the Environmental Management System implemented at the school. This research will in no way have a negative impact on your employment obligations. The research study will not place you under any danger. The research output may improve teaching-learning practice in schools regarding the promotion of Education for Sustainable Development through the implementation of an Environmental Management System.

No payment will be made to you as the participant. You enter as a voluntary participant and you under no obligation to grant permission to be interviewed. If permission is granted, you are free to withdraw from participation at any time. You may also refuse to answer any questions you don't want to answer and still remain in the research study. As the researcher I may withdraw you from this research if called to do so by conditions that may arise.

Your identity will also remain anonymous. Confidentiality of all participants' responses is protected. The interpreter that will be used upon your request, if you are not proficient in English, will sign a confidentiality agreement and this will ensure that your responses will not be disclosed. Information will otherwise not be released to anyone except the researcher and promoters. The transcribed data can be reviewed by you at any stage during the research process.

The research results of this study will be made public in the PhD dissertation. Sections of this research will be used for journal articles. You were selected as a possible participant in this research study because the school to which you are affiliated has implemented an Environmental Management System which forms part of this research study.

If you have any questions or concerns about the research, please feel free to contact Prof Barry Richter, my research study promoter at 018 299 1612. By taking part in this research study you are by no means exposing yourself to any legal claims.

Kind regards

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Luiza de Sousa

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**PERMISSION OF PARTICIPANT**

I hereby grant permission to involve myself, as a participant, in this doctoral research study.

The information above was presented to me by Luiza de Sousa in English. I am proficient in the English language. I was given the opportunity to ask questions and these questions were answered to my satisfaction.

I hereby give consent to participate voluntarily in this research study. I have a copy of this form.

\_\_\_\_\_

Name of participant

\_\_\_\_\_

Signature of participant

\_\_\_\_\_

Date

**Participant's role [Please underline]** (principal, teaching staff member, teacher who is the Environmental Committee leader, non-teaching/administration staff member, ground staff member, cleaning staff member, governing body member or community member)

\_\_\_\_\_

Name of researcher

\_\_\_\_\_

Signature of researcher

\_\_\_\_\_

Date

ADDENDUM C:

LETTER TO PARTICIPANTS EXPLAINING THE AIM OF THE RESEARCH,  
INTERVIEW PROCESS, FOCUS-GROUP PROCESS AS WELL AS THE  
PURPOSE OF THE DATA COLLECTION WITH CONSENT FORM (MINORS)



**CONSENT TO PARTICIPATE IN DOCTORAL RESEARCH BY THE NORTH-WEST  
UNIVERSITY (POTCHEFSTROOM CAMPUS)**

Dear Parent / Guardian / Learner

I, Ms Luiza de Sousa, am a lecturer in education at the North-West University (Potchefstroom Campus). I am presently doing doctoral research on Education for Sustainable Development. XXXXXX Primary School is involved in the *Education for Sustainable living* project that is funded by the Flemish government in collaboration with the Vrije University of Brussels and the North-West University (Potchefstroom Campus). XXXXXX Primary School has implemented an Environmental Management System at the school that is based on a whole-school approach meaning that all the elements of school life take the environment into consideration. It is important for this research to include the views of learners, in line with the whole-school approach, since they have been exposed to the implementation of the Environmental Management System at the school.

The aim of the research study is to address the following research question: How is an Environmental Management System implemented in South African Primary Schools to ensure Education for Sustainable Development?

The main objectives of this study are to:

- To explore how environmental learning is presently integrated in the South African curriculum so as to ensure Education for Sustainable Development.
- To identify the key indicators of the Environmental Management System of the Primary Schools in the case study that promotes Education for Sustainable Development.
- To design an EMS framework that promotes Education for Sustainable Development in South African Primary Schools based on the different types of schools selected in the case study.

The purpose of the research study is design an Environmental Management System framework for South African Primary schools in order to promote Education for Sustainable Development.

Your child is invited to participate in a research study conducted by myself that will be recorded on camera. I would be most grateful if you would agree to allow your child to be interviewed in the week X – X XXXXXXX 2011. This will involve your child as a participant in a focus-group interview or individual interview. The discussions involve environmental learning that will be recorded on camera. This research will in no way have a negative impact on your child's academic obligations. Since this is voluntary, you are not obliged to grant permission to allow your child to be interviewed. If permission is granted, your child is

free to withdraw from participation at any time. Participants' identity will also remain anonymous and confidentiality of all participants' responses will be protected.

No payment will be made to you as the participant. Your child may also refuse to answer any questions he/she doesn't want to answer and still remain in the research study. As the researcher I may withdraw your child from this research if called to do so by conditions that may arise.

The interpreter that will be used upon your child's request, if he/she is not proficient in English, will sign a confidentiality agreement and this will ensure that your responses will not be disclosed. Information will otherwise not be released to anyone except the researcher and promoters. The transcribed data can be reviewed by your child at any stage during the research process.

The research results of this study will be made public in the PhD dissertation. Sections of this research will be used for journal articles. Your child was selected as a possible participant in this research study because the school to which he/she is affiliated has implemented an Environmental Management System which forms part of this research study.

If you have any questions or concerns about the research, please feel free to contact Prof Barry Richter, my research study promoter at 018 299 1612. By taking part in this research study your child is by no means exposing him/herself to any legal claims.

I hereby request permission to involve your child as a participant in this doctoral research study. If you are willing to allow your child to participate in this research, please fill in the following page and send it to school with your child the next day.

Kind regards

---

Luiza de Sousa

---

I \_\_\_\_\_ (parents/guardians name),

hereby grant permission for my child

\_\_\_\_\_ (child's name) to participate in the research study being conducted by Ms Luiza de Sousa relating to her doctoral research. I have read the above letter and understand its contents.

\_\_\_\_\_  
Parent/Guardian Signature

\_\_\_\_\_  
Date

I \_\_\_\_\_ (learner's name), hereby grant permission to participate in the research study being conducted by Ms Luiza de Sousa relating to her doctoral research. I have read the above letter with my parents/guardians and understand its contents.

\_\_\_\_\_  
Learner's Signature

\_\_\_\_\_  
Date

ADDENDUM D:

NORTH-WEST UNIVERSITY'S ETHICAL CONSENT FOR PILOT STUDY



Private Bag X6001, Potchefstroom  
South Africa 2520

Tel: (018) 299-4900  
Faks: (018) 299-4910  
Web: <http://www.nwu.ac.za>

**ETHICS APPROVAL OF PROJECT**

**Ethics Committee**

Tel +27 18 299 4850  
Fax +27 18 293 5329  
Email [Ethics@nwu.ac.za](mailto:Ethics@nwu.ac.za)  
2012/09/12

This is to certify that the next project was approved by the NWU Ethics Committee:

<p><b>Project title :</b> Promoting Education for Sustainable Development: An Environmental Management Systems Framework for South African Primary Schools</p> <p><b>Project leader: Prof B Richter</b> <b>Student: L de Souza</b></p> <p><b>Ethics number: NWU-00037-11-A2</b></p> <p><small><u>Status:</u> S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation</small></p> <p><b>Expiry date: 2016/04/20</b></p>
--

The Ethics Committee would like to remain at your service as scientist and researcher, and wishes you well with your project. Please do not hesitate to contact the Ethics Committee for any further enquiries or requests for assistance.

The formal Ethics approval certificate will be sent to you as soon as possible.

Yours sincerely



Me. Marietjie Halgryn  
NWU Ethics Secretariate

ADDENDUM E:

NORTH-WEST UNIVERSITY'S ETHICAL CONSENT FOR MAIN STUDY



Private Bag X6001, Potchefstroom  
South Africa 2520

Tel: (018) 299-4900  
Faks: (018) 299-4910  
Web: <http://www.nwu.ac.za>

**ETHICS APPROVAL OF PROJECT**

**Ethics Committee**  
Tel +27 18 299 4850  
Fax +27 18 293 5329  
Email [Ethics@nwu.ac.za](mailto:Ethics@nwu.ac.za)  
2012/09/12

This is to certify that the next project was approved by the NWU Ethics Committee:

**Project title :** Promoting Education for Sustainable Development: An Environmental Management Systems Framework for South African Primary Schools – Full project

**Project leader:** Prof B Richter  
**Student:** L de Souza

**Ethics number:** **NWU-00107-11-A2**

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

**Expiry date:** 2016/09/21

The Ethics Committee would like to remain at your service as scientist and researcher, and wishes you well with your project. Please do not hesitate to contact the Ethics Committee for any further enquiries or requests for assistance.

The formal Ethics approval certificate will be sent to you as soon as possible.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Me. Marietjie Halgryn', written over a horizontal line.

Me. Marietjie Halgryn  
NWU Ethics Secretariate

ADDENDUM F:

WRITTEN CONSENT FROM NORTH WEST PROVINCE'S DEPARTMENT  
OF BASIC EDUCATION



**education**

Lefapha la Thuto  
Onderwys Departement  
Department of Education  
**NORTH WEST PROVINCE**

First Floor,  
Garona Building  
Private Bag X2044,  
Mmabatho 2735  
Tel.: (018) 387-3429  
Fax: (018) 387-3430  
e-mail: ptyatya@nwpg.gov.za

**OFFICE OF THE SUPERINTENDENT-GENERAL**

Enquiries: Ms M.J. Mogotsi  
018-388 3433

15 August 2011

To: Ms De Sousa  
Doctoral Student: North West University  
Potchefstroom Campus

From: Dr M.A. Seakamela  
Acting Superintendent General

**SUBJECT: REQUEST FOR PERMISSION TO CONDUCT RESEARCH:  
PROMOTING EDUCATION FOR SUSTAINABLE DEVELOPMENT:  
AN ENVIROMENTAL MANAGEMENT SYSTEMS FRAMEWORK  
FOR SOUTH AFRICAN PRIMARY SCHOOLS.**

Please be informed that the permission has been granted for you to conduct research at Primary School in in the North West Province. Approval is therefore granted under the following conditions:

- That consultation with the school identified is done
- That the necessary information related to the evaluation process is shared with the school
- That any publication of information pertaining to the department should be done with the permission from the department
- That learning and teaching process is not compromised
- That the department be furnished with the outcomes of the research

Your input in contributing to the betterment of education will be appreciated

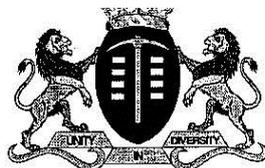
Regards

**Dr M.A. Seakamela**  
Acting Superintendent General

**Cc: Dr J. A Myburgh: Executive Manager: General & Further Training Services**

"TOGETHER, DOING MORE, BETTER"

ADDENDUM G:

WRITTEN CONSENT FROM GAUTENG PROVINCE'S DEPARTMENT OF  
BASIC EDUCATION

**education**  
Department: Education  
GAUTENG PROVINCE

For administrative use:  
Reference no. D2012/132

**GDE RESEARCH APPROVAL LETTER**

Date:	28 July 2011
Name of Researcher:	De Sousa L.O.
Address of Researcher:	1 Caledon Street
	Stilfontein
	2551
Telephone Number:	018 484 3594 / 083 468 6726
Fax Number:	018 484 3594
Email address:	luiza.desousa@nwu.ac.za
Research Topic:	Promoting Education for Sustainable Development : An environmental Management System framework for South African Primary Schools
Number and type of schools:	TWO Primary Schools
District/s/HO	East

**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:

1. The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.
2. The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.
3. A copy of this letter must be forwarded to the school principal and the chairperson of the School

I

*Making education a societal priority*

**Office of the Director: Knowledge Management and Research**

9<sup>th</sup> Floor, 111 Commissioner Street, Johannesburg, 2001  
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0506  
Email: David.Makhado@gauteng.gov.za  
Website: www.education.gpg.gov.za

- Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.
4. A letter / document that outlines the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.
  5. The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.
  6. Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.
  7. Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year.
  8. Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.
  9. It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.
  10. The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.
  11. The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.
  12. On completion of the study the researcher must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.
  13. The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.
  14. Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards



Shadrack Phele MIRMSA  
[Member of the Institute of Risk Management South Africa]  
CHIEF EDUCATION SPECIALIST: RESEARCH COORDINATION

28 July 2011

2

*Making education a societal priority*

**Office of the Director: Knowledge Management and Research**

9<sup>th</sup> Floor, 111 Commissioner Street, Johannesburg, 2001  
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0508  
Email: David.Makhado@gauteng.gov.za  
Website: www.education.gpg.gov.za

ADDENDUM H:

INTERPRETER'S CONFIDENTIALITY AGREEMENT

**CONFIDENTIALITY AGREEMENT: INTERPRETER**

I agree that all data observed and interpreted at XXXXXXX Primary School for Ms Luiza de Sousa's doctoral research study will remain anonymous and confidential. All responses from the participants will be protected, ensuring no disclosure. Information will otherwise not be released to anyone except the researcher and promoters.

\_\_\_\_\_

**Name and signature of interpreter**

I hereby agree not to reveal information acquired while interpreting during the interviews conducted by Ms Luiza de Sousa at XXXXXXX Primary school.

\_\_\_\_\_

Name of interpreter (Please print)

\_\_\_\_\_

Signature of interpreter

\_\_\_\_\_

Date

\_\_\_\_\_

Name of researcher (Please print)

\_\_\_\_\_

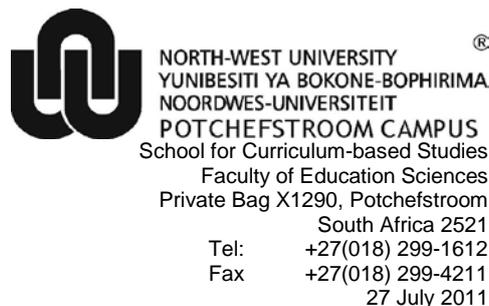
Signature of researcher

\_\_\_\_\_

Date

ADDENDUM I

PROJECT LEADER'S LETTER REQUESTING PERMISSION FROM THE  
NORTH WEST AND GAUTENG PROVINCIAL DEPARTMENT OF BASIC  
EDUCATION AS WELL AS THE THREE SCHOOL PRINCIPALS TO  
CONDUCT RESEARCH



Dear

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT \_\_\_\_\_ PRIMARY  
SCHOOL IN THE \_\_\_\_\_ PROVINCE

I hereby request permission for Ms Luiza de Sousa to do empirical research at  
\_\_\_\_\_ Primary School in the \_\_\_\_\_ Province.

Ms Luiza de Sousa (Personnel number 10848509) is enrolled as a PhD student in the School for Curriculum-based Studies, at North-West University (Potchefstroom Campus). The title of her dissertation is: *Promoting Education for Sustainable Development: An Environmental Management Systems Framework for South African Primary Schools*.

Ms De Sousa would like to conduct her research study's empirical research at \_\_\_\_\_ Primary School since the farm school is part of the *Education for sustainable living* project that is a collaboration between the Vrije University of Brussels and the North-West University (Potchefstroom Campus) funded by the Flemish government. Her research deals with the Environmental Management Systems implemented in the Primary schools. Her research will require the participation of learners as well as the principal, a teaching staff member, the teacher who is the Environmental Committee leader, a non-teaching/administrative staff, a ground staff member, a cleaning staff member, a governing body member and a community member. This forms part of the whole-school approach. This is an approach that incorporates all the members/role-players of school life.

The aim of this research is to design an Environmental Management Systems framework that can be implemented in the South African Primary schools so as to promote Education for Sustainable Development.

The information obtained from the school, learners, principal, staff members and all other role-players will be handled confidentially. The information will be handled within the ethical rules of research determined by the North-West University and informed consent, voluntary participation and respect for anonymity will be adhered to.

I hope that will be able to accommodate Ms De Sousa. Your assistance is greatly appreciated in this respect.

Yours sincerely



Prof Barry Richter

Director of the School for Curriculum-based Studies

ADDENDUM J:

LETTER FROM THE LANGUAGE EDITOR VERIFYING THE CORRECT  
LANGUAGE USE IN THE THESIS

*Rita van Wyk*

*Language Practitioner  
Afrikaans – English / English – Afrikaans*

084 5484177  
rieviewa@mweb.co.za

~~~~~

**DECLARATION**

09 October 2012

I herewith declare that I was responsible for the language editing of the PhD  
thesis:

**Promoting Education for Sustainable Development: an Environmental  
Management Systems Framework for South African Primary Schools, by Ms  
Luiza de Sousa.**

**South African English was used for the purposes of this thesis.**



**M J VAN WYK**

BA (Unisa)  
Advanced Dipl in Translation and Interpreting Cum Laude (UFS)  
Accredited member of the SA Translators' Institute

~~~~~

ADDENDUM K:

LETTER FROM PROFESSOR CJH LESSING VERIFYING THE ACCURATE  
CONTROL OF THE BIBLIOGRAPHY

1 Gerrit

Dekker Street

POTCHEFSTROOM

2531

7 October 2012

Ms De Sousa

NWU (Potchefstroom Campus)

POTCHEFSTROOM

### **CHECKING OF BIBLIOGRAPHY**

Hereby I declare that I have checked the technical correctness of the Bibliography of the DPhil.-thesis of Ms Luiza De Sousa according to the prescribed format of the Senate of the North-West University.

Yours sincerely



**Prof CJH LESSING**