

SCHOOL GROUNDS AS A PLACE FOR ENVIRONMENTAL LEARNING IN THE LIFE SKILLS LEARNING PROGRAMME

A half-thesis submitted in partial fulfillment of the requirements for the Degree of
Master of Education (Environmental Education)
At Rhodes University

By
Sindiswa Mambinja

30 April 2008

Supervisor: Ms Ingrid Schudel
Co-Supervisor: Professor Heila Lotz-Sisitka

ABSTRACT

With the intention of improving my own practice, the study investigated how school grounds could be used for environmental learning in the Foundation Phase Life Skill Learning Programme within the Revised National Curriculum Statement. The research was conducted in the Grade One class of Ntaba Maria Primary School situated in Grahamstown East.

The study was an action research case study based on interpretive approach to research. It had two cycles comprised of two lesson plans. The first Lesson Plan focused on an audit of the school grounds to identify environmental issues. The second Lesson Plan was informed by the audit, and addressed one of the identified environmental issues. Data was gathered through analysis of curriculum documents, video recordings and photographs of learning interactions, journal entries and learners' work.

The study highlighted that school grounds provided a context for environmental learning within Life Orientation Learning Area especially when integrated with other learning areas. There were cases however, where assessment standards were only partly addressed. The study also revealed that the Life Orientation Learning Area was also limiting for school grounds learning opportunities in some cases. In other cases the study highlighted the open-ended nature of some of its assessment standards.

The study also revealed how school grounds related activities offered opportunities and challenges for constructivist, situated and active learning. Opportunities and challenges regarding group work, language use, active engagement with information learning in authentic settings, and action and action competence; emerged as issues from the analysis.

Finally, the study shed light on how reflection on learners' work and assessment of these could help teachers modify activities and do them differently so as to enhance the achievement of skills, knowledge, attitudes and values. The achievement of investigative and problem-solving skills through the two lesson plans was critically evaluated as the processes of values education employed in the lesson implementation.

DEDICATION

I dedicate this thesis to my grandmother, Notumata Nothusile Mkangeli; brother, Mluleki Tokwe; and friend, MyDali, who believed in me but did not make it to the end.

ACKNOWLEDGEMENTS

First of all, I would like to give thanks to Almighty God for providing and supporting me throughout my years at Rhodes University. I believed that what He brought me to; He will get me through it.

Also I express my gratitude to a few people without whom this research would not have been possible. To my principal, Mr Rodney Scheepers, for opening his heart for me to grow academically. To the Grade One class of 2005 and their parents, for allowing me to use their work in the study. To my replacement teacher, MakaBhabhi, you are a Star. I am greatly indebted to you all.

My sincere thanks goes to my Supervisor, Ms Ingrid Schudel for constantly focusing my attention by asking me to relate everything to the research question, for looking into the nitty gritty details of my writing to clarify thoughts and concepts, and your critical but constructive comments throughout the study. This really helped to improve not only my writing skills but academic writing as well. The journey was VERY long, at times I vanished but you found me. I am also thankful to ALL the Education Department staff of Rhodes University, but a special thank you to the Environmental Education and Sustainability Unit staff. But, *isiXhosa* says "*iinkwenkwezi ziyashiyana ngobuqaqawuli*", Heila Lotz-Sisitka, you are SPECIAL in many ways, thank you for putting me under the supervision of a thorough person.

My appreciation also goes to Helen Fox and Nellie Chipchwanya for helping me in gathering video data, Jonathan Scheepers for making it viewable. Guys, without your help there would have been no study.

To my family, Sontombi, *namaTshawe*, *ndiyanibulela ngenkxaso yenu nikwelemimoya*. Makhulu, I miss you MaDlamini. Mluleki brother, I couldn't have made it without your untiring support up to as far as you have left me. Thank you for putting up with every nonsense I gave you. You are a TRUE YOUNGER BROTHER. Nwabisa and Fifi, this is for you - do not stop dreaming because it is one of the greatest gifts you have.

Friends, a lot of things have happened during the course of this study. Through your support either with a word of encouragement, asking how the learning is going, consideration in many ways, or prayers, I managed them all. **THAT'S WHAT FRIENDS ARE FOR – BRAVO!!!.**

Lastly, I thank the National Research Foundation for the scholarship they provided me to undertake this research.

OOPS!!! I did it again. Ooh la la!

TABLE OF CONTENTS

ABSTRACT	i
DEDICATION	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	v
LIST OF ANNEXURES	viii
LIST OF ACRONYMS	ix
LIST OF FIGURES AND TABLES	x
CHAPTER 1: CONTEXT OF THE STUDY	1
1.1. Introduction	1
1.2. Rationale	1
1.3. Purpose of the research	2
1.4. History of the community	3
1.5. The school context	4
1.6. Learners' context	5
1.7. Language and learning	6
1.8. Overview of the chapters	7
CHAPTER 2: LITERATURE REVIEW	9
2.1. Introduction	9
2.2. Environmental issues pertinent to the study	9
2.2.1. Water issues pertinent to the study	9
2.2.2. Waste issues pertinent to the study	10
2.2.3. Soil issues pertinent to the study	11
2.3. The South African Constitution and changing Education Policy	11
2.3.1. Curriculum developments	12
2.3.2. Values in the curriculum	13
2.3.3. New expectations for teachers in the Outcomes Based Education system	14
2.3.4. Environment in the Life Skills Learning Programme	16
2.4. Learning theories and strategies relevant to this study	18
2.4.1. Constructivism	18
2.4.2. Perspectives on social constructivism	19
2.4.3. Cognitive processes and language	21
2.4.4. Situated learning	21
2.4.5. Active learning and action competence	23
2.5. Lesson planning and assessment	25
2.6. School grounds as context for teaching and learning	27
2.6.1. School grounds as sites for learning	27
2.7. Conclusion	28
CHAPTER 3: RESEARCH METHODOLOGY	29
3.1. Introduction	29
3.2. Research methodology	29
3.2.1. Action research	31
3.2.2. The action research spiral	32
3.3. Data generation techniques	35
3.3.1. Document analysis	35
3.3.2. Video and photographs	36
3.3.3. Journal	37

3.4. Data analysis	37
3.5. Ethics and trustworthiness	38
3.6. Validity	39
3.7. Conclusion	39
 CHAPTER 4: ACTION AND DATA PRESENTATION	 40
4.1. Introduction	40
4.2. Cycle One	40
4.2.1. Description of and reflection on the planning and design of the Cycle One Lesson Plan	40
4.2.1.1. Introducing Lesson Plan 1	40
4.2.1.2. Curriculum policy analysis	40
4.2.1.3. Interpretation of Learning Outcomes and Assessment Standards used in Lesson Plan 1	41
4.2.1.4. Integration of other Learning Outcomes and Assessment Standards from other Learning Areas	43
4.2.1.5. Contextualising Assessment Standards	43
4.2.1.6. Participatory learning	45
4.2.2. Activities and preliminary data analysis for Cycle One	45
4.2.2.1. Activity One – Discussion of photographs	45
4.2.2.2. Activity Two – Making binoculars	50
4.2.2.3. Activity Three – Drawing pictures of school grounds	51
4.2.3. Emerging issues from the preliminary analysis of Cycle One activities	54
4.2.3.1. Teaching methods and strategies	54
4.2.3.2. Achievement of skills, knowledge, attitudes and values	56
4.2.3.3. Learning in English as a First Additional Language	56
4.2.3.4. Lesson Plan design	56
4.3. Cycle Two	57
4.3.1. Description and reflection on the planning and design of the Cycle Two Lesson Plan	57
4.3.1.1. Introducing Lesson Plan 2	57
4.3.1.2. Curriculum policy analysis	58
4.3.1.3. Interpreting Learning Outcomes and Assessment Standards	58
4.3.1.3. Contextualising Learning Outcomes	60
4.3.2. Activities and preliminary data analysis for Cycle Two	60
4.3.2.1. Activity One – Storytelling	60
4.3.2.2. Activity Two – Discussion of ‘not looking after water’ pictures	62
4.3.2.3. Activity Three – Water audit activities	64
4.3.2.4. Activity Four – Measurement	66
4.3.3. Emerging issues from the preliminary analysis of Cycle Two activities	68
4.3.3.1. Teaching methods and strategies	68
4.3.3.2. Teacher as reflexive practitioner	69
4.3.3.3. Achievement of skills, knowledge, attitudes and values	70
4.3.3.4. Assessment	71
4.3.3.5. Lesson Plan design	71
4.3.3.6. Teaching and learning support materials	72

4.4. Synthesis and summary of emerging issues	72
4.4.1 Issues emerging from Lesson Planning	72
4.4.2 Issues emerging from implementation	72
CHAPTER 5: DISCUSSION OF FINDINGS	74
5.1. Introduction	74
5.2. Analytical Statement 1	74
5.2.1. Working with content specific and open-ended Assessment Standards	74
5.2.2. Integrity of the curriculum	75
5.2.3. Integration with other Learning Areas	75
5.3. Analytical Statement 2	76
5.3.1. Preparing learners for learning in the school grounds	77
5.3.2. Development of problem solving skills	77
5.3.3. Development of investigative skills	78
5.3.4. Working with values and attitudes	78
5.3.5. Developing understanding	79
5.4. Analytical Statement 3	79
5.4.1. Constructivist learning processes	80
5.4.2. Dimensions of active learning revealed by the study	82
5.5. Analytical Statement 4	83
5.5.1. Learning in an authentic setting	83
5.5.2. LTSMs for situated learning	83
5.5.3. Situated learning requires a broad range of teacher knowledge and skills	84
5.6. Analytical Statement 5	85
5.6.1. Teacher as a researcher	85
5.6.2. Giving instructions in view of LOs and ASs	85
5.6.3. Assessment as a cyclic process	85
5.6.4. Strengthening the achievement of SKAVs	86
5.7. Conclusion	86
CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS	87
6.1. Introduction	87
6.2. Summary of the study	87
6.3. Overview of the main findings	87
6.4. Recommendations	90
6.5. Reflections on the research process	92
6.5.1. Methodological findings and recommendations	92
6.6. Concluding summary	94
LIST OF REFERENCES	95
APPENDICES	102

LIST OF ANNEXURES

ANNEXURE A: Coded video transcript	102
ANNEXURE B: Journal reflections	103
ANNEXURE C: Analytic memo	104
ANNEXURE D: Letter of consent	108
ANNEXURE E: Lesson Plan 1	109
ANNEXURE F: Drawing of problems	112
ANNEXURE G: Learner's audit worksheet	113
ANNEXURE H: A mythological story	114
ANNEXURE I: Lesson Plan 2	117
ANNEXURE J: Uses of water	121
ANNEXURE K: Guided water audit sheet	122
ANNEXURE L: Measurement worksheet 1	123
ANNEXURE M: My own measurements	124
ANNEXURE N: Assessment records	125
ANNEXURE O: Record of water audit activities	126
ANNEXURE P: Consequences of water misuse	127

LIST OF ACRONYMS

ASs	Assessment Standards
C2005	Curriculum 2005
DoE	Department of Education
EECI	Environmental Education Curriculum Initiative
HSRC	Human Sciences Research Council
LfS	Learning for Sustainability Pilot Project
LOs	Learning Outcomes
LP	Lesson Plan
LTSM	Learning and teaching support materials
NCS	National Curriculum Statement for Grades R-9
NEEP-GET	National Environmental Education Project for General Education Training
OBE	Outcomes Based Education
SKAVs	Skills, Knowledge, Attitudes, Values
ZPD	Zone of Proximal Development

LIST OF FIGURES AND TABLES

FIGURES

Figure 1.1	Ntaba Maria Primary school grounds	5
Figure 3.1	Action research cycles	33
Figures 4.1(a,b,c,d)	Learners at work	51

TABLES

Table 4.1	Life Orientation LOs and ASs	42
Table 4.2	Integration with other learning areas	43
Table 4.3	Issues reflected in learners' drawings	49
Table 4.4	LOs and ASs used in LP2	59
Table 4.5	Analysis of learners' drawings	62
Table 4.6	Measuring water	67
Table 4.7	Rubric	68

CHAPTER 1

CONTEXT OF THE STUDY

1.1. INTRODUCTION

This chapter provides background to the study. It begins with the rationale for undertaking the research and makes reference to Eco-Schools and how this organisation recommends integrating environmental learning in the school grounds within the curriculum. It then goes on to discuss the purpose of the research and shares the research question and goals, and the focus of the study. It continues with a brief history of the community where the school is situated and the context of the school and the learners, and includes a discussion on the learners and issues of language and learning. The chapter also outlines the context of my work as a Foundation Phase teacher at Ntaba Maria English medium Primary School. It concludes with an outline of the chapters in the thesis.

1.2. RATIONALE

As a Foundation Phase teacher operating within a context of a changing curriculum that has brought along with it a challenge of implementing environmental education and putting curriculum principles into practice, I needed to be certain about how to go about responding to the environmental focus of the curriculum. The South African Outcomes Based Education (OBE) curriculum requires teachers to be reflexive practitioners and to develop applied competence as articulated in the newly developed *Norms and Standards for Educators Policy* (South Africa. Department of Education (DoE), 2000). This policy requires teachers to develop practical, foundational and reflexive competence, which means that teachers should teach well, know what they are teaching and why, and change their practice in response to action and review processes.

School grounds have the potential to create environmental learning opportunities because they provide access to real life natural experiences, for example, exploration of living and non-living things, recycling, social interaction through environment-child relationships, sensory stimulation and others (Malone & Tranter, 2003). In South Africa this has been encouraged by the Eco-Schools project.

Eco-Schools is an international programme of the Foundation for Environmental Education. In South Africa the programme is being developed and managed by the Wildlife and Environment Society of South Africa, a

member of the Foundation for Environmental Education, in a cooperative relationship with the Department of Education.

(Ward & Schnack, 2003, p.142)

Eco-Schools South Africa was launched in June 2003 with the aim of strengthening the ability of schools to implement the principles of the Revised National Curriculum Statement (NCS)¹ in all learning areas. It “encourages learners to participate in decision-making processes and develop responsible attitudes and commitment to improving school ...environments” (Ashwell, 2003, p.12). The programme requires visible curriculum work and evidence of environmental learning in schools. This motivated me to focus on school grounds as an opportunity for environmental learning.

I believed that through environmental activities and curriculum work linked to the school grounds, environmental issues could be addressed. This was the motivation for focussing this research on the use of school grounds for environmental learning.

The Eco-Schools programme locally (Makana cluster in Eastern Cape) supported teachers to respond to the challenge of responding to environmental issues in their local context and provided them with an opportunity to develop skills to put the NCS into practice (Timmermans & Gon, 2003). Registering for the programme in 2006 helped me to identify priority areas in the school environment for improved environmental learning. This was achieved through the development of an environmental policy and environmental learning curriculum activities, which involved developing lesson plans that include environment as an integral part of the different Learning Programmes in the Grade One class as required by the NCS. This, together with work on this MEd environmental education thesis, helped me to gain Eco-Schools status for Ntaba Maria in 2006. This means that Ntaba Maria was recognised by the Eco-Schools programme as an Eco-School and awarded an Eco-School flag.

1.3. THE PURPOSE OF THE RESEARCH

“All research is enquiry conducted for some purpose, ... the main purpose of action research is to bring about an improvement in practice” (McNiff, Lomax & Whitehead, 1996, p.13). Action research is a form of practitioner research that can be used to

¹ National Curriculum Statement for Grades R-9 [formerly referred to as the Revised National Curriculum Statement (RNCS)]

help teachers improve their professional practices in many different workplaces (see Section 3.2.1.). In this study I set out to explore, through action research, how the school grounds could be useful for environmental learning in the Grade 1 Life Skills Learning Programme. In my class I teach all the three Learning Programmes required in the Foundation Phase which are Literacy, Numeracy and Life Skills (South Africa. DoE, 2002a). In this research the focus is Life Orientation which is the backbone for the Life Skills Learning Programme in the Foundation Phase. The research project had two cycles. The first was an audit of the school grounds to identify environmental learning opportunities, constituted as a lesson plan. The second included the design, teaching and assessment of a lesson plan informed by the audit.

The research question was: How can the school grounds be used for environmental learning in the Grade One Life Skills Learning Programme?

The goals for the research were to:

- Develop a lesson plan to audit the school grounds for environmental learning opportunities.
- Develop an additional lesson plan using the school grounds in the Life Skills Learning Programme.
- Trial and review lesson plan activities and teaching practices using school grounds in the Life Skills lessons.

The research was undertaken in my school, Ntaba Maria, which is situated in Grahamstown East, which I now describe in more detail.

1.4. HISTORY OF THE COMMUNITY

“Grahamstown East, or Rini ... is home mainly to the black population of Grahamstown” (Moller, 2001a, p.4). The *amaXhosa* population were attracted in the early 19th century by the military and railway construction. The *amaMfengu* (Fingo's) were given title deeds to Fingo village in 1855 (Gibbens, 1982 & Hunt, 1958 as cited in Moller, 2001b). Later other areas known as Old Municipality Location in 1860, Tanti in 1870, Newtown in 1927, Xolani in 1938, Makana's Kop in 1957, Ndancama in 1969, Silvertown in 1977, and so on were established (Moller 2001b). The population continued to grow as did the need for housing. The Group Areas Act of the 1950's caused racial groups to occupy different areas where living conditions

were poor for blacks and coloureds because those in authority (the white nationalist government) gave little attention to improving living conditions and quality of life in these communities.

Grahamstown East became overcrowded. The population figures were 97 210 in the 1999/2000 census. "The corresponding population figure for Grahamstown as a whole was 124 758" (Moller, 2001b, p.14). As housing developments were inadequate or absent, residents started building low cost informal housing or temporary residential areas. These houses were built by people who were from the farms "who were not anxious to be modern" (Manona, 1988, p.308). This gave the township a rural look. By that time Extensions were already built. The most affluent households are in Extension 4 and 5. Some of the houses in Extension 6 were built for Rhodes University employees. Presently the housing developments have expanded and have improved, and extensions go as far as Extension 9. The informal housing and temporary residential areas have also improved, for example, Silvertown residents have been moved to Vukani Location which is a reconstruction and development programme of the post 1994 government.

Grahamstown East is an over-crowded community with a remarkably high unemployment rate "... an estimate of unemployment among the economically active ... would be approximately between 46% (survey results) and 54% (census results)" (Moller, 2001b, p.15). A contextual profile of Ntaba Maria revealed that the school is faced with environmental issues such as land degradation, poor waste management, and poor management of natural resources such as water (Mambinja, 2004).

1.5. THE SCHOOL CONTEXT

Ntaba Maria primary school is an urban school on a gentle sloping site with very small school grounds and very limited natural vegetation. It has a number of mature and immature trees. The open play environment consists of a netball court, cement floors, a small jungle gym area and a small soccer field with no grass.

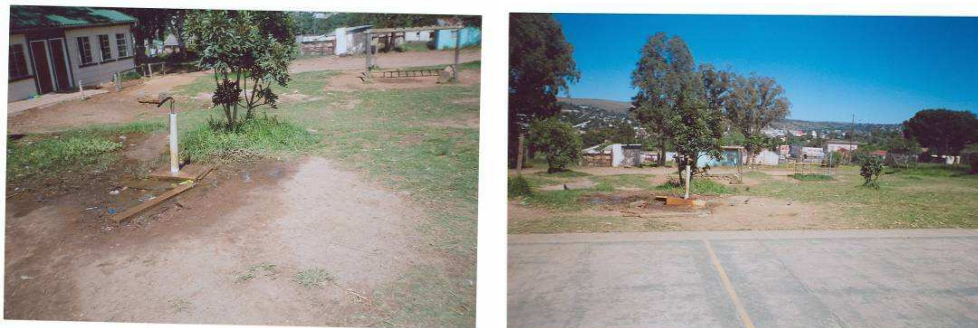


Figure 1.1 Ntaba Maria Primary school grounds.

The official designation of the school is a public school on private property. The property is owned by the Roman Catholic Church situated next to the school. Its establishment was the realisation of a dream to re-establish the former St Peter Claver's Catholic School that closed after being handed over to the government in the early 1980s. The school served black community members who could not afford to take their children to former model C schools due to their inability to pay fees. The school is the first English medium primary school in Grahamstown East. The re-establishment of the school indicated the commitment of the Catholic Church to education in South Africa. It started at the back of the church vestry in April 1993 with 18 learners who were drawn from other public primary schools in Grahamstown East. Most of the learners were Catholics. That was the learners' first year in Sub B² being introduced into learning through the medium of English³ with the help of an interpreter. The learners' home language was taught as a subject later in that year.

The school now has an enrolment of 437 learners from Grades R-9 including the pre-Grade R learners. 362 learners (Grades 1-9) occupy the primary school which is the size of five plots in Fingo village. The Grade R and the pre-Grade R classes occupy another plot in another street which is also the property of the church. The size of land occupied by these 437 learners is small compared to other public schools in the area.

1.6. LEARNERS' CONTEXT

The Grade One class which I teach has 43 learners who have had two years of pre-school experience. Their age cohort is seven years. My home language as well as

² In the new Education policy framework Sub B is Grade 2.

³ This is now called the language of learning and teaching, which is not the learners' home language but their first additional language.

the home language of the learners is isiXhosa but the language of learning and teaching is English. Learners have been introduced to English at pre-school by non-mother tongue speakers. Two of the learners have been identified as having barriers to learning. They are attending occupational therapy sessions.

Ntaba Maria caters for learners mainly from Grahamstown East. Parents wanted their children to be introduced to English at an early age right through from Grade R to Grade 9 so that they would not be in the same situation which their parents experienced, in which they were not able to get good jobs because they were not fluent in English. Parents see English as the language of work, a gateway to a better life; and the school provides hope for better education for their children.

1.7. LANGUAGE AND LEARNING

In Section 2.4.3. I have argued the importance of language in learning. A good grasp of the language of learning is also essential for environmental learning which is reliant on discussion around complex issues. Thus, the following section outlines the context of language and learning in this case study. In South Africa the language policy recognises African languages through legislation and most importantly, through the NCS which clearly promotes additive multilingualism in education. Additive multilingualism is when learners learn their home language and an additional language, they become competent in this additional language while their home language is maintained and developed (South Africa. DoE, 2002b, p.4). It also articulates the importance of learning in ones' home language where this is reasonably practicable. However, this realisation is far from being realistic in our schools and societies because firstly, "African languages have not yet been developed as academic, scientific and technical languages" (South Africa. DoE, 2002, p.8-9 as cited in Chisholm, 2004, p.182) and secondly, "in real life, the two former official languages, English and Afrikaans, are still held in high esteem by all who aspire to be successful socially and economically" (South Africa. DoE, 2002, p.8-9 as cited in Chisholm, 2004, p.182).

Learners in my class were taught in English as the medium of instruction in pre-school. Their teachers' home languages were not English and so the teachers themselves are not fully proficient in the language of teaching and learning. The learners have spent two years in this context. They are now in Grade 1 where the situation is the same. Additionally, they learn to read and write in their home

language but the other two Learning Programmes are taught in English. This is the school's language policy. The learners use both languages in class and I do a lot of code-switching during lesson presentation. Code-switching is when a teacher uses an English word or sentence and finds out that the learners do not understand it, and after using gestures, she uses an *isiXhosa* word to explain the concept in home language. A teacher does this to facilitate understanding. The learners are allowed to express themselves in the language they are comfortable with.

1.8. OVERVIEW OF THE CHAPTERS

Chapter Two starts with a review of literature on some of the environmental challenges facing South Africa and that are pertinent to the study; looking broadly at national, provincial and local levels. It then looks at education as a response to the environmental challenges, taking into consideration the goals of the country's education policy expectations within the framework of OBE and its expectations for teaching and learning. It finally, offers an argument that reflexive practice is central to enabling curriculum change.

Chapter Three outlines the research methodology of the study. It also describes the processes used to generate data relevant to the research question and goals. The action research case study approach is discussed and I describe how I used a variety of data generation techniques such as learners' work, video recordings, photographs and research journal to develop the case study. Ethical issues, trustworthiness and validity are also considered in this chapter in order to provide authenticity of the accounts. Finally, data analysis techniques are outlined.

Chapter Four presents a report on what happened in the action research cycles. It details the two cycles that make up the action research project and describes the planning, acting, observation and the reflection phases of the cycles. A description of activities and preliminary analyses of these is discussed. It also highlights emerging issues from both cycles.

Chapter Five discusses the findings, using a set of analytical statements. These provide further perspectives on the issues highlighted in chapter four.

Chapter Six provides a summary of the study and outlines recommendations for further research. It reflects on the research process, and deliberates on lessons

learned. It explains what I could have done differently if I were to do the study again, providing a reflexive review of the study.

CHAPTER 2

LITERATURE REVIEW

2.1. INTRODUCTION

The first section of this chapter reviews three environmental challenges pertinent to the study. These issues are dealt with, with respect to South Africa at national level, the Eastern Cape at regional level, and Grahamstown East (the location of my study) at a local level. Then it moves on to how the government has responded to the situation through policies such as the constitution and curriculum. It also looks at selected learning theories, frameworks and strategies relevant to the study and how policy and practice relate to each other. The chapter also argues for reflexive curriculum practice and how it can be done through environmental learning in the different Learning Areas of the curriculum.

2.2. ENVIRONMENTAL ISSUES PERTINENT TO THE STUDY

2.2.1. Water issues pertinent to the study

With the need for fair distribution and access to resources in South Africa, the demand for resources is also increasing. The country's urban and domestic demand for water totalled 2 million cubic metres in 1996 (State of environment report, 1999)

South Africa is already a water scarce country and this is exacerbated by inconsistency in rainfall volumes.

Four consecutive years of below-average rainfall over much of the country resulted in a decline in the total volume of water in storage in the country's major dams from around 90 percent of the total national full supply capacity in March 2002 to around 67 percent at the end of March 2005.

(South Africa, Department of Water Affairs & Forestry, 2006, p.9)

Better rains were experienced, though, in late 2005 and early 2006. From these facts about uncertainty regarding South Africa's water supply, it is apparent that this poses challenges for the future and highlights the importance of maintaining this resource. The way water is cared for and managed becomes essential.

At a provincial level, there is also an increasing water demand despite the fact that most South African rainfall is along the eastern coasts. "A comparison of total water required with the total water available for use provides a picture of the current or

potential stress placed on water resources in the Province [Eastern Cape]" (State of the environment in South Africa: Eastern Cape, 2004, p.63). One of the reasons for increased water demand is an increase in the rate of provision of water borne sewage as is evident in Grahamstown East.

At Ntaba Maria water is mainly used for drinking, washing hands, flushing toilets, cleaning cement floors and washing cars. These activities also have an impact on the potential water stress in the municipality.

2.2.2. Waste issues pertinent to the study

Litter is also a growing problem in South Africa. As economic development increases the amount of packaging also increases. This can affect human and animal health. For instance, the safety and health of people living near dump sites is threatened, and domestic and wild animals can swallow pieces of litter (Booth, McCullum, Mpinga & Mukute, 1994).

Also "people who are poor are at high risk because they are more likely to suffer" because their "low income housing is typically located near rubbish dumps..." (Booth et al., 1994, p.227) as is the case in our Eastern Cape townships. For example, in the Makana Municipality "the most common observations are that littering and illegal dumping occur throughout urban areas" and "there are people living on and around the Grahamstown landfill site, some of [whom] are permanent residents" (Makana Municipality, 2004, p.3). In Grahamstown East waste spills out of the municipality skips due to animals and people looking for recyclables. These skips are provided for garden refuse only but are used for general waste (Makana Municipality, 2004). This also affects the quality of streams and rivers around the towns under the Makana Municipality.

At Ntaba Maria the visible issue is littering. The litter consists mainly of chips and sweet papers, fruit peels and bread lying around the school grounds. The cleaning staff pick this up and put it in bins that are everywhere in the school grounds.

2.2.3. Soil issues pertinent to the study

Another environmental concern is that South African soils are generally thin. It is estimated that the average annual soil loss is 2.5 tonnes per hectare, which is eight times faster than it is being replaced by natural processes (State of Environment

Report, 1999). Land degradation such as soil erosion is accelerated mostly by human activities such as urbanization (State of the Eastern Cape Environment Report, 2004).

It is documented that “between 13 and 60 tonnes of soil per hectare were lost in 2000 over more than half of the [Eastern Cape] province” (State of the Eastern Cape Environment Report, 2004) due to various causes. In the Eastern Cape a major cause of land degradation is overcrowding which is unnatural. This situation is due to apartheid planning and has contributed severely to land degradation in the province.

At Ntaba Maria the soccer field has no ground cover and is dusty. This is due to the fact that there is limited playground space for learners and they tend to concentrate in this area. Because Ntaba Maria is on private property we do not have the same amount of space as is allocated to conventional government schools.

2.3. THE SOUTH AFRICAN CONSTITUTION AND CHANGING EDUCATION POLICY

There are widespread environmental challenges facing the world and Southern Africa. The environmental issues discussed above reflect a deepening crisis which needs a response by individuals and communities. The South African government recognizes this and is active on many fronts in promoting programmes and action to protect the environment. Education is seen as an important response and education policy and the curriculum reflect this. Education was recognized by the intergovernmental Conference on Environmental Education in Tbilisi in 1977 as having the potential to play a vital role in enabling an understanding of people-environment relationships (Palmer & Neal, 1994). Recommendations that emerged from this conference state that “environmental education is an approach to education as a whole, rather than a subject”, and it “...concerns the interrelationship and interconnectedness between human and natural systems” (Palmer & Neal, 1994, p.21). The South African curriculum in its critical outcomes also envisages learners (and teachers as lifelong learners) showing responsibility towards the environment and the health of others (South Africa, DoE, 2002c). One of its goals is to make learners “...knowledgeable and ...sensitive to environmental issues and able to respond to and act upon the many challenges that will still confront South Africa in the twenty first century” (South Africa. DoE, 2002a, p.1).

The next section covers how the South African government has responded to environmental challenges through education as well as how constitutional values have influenced the curriculum.

2.3.1. Curriculum developments

The following section describes some of the history behind how environmental education came to be included in the Life Orientation Learning Area. In 1995 the government responded to the need to protect the environment of South Africa by including the following principles in the White Paper on Education and Training:

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

The nation's new Constitution enshrines human rights which are to ensure that the environment is kept clean, healthy and protected. Thus, amongst other rights, the Constitution gives people the right to a healthy environment, which must be protected against activities that are damaging it. It says:

Everyone has the right
a) to an environment that is not harmful to their health or well-being; and
b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that

- i. prevent pollution and ecological degradation;
- ii. promote conservation; and
- iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

(South African Bill of Rights, 1996)

Based on this policy framework, the Environmental Education Curriculum Initiative (EECI), the Learning for Sustainability Pilot Project (LfS) and the National Environmental Education Project for General Education and Training (NEEP-GET) worked to ensure that environmental education is no longer a peripheral issue in the curriculum, but that it is strongly emphasized in South African curriculum policy (Lotz-Sisitka, 2002). In 2001 the NEEP-GET was launched by the Ministry and Department

of Education to develop the capacity of teachers and departmental officials to implement environmental learning within the NCS.

The new curriculum reflects the intent to promote environmental awareness, knowledge and responsibility among learners. The following section reviews the features of the environmental elements of this curriculum and also traces its links to certain constitutional principles and values.

2.3.2. Values in the curriculum

The curriculum is underpinned by the values of the Constitution. The constitutional values are intended to reflect national values that are needed to bring people together from different identities, heritage and societies beyond 1994 (South Africa. DoE, 2001). These values are intended to reflect areas of common national interests, helping people to relate to each other and to unify South African society and promote nation building and democracy. Drawing on some of the constitution's guiding imperatives; this curriculum aims to remove bias, discrimination and social injustice and is committed to human rights (Human Sciences Research Council, 2005). However, to be realistic "the curriculum is and will be differently interpreted and enacted in diverse contexts" (South Africa. DoE, 2002a, p.1).

Caduto (1983, p.14) reminds us that "valuing is an unavoidable, implicit part of all forms of interaction between the teacher and the learner". Values are taught implicitly in various ways, for example, the way the teacher relates to learners. Values as well as attitudes are built into the LOs and ASs of each learning area in the South African curriculum together with skills and knowledge. Life Orientation in particular is about promoting positive commitments and values drawn from the South African Constitution (NEEP-GET, 2004b).

With the strong emphasis on values in the South African curriculum, it is important to consider how teachers might work with values in the classroom situation. Caduto (1983) sees values inculcation as a strategy amongst others to instill certain chosen values in learners. Moralizing, that is, simply telling learners what is right or wrong, is one way of inculcating values. For example, simply telling learners not to litter or laying down rules is a process of inculcation. In other words, it is indoctrinating and enforcing a set of values held by more powerful actors. Foundation Phase learners who are still in the early phases of constructing values need this because "certain

basic values must be instilled if continuing of culture is to be ensured" (Caduto, 1983, p.15). However, when teaching environmental education, different values education strategies can be used in different contexts. Modeling can complement inculcation as a methodology, where the teacher sets an example for the learners by picking up litter when going past it and by not littering herself. Importantly, teachers must exemplify good environmental practices for effective environmental education. In addition to modeling; values analysis as a strategy that allows learners to make decisions in their own lives should be used. In this process the role of the teacher is to help learners reflect on their values in the values analysis exercise so that they can gain insight into values. This strategy recognizes learners' reasoning and objectivity (Caduto, 1983). This combination of strategies and methods can help to bring the Constitution to life in the classroom. Use of such strategies also introduces new expectations for teachers, which I discuss next.

2.3.3. New expectations for teachers in the Outcomes Based Education system

The *Norms and Standards for Educators* policy states that teachers must be able to demonstrate applied competence within their practice. The notion of applied competence involves a combination of:

- *Practical competence*: Being able to do something (e.g. design a lesson plan)
- *Foundational competence*: Knowing why you are doing something (e.g. knowing why particular choices are made for activities and content in lesson plan in relation to educational policy and learner needs and context)
- *Reflexive competence*: Ability to evaluate actions and change (e.g. ability to use the lesson plan, reflect critically on its use, and change and adapt the lesson plan).

(NEEP-GET, 2005, p.26)

These three discrete competences are central to the seven roles of educators which are learning mediator; interpreter and designer of learning programmes and materials; leader, administrator and manager; scholar, researcher and lifelong learner; community, citizenship and pastoral role; assessor; and phase specialist (South Africa. DoE, 2000). The role of being a designer of learning programmes is specifically pertinent to this study.

This study itself is an example of reflexive practice in that the research process has evoked action through the trialing of lesson plans and teaching approaches, and reflection and researching of practice in an area of professional interest. This process

develops the role of scholar; researcher and lifelong learner (see Sections 3.2.1. and 3.2.2.).

Reflexive competence in particular involves praxis. Praxis is comprised of action and reflection in relation to practice. To clarify praxis, theory is required. The relationship between theory and practice is a reflexive one in which each builds upon the other (Grundy, 1987). In trying to explain the concept of praxis, it is worth examining it in relation to curriculum because “the curriculum itself develops through the dynamic interaction of action and reflection” (Grundy, 1987, p.115). Grundy (1987, p.6) claims, “It is not on the teacher’s shelf that one looks for the curriculum, but in the actions of people engaged in education”. Those people are teachers and learners who are engaged in curriculum practices.

Learners socially construct and reconstruct curriculum knowledge. This makes it an active process which takes place in a form of interactions with each other, the teacher and the learners in a learning situation.

Curriculum viewed as praxis is a social process that develops through changing interactions of action and reflection (Grundy, 1987). In the process of planning, teaching and learning and evaluation are all integrated. Teachers plan, teach and reflect on their teaching and through this learn how to teach differently. Grundy (1987) describes this as movement from action to reflection and from reflection upon action to a new action. It “implies a conscious recognition of the relationship that exists between practice and its rationale(s)” (Janse van Rensburg & Le Roux, as cited in Lotz, 1999, p.30). It involves asking the why questions about the way we do things which then affects what we do next. In this way it feeds back into our practice (Janse van Rensburg & Le Roux as cited in Lotz, 1999). Thus there is integration between theory and practice because theory needs to be related to the work the teachers are doing. However, theory itself needs to be critiqued by engaging with better ways of doing our work. This makes praxis a process of “**informed critical action**” (Lotz, 1999, p.33). This notion of praxis can be likened to the process of reflexivity.

The implications for teaching and learning practices are that knowledge does not become something that can be taught to learners nor does it occur when learners have acquired the intended knowledge of the teacher. Instead knowledge is about the provision of activities that create knowledge as well as critique of it (Grundy,

1987). Hence the processes of praxis should not be reduced to simple methods of teaching where teachers impose their own meanings on situations rather than engaging in curriculum deliberations with learners (Usher, Bryant & Johnston, as cited in Lotz, 1999). For example, in this research learners will be involved in identification of environmental issues by drawing pictures of them, describing their feelings about the issues drawn, and commenting on these in relation to environmental health.

As a teacher one needs to be capable of reflexively reviewing practice which is central to curriculum change (Grundy, 1987). Reflexivity enables teachers to do their jobs better through critical reflection and developing understanding of their work. Therefore, curriculum theory ought to be related to the work that teachers are doing (practice). This makes curriculum come to life because curriculum is enacted practice, or a contextualised social process, as described by Cornbleth (1990). For example, involving learners in activities in local context that enable them to take responsibility for creating a healthy school environment is influenced by a view of curriculum as an ongoing social process, comprised of the interactions of learners, teachers, knowledge and the setting (Cornbleth, 1990).

An understanding of these competences is important for the study because of their relation to the planning, action and reflection components of the action research cycle in this study (see Sections 3.2.1. and 3.2.2.). For example, during the action research process, lessons are planned and informed choices about activities are made, which provides evidence of practical and foundational competences. During the reflection process, questions about actions are asked which affect subsequent activities and cycles, which provides evidence of reflexive competences.

2.3.4. Environment in the Life Skills Learning Programme

My study is located specifically within the Life Skills Learning Programme of the Foundation Phase. Life Orientation is the backbone of Life Skills Learning Programme in this phase. The scope and detail of the environmental elements within the Life Skills Learning Programme are discussed below.

A challenge for environmental learning programmes, is that they are developed within the context of broader educational challenges. In the early attempts at putting curriculum into practice teachers' interpretations of curriculum in classrooms were often superficial. There were problems associated with curriculum implementation

linked with challenges of difficulties in interpreting policy documents and the expectations on teachers to respond to local and contextual issues; as well as a complex curriculum with a mixture of old and new (Committee for Review of Curriculum 2005, 2000 as cited in Lotz-Sisitka, 2002). Findings from studies such as EECl, LfS and NEEP-GET indicated that teachers were not actually teaching meaningful environmental learning. It was superficial in that teachers designed activities which were not furthering the aims of the learning areas, nor deepening the knowledge and skills of learners, and in many cases teachers were misinterpreting learning outcomes (Lotz-Sisitka & Olivier, 2000; Lotz-Sisitka & Raven, 2001 as cited in Lotz-Sisitka, 2002).

These concerns lead me, in my research, to conduct an in-depth study into the achievement of LOs by learners. I also looked critically at the role of environmental learning in furthering curriculum requirements and critiqued my Lesson Plan design in terms of its ability to enable the development of these LOs.

Today in the NCS, environment is integral to all the learning areas. To ensure a healthy and a safe school environment, health issues are included in the curriculum. "The Learning Area Statements try to create an awareness of the relationship between social justice, human rights, a healthy environment and inclusivity" (South Africa. DoE, 2002c, p.2). As teachers we are expected to respond to environmental issues and risks through education.

This we can do through the Life Skills Learning Programme for the Foundation Phase of which Life Orientation provides the backbone. This learning area like all the others considers environmental health risks. The learning area prepares learners for life, its possibilities and challenges in order to operate effectively with others in the wider South African society faced, as it is, with a lot of challenges (South Africa. DoE, 2003a).

The development of LOs and ASs from Life Orientation can help learners respond to environmental issues. For example, LO1 is about health promotion. It states that learners should be able to make informed decisions regarding personal, community and environmental health, that is, "**a healthy environment that supports human health**" (NEEP-GET, 2004b, p.11). This may, for example, involve lessons about keeping the environment healthy by conserving water.

The South African curriculum is the country's educational response to environmental concerns. Therefore, as responsible citizens, teachers and learners need to ensure that constitutional rights are respected by finding ways, no matter how small, to improve the quality of learners' lives in our schools and communities. Engaging with these issues requires a consideration of learning theories, which I discuss next.

2.4. LEARNING THEORIES AND STRATEGIES RELEVANT TO THIS STUDY

Through my research I was hoping to develop strategies that support OBE, the constructivist theory that underpins it, and its strong learner-centered focus (NEEP-GET, 2004a). I wanted to develop activities in the school grounds that would help me to engage in learner-centered approaches and to do this I drew on ideas provided by literature on active learning, action competence and situated learning. In order to elaborate on these ideas, this section discusses the above-mentioned theories and strategies in detail.

2.4.1. Constructivism

Constructivism has been placed at the center of the development of teaching and learning policy for South African schools through the introduction of OBE. This movement has also instilled constructivist principles into the renovation of classroom practices (Moll, 2002). A constructivist view of learning is described by Lave and Wenger (1991:47) as a "process by which a learner internalizes knowledge, whether 'discovered', 'transmitted' from others, or 'experienced in interaction' with others".

One perspective on constructivism views learning as largely a function of the individual mind. It is defined in terms of the cognitive processes involved. Such a view of learning can be seen in the work of Piaget who viewed learning as a process that an individual goes through in order to make meaning. Knowledge is constructed in the mind of learners through a cyclic process of adaptation, assimilation, accommodation and equilibrium. Adaptation can be explained as the way learners make sense of the world so that they are able to survive in that world, assimilation as the way learners relate new knowledge and skills to pre-existing structures, accommodation as the reaching of understanding, and equilibrium as the state of being satisfied that the learner knows and understands something (van Harmelen & Bolt, 2000).

Piaget did not take into account the vital role played by social interactions and the role of language in the learning process as well as the differences in the way different learners learn. His theory did not take into account that some learners when confronted with a new learning experience may have no pre-existing structures to refer to and so will need some sort of additional help in order to achieve a desired outcome. On those accounts his perspective was limited. Piaget claimed:

...the young child is largely impervious to social influence because egocentricity blocks the establishment of reciprocity and cooperation in considering differing points of view... it is not until middle childhood that children's intellect benefits from social interaction, when logical argument between children with varying points of view becomes possible.

(Rogoff, 1999, p.76)

The concept of constructivism is embedded in the theory of cognitive development discussed below (Section 2.4.3.) because both Piaget and Vygotsky also share the idea of constructivism where learners actively construct knowledge. However, for Piaget the learner develops constructs as an individual while for Vygotsky the learner develops constructs with peers or an adult.

2.4.2. Perspectives on social constructivism

In Vygotsky's perspective development moves from the social to the individual, beginning with social influences in the first months of the child's life. He emphasized the role of social interaction in cognitive development as an important aspect of learning. Vygotsky supported a problem solving approach to learning that occurred between partners with guidance by a more skilled person. He emphasized the importance of such a skilled person in bridging the zone of proximal development (ZPD). Vygotsky defined the ZPD as:

The distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.

(Tudge, 1990, p.157)

The idea of the ZPD is similar to the master/novice idea where the master is the old-timer and the novice is the newcomer. This view of apprenticeship sees the transmission of a skill held by the expert to the novice learner. It is also similar to the interpretation of ZPD as the distinction between the spontaneous and the scientific concepts whereby the spontaneous concepts were the child's everyday experiences and the scientific concepts were the concepts taught at school through instruction by the teacher.

Vygotsky's concept of the ZPD was also described as the "distance between the everyday actions of individuals and the historically new form of the societal activity that can be collectively generated..." (Engeström, as cited in Lave & Wenger, 1991, p.49). This interpretation is concerned with "connecting issues of sociocultural transformation with the changing relations between newcomers and old-timers in the context of a changing shared practice" (Lave & Wenger, 1991, p.49). This means that social relations within such an involvement are constantly changing, and so is knowledge. According to Rogoff (1999) this interpretation goes beyond the idea of simply adding social context of learning onto Piaget's individualistic approach. It includes the learners acting in the lived-in-world and being embedded in their culture. This perspective on social constructivism will be taken further in Section 2.4.4. in the discussion on situated learning.

Vygotsky's concept of ZPD was elaborated on by Bruner with the concept of scaffolding, where the more experienced person provides the support structure to the child who is working alone so that the learner may perform the tasks later without assistance.

Rogoff (1999) also acknowledged the role of guided participation in learning and development but she argued that adult-child interaction may have little relation to children's learning. It does not always advance learners' learning. For instance, if the adult is a teacher who teaches learners to do a particular activity; at the end of that activity one cannot always say that the learners have learnt something. Of course learners learn from adults and learning is an aspect of every activity and it can take place where there is teaching but instruction per se is not the cause of learning (Rogoff, 1999). "That is why stories can be so powerful in conveying ideas, often more so than an articulation of the idea itself" (Lave & Wenger, 1991, p.34). Knowledge construction in a case of instructing learners to do something is not socially mediated and open-ended whereas it should be "because the place of knowledge is within a community of practice" (Lave & Wenger, 1991, p.100) which is concerned with relationships among participants, activity and the context. Rogoff (1999, p.70) further argued "it is important to examine explicitly the influence of expertise of partners, of equality of status, of shared problem solving, of the structuring of children's efforts, and of the transfer of responsibility to children".

A strategy central to the concept of social constructivism is that of learner-centredness. Learner-centred approaches also involve a process of co-operative meaning making where the role of the teacher changes from one of being an actor acting upon learners to that of acting with learners. Therefore, cooperative learning as one of the learner-centred approaches becomes the kind of learning that acknowledges the social nature of learning because the kind of learning offered by this approach is much more than group work. It involves learners working together to achieve shared goals (Wilmot & Euvrard, 1998). Within this approach there is interdependence among learners in order to achieve the learning goal. Positive interdependence means that the common goal is reached when there is input from all group members. This maximizes the benefits of learning for individual learners (Wilmot & Euvrard, 1998). This also helps to develop a sense of ownership of learning amongst the learners.

2.4.3. Cognitive processes and language

During group work, encouraging learners to formulate and ask questions should be encouraged because that is where learning originates. All learning depends on communication. The learner's ability to understand concepts is through the use of language. Learning is a language-based activity. Language then becomes the key to developing all forms of knowledge (Moll, 2002). Vygotsky also puts language and communication at the centre of intellectual development thus:

...concrete cultural relationships between people, inscribed in language...Children acquire these cultural relations, or sign systems, as their own practices in the course of social interactions, specifically through the mechanism of speech (being spoken to and speaking).
(Moll, 2002, p.15)

For Vygotsky, thought starts with social interactions through which communication between individuals through language happens. Language becomes a tool of thought and therefore, central to learning because participants in a discussion reach a common understanding through dialogue that could be between learners and the teacher or between learners themselves where a two-way form of asking questions stimulates thinking.

2.4.4. Situated learning

Situated learning takes into consideration the notion of "*participation as a way of learning*" (Lave & Wenger, 1991, p.95), where members need to be full participants in

the process of learning within social communities, where their membership evolves within that sociocultural community, and their identities become constructed through living relations between persons and their place and participation in communities of practice (Lave & Wenger, 1991). Theories of situated learning can help develop an understanding of social processes in schools which have similar dynamics regarding relationships, interactions, acceptable norms and rules.

Situated learning views learning as having an always-together feature of social practice that characterizes it as legitimate peripheral participation in communities of practice (Lave & Wenger, 1991). This process does not happen immediately as it takes time for learners to construct their identities, and to acquire certain beliefs and behaviours. For example, knowing that their actions have an impact on the environment, learners begin to change their actions in the way they interact with it. In this way the kind of persons they become, that is, their identity, also changes.

Lave and Wenger locate learning in the processes of co-participation not in the heads of individuals. This theoretical perspective influences teaching practice in that planning lessons to accommodate situated learning requires teachers to close the gap between intellectual and personified activity, between observation and involvement, between concepts and experience (Lave & Wenger, 1991). This means that relations among learners in activities in their environment are based on negotiation and renegotiation of meaning. They see the masters and novices as co-learners and the relationship between them as changing. They were concerned with the kinds of social engagements that provide a context for learning to take place. They believed that learning involves a shared activity within the social relations that is, an endeavor of joint practice by members. The members' engagement binds them into one social being who then share a collection of communal resources developed over time (Lave & Wenger, 1991). Hence they suggest that:

Learning is a way of being in the social world, not a way of coming to know about it. Learners, like observers more generally, are engaged both in the contexts of their learning and in the broader social world within which these contexts are produced. Without this engagement, there is no learning, and where the proper engagement is sustained, learning will occur.

(p.24)

Lave and Wenger (1991) argue further that situated learning is not just about learning in context but about learners participating in learning within a community of practice. In this way learning becomes a social process, school grounds are where learners interact with others and the teacher, making sense of their immediate environment

through activities. In this process meaning is constructed and reconstructed about the content provided by the school grounds (Moll, Gultig, Bradbury & Winkler, 2001).

Another kind of participation similar to full participation is genuine participation. Hart (1997) describes increasing levels of participation on a ladder of children's participation. He describes genuine participation as happening when learners are operating in the upper levels of the ladder. Genuine participation entails young learners assigned with a task, informed and consulted; the task being initiated by the teacher but decisions shared with young learners; young learners then lead and initiate action and both share the decision making. This kind of participation helps to make learners' actions more informed. Genuine participation then becomes essential to learning hence the need to avoid tokenist forms of participation.

Social relations in the learning process do not narrowly mean the involvement of other people as is the case with the master-novice relationship, or that people's thoughts and actions are social and "immediately dependent for meaning on the social setting that occasioned them" (Lave & Wenger, 1991, p.32-33). They also involve social structures with power relations, activities and provision of authentic settings. Finding spaces for social learning in the curriculum becomes important in teaching and in lesson planning.

Another important aspect of situated learning is helping teachers to contextualize knowledge. Teachers have the challenging task of providing a learning environment that facilitates learning about environmental issues in context. The way teachers think about how learners learn will influence the way they teach as well as the methods they use to bring about learning within a particular context. For instance, when teaching about water pollution taking learners to a polluted river will develop their enquiry skills, active knowledge acquisition, attitudes about reducing pollution levels, and also teach them to value this life sustaining resource rather than merely telling them a story about water pollution or giving them information on water pollution issues.

2.4.5. Active learning and action competence

The NEEP-GET active learning framework with its components: namely, prior knowledge, information, enquiry, action and reporting can be very useful for assisting teachers to implement the NCS, particularly lesson planning which involves environmental learning (NEEP-GET, 2004a). In active learning learners have an

opportunity to explore the diverse and contextual nature of issues in more meaningful ways through developing insights from sharing, asking questions, finding information and taking action for making better environmental management and lifestyle choices (NEEP-GET, 2004a; O'Donoghue, 2001). Responding to learners' prior knowledge means that teaching must take learners' existing knowledge and experiences and their day-to-day experiences into account.

According to Moll (2002) prior knowledge is culturally embedded in everyday knowledge. OBE recognizes the value of prior knowledge and encourages learners to share this in the learning process.

Teachers must, however, take learners a step further to learn more than they already know. Learners should “*make connections* between what they already know and new experiences and ideas, and the main vehicle for this will be their *own talk*” (Moll et al., 2001, p.55). This new knowledge is encapsulated in school knowledge, but in doing so the teacher must seek to contextualize it. The curriculum recognizes that this can be done in different ways because of different contexts, “The curriculum is and will be differently interpreted and enacted in different contexts” (South Africa. DoE, 2002a, p.1).

Highlighting the importance of the action component of the active learning process, Jensen (2004) defines action as having two elements. Firstly, he argues that before any action learners must be able to make conscious decisions to do something whether it is a question of behaviour change or to make a contribution for the environment. He points this out because he believes that knowledge does not necessarily lead to action that represents changed behavior. Action competence could be developed through addressing problems in the school grounds by guiding learners to make informed decisions about making a contribution to the environment or addressing the problems. Secondly, he argues that activities incorporated in teaching do help with knowledge acquisition but cannot be defined as actions if they do not address solutions to the problem. He further argues that there are different kinds of actions. Environmental actions address environmental problems specifically whether direct (people and environment relationships, for example, saving water) or indirect (people to people relationships, for example, drawing pictures with a particular message to be displayed in the school foyer).

2.5. LESSON PLANNING AND ASSESSMENT

With a consideration of environmental issues facing the school (see Section 2.2.), the curriculum response and opportunities offered for environmental learning (see Section 2.3.), and the understanding of learning processes and strategies that guide environmental learning (see Section 2.4.); it is also important to consider aspects of lesson planning and assessment that support the implementation of environmental learning.

As the old saying goes, 'failing to plan is planning to fail'. However, it must never be a matter of just planning for the sake of having a Lesson Plan in the teacher's portfolio and not using it until the Education Development Officer visits the classroom. Nor should an overemphasis on Lesson Planning lead to superficial teaching and learning. This point arises from the concern that "OBE requires too much paperwork" (HSRC, 2005, p.82). Teachers tend to do it for the sake of doing it; and most of the lessons do not take into consideration the contextual process of learning.

Teachers need to plan quality lessons. Quality can be measured against the framework developed by the Department of Education which provides a list of elements to be contained in a lesson plan in order to meet curriculum requirements. Lesson Plans must have "a number of features that are central to all OBE Lesson Plans" (NEEP-GET, 2004a, p.30). Taking into account the learning process Lesson Plans ought to show links between LOs and ASs, how learning and teaching support materials (LTSMs) are to be used, include ways of assessment and reflect active learning approaches (NEEP-GET, 2004a). This helps teachers to review their lessons afterwards, which then constitutes reflection on the planning part of the teaching process.

When planning lessons teachers should consider the learners and the context in which they live so that lessons are relevant. Learners' actions can be provided by their context, for example, auditing how much water is used or wasted in the school grounds and developing a water saving strategy in response. Lesson Plans should allow for meaningful learning and they could include elements of the active learning framework in order to make provision for learning with understanding. In this way the environmental focus, LOs and local context in lesson planning could lead to more in-depth engagement by learners with issues in context thereby bridging the gap between the abstractions of the curriculum policy and the concretedness of the local

context with the goal to enhance learning. Bridging this gap is one dimension of being able to put the NCS into practice.

Curriculum policy documents state that activities usually “address a number of Learning Outcomes at a time, the assessment should focus on one or two key Learning Outcomes and their related Assessment Standards” (South Africa. DoE, 2003b, p.29). This study falls within the Life Skills Learning Programme but some activities offered opportunities for assessing the other Foundation Phase learning programme which is Numeracy. Teachers need to allow for extended assessment of activities, other than the content explicit in the ASs of the learning programme within which they are working. This allows for meaningful integrated teaching and learning across other learning programmes (South Africa. DoE, 2003a).

Teachers also need to be creative and allow learners to reach further than the minimum requirements, in a process of conceptual progression. Providing other forms of content within learners' contexts can do this and will help to extend the depth of activities within the grade itself rather than from grade to grade (South Africa. DoE, 2002a). Waiting until the next grade for conceptual progression as is the provision by the NCS delays some learners. It should be provided directly when needed.

Assessment is a very important part of teaching and learning activities. It has shifted from an authoritarian approach to one which is formative, standards- based and continuous (Chisholm, 2004). Teachers need to think about assessment before planning activities, hence the focus on LOs and ASs which guides teachers in knowing the minimum requirements for learners. Another important aspect of assessment is developing a good understanding of the skills, knowledge, attitudes and values required by these LOs and ASs. This ensures that learners join together knowledge and skills which is central to learning and teaching. In this study, new ideas about assessment, for example, formative assessment and recording assessment using the national code have been implemented. Finally, assessment should be done to support the development of learners through monitoring progress, provoking further learning and highlighting requirements of individual learners.

To plan for meaningful environmental learning in all learning areas teachers need to interpret ASs. We need to know what is required by the ASs so as to design appropriate activities. Thus, we need to know

- What do these assessment standards involve?
- How do they support environmental learning and a healthy environment?
- How do they relate to social justice, human rights, and inclusivity?
- **What** and **how** do we teach, so that learners can achieve them?
- How do we assess them?

(NEEP-GET, 2004b, p.13)

According to the principles that inform Life Skills learning and teaching in particular, assessment in this learning area should, where possible, be done in the learners' home language. Alternatively teachers need to provide language rich experiences, for example, group discussion between learners themselves, where learners are encouraged to speak and report back in their home language through mime, singing, etc (South Africa. DoE, 2003).

The discussions of OBE and assessment in this chapter helped in developing the plans for my research project.

2.6. SCHOOL GROUNDS AS CONTEXT FOR TEACHING AND LEARNING

With the focus on school grounds in my research question and associated lesson planning, this section reviews literature around the role of school grounds as sites for learning.

2.6.1. School grounds as sites for learning

School grounds are a valuable resource. Their size, design, the features they contain, and how they are utilised, managed and perceived by staff and students of a school, can all have a significant influence on the life and work of the school and on the quality of education provided for the students.

(Malone & Tranter, 2003, p.289)

In school grounds, learners could explore their environments as well as engage in learning; however some school grounds and neighbourhood spaces do not allow this because of the way they are planned. Some school grounds are left alone and are not valued by the school, thus, ignoring their potential (School scapes, 2005).

Because Grahamstown East is an over-crowded community, many children have lost access to natural environments. Their play environment is limited to their homes or friends' homes. This provides a challenge for environmental educators to develop the environment-learner relationship in the school grounds. Research by *Learning through Landscapes* suggests that school grounds can be used to support both the formal (teaching), informal (social and play) and the hidden curriculum (wider issues).

School grounds can also facilitate learning and provide a rich variety of spaces offering different qualities and experiences (School scapes, 2005). This research contributes to exploring the potential and possibilities for using school grounds as sites for learning.

2.7. CONCLUSION

This chapter deals with environmental issues pertinent to the study, which are water, waste and soil issues both at national, provincial and local level.

Learning needs to be around issues of biodiversity, ecosystems and human well-being for better management of the environment. Fortunately, the NCS provides the opportunities for this to happen in the way environment foci are infused in the different Learning Areas of the curriculum.

OBE more broadly has a number of expectations and prescriptions (as in LOs and ASS) about teaching, learning and assessment. It provides a series of ideas about teaching and learning as well as environmental learning processes. The link between theory and practice is achieved through praxis. The argument in this study is that it is through practice that links can be made between the abstractions and principles of the curriculum goals and context.

An understanding of learning becomes very important in providing insightful learning and teaching. Knowing how learners learn can help teachers to plan to make use of different teaching strategies in order to accommodate as many different learners as possible. Learning theories and strategies such as social constructivism, active learning and situated learning and their relevance to this study are discussed. In this study school grounds are viewed as an appropriate vehicle for contextualizing learning and allowing for active learning in the environment because they are a context that can allow learners to actively investigate authentic environmental issues such as littering, prevalence of indigenous fauna and flora as well as water use. They are one example of a local context in which teachers can contextualize and make more real the ideas and abstract concepts of the curriculum relating to the environment.

Assessment is also dealt with briefly in this chapter because within the NCS assessment is considered integral to teaching and learning (NEEP-GET, 2004b).

CHAPTER 3

RESEARCH METHODOLOGY

“It is teachers in the end who will change the world of education, by understanding it”
(Stenhouse, 1983 as cited in O’Hanlon, 2003, p.31).

3.1. INTRODUCTION

In this chapter I outline the research methodology used in the process of examining the use of school grounds for environmental learning in the context of the Grade One Life Skills Learning Programme at Ntaba Maria School. The chapter describes the research orientation that guided this action research enquiry. I also describe the methods and techniques used to gather evidence and generate data relevant to the research question and goals. Data analysis as the process of making sense of all the generated data is also discussed. Finally, ethical considerations and issues of validity are addressed.

3.2. RESEARCH METHODOLOGY

I have drawn on an interpretive orientation to research to guide the interpretation of the action research process in this study. Interpretive research seeks to understand a particular social action (e.g. teaching in this case) and the enquirer must grasp the meanings that constitute that action. The enquirer is also required to interpret in a particular way what the actors are doing (Denzin & Lincoln, 2000). I have chosen this orientation because

interpretive research sees education as a lived experience for those involved in educational processes and institutions. Its form of reasoning is practical; it aims to transform the consciousness of practitioners and, by so doing, aims to give them grounds upon which to decide how to change themselves. Its interest is in transforming education by educating practitioners...

(Carr & Kemmis, 1986, p.219)

This kind of research also “tries to get inside individuals and institutions to understand situations and people” (Koshy, 2005, p.85) rather than taking a simplistic view of understanding actions. In this case, interpretation was focused on my own practice within an action research case study.

This research was conducted as a case study. Merriam (2001, p.41) stated that case studies can “bring about understanding that in turn can affect and perhaps even

improve practice". I selected a case study because understanding and improving practice in my school context was my particular intention.

Yin provided a common technical definition of a case study as research that:

- investigates a contemporary phenomenon within its real-life context; when
- the boundaries between the phenomenon and context are not clearly evident; and in which
- multiple sources of evidence are used.

(1984, p.23)

This definition describes my study because I was interested in what was happening in the school grounds of Ntaba Maria. I involved learners in real issues identified in their own school environment in particular. Data gathered in this case became strongly founded in reality (Koshy, 2005) as the process included video recordings, learners' work and comments about their drawings (depicting the nature of the case), and photographs (showing the physical setting); in order to show the particularity of the case.

A special feature of case studies is being particularistic. This "means that case studies focus on a particular situation, event, program, or phenomenon" (Merriam, 2001, p.29). The emphasis is on understanding the uniqueness of the case (Stake, 1995) in terms of what it reveals about what is happening.

However, a case can look at a specific instance but can help to clarify a general problem (Merriam, 2001). Stake (1995) argued that it is common in research to draw generalizations, but one normally does not generalise from a case study. In this research I will not generalise, but I hope other teachers can understand the reported interpretations of the case and draw their own conclusions as to whether these can be used to inform practice in other contexts, where their use could be tested in order to enrich their understandings of curriculum in practice (Denzin & Lincoln, 2000, p.98).

A criticism of case study research is raised by Yin (2003, p.61-62) who claimed that case study researchers are prone to bias because they seek to use a case study to substantiate a preconceived position. They are not open to contrary findings. However, "it is not possible to eliminate bias completely because it is inherent in all research personnel and procedures" (Macintyre, 2000, p.48). Sharing data with a critical friend would reduce bias (Koshy, 2005), and when reporting preliminary

findings to a critical friend one must also be tolerant of contrary findings (Yin, 2003). Comment on the role of a critical friend can also be drawn from action research literature. Elliott (1991, p.61) discusses how openness and shared critical responsibility can cause a dilemma in that when one's professional practice is critiqued or when data-sharing happens, "problematic areas of practice become exposed". I experienced a dilemma of risking exposure of my practice to a fellow action researcher in the Master of Education programme, which ultimately I did and felt that it had benefited my growth in and understanding of my practice. Ultimately my supervisor performed the task of being a critical friend. This helped to keep me focused and helped me make sense of what I was doing.

There are "four broad types of case study: ethnographic, evaluative, educational and action research case studies" (Stenhouse, as cited in Bassey, 1999, p.27). My research fits in to the action research type. Action research is detailed in the following section.

3.2.1. Action research

In the South African system, curriculum planners tend to try and drive change within teacher practice. But teachers' participation and contribution in curriculum development is particularly important. I feel that it needs to be the teachers that initiate and drive change so that change becomes more meaningful and more relevant to their particular context. I feel that action research (as described below) will empower me to drive change in my own practice in a way that is meaningful and relevant to the curriculum change process in South Africa.

Historically there has been a wide variety of action research traditions and these traditions have developed over time. A major landmark in the development of action research as a methodology is Lewin's work (Koshy, 2005). Later, it was advocated by Stenhouse (1975) who viewed action research as a 'teacher-as-researcher' movement. Then there was a move to participatory action research supported by Stephen Kemmis and Robert McTaggart (Koshy 2005). But action research need not only be collaborative; "it can be undertaken by the individual teacher" (Cohen, Manion & Morrison, 2000, p.227) and still be called action research. Action research is a form of practitioner research. "Practitioner research simply means that the research is done by individuals themselves into their own practices" (McNiff, Lomax & Whitehead, 1996, p.7-8).

In its nature action research is practical hence it is popular amongst practitioners as a mode of studying their practices within their settings working towards practical outcomes (Koshy 2005). It becomes practical when one deals with one's own practice with the purpose to better understand and improve it. The process involved is continuous learning. It is about constructing knowledge of specific issues through planning, acting and reflecting.

A feature common to all types of action research is that it all aims to change situations as well as achieve an understanding and interpretation of the world. It is designed to bridge the gap between research theory and practice where ideas come to inform the practice and are tried out practically. Stenhouse (1979) also suggested that "action research should contribute not only to practice but to a theory of education and teaching which is accessible to other teachers, making educational practice more reflective" (Elliott as cited in Cohen et al., 2000:227).

3.2.2. The action research spiral

My purpose to do action research was to empower myself to be a reflexive practitioner. I used the action research model proposed by Kemmis and McTaggart to fit my purpose. It constitutes "a series of cycles of deliberate planning, action, observation and reflection, conducted by practitioners in their own work" (McTaggart, 1991, p.31). However, I adapted it to fit my purpose as it is advised that one must be flexible because these four features may differ in actual classroom practice.

This action research study involved a spiral of cycles of planning, action and reflection as shown in the diagram below (see Figure 3.1). In the diagram I have not noted observation as a distinct dimension of each cycle. This is because I was observing during both the action and reflection phases. In the action phase I observed classroom activities and recorded these in my journal. I was also observing during the reflection phase when I looked at videos and photographs of classroom interactions and at learners' work. The fluidity between spirals allows for improvement in practice that takes place systematically, responsively, and reflectively (McTaggart, 1991). This allowed me to understand a particular issue within an educational context and make informed decisions through enhanced understanding (Koshy, 2005). What follows is the detail of each cycle.

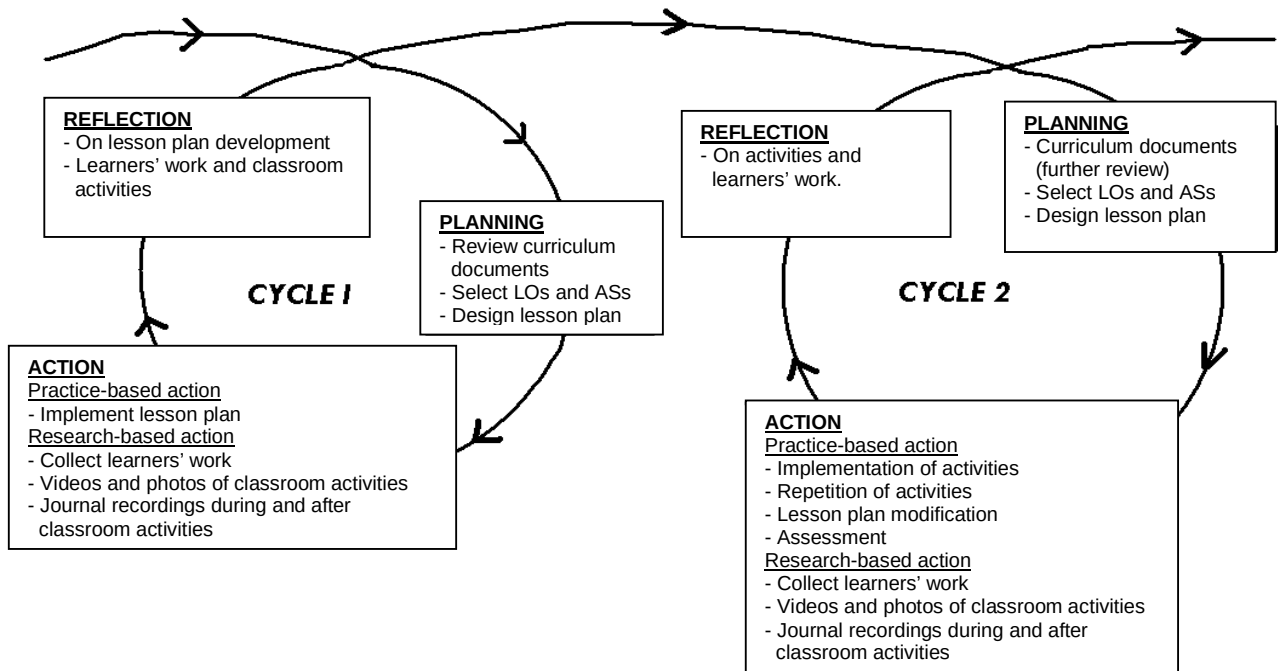


Figure 3.1 An adapted version of Kemmis and McTaggart's (Koshy, 2005, p.4) model of action research.

The action research process in this study had two cycles. Each cycle had three features, namely, planning, action and reflection. Cycle One was an audit of the school grounds to identify environmental learning opportunities. This was in the form of a lesson plan. For planning, curriculum documents were reviewed for the purpose of selecting LOs and ASs to be used in the lesson plan. Activities that linked to the LOs and ASs were planned. For action, Lesson Plan 1 (LP1) was implemented and data was collected. Reflection on LP1 development, activities and learners' work was done.

The second cycle was focused on a lesson plan informed by the audit. Its three features were similar in many respects to those contained in Cycle One. However, curriculum documents were further reviewed in the light of what came out of the reflections; which then affected the choice of LOs and ASs during planning and designing of Lesson Plan 2 (LP2). In the action feature involving implementation of

LP2, modification of the LP allowed for practise of skills that were needed by learners, as well as assessment.

Each cycle involved a process of preliminary data analysis. In this way the preliminary data analysis of Cycle One informed Cycle Two. A more formal in-depth analysis of both cycles was done after completion of both cycles, to reflect on the entire process. Preliminary reflections in Cycle One influenced the choice and design of activities in Cycle Two. For example, prioritisation of water management, based on the school environmental audit conducted in Cycle One influenced the focus on water wastage in Cycle Two. I was also able to repeat activities within both cycles and modify an activity in Cycle Two. This was driven by the internal reflections I made based on my observations in Cycle Two and influenced by journal notes.

This self-reflexivity helped me to understand what was happening and to inform the next cycle. In other words, I was reflecting on my developing practice to inform continuous improvement in my practice as described by NEEP-GET (2005) (see Section 2.3.3. Thus, “to be action research, there must be praxis rather than practice because praxis is informed, committed action that gives rise to knowledge rather than just successful action” (McNiff et al., 1996). Praxis also helps to bring theory and practice together (see Section 2.3.3.). In this study the intention was to improve the quality of my practice thereby contributing useful knowledge with convincing evidence into the public arena. Significant to this was the process of reflecting critically on my own actions through looking at video recordings and reflecting in a journal as well as exposing my practice to a critical friend to check if the data was plausible. In the case of this research a view that encourages small changes in practice which can provide an experiential base from which bigger ideas like environmental sustainability, human rights and social justice amongst others can be embraced (NEEP-GET, 2004). This research reflects on a series of small actions which develop ideas on how the school grounds can be useful for environmental learning.

The research focused on how useful the school grounds were to environmental learning in achieving the selected learning outcomes. According to Lewin, focus helps to set the limits of an inquiry (Cohen et al., 2000). The approach of learning in the work place about the work place as a feature of action research brought about better understanding of my practice. McNiff et al. (1996) also believe that well-conducted action research can lead

- to your own personal development,
- to better professional practice,
- to improvements in the institution in which you work, and
- to your making a contribution to the good order of society.

(p.8)

But understanding one's own practice is insufficient as mentioned above that, it must involve questioning one's own practice in order to be well-informed about it.

3.3. DATA GENERATION TECHNIQUES

Only data generation techniques which answered the question "what action(s) can I take to gather evidence to answer the research question?" were useful (Macintyre, 2000, p.59). Most of the data was generated within the first and the second school term. I employed qualitative research techniques and methods for gathering evidence because these "facilitate study of issues in depth and detail" (Patton, 2002, p.14) in a case.

These techniques and methods for gathering evidence included document analysis, video recordings and transcripts, photographs, learners' work and research journal notes. These were appropriate because the curriculum documents informed me about the recent curriculum deliberations; the video captured the teaching and learning interactions; and learners' work was a source for critical feedback from a critical friend. Journal notes contained reflections, feelings and interpretations of what it was like at the time; and photographs provided evidence of learning where possible.

3.3.1. Document analysis

Documents that provided information relevant to the question under investigation were analysed (Elliott, 1991). They were the NCS Learning Area Statements and learners' work. The NCS was reviewed to identify the environmental learning opportunities in the Life Orientation Learning Area (backbone of the Life Skills learning programme) in particular, together with the other two Learning Programmes (Literacy and Numeracy) in the Foundation Phase; through the use of school grounds. Other applicable Learning Areas across the NCS were also looked at. Through the whole process I was looking at the Grade One LOs and ASs in response to a healthy environment which is part of the first principle of the NCS and in relation to the role and purpose of the Life Orientation Learning Area. A detailed analysis of

these documents is contained in the next chapter (see Sections 4.2.1.1., 4. 2.1.2., 4.3.1.1. and 4.3.1.2.).

In both cycles learners' work and their interpretations of these were used to provide evidence of learning. For example, learners were given worksheets on which they drew a section of the school grounds and coloured in a face that showed how they felt. To provide qualitative data I had informal conversations asking them to interpret their drawings. I then recorded their responses on their worksheets. The analysis of learners' work with drawings and annotations of interpretations was recorded in the form of tables. For all worksheets each learner's work was given a code (L) which stands for learner, as well as a number given for each learner. For example, learner one (L1) had this number for all the worksheets in both cycles. Each piece of work also included a letter/s of the alphabet which represented the activity, for example, in the case of activity one the worksheet was coded (L1p). The (p) stood for problems that they drew in this activity.

3.3.2. Video and photographs

Data in the form of video recordings offered authentic evidence in that it recorded significant incidents (Koshy, 2005) as well as aspects of teaching such as interactions, actual words that were spoken and reactions (Macintyre, 2000). In this study the video was used to record teaching and learning processes in some of the activities which helped to provide "a valid and reliable record of human interaction, which can be retrieved for interpretation and reinterpretation" (McKernan, 1996, p.103). The video clips were used to provide a thick description of teaching and learning processes in the form of verbal exchanges between the teacher and particular learners. This recorded data was cross-referenced with evidence from learners' work (McKernan, 1996) during the analyses. The video transcripts were coded Cycle One video activity one (C1V1) and Cycle Two video activity one (C2V1) and so on (see Annexure A).

When the video was not available photographs were taken to help in documenting the quality of learners' engagement with activities and as evidence that an event had taken place (McNiff et al., 1996). The photographs were used to analyze different aspects of activities for example, the sequence of the activities which helped to identify a significant point of teaching practice.

Both the video recordings and photographic evidence were secured with the help of outsiders who were not involved in the research.

3.3.3. Journal

One of the things a research journal as a research technique cannot do is to record conversations. Also, the recordings in it can be highly subjective (Macintyre, 2000). To respond to those two issues, the journal was used with other research techniques, for example, video recording. The journal was useful because it kept a record of reflections, feelings, observations and explanations on what happened at the time and as soon as it was practical afterwards. These helped to reconstruct what it was like at the time (Elliott, 1991). Journal reflections were dated and coded according to date of entry, for example, Journal, 28. 04. 2005. The amount of detail in the entries varied because some were pre-planned and some were not (see Annexure B).

3.4. DATA ANALYSIS

Data in the form of learners' work, video transcripts, photographs and journal reflections was collected during the first and the second term of the year in the Grade One class. As explained above, data was not analysed in great depth during the reflection feature of each cycle as was originally planned; as it was only possible to do a preliminary analysis to inform the next planning and action process due to time constraints. Curriculum policy analysis for each cycle was done during the planning feature of each action research cycle (see Sections 4.2.1 and 4.3.1). In-depth analysis of all the data was deferred until all data was collected (see Section 3.2.2. for detail). To allow for the interpretation to come out of the data, each cycle's activities were described and analysed. The analyses were coded systematically and from them different issues began to emerge. The emerging issues from each preliminary analysis were again analysed and synthesized to identify similarities and differences between them. This constant comparison helped to generate further insights into the emerging issues. These were captured as analytical statements in Chapter Five, which are in agreement with the data. These were generated through a process of testing and amending against the data analyses reported in Chapter Four (Bassey, 1999).

Learners' work was analyzed using analytic memos. Analytic memos are useful in action research. They help to control data. As data was collected, coded and analysed; analytic memos were used to keep track of what was emerging (Glaser,

1998, p.142). These were in the form of tables (see Annexure C, see also Table 4.5 and 4.6). Photographs were used to analyse the teaching and learning processes evident in them. Analysis was driven by reference to the main LOs and ASs of the Lesson Plans. Themes such as leaves on the ground, animals feeding on litter, learners drinking from tap with cupped hands and mouth, puddles next to tap, hosepipe left running and tap not properly closed were generated from learners' work. These were categorised as littering, water wastage, learning opportunities brought by birds and ants in the school grounds and solutions. Raw data generated through the video transcripts and research journal was coded with categories such as learners having different reasons about issues, teacher imposing a particular issue and learning opportunities provided by different activities (see Annexure A).

Data from video transcripts, journal reflections, photographs and learners' work complemented each other to provide a better analysis of activities (see Sections 4.2.2. and 4.3.2.). Elliott (1991) described the idea of collecting accounts elicited through learners' work, video transcripts, journal reflections and photographs of a situation from a variety of perspectives, and then comparing and contrasting them in a process of triangulation.

3.5. ETHICS AND TRUSTWORTHINESS

There are clear implications for ethical considerations in the above data generation techniques. I used McNiff and Whitehead's (2006) ethical framework. Firstly, consent from the principal of the school was negotiated to be able to use school grounds, take photographs, make video recordings and send letters to parents. As I depended on my Grade One learners for data and evidence, I needed to get permission from parents as well because they are young. It is regarded as important to consider other's welfare within a context because involving young learners is a potentially controversial area full of tensions in that they are powerless (McNiff & Whitehead, 2006). McNiff and Whitehead referred to this category as access.

It became important to acknowledge the ownership of learners' work and treat it with respect. Names of learners were not revealed but a symbol for each learner was allocated to their data and when writing up the action research. When a learner's worksheet had his/her name on I covered the name if it was photocopied for inclusion in the appendix. I had to respect parents' wishes for their children's identity not to be revealed. McNiff and Whitehead (2006) referred to this category as safeguarding

rights. Only one learner's parent verbally requested that her child's photographs not to be used in the written report. The letters were kept carefully in the data archive (see Annexure D).

3.6. VALIDITY

"Validity is about establishing the truth value, or trustworthiness, of a claim to knowledge" (McNiff and Whitehead, 2006, p.97). I tried to ensure validity and trustworthiness of the case study through triangulation involving constant comparison of data sources. All the research techniques provided authentic evidence of what happened. By ensuring trustworthiness in this action research project, I hope that I will give my audience (teachers who may wish to learn from my work) confidence to try the ideas out thus, ensuring catalytic validity. Throughout the process, my knowledge claims were critiqued by my critical friend who raised points that were not thought about. That also helped to establish validity and reduce bias. A further strategy used to enhance validity was self- reflexivity, which is an integral part of the action research process. This was enhanced by my critical friend's comments, and through rigorous triangulation and examination of the data.

3.7. CONCLUSION

In this chapter I have shared the key ideas informing the research approach and techniques used in this research. The process involved gathering data and generating evidence on the usefulness of school grounds in environmental learning as well as improving practice and learning, in two action research cycles.

The chapter explained how I attempted to reduce bias through constant comparison of data using triangulation and being open to criticism from a critical friend. The chapter explained that the intention was to bring about informed practice.

CHAPTER 4

ACTION AND DATA PRESENTATION

4. 1. INTRODUCTION

In this chapter I detail and analyse the two cycles that made up my action research project. For each cycle I firstly, describe and reflect on the planning phase and design of the lesson plan; and secondly, the teaching and learning activities (action phase), and preliminary data analysis (reflection) for each activity. Concluding each cycle is a synthesis of issues emerging from the preliminary data analyses of each activity. Finally, these emerging issues are summarised and highlighted for discussion in the next chapter.

4.2. CYCLE ONE

4.2.1. Description of and reflection on the planning and design of the Cycle One Lesson Plan

4.2.1.1. Introducing Lesson Plan 1

For this cycle I prepared an audit of the school grounds. This was done within a Lesson Plan made up of three activities. Two of these were meant to stimulate learners' thinking about school grounds in general. The other was the actual audit done by learners themselves (see Annexure E).

I focused the Lesson Plan on the school rule about littering specifically because I was concerned about what the learners learn from being told not to litter, asked to pick up the litter, and finding the school littered again the next day. I was concerned that learners do not engage in meaningful learning through the messages we give them, and that meaning should arise from activities in context (see Section 2.3.2.).

4.2.1.2. Curriculum policy analysis

I analysed the curriculum policy document in order to look for opportunities for environmental learning in the Life Orientation Learning Area which has the outcomes for the Life Skills Learning Programme. This Learning Area deals with social, environmental and cultural issues such as those raised by the principle of the interrelationship between social justice, human rights, and a healthy environment (see Section 2.3.4.). In relation to this principle, this Learning Area develops skills, knowledge, attitudes and values that empower learners to make informed decisions

regarding health promotion and to develop an understanding of the relationship between health and environment. This is done through addressing issues relating to nutrition, diseases and environmental health (South Africa. DoE, 2002c). I have found that these elements of environmental learning, with environmental health in particular, relate to my research.

4. 2.1.3. Interpretation of Learning Outcomes and Assessment Standards used in Lesson Plan 1

I also looked at the LOs and ASs of Life Orientation to find an environmental focus which I could relate to the use of school grounds. It is important to look at all the LOs and ASs for elements of environmental learning as there are school grounds-related environmental learning opportunities throughout the Life Orientation Learning Area Statement.

The first LO (see Table 4.1) emphasises health promotion in its second AS. In my study a focus on this environmentally focused LO and AS supported learners in investigating steps to ensure a healthy environment in the school grounds. The LO was clustered with parts of LO2: AS1 (explains school rules and why they should be followed) and LO3: AS3 (shows and identifies different emotions) (see Table 4.1).

LOs and ASs from the same and other Learning Areas need to be included when planning, but these must be naturally linked or connected to make the activities more authentic and meaningful. These links combine to develop a balanced deepened understanding of concepts in authentic contexts and enable the deliberation of integrated solutions to environmental issues and risks. In this Lesson Plan I grouped together LOs and ASs within the same Learning Area; that is, LO1: AS2 with LO2: AS1 and LO3: AS3. This was done because in order to be able to make informed decisions, learners needed to be able to explore their feelings about the issues in their school grounds and be able to explain why the school rule about littering must be obeyed.

Table 4.1 Life Orientation Learning Outcomes and Assessment Standards

LIFE ORIENTATION

LO1: Health Promotion

The learner will be able to make informed decisions regarding personal, community and environmental health

AS2 – Explains steps to ensure personal hygiene and links these steps to environmental health.

LO2: Social Development

The learner will be able to demonstrate an understanding of and commitment to constitutional rights and responsibilities, and to show an understanding of diverse cultures and religion

AS1 – Draws up classroom rules and explains school rules and why they should be followed.

LO3: Personal development

The learner will be able to use acquired life skills to achieve and extend personal potential to respond effectively to challenges in his or her world

AS3 – Shows and identifies different emotions, including respect for living things.

Part of LO2: AS1 deals with the ability to explain why school rules should be followed. Our school rule states that learners must not litter and they must pick up bits of litter lying all around and throw them into the bins. This is what we always tell the learners yet they do not own this school rule. I was concerned that without understanding why they were not allowed to do it, learners would not be committed to upholding the school rule. My intention was to help them to understand the right to a healthy environment in order to understand why littering is a problem. I also hoped that thinking about what could be done about the situation of their school grounds would help make learners feel that they were part of the decision-making process and encourage ownership of the rule. This would help them to understand that keeping the rules about the school environment is a shared responsibility.

Part of LO3: AS3 is about being able to show and identify different emotions. The intention of this Lesson Plan was to provide learners with an opportunity to think about how they felt about the way their school grounds looked. The drawing of faces showing different emotions was designed to help learners think about their feelings and identify with these. These integrated LOs and ASs were used together to build

up skills, knowledge, attitudes and values that complemented those integral to LO1: AS2.

4.2.1.4. Integration of other Learning Outcomes and Assessment Standards from other Learning Areas

The integration of LOs and ASs from other learning areas enhanced the identification and understanding of the issues in the school grounds. We would not have been able to develop an understanding of issues without communicating our ideas hence I integrated with English - First Additional Language LO1: AS5. Learners must be informed before they can attempt to respond appropriately to a particular situation, hence listening as a skill must be developed. When listening to others, when discussing issues and solutions, as well as when presenting; the intention was that learners would get information that would help them to respond appropriately.

Technology LO1: AS1 was integrated because making binoculars would encourage learners to focus through them on something real rather than on something in their imagination when auditing school grounds for environmental issues. Table 4.2 below shows the LOs and ASs used for integration in the Lesson Plan.

Table 4.2 Integration with other Learning Areas

ENGLISH – FIRST ADDITIONAL LANGUAGE

LO1: Listening

The learner will be able to listen for information and enjoyment, and respond appropriately and critically in a wide range of situations

AS 5 – Shows respect for classmates by giving them a chance to speak, and by listening to them.

TECHNOLOGY LO1: Technological processes and skills

The learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technologies.

AS1 – **Makes** simple products from a range of materials provided.

4.2.1.5. Contextualising Assessment Standards

I had to choose a suitable focus to contextualise the LOs I had identified. The school grounds as the learners' environment provided a suitable context for learning in this particular case because the context was drawn from real life issues facing the learners and the teacher.

There are three key aspects of Assessment Standard contextualisation that were highlighted when I designed and analysed the Lesson Plan.

Firstly, I intended to bring in the school grounds as a context for learning because the NCS encourages teachers to bring in appropriate content according to its context. However, I felt limited in my freedom to choose the content as some ASs in Life Orientation, specified content topics to be taught. The prescriptive nature of some ASs ensures that certain key content is covered over the course of the learners' schooling years.

However, other ASs are more open-ended in that they allow teachers to be flexible in their choice of content. For example, LO2: AS1 (see Table 4.1 above) enabled me to address the school rule about littering. That is, the learners should be able to explain why this rule should be followed in their school.

Secondly, on analysis of my Lesson Plan I realised there was a problem with changing the wording for Assessment Standards to fit with my planned activities. On initial analysis of the Life Orientation Learning Area statement for Grade One, I felt that there was no AS that specified content associated with school grounds. I felt that LO1 was most appropriate for this particular Lesson Plan, but I found that the ASs for this LO specified 'personal hygiene' as the content. Thus, I changed the ASs to read as: "Explains why the people in the picture are doing what they are doing to keep their environment healthy". Later discussion with my fellow students, supervisor and the Department of Education Development Officer made me realise that changing assessment standards is against policy. This issue is discussed further in Section 4.2.3.3.

Thirdly, the NCS "provides Assessment Standards that indicate the **minimum** that learners must achieve in each grade" (NEEP-GET, 2004c, p.21). Teachers are expected to teach more than the ASs prescribed. By further exploring the LO1 concerned with informed decisions regarding environmental health, opportunities were provided for learners to learn beyond the minimum requirements. By investigating their own actions and the impact of these on the environment and by making suggestions for improving the situation, learners were being supported to make informed decisions.

4.2.1.6. Participatory learning

I involved learners in some of the stages of the process by considering their opinions which I believed would help them to cultivate a sense of ownership of learning. My goals were to help them identify and understand issues in their own context. In this way I intended to develop informed citizens through genuine participation (see Section 2.4.4.). For example, in Cycle One Activity Three, learners were asked to draw solutions to problems identified. The proposed solutions were compared to what they drew as problems in order to give me an indication of whether the intention to support informed decisions was realized. Ideas from these identified problems and proposed solutions also informed planning for the next cycle in that the decision to design a Lesson Plan about water wastage was informed by the fact that out of 43 learners 30 drew and commented about water and its use on our school grounds either as a problem or solution.

4.2.2. Activities and preliminary data analysis for Cycle One

For this cycle each activity is described, followed by a preliminary data analysis for each. The analysis consists of an explanation of the specific tools used to gather data, a description of what was analysed and a discussion of insights gained. The insights focus particularly on two areas of teaching and learning. Firstly, methods and strategies; secondly, achievement of skills, knowledge, attitudes and values related to the stated LOs and ASs.

4.2.2.1. Activity One – Discussion of photographs

- Activity description

This activity was a discussion of two sets of photographs; firstly, of other schools' grounds and secondly, our own school grounds. Learners worked with photographs to answer three questions posed on each set.

To represent other schools I used photographs of Eco-Schools from the national coordinator. These pictures were used to give them an idea of how and what other learners are doing to keep a healthy environment in their schools. With these photographs learners were working in groups to answer three guiding questions that were posed to them, namely,

1. What is happening in the photographs?
2. Where do you think the people in the photographs are?

3. Why are they doing what they are doing?

For our school I took photographs of what happens daily. The photographs of our school were used to help learners see, talk and think about what goes on outside the classroom in the school grounds. The guiding questions for these were as follows:

1. What is happening in the photographs?
2. How does it make you feel?
3. What can be done about it?

The activity aimed to stimulate learners' thinking about the state of our school grounds as compared to what school grounds could look like. This provided them with an opportunity to discuss and thereafter report their ideas to the whole class.

This was a cooperative group work exercise. The model of cooperative learning used was designed to make sure that each group member understood what the group was discussing so as to be able to report back and not let other group members down.

Group work was facilitated by asking questions from learners to help focus their attention on answering the questions. All the answers were welcomed, that is, there was no right or wrong answer. Learners were grouped at random not in their original groups where they already know their peers very well. This was done to allow new leaders to emerge in the process of all learners participating in the construction and reconstruction of knowledge.

We were all learners in the process. The process of sharing information was two-way; that is, from the teacher to the learners and from the learners to the teacher. For instance, one learner shared that he put uneaten bread in his lunch box to keep for his dog as opposed to dropping it on the ground or throwing it into the bin. Through my intervention, learners' thinking changed about what must be done about food thrown on the school grounds. I had a concern that learners felt it was alright to litter as long as there is someone to pick it up. After our discussion one learner said this about banana peels on the ground, "we must put litter in the bin" (translated from C1V1). This interchanging of roles helped both of us learn from each others' experiences.

Afterwards learners drew pictures of what they thought were problems at their school. I had informal conversations with individual learners to talk about and

interpret their pictures and I recorded these conversations on the worksheets (see Annexure F).

- Preliminary data analysis

When looking at the video (C1V1) for evidence of cooperative group work in the first part of the activity I noticed myself facilitating the understanding of individual learners within groups because learners did not seem to be achieving a shared learning goal through the discussion. For example, one conversation was about a photograph showing labelled flowers in a school garden. When the learner was asked what was happening in the picture she said, “the learner in the picture was picking the paper”. When I asked her about the writing on it she said that the paper is labelled, “we are picking flowers”. When I further told her that flowers are not meant to be picked, she said the label said, “flowers are beautiful, do not pick them”. When I suggested that maybe the label has the name of the flower, she said, “that is a sunflower” (C1V1). These questions and comments were directed at the individual learner. There was no evidence of learners learning from each other in cooperative ways that included interdependence and learners taking responsibility for each other’s learning. From this interaction I learned that one cannot rely on group discussion alone for learning to take place. The teacher needs to facilitate with scaffolding questions in order to deepen learning. Thirdly, learners may need more experience with taking responsibility for their own learning for cooperative learning activities to succeed.

Despite the goal of cooperative learning, the way I structured the activity resulted in an outcome that not all group members had an opportunity to report on the activity and demonstrate their understanding of it. I ended up asking random learners to report back the group’s discussion (that is, those that were keen to report). But they reported their own thinking, not that of the group. Thus, the cooperative group work did not work successfully. A deeper understanding of the cooperative learning process would have enabled me to facilitate the activity better. The way I facilitated the process was partly driven by my concern for receiving the correct answer, rather than a concern for each individual participating and learning in the activity.

One success of this activity was that some learners were able to report ideas back to the whole class. Reporting ideas is an element of active learning. There were, however, groups which could not report successfully, for example, one learner could only say, “they are at school” (C1V1) which was the answer to only one question out of the three that were asked.

I noted that learners reported different interpretations of particular situations. For example, when viewing the photograph showing learners and collected cans, one learner said “they are drinking cooldrink”, another said, “they are collecting cans to avoid uncleanness”. When viewing the photograph of learners working in a garden, one learner said, “the learners want the garden to be beautiful”, but another said, “the learners are punished” (C1V1).

Learners’ prior knowledge was mobilized by making use of photographs. Photographs representing other schools exemplifying solutions were used as the starting point. Our school’s photographs were used to show problems. Using photographs that depicted solutions first was meant to expand their horizons of possibility.

Another element of active learning used in this activity was the information seeking dimension of active learning in that learners were finding out about the state of our school grounds as compared to what school grounds should look like, which was learning about environmental health.

Several times in the process I found myself trying to influence the learners by stating the issues of concern to me without explanation. For example, I said, “it is wrong to wash the cement floors or school bus with a hosepipe”, while most of them thought there was nothing wrong with such an activity. When looking at the photographs of the school, learners reported that the school was being cleaned with a hosepipe, when asked if it was right to do that they replied, “Yes”. Again when they were reporting back about water puddles next to the tap, I led them to what I wanted them to say by repeating what was said by a learner, “learners at Ntaba Maria are drinking from the tap with the mouth. And now what happens to the water?” Learners said, “It becomes stagnant, it falls”. Then I said, “They are wasting it” (C1V1). In this way I was imposing my own views instead of creating opportunities for dialogue and critical engagement with the issue through active learning processes such as an audit of water lost when using a hosepipe. That is, I could have **worked with** the prior knowledge by stimulating discussions about why certain water-use practices are problematic, rather than imposing my view when realising that their views were not consistent with mine.

Out of 43 learners 39 drew and commented about how water is used or wasted on our school grounds. Fourteen pictures showed other issues (see Table 4.3 below).

Table 4.3 Issues reflected in learners' drawings after Activity One

ISSUES	NUMBER OF LEARNERS
Playing with water	3
Washing with a hosepipe	12
Dripping water	10
Drinking with hands	6
Drinking with mouth	1
Water puddles next to tap	4
Washing hands	1
Hosepipe left running	2
Leaves on the ground	6
Littering	6
Animals feeding on litter	2

* NOTE: Some learners drew more than one issue in their pictures

My strong focus on water could have influenced the emphasis on water in the learners' drawings that they did straight after this activity. There is also an indication that the use of English was inhibiting learning because when asked questions learners provided one-word answers in English. I helped them to understand by code switching to clarify instructions or encouraging them to talk isiXhosa amongst themselves in their discussion groups.

I also encouraged them to use simple English because it is the Language of Learning and Teaching in the Life Skills and Numeracy Learning Programmes. I said "in English please" and the learner tried 'She is making the school clean', "Do you like the school?" 'Yes' "Why do you like it?" 'They have gard [a garden]' (C1V1). This way I gave them an opportunity to go further than just giving one answer. This is evidence of running two lessons in parallel, a Life Skills and an English lesson.

When learners reported on the photographs of our school they were certain that it was right to use a hosepipe when cleaning cement floors (C1V1) and could not understand why it was wrong (Journal, 26.04.2005). But their drawings straight after the discussion showed the use of the hosepipe as an issue (see Table 4.3 above) though they had not understood the extent of the wastage or the problem with wastage. That was evidence of reproducing what they were told without developing a deeper understanding of the issue.

4.2.2.2. Activity Two – Making binoculars

- Activity description

This started by doing a fun activity to train learners' eyes to see. I introduced this by giving learners a worksheet of a picture of learners playing in the school grounds. I asked them to find the girl hidden in the picture. This was done to train them in focusing their vision.

We then had a discussion about not being able to see (i.e. blindness). We dramatized blindness by doing a blind walk in class and asked them about how they felt about being blind, for instance, trusting their friends when walking blind.

Afterwards learners made binoculars out of toilet rolls with my help. The binoculars were meant to stimulate learners' interest and enhance their attention when drawing the school grounds in the next activity.

- Preliminary data analysis

Photographs were taken and my research journal reflections were made after the activities. I analysed the teaching and learning processes evident in the photographs.

In Figure 4.1(a) learners were involved in a dialogue, helping each other to spot the girl amongst other children playing. This social process helped to focus learners' attention and sharing amongst each other. In this activity learners started off by being engaged individually to find the hidden girl and later collectively engaged in helping each other when they struggled to find her. These engagements did not necessarily mean that all learners managed to achieve the skill of focusing on things very carefully (as evident in the learners' work) because those who could not spot the girl had her pointed out by other learners for them.

The blind walk activity (see Figure 4.1(b)), while intended to raise learners' awareness of what it means to be focused, actually distracted them from the purpose of the group of activities which was to draw what they actually saw rather than what was in their imagination.

Learners then moved to working individually which is also important in meaning making and when it is required in an activity (see Figures 4.1(c) and (d)). In Fig 4.1(c) learners were each required to make their own binoculars to help them focus.



Figure 4.1(a) Spotting the hidden girl



Figure 4.1(b) Blind walk



Figure 4.1(c) Making binoculars



Figure 4.1(d) Vision focussing

This activity as a whole also developed skills from Technology LO1:AS1 (see Table 4.4). Although learners were not involved in environmental learning per se, this was preparation for engaging with environmental learning in Activity Three.

In retrospect I feel that the “finding the girl” worksheet should have led straight to the making of binoculars and then to the audit of school grounds. The two scaffolding activities, the worksheet and the making of binoculars were enough to take them a step further from where they were.

4.2.2.3. Activity Three – Drawing pictures of school grounds

- Activity description

At this stage it is important to note that on the day of the audit of school grounds there was no water at school for the whole day. It was a possibility that we would not see water puddles, dripping taps if any and everyday water use activities at school. I also asked the cleaners not to pick up litter after lunch break as they usually do. This was done with the intention that learners became aware of their actions and how these affect the school grounds.

Learners were taken outside to conduct an audit of the school grounds. They were encouraged to look through the binoculars and draw what they saw on the worksheets provided. In this activity I aimed at achieving the skill of focusing vision on issues in the playground. For learners to be able to identify issues they needed to focus their vision on what they saw in reality rather than on imagined or hypothetical problems (see Figure 4.1(d)).

There were three sets of worksheets; one for those who looked next to the netball court area, another for those who went along the fence and one for those who were next to the steps of the main school building. They also had to colour in a face that showed their feelings about what they saw (see Appendix G). The worksheets were designed to include a space for me to record some conversations with learners. I talked to some about their drawings and probed them about why they felt the way they did about their drawings. These conversations helped them to think about their feelings which, I intended, would help them to make informed decisions about what they saw. Later in another activity learners drew solutions to the problems identified.

- Preliminary data analysis

Learners' work for this activity was coded (L1f) and (L1b). An analytic memo was drawn up tabling a description of each drawing, the face drawn, the conversations explaining the drawing, and the solutions drawn (see Annexure C).

The solutions were analysed with the LO1: AS2 of Life Orientation in mind in the light of thinking about steps for improving environmental health in the school grounds. Compared to the problems identified, only 15 learners out of 43 managed to draw solutions to the specific problems identified. The other 28 learners' solutions did not correspond with identified problems.

In 10 cases a mismatch was shown between the learners' drawings, their feelings and reasons for what they drew. Sometimes learners were unsure about their feelings with regards to their drawings (L43). One example of such conversation went on like this (see Annexure?? - L21f):

"What is this?" "A dog". "How do you feel about dogs coming to school, do you like dogs coming to school?" "No". "So, how do you feel? Are you happy about dogs coming to school, or are you OK about it, or are you sad about it? How does it make you feel? Show me the face". The learner pointed to a happy face. "Are you happy?" "Colour it in, why are you happy, do you want to tell me?" "Because I love people". "People? we are talking about dogs coming to school. Why are you

happy about dogs coming to school?" The learner would not even attempt to answer in *isiXhosa* as was encouraged by the teacher (C1V3).

In 18 cases there was a clear connection between what the learners said compared to the coloured in face showing feelings. For example, a learner who drew butterflies, birds flying and a tree coloured in a happy face (see Annexure G). The conversation of the teacher asking and the learner replying went on as follows:

What did you see? "... butterflies and birds" What are the birds doing?" "Flying", "how do you feel about what you have seen? How does it make you feel? "The tree, the tree" "how does it make you feel? Are you sad about what you have seen, or are you OK, or sad about what you have seen? "I am happy". "Why are you happy?", "because I love trees". OK colour in the happy face (C1V3).

In 3 cases, learners' drawings matched with feelings but the contents of the drawing were not environmental issues. This could be that there was a problem with the way the instruction was given because learners were asked to draw "whatever you see on the playground", "how it looks like now" and "see if there is something that is worrying you on the playground". The first instruction asked learners to just draw whatever was there and they may have focused on the first instead of the third instruction which was more specific to environmental issues.

My journal notes (Journal, 28.04.2005) indicated that the binoculars were initially successful in holding learners' attention to the task. In some cases learners stopped using the binoculars and I had to encourage them to keep using them (C1V3). Ultimately only 3 learners' drawings included things not seen from where they were sitting which indicates that they had not drawn what they saw through the binoculars.

L2f had coloured both faces and had been able to explain why. Being able to articulate a problem and how you feel about it is an important step towards making informed decisions about environmental issues.

Although some learners did achieve the LO to some extent; others did not achieve it at all. For instance, one conversation went on like this:

"What is this tap doing?" "It is dripping water". "Do you like to see that?" "Yes" and nodded. "Why?" "The tap does not close properly". "Do you like that?" The learner nodded (C1V3).

This learner has not learnt that a dripping tap can waste water. However, to the same question another learner answered like this:

“Because the tap must not be opened to full strength” “why?” “Because paying for water is difficult” (translated from C1V3).

This indicates that this learner would be able to make an informed decision about environmental health.

Learners L6, L7, L15, L17, L26, and L36 showed that they had not achieved the skill of identifying environmental issues because their drawings do not show any of these. This could be due to the way in which the instruction was given (as discussed above). Twelve learners' drawings showed that they had not been able to fully motivate their choice of environmental issue (L2, L9, L10, L11, L28, L30, L31, L33, L34, L38, L41 and L42).

The element of active learning used in this activity was enquiry about local issues because learners were looking for issues which they then represented in the form of drawings and colouring in faces. Also, significant in this activity was the reporting and reflective element of active learning. That is, the activity showed that without asking learners to motivate on their choices I would not have had any idea as to whether their portrayals of environmental issues had any significant meaning to them. The illustrations of proposed solutions also suggest what could be the action dimension of active learning.

4.2.3. Emerging issues from the preliminary analysis of Cycle One activities

4.2.3.1. Teaching methods and strategies

A cooperative learning model was used in Activity One. This was the first time the learners were involved in this way of learning. There was no evidence of learning from each other amongst the group members. Learners were not helped to have the opportunity of sharing knowledge with others to make sure that all of them understood. I facilitated individual learning within the group. The activity set up confused the learners. They did not report back in a way that revealed learning from each other. They did not succeed in achieving the skill of reporting back to others which is related to being able to make informed decisions about environmental health. This highlights the importance of making sure that learners are trained to work cooperatively as opposed to just working in groups and the importance of the teacher scaffolding the activities according to learners' needs and for the benefit of all group members. In Activity Two, evidence showed that learning and language are inseparable in that some learners helped each other even though the activity was

meant to be an individual activity. The collective engagement started the talking about the worksheet.

Learners' prior knowledge was mobilized by making use of photographs. Learners had different interpretations of these and sometimes these interpretations were misleading, but were also a learning experience for the learners and me. Nonetheless, photographs of success stories helped to show what other learners do about their school environment to keep it healthy. They also served as a measure against which learners could assess their own situation as well as helped them to think about improving their own school grounds.

The imposition of my own views did not necessarily lead to a change in learners' thinking or understanding, but encouraged learners to say what I wanted them to say, or what they thought would please me; without understanding why. For example, learners could have been challenged to move beyond prior knowledge through active learning and critical thought instead of imposition of ideas by myself. They could have been supported to make their own decisions about whether it is right or wrong to wash the cement floors with a hosepipe by measuring the amount of water wasted from a running hosepipe.

The two-way sharing of information ensured that both the teacher and the learners were learners. The teacher learnt from the learners and the learners learnt from the teacher during the discussions of pictures and when I talked to them about their drawings.

The use of binoculars enhanced learner's attention. The binocular activity indicates that young learners benefit from an activity that focuses their attention on the real, rather than simply their imagination of a situation.

Subtleties in the way that I explained activities sometimes detracted from planned learning outcomes. For example, the way instructions were given in Activity Three were too open-ended and did not specify that learners' drawings must show environmental issues.

The lesson provided opportunities for active learning through activities involving enquiry, reflections, reporting and action. The school grounds provided learners with a context to investigate local issues in an enquiry activity. This made learning more

meaningful because it was based in an authentic setting. Learners' reflections on their drawings enabled me to gauge their ability to make decisions. Also, allowing learners to report back gave them opportunities to give their own interpretations of the situation. In addition to that, a foundation for action was laid when learners drew proposed solutions to the problems.

4.2.3.2. Achievement of skills, knowledge, attitudes and values

14% of learners' work showed that they were not able to identify environmental issues at all; 28% were able to identify issues but not fully able to motivate their choice of environmental issues. 42% of learners were able to make informed decisions with regards to environmental health; and 65% were able to explain their feelings about their pictures. This was evidence of developing knowledge and skills contributing towards achieving the main learning outcome for this Lesson Plan.

For Activity Two I wanted learners to be able to look carefully with their eyes in order to spot the girl hidden in the picture. All of the learners were able to achieve this according to evidence in their work. However, analysis of the teaching and learning process gave another interpretation that not all learners achieved the skill of focussing.

LO1: AS2 includes the ability to make informed decisions about environmental health, in our case it was thinking about steps to improve the situation of the school grounds. Only 35% of learners' drawings of proposed solutions matched the specific problems identified.

4.2.3.3. Learning in English as a First Additional Language

I have found using both English and *isiXhosa* helpful. It helped learners to understand the questions and enabled them to express themselves in their home language. These benefits of code switching were as important for learners as learning to speak the additional language.

4.2.3.4. Lesson Plan design

Looking at all the LOs and ASs in the Life Orientation Learning Area helped me to discover integration opportunities. The ASs I used for integration in this Lesson Plan have parts of them dealing with school grounds. However, I did not manage to

discover links between the school grounds and the curriculum, that is, ASs that articulated school grounds content explicitly in this Learning Area. I then rewrote them to fit with what I was doing (see Annexure E). This dilemma caused a problem with maintaining the integrity of the curriculum during planning.

Through contextualising ASs I realize that some ASs prescribe content and others are open-ended. The open-endedness allowed for contextualization of content to be appropriate with real life experiences.

Some of the LOs and ASs were found through interpretation of other learning areas. Integration helped to develop a deepened understanding of environmental issues and to strengthen the achievement of making informed decisions about environmental health in the school grounds. For example, learners needed to listen to each other in order to be informed, hence integration with English FAL. Also, the Lesson Plan showed meaningful integration with Technology (through making of binoculars).

Allowing learners to develop an understanding of why rules need to be followed gave them an opportunity to participate in the process of learning and decision making. This helped them to be informed participants.

Through integration learners were given opportunities to go beyond the requirements of LO1: AS2 of Life Orientation in that learners thought about their situation (discussing photographs), examined the consequences of their actions (audit) and made suggestions for improving the situation (pictures of solutions).

4.3. CYCLE TWO

4.3.1. Description and reflection on the planning and design of the Cycle Two Lesson Plan

4.3.1.1. Introducing Lesson Plan 2

For LP2, the intention was again to meet curriculum requirements using school grounds as well as to improve my teaching practice. Integrated LOs and ASs from other learning areas were analysed in relation to school environmental health.

For LP2 I needed to improve my assessment practices, because for LP1 I had not been able to comment critically on the extent to which learners had achieved the

intended LOs. I realised that more formal assessment practices and record keeping would help me in my research process as it would give me the tools for judging the depth and breadth of learners' achievements in relation to my expectations for environmental learning in my curriculum work.

Informed by the previous cycle and also by my interest in showing learners how much water is used or wasted during our everyday activities in the school grounds, issues were prioritised according to what needed urgent attention. I prioritised water wastage because the issue is less visible than littering and degradation, which are easily seen by the school community. It seemed that not everyone at school was aware that this was a problem. If they were, cleaning of cement floors would strictly be done by using brooms or rakes. The Lesson Plan was mainly designed for finding out if water really is wasted during everyday activities in the school grounds. This was an exploration of the issue thereby developing attitudes and awareness to respect this life sustaining resource.

I used the ASs as they are in the policy documents. However, it must be noted that not the whole of each AS was covered; only parts of them were dealt with in the Lesson Plan activities. This is explained further under each activity.

4.3.1.2. Curriculum policy analysis

I looked at the NCS in the Life Skills Learning Programme for LOs and ASs with an environmental focus. This meant considering primarily the LOs from Life Orientation; together with those of Languages and Mathematics. LOs from other learning areas were also integrated. In a Life Skills lesson learners explore the world they live in through the use of language and because of that I thought story telling would work well in investigating the environment. Likewise, Mathematics helps learners to describe and investigate everyday situations in numbers. So in relation to this I did water auditing activities. This was intended to enable learners to understand the world better and to plan for the future (NEEP-GET, 2004) through helping them to understand their school grounds better and to decide what needed to be done about the situation.

4.3.1.3. Interpreting Learning Outcomes and Assessment Standards

For this cycle Life Orientation LO1: AS2 (see Table 4.1 above) became the main LO for LP2 because my study was confined to this Learning Area and learners needed to

know that to ensure environmental health they need to be able to explain steps about what to do to respect water. Again links with personal hygiene were not the focus of LP2. However, I integrated across with other Learning Areas, namely, Social Sciences (Geography), Mathematics and Languages (English First Additional) (see Table 4.6 below for details of relevant LOs and ASs). Social Sciences (Geography) links naturally with LO1 of Life Orientation because they both deal with making informed decisions about social (that is, personal and community) and environmental problems. LO3: AS1 of Social Sciences (Geography) explicitly deals with the issues of environmental health in the school environment. Mathematics was also integrated because it was planned that learners would enquire about the issue by reading the water meter, measuring and calculating to find out if water was wasted.

Table 4.4 Learning Outcomes and Assessment Standards used in LP2

SOCIAL SCIENCES (GEOGRAPHY) LO3: Exploring issues

The learner will be able to make informed decisions about social and environmental issues and problems.

AS1 – Identifies and describes issues affecting personal health or safety in the school and/or home environment [the issue].

MATHEMATICS LO1: Numbers, Operations and Relationships

The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

AS3 – Knows and reads number symbols from 1 to at least 100 and writes number names from 1 to at least 34.

LO4: Measurement

The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

AS5.2 – Estimates, measures, compares and orders three-dimensional objects using non-standard measures:

- capacity (e.g. spoons, cups,).

4.3.1.4. Contextualising Learning Outcomes

LP2 was designed for learners to encounter and make meaning of water wastage in their own surroundings. It was also designed to engage learners in activities that required them to find more information about the issue. Thus, Social Sciences (Geography) LO3: AS1 became a perfect vehicle to do this because it required learners to explore issues in their school environment.

To calculate water wastage, learners needed to be able to recognise numbers, count, estimate and measure volume. Thus, Mathematics LO1: AS3 and LO4: AS5.3 were appropriate outcomes for a water quantity audit. The use of the school grounds enabled learners to encounter problems that called for the need to measure in a situation that made sense to them.

4.3.2. Activities and preliminary data analysis for Cycle Two

4.3.2.1. Activity One – Storytelling

- Activity description

For this lesson plan my starting point was a story because of the consideration of the importance of stories in teaching certain values to young learners and because stories help in developing knowledge and visualising issues and situations.

A mythological story 'For the love of water' was told (see Annexure H). The story is an African myth from the Sesotho culture. Mythology stems from the oral tradition. I adapted the story by using *isiXhosa* names for the characters and modifying the words in the song to suit the age group. In this way I was trying to help learners identify with the story. The story was told using real objects connected to the story, namely, clay pots and items inside them to make it real, more interesting and meaningful.

During the story telling I emphasised that water wastage led to the water being locked away but the story itself was not clear about how water was wasted by the community. The belief was that stories foster learners' understanding of the world. I thought the encounter (touching the real objects and doing actions), and reflecting (thinking about what will happen next) on experiences in the story would help them to make meaning of water wastage. The story described clearly one water-related issue, namely, water pollution. It explained that the people polluted the river by

throwing dead dogs and all kinds of rubbish into the water and by using the river as a toilet. In this way it strengthened knowledge about pollution and respect for water.

The story was told in First Additional Language (FAL) (see Annexure I for relevant LO and AS) and to help learners understand I used my voice to represent different characters and used eye contact and gestures. These helped to convey the meaning of the story.

During the story learners were involved in a variety of ways. They joined in with singing, doing actions, making contributions and answering questions using both languages to express their experiences and organise their thoughts. They were also asked to act out the story voluntarily using their home language. This was done because with every method used in class some learners would be at an advantage and some at a disadvantage. With the story telling only those who were confident to speak English would answer the questions and make contributions. Those who found language inhibiting their oral participation in the form of answering questions in FAL were able to participate by acting out the story.

After the story learners drew pictures to illustrate the story. Some also described what was in their pictures and I recorded these descriptions on the drawings.

After looking at these drawings I decided to retell the story as I was dissatisfied that they had only represented characters from the story. The second time I told the story I emphasized the people's actions and consequences thereof and asked the learners to draw again. Once again I recorded the learners' descriptions of the drawings.

- Preliminary data analysis

Both sets of drawings and learners' interpretations of their drawings (where applicable) were analysed using analytic memos. In the coding each learner had the same number as in the previous cycle. Drawings telling the story for the first time were coded, for example, L2s (where "s" stands for story telling) and for the second time, L2sa (where "sa" stands for story telling again).

The second set of drawings was analysed according to categories of consequences and people's actions (see Table 4.5).

Table 4.5 Analysis of learner drawings from second storytelling

CATEGORIES	NUMBER OF LEARNERS
Animals dying	9
Water pollution	7
Hungry people	2
Dead plants	2
Lack of water	8
Person throwing something into river	2
Characters from the story (no issue identified)	22

Only two learners showed people's actions (throwing waste into a river). 20 out of 42 learners (one learner absent) showed evidence of understanding that if the water is wasted or polluted, animals and plants will die, there will be no water, people will be hungry and the little water left will be polluted. The other 22 learners just drew characters again. Thus, approximately half of the class achieved the skill of showing the consequences of people's actions. This developing knowledge was then mobilised in the next activity to take learners a step further towards achieving LO1: AS2 of Life Orientation. Learners needed this understanding for the next activity but nothing was done to, for example, share the drawings of those who were able to illustrate people's actions so that the others all had the foundation of understanding the issue before moving on.

Possible expanded integration could have been made with FAL LO2: AS1 (see Annexure I) to help learners practise speaking English. Learners answered questions about the mythological story. When asked about what the village people did they said, "They wasted the water" (C2V3) and when asked about what the snake did they said, "He lock up the water" (C2V3). This was an example of being able to respond appropriately in English to simple questions.

4.3.2.2. Activity Two – Discussion of 'not looking after water' pictures

- Activity description

This activity was from *Sharing our World: Integrated Life Skills learner's book for Grade 1* (Davis & Shaw, 1998). It had five pictures of people using water (see

Annexure J). These were chosen because my goal was towards the achievement of LO1: AS2 of Life Orientation which requires learners to be able to explain steps to ensure personal hygiene and link these steps to environmental health. AS2 involves being able to describe what is happening and put in plain words what needs to be done to ensure that the school environment is healthy. This was how I re-interpreted AS2 in order to relate it with the context it was used in. For example, in this case this required learners to say what needed to be done to respect water in our school grounds. Learners were engaged in dialogue about what was taking place in the pictures. Afterwards they had to say what was wrong in each picture and later they had to come up with what they would say if they were to talk to the people in the picture about their actions. Any unexpected responses and changed understandings expressed during their oral responses were recorded in my research journal.

Learners used the Life Skills books provided. They worked in pairs but individual learners reported back to the whole class.

- Preliminary data analysis

In the two pictures of children washing in a full bath and of two children playing with a sprinkler; most learners did not see any problem. Their comments were “It is hot and children are cooling themselves with water”. Another was “I also do this at home. I like to fill the bath with water like this child” (Journal, 22.06.2005). They also did not see anything wrong with the Indian lady throwing water down the drain. They thought that it was right to throw water down a drain, until I brought their attention to the plant next to her. Even then they could not understand why dirty water from washing dishes in the kitchen could be used for watering plants because they regarded it as dirty. They responded, “There is nothing wrong. We must throw water in the drain” (Journal, 22.06.2005). Even though I was uncertain myself of the health and hygiene implications of using dirty water, the textbook expectations drove me to convince the learners that it was an appropriate thing to do. This is evident from the following response: “Don’t throw water away, water the flower instead” (Journal, 22.06.2005). Their responses to the woman washing her car were, “don’t leave the hosepipe running, close the tap, and use a bucket” (Journal, 22.06.2005).

This set of pictures helped me to discover the learners’ reactions when seeing bad user patterns. These facts about this set of pictures highlighted the usefulness of the upcoming activities - finding out if there were problems with everyday practices in our

school grounds and quantifying one particular issue (water usage) through numerical investigations.

4.3.2.3. Activity Three – Water audit activities

- Activity description

In this activity learners were taken outside to do water auditing activities in order to find out if they were really wasting water in their everyday activities in the school grounds. We started off by recapping what happened in the story in the form of questions and answers. Then they were told about the water meter and how it works.

One group stayed in the classroom with a teacher helper to complete worksheets about water, for example, uses of water, animals in water, water containers and filling in words of things that need water. They measured water using different measuring units. These were photocopied from *Sharing our World: Integrated Life Skills learner's workbook for Grade 1* (Davis & Shaw, 1998). The other group went outside to look at the dial type water meter and how to read it before starting with the water audit activities. One learner wrote down the digits that were read by another. They took turns in reading the water metre then they were shown how to write the readings.

Thereafter we measured drinking with cupped hands, hand washing, and using a hosepipe for washing cement floors and the school bus. These were selected because they were everyday activities happening in the school grounds. Learners took turns in keeping time, opening the tap and drinking or washing depending on the particular activity at hand.

- Preliminary data analysis

Auditing activities were in themselves a learning experience for me in that I was not sure of what I was doing. This is evident in the video footage in that, for example, I said, "What do we do now? I am not sure about this thing" (C2V3). A couple of times I said "Let's do it again" (C2V3) and "Sometimes I felt that this was not working" (Journal, 23.06.2005). This meant that there was a bit of a problem in getting the correct information about how much water was wasted. It could be that learners opened the tap at different strengths and pressing the start and stop button of the stop watch was a bit of a problem to both the learners and the teacher. Records were kept on a piece of paper. The recorded data showed that our results were not

successful from a mathematical point of view due to technical problems such as timing and recording. The only success was the hosepipe activity. However, some learners' comments during the other two activities meant that they recognised water wastage. They said, "Yhu!". Learners were also surprised at how much water fell into the basin when they were drinking and washing under the running tap. This is evident in their remarks which were "the water is dripping!" "No, there is little water" and "it is full!" (C2V3). In terms of the Geography LO3: AS1 (see Table 4.6 above) I could say the lesson was successful in developing the skills of identifying and being able to describe the issue affecting the school environment and the ability to develop the awareness of the issue, which is knowledge about the issue and which in turn is likely to develop the worthiness of water as a resource.

Through reflecting on the activities of the day I designed a water audit sheet (see Annexure K) to again record water used in each activity. My intention was that a guided water audit sheet would ensure that learners and I were more clear as to each step in the auditing process, which would make the activity run more smoothly and give more accurate mathematical results. This was done with the whole class the next day with only one learner recording while others took turns in opening the tap, doing the activities, and measuring the water that was wasted. To some extent this improved the mathematical accuracy of the activity.

Another concern raised by my reflections was that with the group of 27 learners that I took outside, I noticed difficulties with accurate measurement. Outside few learners had an opportunity to actually measure the water that was wasted; but they participated in other activities such as opening and closing the tap, operating the stopwatch, drinking and washing.

Looking at the video from the classroom interactions, learners were shown how to measure and only one child actually had an opportunity to do the measuring because it was the strategy used by the helper teacher (C2V3). Evidence of that was also shown in the learners' work (see Annexure L). They all wrote the same answers.

I felt that measuring and collecting data in the form of recording were important skills that all learners needed to experience practically. Learners needed to be able to estimate and measure using measuring instruments and also to be able to collect data that would help them with drawing conclusions (Mathematics LO4: AS5.3).

Thus, I repeated the measuring activity (see teacher's reflections in Annexure I) so that all the learners could be provided with an opportunity to do the measuring. The Lesson Plan was then modified to teaching measurement instead of teaching about the water cycle. This unintended outcome added a meaningful integration feature to the Lesson Plan and reflection led towards the better achievement of skills, knowledge, attitudes and values.

4.3.2.4. Activity Four – Measurement

- Activity description

The same measurement worksheet that was done by those who were in class in Activity 3 (see Annexure L) was used for this activity. I measured and kept a record on my own worksheet for the purpose of checking the accuracy of learners' measurements (see Annexure M).

The activity was done with the whole class so as to provide each learner with an opportunity to develop their estimation and measurement skills. A variety of measuring units were used. I started off by helping them to estimate. For example, they guessed how many cups in a 330millilitre milk carton. All learners estimated and measured individually and recorded results on their worksheets, for example, measuring how many tablespoons in a cup.

- Preliminary data analysis

This activity was analysed by drawing a table that summarised learners' results for both the estimation and measurement activities.

Learners' work showed that there was a big difference between the estimation number and the measurement number for most of the estimations. For example, estimation of how many tablespoons in a tea cup, there was no correct estimation; only four learners guessed a number close to twenty; for how many tea cups in a carton, there were eight correct estimations; thirteen guessed a number close to two; for how many tea cups in a yoghurt cup, there were seven correct estimations; for how many egg cups in a tea cup, there were seven correct estimations and for how many teaspoons in an egg cup, there was one correct estimation eleven guessed close to ten. For measurement 16 learners measured accurately for how many tablespoons in a tea cup; most learners 35 measured accurately how many tea cups in a carton; 12 measured accurately for how many tea cups in a yoghurt cup; 14

measured accurately for how many egg cups in a tea cup; and 7 measured accurately for how many teaspoons in an egg cup (see Table 4.6 below). Also, accuracy in measurement was compromised because we used non-standard measures and had not reached a shared understanding of where “full” was on the measuring containers.

Table 4.6 Measuring water

Learner	ESTIMATION AND MEASUREMENT									
	Tablespoons in tea cup		Tea cups in carton(330ml)		Tea cups in yoghurt cup(one litre)		Egg cups in tea cup		Teaspoons in egg cup	
	E	M	E	M	E	M	E	M	E	M
L1ma	8	20	6	2	5	6	3	7	4	-
L2ma	3	20	5	2	6	5	3	6	4	9
L3ma	6	-	3	-	5	-	23	-	-	10
L4ma	5	20	7	2	2	3	10	9	4	4
L5ma	8	20	2	2	3	6	3	5	4	10
L6ma	3	24	4	1	5	7	1	6	2	20
L7ma	8	26	2	2	3	6	3	6	4	12
L8ma	3	26	5	2	6	5	3	6	2	9
L9ma	3	20	7	2	8	6	5	6	6	10
L10ma	4	10	7	2	8	5	1	6	3	19
L11ma	8	13	5	2	4	14	7	-	6	-
L12ma	9	20	8	3	10	5	-	5	-	10
L13ma	5	20	6	2	8	5	5	5	7	-
L14ma	6	30	3	2	5	6	-	8	-	15
L15ma	5	15	7	21	3	-	4	-	2	-
L16ma	4	26	6	2	7	9	1	12	2	18
L17ma	4	12	8	2	6	7	7	6	5	-
L18ma	5	39	7	2	10	7	8	5	9	11
L19ma	31	31	2	2	3	6	-	5	-	20
L20ma	13	18	30	2	40	6	13	5	3	12
L21ma	5	20	3	2	2	-	-	-	-	-
L22ma	4	05	2	2	3	5	5	-	6	11
L23ma	3	20	4	2	7	5	3	6	3	9
L24ma	4	34	3	3	2	5	8	5	9	10
L25ma	5	20	7	2	10	8	-	10	-	9
L26ma	7	20	3	2	2	5	4	5	4	11
L27ma	8	20	6	2	5	6	3	-	4	-
L28ma	3	25	4	2	6	8	3	7	4	6
L29ma	4	20	5	2	6	8	7	5	8	10
L30ma	8	20	6	2	5	6	3	5	4	-
L31ma	5	13	4	2	7	6	3	7	4	20
L32ma	6	20	2	-	4	-	3	-	4	-
L33ma	5	01	7	2	8	11	5	-	6	-
L34ma	5	25	7	2	8	5	5	6	8	10
L35ma	6	11	9	2	4	14	3	-	4	-
L36ma	6	10	9	2	4	9	3	8	4	-

L37ma	3	44	5	2	6	6	9	5	2	13
L38ma	4	50	2	6	3	31	5	-	1	-
L39ma	16	36	2	2	3	6	8	5	2	4
L40ma	4	20	8	2	2	5	5	5	7	-
L41ma	12	33	2	2	3	5	4	5	1	11
L42ma	6	39	7	2	8	9	9	8	10	14
L43ma	23	23	7	7	5	8	-	9	-	16

E stands for estimation and **M** stands for measurement

There were five estimation figures and five measurement figures which made a total of ten. I developed a rubric (see Table 4.7 below) and used it to assess the learners. I gave them codes for the achievement of the skills.

Table 4.7 Rubric

Criteria	4-has exceeded the requirements	3-has satisfied the requirements	2-has partially satisfied the requirements	1-has not satisfied the requirements
Estimates	Is able to estimate capacity of all containers with ease.	Is able to estimate capacity of most containers accurately.	Is able to estimate capacity of a few containers.	Cannot estimate capacity of containers.
Measures	Is able to measure capacity of all containers with competence.	Is able to measure capacity of most containers accurately.	Is able to measure capacity of some containers.	Cannot measure capacity of containers.

I realised afterwards that firstly, I should have assessed the two skills separately because the mark out of ten did not give me an indication of the achievement of each. Secondly, after a discussion with another fellow student I realised that I needed to be in line with the *National Protocol on Assessment for Schools* (South Africa. DoE, 2005) and adapted the ranges within which codes were allocated. In these two ways I achieved a more detailed and useful assessment of each skill (see Annexure N).

4.3.3. Emerging issues from the preliminary analysis of Cycle Two activities

4.3.3.1. Teaching methods and strategies

Different teaching methods were used in LP2. Learners were involved in discussion, doing actions, singing, dramatisation, drawing, communicating, measuring, recording and investigating. This enabled learners to participate in different learning styles about the topic thus, providing different opportunities for knowledge construction.

I also needed to be more directive in giving instructions to learners so as to ensure more meaningful learning. For example, I needed to be clearer as to what was expected from the drawing of the story.

Opportunities for expansion were not all utilised in order to get learners who had not grasped the concepts to follow. However, further explanations could assist learners' knowledge of bad user patterns.

Proper equipment and testing of these could have minimized technical problems during the audit. Problems could also have been reduced by reaching a shared understanding about non-standard measures.

Pair work such as during the discussions on "not looking after water" (Cycle Two Activity Two) was easier to handle than the cooperative group work (Cycle One Activity One) because there were less discipline problems and the smaller groups appeared to facilitate discussions amongst the pairs better than had happened during the larger group discussions.

4.3.3.2. Teacher as reflexive practitioner

As a teacher I found myself learning in the process of doing activities. I was uncertain about how to do the water audit activities and how to record these. As I did the activities I learnt and developed my teaching skills. After learning that the recording of water used and wasted while drinking with cupped hands (see Annexure O) did not make sense to me, I decided to design a water audit sheet to record results more clearly and accurately.

Looking at the learners' work helped me to discover gaps in the teaching and learning processes. Such analysis of learner's work helped me to discover what support was needed in order to help learners' achievement of the skills, knowledge, attitudes and values.

Repetition of activities was used to fill gaps in meeting learning outcomes, for example, I repeated the water audit activities so as to maximise learning opportunities. Also, to strengthen what was learnt, activities had to be repeated. Modification of LP2 gave me an opportunity to teach learners how to measure.

Repeating activities also allowed for improvement of activity design and improvement on assessing learners.

4.3.3.3. *Achievement of skills, knowledge, attitudes and values*

During the measurement activity the intention was to help learners to develop a foundational skill for measuring and understanding water use and wastage. There were problems with this activity with regards to accuracy and also the failure (due to time constraints) to compare estimations and measurements. This points to a need to redo such an activity at a later stage so that learners can learn to respect the importance of accuracy in describing and analysing environmental issues.

Cycle Two Activity Two provided some learners with opportunities to articulate what needed to be done by the people in the pictures in order to look after water as well as going beyond to suggest what could be done to make the environment healthier. However, for those learners that did not achieve a clear understanding of water wastage issues (see Section 4.3.2.2.); I was able to raise awareness of the large volumes of water wasted unnecessarily through investigating water use in Activity Three. Activity Three made provision for those whose responses to Activity Two showed that they had not developed knowledge of water wastage issues yet, who still required a baseline understanding crucial to achieving the skill of explaining steps ensuring environmental health and making informed decisions required in LO1: AS2 of Life Orientation.

At times it became difficult when many learners had not achieved the AS I was addressing. For example, in Activity One only half of the class were able to show the consequences of people's actions. Thus, the story was told again to support learners to be able to show consequences of water misuse in their drawings (see Annexure P). This knowledge was needed in order for learners to be able to make informed decisions about environmental issues. This skill is relevant to LO1: AS2 of Life Orientation. Activity Two then became an expanded activity in that it made use of the knowledge developed in the first activity to get better understanding of the issue, though I did not make use of all the chances that were available such as finding out about the health and hygiene implications of using dirty water myself and then scaffolding learners to build up their understanding of water-saving techniques. Activity Three helped learners to express their developing understanding about problems with their daily experiences of water use. Through these activities values

relevant to understanding of negative impacts to environmental health were achieved, and these values are implicitly contained in LO1: AS2 of Life Orientation.

In Activity Three we needed more knowledge about the issue hence the audit; however, our record of numerical investigations was not successful at first. That had an effect on the ability to achieve a deeper understanding of the issue. But learners' comments during the audit were evidence of being able to identify the water wastage issue which is more relevant to LO3: AS1 of Geography (used for integration) than it was to the Life Orientation LO1: AS3 (see Annexure I).

4.3.3.4. Assessment

I learnt that I should have assessed estimation and measurement separately. At first assessment failed to follow the national protocol but a change to follow the protocol gave me richer and more accurate tools for assessment.

4.3.3.5. Lesson Plan design

For this lesson plan I wrote down ASs as they are in the Life Orientation Learning Area. Parts of LO4: AS5.2 of Mathematics, namely, estimation and measurement were addressed.

The investigation of environmental issues provided an opportunity to focus on Numeracy LOs and ASs within a Life Skills Lesson Plan because learners needed to develop further skills to be applied in environmental investigations. Hence the Numeracy activities in LP2 enabled me to develop learners' ability to understand the issue better by relating it to numbers during the water audit activities. For example, for learners to realize that water was wasted they needed to be able to see it practically through that evidence based on numerical representation.

Integration with Social Sciences (Geography) offered particularly appropriate content in that Geography deals with making informed decisions about issues. It was well integrated with LO1 of Life Orientation and did not detract from the main purpose of the LP, which was environmental investigation (see Section 4.3.1.2). Social Sciences is also one of the learning areas that must be covered to add meaningful integration to lesson plans but not assessed in the Foundation Phase. I made use of LOs from Life Orientation as this learning area is the backbone of Life Skills Learning

Programme. LO3 of Social Sciences (Geography) therefore, became an additional LO in exploring environmental issues in the context of school grounds.

4.3.3.6. Teaching and learning support materials

Adapting the story to be clear about the issue of water wastage would have strengthened the development of learners' knowledge in terms of the issue.

Better preparation in the form of an audit sheet would have ensured that I did not get confused during the activity.

4.4. SYNTHESIS AND SUMMARY OF EMERGING ISSUES

Emerging issues from my lesson planning analysis as well as analysis of the implementation of the activities are summarised below.

4.4.1. Issues emerging from Lesson Planning

- ASs in Life Orientation are not obvious about school grounds content. Changing ASs to fit with what I was teaching was not in agreement with NCS policy. Careful unpacking of a broader range of ASs helped me to find links between school grounds and curriculum.
- Integration with other learning areas offered appropriate content for an environmental focus on school grounds. It also made provision to develop further skills needed in environmental investigations and to raise awareness, which could develop responsible attitudes about water use. It also helped with designing activities to increase understanding of environmental issues.
- In lesson planning not the whole ASs were addressed but parts of some of these. In the case of LP1, skills were developed to achieve the LO not the AS.

4.4.2. Issues emerging from implementation

- In both cycles I learnt that different teaching methods provided different learning opportunities for learners. For example, learners who could not communicate ideas during feedback discussions could communicate better through drawings and interpretation of these. This increased learners' chances of grasping concepts.
- Repeating activities allowed for consolidation of new knowledge, improvement of activities and modification of Lesson Plan.

- Group work provided a two-way sharing of knowledge which made the learners and the teacher to be both learners in the situation. However, smaller cooperative groups worked better than large groups.
- Imposing ideas seemed to have hindered informed decision-making amongst learners.
- Investigations in authentic settings enabled a clearer understanding of issues and meaningful learning.
- Learners' conversations about their drawings gave me an opportunity to understand these.
- Skills needed to be practised by giving learners similar activities or more opportunities to attain them. For example, in Cycle One both learners and the teacher needed to have been experienced in group work skills, as well as in Cycle Two learners needed to be taught focus skills.
- Language shaped the process of learning. The two languages complemented each other in the process of instruction as I needed learners to understand what was taught. Learners were also expected to participate through feedback and sharing of knowledge. All this was made possible by the use of both languages.
- Not all the integrated LOs and ASs were assessed because some are not to be assessed in the Foundation Phase. But the associated activities helped me to develop the SKAVs integral to the selected LO1: AS2 of Life Orientation.
- Assessing skills separately and using the codes correctly clearly showed that a learner might have achieved the intended learning well in one aspect but not in another. This helped to direct where I needed to focus teaching and learning in following lesson plans.
- Reflections on what was done and then doing things differently after that developed my teaching skills.
- Expanded opportunities strengthened learners' understanding.

These issues are used in the next chapter to formulate analytical statements which are discussed in the light of the key ideas highlighted in Chapter Two.

CHAPTER 5

DISCUSSION OF FINDINGS

“A useful way of handling and trying to make sense of the data is analysis which seeks to condense them [analytical statements] into meaningful statements” (Bassey, 1999, p.70).

5.1. INTRODUCTION

Data in the form of learners’ work, a video transcript, photographs and research journal entries was produced in this study. In Chapter Four I have provided a detailed analysis of data from the two cycles. In this chapter I will discuss the results using analytical statements. These will be substantiated by pointing out evidence in Chapter Four and discussed in relation to the key ideas and concepts highlighted in the literature review. These analytical statements were generated from the analyses and emerging issues of the cycles. Bassey (1999) describes analytical statements as meaningful statements that are generated to give clear answers to the research question. In my case, the statements were drafted and amended against the data in order to ensure the trustworthiness of the hypotheses.

To facilitate the discussion of the findings the research question and goals as mentioned in Chapter One, will also be considered. In doing so, I will determine what I have learnt during the course of this study.

5.2. ANALYTICAL STATEMENT 1

School grounds provide a context for environmental learning in Life Orientation especially when integrated with other leaning areas in the Life Skills Learning Programme

5.2.1. Working with content specific and open-ended Assessment Standards

Curriculum policy analysis shows that there are school grounds related environmental learning opportunities throughout the Life Orientation Learning Area. For example, part of LO1 of Grade One deals with environmental health in particular. Its AS2 deals with explaining steps to ensure personal hygiene and linking these to environmental health (see Section 4.2.1.3.). This environmentally focused LO and AS, however, limits the school grounds context to hygiene in the school grounds.

Other LOs and ASs used when planning for example, LO2: AS1 and LO3: AS3 are more open-ended in that they provide teachers with the flexibility of choosing environmentally related content relevant to context. For example, part of LO2: AS1 is about school rules which can be focused on the rule about not littering at school. Thus, these LOs and ASs “leave considerable room for creativity and innovation on the part of teachers in interpreting *what* and *how* **[Emphasis mine]** to teach” (South Africa. DoE, 2002a, p.12). LO3: AS3 also has an open-ended focus on emotions and ‘respect’ for living things and allows for different environmentally related foci based in the school grounds.

5.2.2. Integrity of the curriculum

The NCS acknowledges that curriculum is differently interpreted and enacted in diverse contexts (see Section 2.3.2.). In trying to contextualise the curriculum I found myself changing ASs to articulate what I wanted to teach (see Annexure E). In that process I was caught in a situation of not maintaining the integrity of the curriculum. This changing of ASs to fit with the content provided by context shows that as a teacher I am still faced with challenges associated with putting NCS into practice. One of them is lesson planning and the dangers particular to environmental learning of not furthering the aims of the learning area and misinterpreting LOs as noted in the NEEP-GET study (see Section 2.3.4.). It is also evident that with most ASs covered in this research only parts of the AS were addressed not the whole AS. For example, comparing estimations and measurements in Cycle Two Activity Four could have brought a realization of the importance of accuracy in identifying and describing environmental issues.

5.2.3. Integration with other learning areas

Opportunities provided by the research activities enabled a response to generic curriculum challenges of providing integrated learning opportunities in OBE (see Section 2.5.). Numeracy and literacy skills allow learners to access and use knowledge and develop skills in environmental learning. This is evident in the descriptions of the activities in Chapter Four, which illustrate how the Grade One Life Skills Learning Programme was enriched through integration with other learning areas (see Sections 4.2.1.4. and 4.3.1.3.). For example, in Cycle Two Activity Three and Four learners’ numeracy skills were utilized. The activity conducted for Maths LO4: AS5.2, provided the learners with an opportunity to make use of numbers to

understand water use and wastage and I had the experience of seeing “Learning Areas as linked and related” (South Africa. DoE, 2002a:13) (see Sections 4.3.1.3. and 4.3.2.3.).

Integration with Languages provided learners with the opportunity to use both English and *isiXhosa* in Life Skills in order to express themselves with respect to environmental issues. Thus, the Life Skills Learning Programme supports literacy. Language plays a vital role when discussing and investigating environmental issues because learners need to understand issues in order to be able to respond appropriately. They also need to listen carefully for information in order to be informed. Understanding is a thought process facilitated by the use of language between individuals as Vygotsky believes (see Section 2.4.3.). Teaching in the first additional language and using home language to interpret enables learners to feel free to express themselves in both languages (see Section 4.2.2.1.).

Policy documents also encourage relevant integration of other Learning Areas (South Africa. DoE, 2003b), other than the three backbone Learning Areas in the Foundation Phase. Integration with Social Sciences (Geography) LO3: AS1 was appropriate for a school grounds context because of its focus of making informed decisions about environmental issues in the school environment. This is illustrated in the Cycle Two Lesson Plan (see Section 4.3.1.3.). Social Sciences (Geography) became a means for making Life Orientation LO1: AS2 more meaningful; even though LOs and ASs in Social Sciences (Geography) are not assessed in the Foundation Phase.

In integration there is also evidence of helping learners to expand their achievement of SKAVs included across the curriculum. Integration with Technology helped to enhance learners’ concentration skills in identification of environmental learning opportunities. Hence, only 14% of learners were not able to identify environmental issues in the school grounds. This can possibly be attributed to the increased attention provided by the use of binoculars made by learners as a Technology exercise (see Section 4.2.2.3.).

5.3. ANALYTICAL STATEMENT 2

Activities focussing on school grounds offered opportunities for the development of a range of SKAVs

5.3.1. Preparing learners for learning in the school grounds

It became a concern for me for Grade One learners to be able to make the most of the learning opportunities provided by learning outside of the confining walls of the classroom; in a place that is meant for play, and where there are many interesting things to distract their attention. School grounds as a context for learning required me to do preparatory activities in the classroom to help learners to cope with contextual learning in the school grounds. Thus, in preparation for learning in the school grounds a variety of activities were planned that would help learners make the most of the experiences to be provided by school grounds.

These were to support learners to be able to achieve the skill of making informed decisions about environmental issues [in the school grounds] LO1. The activities also provided learners with different learning opportunities. For example, in Cycle One Activity One learners were engaged in reporting back ideas, and making use of prior knowledge to find out about issues (see Section 4.2.2.1.). This gave learners an opportunity to give differing opinions about issues and in the process develop new knowledge to inform their decision-making. These are elements of active learning as discussed in Section 2.4.5.

5.3.2. Development of problem solving skills

In LP1, most learners were able to identify environmental issues when they were in the school grounds. The context provided by the school grounds promoted the skill of identifying environmental issues (see Section 2.4.6.). However, when drawing solutions, only a third of the class managed to draw solutions that corresponded to the problems identified. This could partly be attributed to the fact that they used their imaginations to draw these and the connection between the problems and the solutions was not emphasized to learners. Learners could have been engaged with the problems they drew and asked to draw solutions that match up with these (see Section 4.2.2.3.).

Cycle Two Activity Two did not really help learners to make informed decisions about what needed to be done to keep the environment healthy (see Section 4.3.2.2.) but to a certain extent it gave some learners an opportunity to be able to explain what was happening in the pictures to ensure environmental health. Activity Three through its provision of real life experiences helped most of the group of learners that were taken outside to discover the issues (see Section 4.3.2.3.).

5.3.3. Development of investigative skills

The worksheet activity about finding the girl hidden in the picture did not give me an accurate assessment of the achievement of the skill of focussing (see Section 4.2.2.2). According to the worksheets all learners achieved the skill of finding the girl in the picture but on further analysis I realised that was not the case. Teachers need to be critical in the way they analyse the achievement of SKAVs as shown in learners' written work. Using another source of evidence as a means of assessment helps teachers in measuring the processes of learning. The NCS also states that when assessing the achievement of skills in Life Orientation it is important not only to focus on the product at the end of the learning experience, but on what is happening during the learning as well; that is, the process (South Africa. DoE, 2003a).

Evidence from learners' drawings shows that most learners' interest was enhanced by the use of binoculars. Learners were also very much controlled, sitting and drawing while I observed them. This was despite my previous experience of a lack of discipline during classroom activities. This is evidence of most learners having achieved the skill of focussing during this activity (see Section 4.2.3.1.).

In Activity Four, the practical activities revealed that only a small percentage of learners were able to measure accurately and to a lesser extent, estimate. Accurate measurement is an important skill for developing a realistic representation of one's environment. For example, when doing a water audit in the school grounds it made sense that learners needed to be able to measure volume (see Section 4.3.1.3.). Therefore, this activity revealed for me a need to focus more on developing this skill amongst my learners as evident in Section 4.3.2.4.

5.3.4. Working with values and attitudes

It is not easy to assess attitudes and values because they refer to inner states. But they form an integral part of what must be taught and assessed in Life Orientation (South Africa. DoE, 2003a). For example, to be able to make informed decisions regarding environmental health (Life Orientation LO1), certain values and attitudes need to be developed (see Section 2.3.2.). When learners are free to make a choice they become willing to talk about how they feel. Caduto (1983) referred to this as values clarification. In Cycle One Activity Three very few learners were not able to say why they felt the way they did about their drawings of how the school grounds looked (see Section 4.2.2.3.). This can be attributed to the process of valuing that

was used in the activity where the teacher did not seek to instil any particular set of values or to allow a single answer to the problem, but rather to help learners to be aware of and identify their own values and be honest about them. This could also be attributed to the fact that they were actively involved in identifying real environmental issues - a key aspect of values clarification as suggested by Caduto (1983).

In Cycle Two Activity Two some steps of a values analysis strategy were evident (see Section 4.3.2.2.). In this activity value questions were raised and there was evidence of value conflict in that many learners did not see a problem in the way water was used by the people in the pictures. This conflict may have arisen as I was not able to support learners with relevant facts about issues or able to assess the truth of the facts provided by the pictures in order to make an acceptable decision about water use. This is significant for values education as learners need a good knowledge foundation in order to formulate their values.

A second reason why conflict may have arisen is that I did not take sufficient cognisance of learners' emotions in order to help me understand the values that informed their particular views of the pictures of water wastage. In the way these values were taught learners were not given opportunities to explore their subjective views of water use further.

5.3.5. Developing understanding

Different activities in LP2 provided learners with opportunities to develop understandings of different aspects of water use and wastage. For example, in Activity One (after the second telling of the story) 48% of the class were able to illustrate the **consequences** of people's pollution and wastage of water (see Section 4.3.2.1.). This activity was then taken further in Activity Two (see Section 4.3.2.2.) where learners looked at water wastage from a different perspective – focusing on the **causes** of water wastage. In Activity Three learners developed a more in-depth understanding of the **nature** of water wastage through an audit in the school grounds.

5.4. ANALYTICAL STATEMENT 3

School grounds focused activities provide both opportunities and challenges for constructivist and active learning

5.4.1. Constructivist learning processes

When learners were working in big groups discussing Eco-School pictures; most gave a report back on what they learnt on their own from the pictures (Cycle One Activity One). An example of this is when they were reporting back, responding to the three questions that were asked (see Section 4.2.2.1.). Evidence shows that individuals reported on their own knowledge not that of the group. This raises the challenge of relying on cooperative learning to support constructivist approaches to teaching and learning.

In the same activity, when I attempted to scaffold their learning by prompting there is evidence that they replied by saying what they thought I wanted them to say. This raises the question of how meaningful the learning actually was and links to Rogoff's (1999) claim that teaching in the form of instruction does not necessarily mean that learners have learnt something. Cycle One Activity One (where, for example, I instructed learners that washing with a hosepipe is a water wasting practice) cannot be claimed to have been built on constructivist principles because knowledge was not mutually agreed upon (see Section 2.4.2.). Also, there was no shared understanding of root causes of the issue in our school grounds and I did not engage learners in activities that would support understanding. I simply told learners that water was wasted. Such imposition of ideas does not support learners in the process of informed decision-making nor does it advance learners' prior knowledge (see Section 2.3.2.). This example highlights the challenge of establishing a shared understanding amongst teacher and learners. This need was met by the water audit activity in Cycle 2 during which both teacher and learners were able to gain understanding of the water issues. The success of the audit may be attributed to involving learners in shared problem solving and transfer of responsibility (see Section 2.4.2 where the importance of examining the influence of such strategies is highlighted).

Being unsure about the cooperative group work model chosen as shown in Cycle One Activity One (see Section 4.2.2.1.) affected the social interactions between the teacher and learners as well as the acquisition of knowledge. Teachers ought to be sure of the cooperative group model they are using when doing cooperative group work especially when working with a large group of learners; otherwise it confuses learners as well. This affects the achievement of the desired outcomes, which are expected to be sharing existing knowledge, constructing new knowledge and as a

result achieving a mutual goal when working cooperatively. The teacher is expected to provide additional help that corresponds with the aims of the cooperative model chosen (see Section 2.4.3.).

Group work is appropriate particularly when meaning needs to be constructed such as in Cycle One Activity One when learners needed to develop an understanding of what was happening in photographs. In this case, learners ended up being strongly influenced by my opinions and understandings rather than by each other's. It is important to recognise that skills needed to make such an activity a success, such as participation, listening, and respect for others' opinions; do not necessarily come naturally. Such skills need to be developed with practice over time.

In other cases group work was not appropriate (such as Cycle One Activity Two). The learners needed to develop the skill by themselves and were actually disadvantaged by group work.

As mentioned in the emerging issues in Chapter Four, language and learning go together. The pair activity (Cycle Two Activity Two) inspired learners to work together. Here the learners shared the logic of the task to create meaning that was beyond one learner's individual effort. In this case cooperation was beneficial. Participation in meaning making is believed to happen between people when knowledge is constructed and reconstructed (Rogoff, 1995, as cited in Lotz-Sisitka, 2004). The social constructivist theory of learning inspired by the ideas of Vygotsky also "interprets learning as a profoundly social process" (Reid, Jensen, Nikel, Simovska, 2008:64) and understanding is reached through negotiation (see Section 2.4.4.).

Knowledge of environmental issues needs to be built on to the experiences of learners. It is these experiences that are expressed by learners. The problem is when these are mediated in another language because when learners are participating in meaning making there is intersubjectivity (see Section 2.4.4.). It becomes difficult for learners to develop critical thinking when exploring issues while using the additional language. For example, during discussions some learners found it difficult to answer the why question that was asked in Cycle One Activity One (see Section 4.2.2.1.) as well as when they were asked why they were happy about animals at school in Activity Three (see Section 4.2.2.3.).

5.4.2. Dimensions of active learning revealed by the study

Active learning as proposed by O'Donoghue (2001) encourages learners to be engaged in finding information, enquiring, taking action, and reporting about environmental issues (see Section 2.4.5.). Teachers are required to consider this when planning lessons. This study has shown that elements of active learning were evident when preparing learners for learning in the school grounds as well as when learning outside in the school grounds.

Regarding the information element of the active learning framework, as described in Section 5.3.2., learners were not **actively** engaged with information in Cycle One, Activity One, but instead information was imposed in them. In Cycle Two the story-telling activity aimed at providing information about what happens when there is no water. In order to encourage learners to engage actively with this information, learners were asked to draw pictures of the story. However, it was only after the second telling of the story that learners were able to represent the information satisfactorily.

With respect to the enquiry element of the active learning framework; when they drew pictures of the school grounds, learners were enquiring into issues in the school grounds. Moreover in Cycle Two (see Section 4.3.2.3.) during the investigation of the issue in the local environment, learners had an opportunity to go beyond what they already knew about the issue (see Section 2.4.6.). They carried out the investigation through first-hand encounter by checking if there was really water wastage in the school grounds. This was a more in-depth phase of exploring the nature of the issue.

Regarding the third dimension of active learning (action), pictures of success stories were used to stimulate learners' thoughts about possible actions in their own school grounds (Cycle One Activity One). Also, emerging from the discussion of not looking after water was a recommendation for change such as water saving techniques which were in effect a bridge to action (see Section 4.3.2.2.). Another activity supporting action was drawing responses to the environmental issues but about two thirds of the drawings did not succeed in linking solutions to problems identified (see Section 4.2.2.3.). About a third of the drawings showed learners' potential to plan for participation in solving the environmental problems, but the Lesson Plan did not provide for these to be enacted.

Making informed decisions to solve problems is discussed in Chapter Two as an element of action competence (see Section 2.4.5.). Amongst the learners that did succeed in meeting the activity outcomes, action competence can be said to have been developed in the sense that learners were responding to environmental issues. However, action competence might have been more fully developed had learners chosen and enacted one of their proposed solutions.

5.5. ANALYTICAL STATEMENT 4

School grounds provide both opportunities and challenges for situated learning

5.5.1. Learning in an authentic setting

Situated learning as discussed in Chapter Two involves co-participation within social communities where learning involves social structures, activities and provision of authentic settings. The gap between observation and involvement, between concepts and experience is closed. When learners' attention is focused on the real, learning is improved. For example, in Cycle One Activity Three learners were focused on identifying what they saw and how they felt about the state of the school grounds. Only 14% of learners were not able to identify environmental issues in the school grounds. In Cycle Two Activity Three there is evidence of achievement of awareness and understanding of the impact of learners' daily uses of water. This can be attributed to a water audit taking place in an authentic setting. Through identification and investigation of issues in context, learning was made more meaningful. When this happens the environment is not seen as an abstraction but a real entity with real people (Reid et al., 2008).

Allowing learners to be involved and experience the situation allows them to be informed participants. For example, Cycle One Activity Three gave learners an opportunity to actively participate in auditing the school grounds rather than to think abstractly about the issues.

5.5.2. LTSMs for situated learning

At times there is also a need to design one's own LTSMs to support situated learning as shown in Cycle Two Activity Three where I designed a worksheet to capture recordings during water use investigations (see Section 4.3.2.3.). This worksheet was necessary because learners and I were struggling to capture and make sense of

the situation, and needed a more structured recording instrument. Therefore, as a teacher, one needs to be able to develop appropriate LTSMs in order to understand and respond to authentic situations and problems.

There is also evidence that equipment needed specifically for contexts such as the school grounds requires testing so that the teacher is familiar with it before activities are carried out. When doing water audit activities, problems with the stopwatch and recording led to misunderstanding the quantity of water wasted (see Section 4.3.2.3.).

It is evident that when learners were engaged with LTSMs that were intended to stimulate their thoughts about their school grounds' situation (see Section 4.2.2.1.), their discussions encouraged subjectivity. Subjectivity in group work allows for reconstruction of understandings and thereby development of a common understanding (see Section 2.4.3.).

5.5.3. Situated learning requires a broad range of teacher knowledge and skills

As a teacher I developed a scientific understanding of the auditing process. For example, I learned that for the results of the water measurements to be meaningful we needed to take at least three measurements which could then be compared (see Annexure K). This indicates the challenge of cross-curricular skills that I needed when conducting practical activities as is common when working in the school grounds.

In Cycle Two Activity Two when preparing learners for learning in the school grounds, they did not understand why dirty water could be used for watering plants. I found that I was lacking in background knowledge to explain to them why this was the case. Environmental issues which emerge through the process of situated learning pose the challenge of opening up new and unexplained concepts and understandings. Responding to issues can be challenging as the concepts that one need cannot be pre-determined or necessarily found in a textbook. Teachers need to be researchers in order to gather more LTSMs to elaborate on concepts that are not clear to the learners. This links to the role of teacher as researcher as described in Section 2.3.3.

5.6. ANALYTICAL STATEMENT 5

The school grounds activities as well as the preparatory activities helped me to grow as a teacher through the process of action research

The above analytical statement does not directly relate to my research question, but rather to my role as a reflexive practitioner which has helped me to develop myself as a teacher with a broad range of generic skills and competences in order to put the NCS into practice and indirectly enhance my ability to enhance environmental learning.

5.6.1. Teacher as a researcher

As discussed in Section 2.3.3., OBE requires teachers to demonstrate certain competences and roles, the research provided me with opportunities to analyse Lesson Plans (see Sections 4.2.1. and 4.3.1.), adapt and develop LTSMs (see Sections 4.3.2.1. and 4.3.2.3.) and to analyse the process of assessing learners' work (see Section 4.3.2.4.). Entailed in these is reflexive practice as suggested by Grundy (1987) and viewing curriculum as an ongoing social process as recommended by Cornbleth (1990).

5.6.2. Giving instructions in view of LOs and ASs

Open-ended instructions given to learners made them draw whatever they saw in the school grounds even though some were not environmental issues. Evidence of this is that 14% of learners did not draw environmental issues in the school grounds (see Section 4.2.3.1.). As a teacher I needed to be specific about what I wanted their pictures to illustrate and have the requirements of the LO and AS in mind when giving instructions.

5.6.3. Assessment as a cyclic process

Assessment is not something that one should think about at the end of a unit of work. It must form an integral part of planning and preparation for effective teaching and learning in a grade, especially as progression is based entirely on continuous assessment in the Foundation Phase (South Africa, DoE, Workshop handout, 2005). Reflecting on learners' work helps to see what kind of support is needed to help them achieve the planned SKAVs of a Lesson Plan. For example, after looking at learners'

work in Cycle Two Activity Three I decided to teach learners how to measure (see Section 4.3.2.3.).

Assessment of activities also needs to be fair to all learners. Adherence to the national code helps teachers in their decisions of what code to give to learners. Certain skills need to be assessed separately as shown in Section 4.3.2.4. in order to ensure a detailed in depth understanding of learners' achievement.

5.6.4. Strengthening the achievement of SKAVs

Repetition of activities increases learning opportunities. Through reflection on learners' work and activities I ended up repeating some activities to facilitate learners' achievement of SKAVs. In this way the activity design also changed. Repetition also leads to modification of lesson plan. This is evidence of reflexive practice as discussed in Section 2.3.3.

5.7. CONCLUSION

In this chapter I have discussed the key findings from the study. These findings have been organised under the following analytical statements:

- School grounds provide a context for environmental learning in Life Orientation especially when integrated with other leaning areas in the Life Skills Learning Programme
- Activities focussing on school grounds offered opportunities for the development of a range of SKAVs
- School grounds focused activities provide both opportunities and challenges for constructivist and active learning
- School grounds provide both opportunities and challenges for situated learning
- The school grounds activities as well as the preparatory activities helped me to grow as a teacher through the process of action research

These statements will be summarised under Section 6.3 of the next chapter.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1. INTRODUCTION

This chapter presents a summary of the study and its main findings. It then suggests some conditional recommendations within the case of Ntaba Maria but which may be applied in other contexts of environmental education practice, schools in particular. This is followed by reflections on the research process. Finally, the chapter makes recommendations for further research.

6.2. SUMMARY OF THE STUDY

The study was conducted at a local primary school in a Grade One class of 43 learners during the first six months of their year in this grade within the Life Skills learning programme. The research question was “how can school grounds be used for environmental learning in the Life Skills learning programme of the Foundation Phase”. This study was influenced by my pursuit to improve on my practice in implementing the NCS. This interpretive case study research was done through action research with two cycles. Data was collected in the form of video recordings, learners’ work, photographs and journal reflections. It was not analysed as it came in but reflections about it were noted in the research journal as soon as it was reasonably practical to do so. It was analysed using analytic memos in the form of tables and from this analysis a number of issues emerged. The emerging issues were constantly compared against data and each other in order to establish their truth. This process happened throughout the study. The findings were discussed using analytical statements that were generated and amended against data.

6.3. OVERVIEW OF THE MAIN FINDINGS

Findings in this case demonstrate that Life Orientation has environmental learning opportunities in its LOs and ASs. In my work with environmental education I was confronted with a situation where the intended school grounds content was not explicitly articulated in some ASs in Grade One Life Orientation curriculum. I found some of the ASs limiting in their provision of content to be taught in Grade One. Thus, I rewrote ASs to fit with school grounds content. This was found to be in opposition to NCS policy. On reflection on my Lesson Plan, however, I was able to

find more suitable LOs and ASs through working with more open-ended ASs and through integrating with other Learning Areas.

I have shown that integration with other learning areas especially Social Sciences (Geography) improved opportunities for the achievement of Life Orientation LOs and ASs. I showed that there were no clear links to school grounds in Life Orientation, but if I had explored integration opportunities further I would not have tried to force my chosen content inappropriately into a certain Life Orientation AS.

In addition, there is also evidence of addressing parts of the ASs and not the ASs as whole in Lesson Plans. When dealing with the school rule about littering part of this AS that is, drawing of classroom rules, was not dealt with. The same with LO1: AS2 where “ensuring personal hygiene” (South Africa. DoE, 2002c, p.16) was not covered in the Lesson Plan. At times the activity addressed the LO only instead of both the LO and AS. This is evidence that teachers require support in this regard so as to be confident in their efforts to put NCS in practice.

I found out that learners require preparation in order to be able to make the most of their learning in the school grounds. For example, learners were involved in classroom activities which helped them to engage with environmental learning in the school grounds. I have also found out that their involvement (whether individually or in groups) needs to be guided and encouraged towards full participation when learning rather than being imposed. Full participation involves learners expressing experiences about issues in the language they are comfortable with. When learners are full participants they do not only become the owners of learning but the benefits of learning are maximised.

The school grounds context provided active learning opportunities where learners were involved in finding out, investigating, reporting and thinking about solutions to real environmental issues rather than being told a story or discussing pictures as a starting point. Storytelling and picture discussions do not give learners an opportunity to actively go beyond the information provided; whereas school grounds provide learners with appropriate context to study issues in depth.

I found out that when learners’ reality is taken into account, their experiences as part of the reality form the basis of teaching and learning. This provides an opportunity for meaningful knowledge construction thereby allowing for other relevant LOs and ASs

to be covered. I also found that possible actions about the situation in the school grounds was stimulated by pictures of success stories even though they were not enacted and that assisted learners in achieving the main Life Orientation LO, that is, making informed decisions, and motivated them to think about solutions to the problems.

The study also shows that an emphasis on situated learning allows learners to learn in meaningful ways. In this case learners were able to identify environmental issues in the school grounds. Also, allowing learners to investigate environmental issues in their school grounds provided them with opportunities to explore the nature of these in their own context.

I faced a number of challenges regarding knowledge and concepts. Evidence from Chapter Five illustrates that I did not have the knowledge to give details about concepts that were not clear in order to assist learners in identifying and describing environmental issues. For example, I missed some of the environmental learning opportunities provided by the research such as finding out why dirty water from the kitchen could be used to water plants. Another challenge I faced was the problem of moving to the next activity before all learners had grasped the concepts properly. I realised I could have used other learners' work to show those who have not achieved what was expected as a means of improving the achievement of SKAVs for all. Another challenge I faced was the need to develop my own LTSMs that were appropriate in developing learners' understanding of the situation.

The findings also show that LOs and ASs within the same learning area or from other learning areas provided learners with different learning opportunities to enhance the achievement of SKAVs through the use of school grounds. For example, when enquiring about water wastage in the school environment numerical investigations from the Mathematics Learning Area were applied. When auditing school grounds, links with showing emotions (which linked to personal development) enhanced the clarification of values. Other values such as showing respect for others by listening (which is a language skill) increased learners' ability to be informed.

Evidence from the study illustrates that assessing the different skills of LO4: AS5.2 separately and according to the *National Protocol* helped to make assessment fair.

The study also illustrates that the way I gave instructions did not give learners a clear picture of the purpose of their drawings. My instructions to the learners did not take into consideration the planned LOs and ASs. As a result for example, in Cycle Two Activity One the majority of learners' drawings did not show people's actions and consequences.

I also found out that planning for assessment helps to improve the achievement and development of SKAVs contained in the chosen LOs and ASs. It also helps to discover spaces in teaching and learning which need further consideration.

Lastly, I have shown that being reflexive about environmental learning and teaching using school grounds could help me in doing my job better. Reflexivity means that I must know the theory that underpins what I am doing (practice), be able to evaluate my actions (critical reflection) and change.

6.4. RECOMMENDATIONS

A healthy environment depends on attention to people's rights, social justice, their lifestyle choices and attitude towards their environment which directly affects their well-being. The health of the people is linked to their activities and the sustainability of their life support systems. This means that; with the right to a clean and healthy environment; a responsibility for own health, cleanliness, a healthy lifestyle and appreciation for the environment must be addressed by teachers and learners. Learners need to be taught to make informed decisions about environmental health and sustainable use of resources. Also, learners need to be made aware that there is a relationship between themselves, what they do and the environment in which they live. Knowledge of this human-environment relationship will help learners to reflect upon the impact of their actions.

Teachers are faced with challenges of finding environmental learning opportunities in the curriculum. The NCS policy states that "it is not allowed that *new* Assessment Standards are written" (South Africa. DoE, 2003a, p.9). ASs contain the SKAVs that are to be assessed (South Africa. DoE, 2003a). Teachers need to do an analysis of LOs and ASs in order to identify those that could appropriately include school grounds content as opportunities are implicitly contained in all the learning areas. Thus, there is a need to focus on Lesson Planning especially finding LOs and ASs with explicit and open-ended environmental foci. Teachers are also required to

consider how they can develop learners' SKAVs contained in the chosen LO and their ASs simultaneously. Therefore, it seems logical that teachers need to be supported and helped in working with more open-ended ASs to meet contextual needs and at the same time not lose the focus of the relevant LO. This can be done through professional development offered by Higher Education institutions in conjunction with the District Offices.

Integration of LOs and ASs from the same and different learning areas is fundamental to environmental learning in the school grounds as it allows learners to explore issues from different perspectives. This also maximises learning opportunities and the achievement of SKAVs.

When providing learners with information, it is recommended that teachers should allow learners to actively engage with information. By this I mean teachers need to give clear explanations and gather more LTSMs that will provide them with necessary knowledge and skills to do this.

Learning in the school grounds requires learners who are prepared with the necessary foundational skills and knowledge to make the most of the opportunity. Such knowledge and skills include: focusing learners' attention on the real rather than using their imagination, measurement skills, and conceptual understanding of environmental issues. It is also important to practise skills for better development of these.

It is very important for teachers to plan assessment as thoroughly as they plan lessons. This helps them to discover spaces in teaching and learning which need further consideration, and enables them to make informed decisions about what learners need to learn next (South Africa. DoE, 2003a). This also helps teachers to be able to link activities in such a way that activities provide learners with a deep understanding of environmental issues and concepts associated with them.

Assessment helps to check progress in terms of the development of SKAVs as well as grounding for effective teaching and learning. It is important for the teacher to "know ahead of time what they want their learners to achieve, so that they can tell them what it is" (Sieborger & Macintosh, 1998, p.10). It is for this reason that teachers need to plan for assessment in order for it to be integrated in the Lesson Plans. In this way what will be assessed is determined in advance. Learners' learning

is demonstrated with respect to LOs and ASs and the development of SKAVs is improved.

Teachers need to bear planned LOs and ASs in mind when explaining activities to learners so that learners' work can show what learners are able to do in terms of knowledge and skills required by these LOs and ASs. Instructions given during the process should correspond with the intended end product.

Assessment of learners' work needs not to focus on the end product only; it needs to consider the process of learning too. Teachers need to critically reflect on learners' work as well as use other sources of evidence to check the development of SKAVs.

Planning for active learning assures open-ended learning in that learners' engagements with each other and the teacher; the content and the context can lead to unpredicted meaningful environmental learning. Hence, it is important for teachers to investigate issues that arise out of situations in order to support learners' understanding. Also, when planning for active learning the Lesson Plan needs to provide for enacting of proposed solutions wherever possible.

Teachers also need to do planning for the phase as a team because in that way environmental learning opportunities can be found in LOs and ASs of other grades. For example, school grounds content is clearly contained in Grade Two LO1: AS2 of Life Orientation – "Suggests and investigates actions to make the home and school environment healthier" (South Africa. DoE, 2002c, p.17). This will also help teachers to honour curriculum requirements.

6.5. REFLECTIONS ON THE RESEARCH PROCESS

6.5.1. Methodological findings and recommendations

Action research has the potential to help teachers in their journey towards being reflexive in environmental education practices. The cycles provided me with an opportunity to reflect on my practice and change. Teachers need to be able to critically reflect on the teaching and learning processes of their everyday work and make use of these reflections to do things differently. Through the different features of action research cycles I had an opportunity to do an analysis of what took place during the teaching and learning processes. Reflecting also allowed me to repeat

activities using an improved design. For example, in Cycle Two I modified Activity Four of Cycle Two after analysing the results of learning (assessment). This made me realise that assessment is not the end point of teaching but it guides and directs future teaching as well. That is, teaching is a cycle of planning, teaching and assessing. As a teacher who is expected to fulfil several roles and competences I got an opportunity to show practical, foundational and reflexive competences within the role of being a researcher. I was able to design Lesson Plans; informed by curriculum theory and context as well as reflect on the Lesson Plan activities and do things differently after that. This reflexivity expanded the learners' achievement of SKAVs because I used the opportunities provided through reflection to fill in the gaps that I discovered in my teaching.

I found it very helpful to have reflective dialogue with learners about their work. This facilitated an understanding between myself and the learners; as well as my understanding of the learners' work. These conversations helped me to analyse my data in more depth.

In action research the idea of a critical friend offers an opportunity to involve questioning one's own practice rather than just understanding one's own practice. It was not easy to involve a critical friend at the beginning stages of the research, that is, planning of lessons because the idea of having a colleague as a critical friend meant that I was exposing my practice to someone else to critique. Having a critical friend would have helped with finding LOs and ASs with a focus on school grounds. I waited until the supervision meetings to get critical feedback which was inescapable. At that stage I had already taught the lessons. If I were to do the research again I would involve a critical friend from the start. Therefore, I encourage teachers to be researchers of their own practices; involve their colleagues as critical friends to provide their opinions about the teaching and learning practices as this is also required for purposes of appraisal.

As critical analysis of learners' work is not part of our everyday teaching, the reflection feature of action research provided me with an opportunity to analyse the level of achievement of SKAVs. It was found that the 'focussing' skill that I thought was fully achieved by learners as suggested by evidence; was in fact not achieved by all learners. This was also as a result of having a critical friend.

Another important issue is to make an in-depth data analysis from each action research cycle before continuing with the next. I waited until I was finished with both cycles and that made it difficult for the second Lesson Plan to be well informed by the previous cycle interpretations. For example, I would have focused on another issue rather than water wastage which was more of my concern than that of the learners. This highlights the importance of genuine participation advocated by Hart (1997) that learners need to be part of decision making in order to be well informed.

6.6. CONCLUDING SUMMARY

School grounds do provide environmental learning opportunities for Foundation Phase learners in the Life Skills Learning Programme. This became evident when learners could identify, describe and suggest possible solutions to the issues identified. However, along with the opportunities are challenges to make it happen.

The research provided me with an opportunity to grapple with putting the NCS into practice. I have gained insights into the challenges of Lesson Planning, working with LOs and ASSs, reflecting on activities, and assessment. It has also given me in-depth insights into the achievement of specific SKAVs relevant to environmental learning.

I have gained insights into the opportunities provided by the school grounds to support constructivist, active and situated learning as well as some of the challenges associated with these approaches to learning.

Finally, the research has provided me with opportunities to be reflexive in my practice, which in turn supports my ability to develop the potential of the learners with whom I work.

LIST OF REFERENCES

- Ashwell, A. (2003). *Schools for a sustainable environment in the City of Cape Town*. Cape Town. City of Cape Town.
- Bassey, M. (1999). *Case study research in educational settings*. Buckingham: Open University Press.
- Booth, A., McCullum, J., Mpinga, J., & Mukute, M. (1994). *State of the environment in Southern Africa*. Southern African Research & Documentation Centre in collaboration with IUCN- the world conservation union and the Southern African Development Community (SADC). Zimbabwe: The Penrose Press.
- Caduto, M. (1983). A review of environmental values education. *Journal of Environmental Education*, 14(3), 13-21.
- Carr, W., & Kemmis, S. (1986). *Becoming critical: Education, knowledge and action research*. London: Falmer.
- Chisholm, L. (Ed.). (2004). *Changing class: Education and social change in post apartheid South Africa*. Pretoria: HSRC.
- Cohen, L., Manion, L., & Morrison, K. (2001). *Research methods in education* (5th ed.). London: Routledge/Falmer.
- Cornbleth, C. (1990). *Curriculum in context*. London: Falmer Press.
- Davis, J., & Shaw, L. (1998). *Sharing our world: Outcomes based approach. Integrated Life Skills learner's book for Grade 1*. Cape Town: Maskew Miller Longman.
- Davis, J., & Shaw, L. (1998). *Sharing our world: Outcomes based approach. Integrated Life Skills learner's workbook for Grade 1*. Cape Town: Maskew Miller Longman.
- Denzin, N., & Lincoln, Y. (Eds.). (2000). *Handbook of qualitative research* (2nd ed.). Thousand Oaks: Sage Publications.
- Elliott, J. (1991). *Action research for educational change*. Buckingham: Open University Press.
- Glaser, B.G. (1998). *Doing grounded theory: Issues and discussions*. Mill Valley, Carlifonia: Sociology Press.
- Grundy, S. (1987). *Curriculum: Product or Praxis?* London: Falmer Press.
- Hart, R. (1997). *Children's participation: The theory and practice of involving young citizens in community development and environmental care*. London: Earthscan Publications.

- Human Sciences Research Council. (2005). *Emerging voices: A report on education in South African rural communities*. Cape Town: HSRC/Nelson Mandela Foundation.
- Jensen, B. (2004). Environmental and health education viewed from an action-orientated perspective: a case from Denmark. *Journal of Curriculum Studies*, 36(4), 405-425.
- Koshy, V. (2005). *Action research for improving practice: A practical guide*. London: Paul Chapman Publishing.
- Lave, J., & Wenger E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Lotz, H. (1999). *Developing curriculum frameworks: A source book on environmental education amongst adult learners*. Howick: Share-Net.
- Lotz-Sisitka, H. (2002). Curriculum patterning in environmental education: A review of developments in formal education in South Africa. In E. Janse van Rensburg (Ed.), *Environmental education, ethics & action in Southern Africa* (pp.97-120). EEASA monograph. Pretoria: HSRC with EEASA.
- Lotz-Sisitka, H. (2004). Trip report. MEd lecture notes, Rhodes University, Education Department, Grahamstown.
- Lotz-Sisitka, H. (Ed.). (2002). Curriculum patterning in environmental education: a review of developments in formal education in South Africa. In Janse van Rensburg (Ed.), *Environmental education, ethics & action in Southern Africa (EEASA) monograph* (pp.97-120). Pretoria, South Africa: Creda Press.
- Lotz-Sisitka, H., & Janse van Rensburg, E. (2000). *Learning for sustainability contextual profile*. Johannesburg: Learning for Sustainability Project.
- Macintyre, C. (2000). *The art of action research in the classroom*. London: David Fulton Publishers.
- Makana Municipality. (2004). *Local Environmental Action Plan: Environment audit report*. Retrieved December 14, 2006, from http://www.ru.ac.za/institutes/rgi/leap/index_files/waste1.pdf
- Malone, K., & Tranter, P. (2003). School grounds as sites for learning: Making the most of environmental opportunities. *Environmental Education Research Journal*, 9(3), 283-303.
- Mambinja, S. (2004). *Contextual profile of Ntaba Maria primary school*. Unpublished research report, Rhodes University, Education Department, Grahamstown.
- Manona, C.W. (1988). *The drift from the farms to town: A case study of migration from white owned farms in the Eastern Cape to Grahamstown*. Unpublished paper. Rhodes University, Grahamstown.

- McKernan, J. (1996). *Curriculum action research* (2nd ed.). *A handbook of methods and resources for the reflective practitioner*. London: Kogan Page Limited.
- McNiff, J., & Whitehead, J. (2006). *Action research living theory*. London: Sage Publications.
- McNiff, J., Lomax, P., & Whitehead, J. (1996). *You and your action research project*. London: Routledge.
- McTaggart, R. (1991). *Action research: A short modern history*. Geelong, Victoria: Deakin University Press.
- Merriam, S.B. (2001). *Qualitative research and case study applications in education*. Revised and expanded from *Case study research in education*. San Francisco: Jossey-Bass Publishers.
- Moll, I. (2002). Clarifying constructivism in a context of curriculum change. *South African Journal of education*, 27, 5-32.
- Moll, I., Gultig, J., Bradbury, J., & Winkler, G. (2001). *Learners and learning: Reader*. Oxford: Oxford University Press.
- Moller, V. (2001a). *Growing up in Grahamstown East/Rini: A sample survey of youth 15-24 years*. Research report series No.9. Institute of Social and Economic Research, Rhodes University, Grahamstown.
- Moller, V. (Ed.). (2001b). *Living in Grahamstown East/Rini: A social indicators report*. Research report series No.6. Institute of Social and Economic Research, Rhodes University, Grahamstown.
- National Environmental Education Project for General Education and Training (2004a). *Lesson planning for a healthy environment: Teachers working with the National Curriculum Statement (R-9)*. Howick: Share-Net.
- National Environmental Education Project for General Education and Training. (2004b). *Enabling an environmental focus in Life Orientation: A policy interpretation guidebook for the Revised National Curriculum Statement for GET*. Pretoria: Department of Education.
- National Environmental Education Project for General Education and Training. (2005). *A critical dialogues monograph. Building capacity for environmental learning in South Africa's education system: Openings for the UN Decade on Education for Sustainable Development*. National Environmental Education Project for General Education and Training. Howick: Share-Net.
- O'Donoghue, R. (2001). *Environment and active learning in OBE*. Howick: Share-Net.
- O'Hanlon, C. (2003). *Educational inclusion as action research: An interpretive discourse*. Buckingham: Open University Press.

- Palmer, J., & Neal, P. (1994). *The handbook of environmental education*. London: Routledge.
- Palmer, J. (1998). *Environmental education in the 21st century: Theory, practice, progress and promise*. London: Routledge.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks: Sage Publications.
- Reid, A., Jensen, B.B., Nikel, J., & Simovska, V. (Eds.). (2008). *Participation and learning: Perspectives on education and the environment, health and sustainability*. New York: Springer.
- Rogoff, B. (1999). Cognitive development through social interaction: Vygotsky and Piaget. In P. Murphy (Ed.), *Learners, learning and assessment* (pp.69-82). London: Sage Publications.
- Schoolscapes: Your school grounds handbook*. (2005). Retrieved July 07, 2006, from <http://freespace.virgin.net/school.scapes/viewour.htm>
- Sieborger, R., & Macintosh, H. (1998). *Transforming assessment: A guide for South African teachers*. Cape Town: Juta.
- South Africa, Department of Education. (1995). *White paper on Education and Training*. Government gazette No. 16312. Pretoria: Government Printer.
- South Africa, Department of Education. (2002c). *Revised National Curriculum Statement Grades R-9 (Schools) - Life Orientation*. Pretoria: Government Printer.
- South Africa, Department of Education. (2002d). *Revised National Curriculum Statement Grades R-9 (Schools) – Social Sciences*. Pretoria: Government Printer.
- South Africa. Department of Water Affairs and Forestry. (2006). *Strategic Plan 2006-07*. Retrieved December 10, 2006, from <http://www.dwaf.gov.za/documents/Other/Strategic%20Plan/2006/StrategicPlan2006.pdf>
- South Africa. Department of Education. (2000). *Norms and standards for educators*. Pretoria: Government Printer.
- South Africa. Department of Education. (2001). *Manifesto on values, education and democracy*. Pretoria: Government Printer.
- South Africa. Department of Education. (2002c). *Revised National Curriculum Statement Grades R-9 (Schools) - Life Orientation*. Pretoria: Government Printer.
- South Africa. Department of Education. (2002). *Revised National Curriculum Statement Grades R-9 (Schools) - Mathematics*. Pretoria: Government Printer.

- South Africa. Department of Education. (2002d). *Revised National Curriculum Statement Grades R-9 (Schools) - Social Sciences*. Pretoria: Government Printer.
- South Africa. Department of Education. (2002a). *Revised National Curriculum Statement Grades R-9 (Schools) - Overview*. Pretoria: Government Printer
- South Africa. Department of Education. (2002b). *Revised National Curriculum Statement Grades R-9 (Schools) – Languages (English First Additional Language)*. Pretoria: Government Printer.
- South Africa. Department of Education. (2003a). *Revised National Curriculum Statement Grades R-9 (Schools) – Teacher's guide for the development of learning programmes (Life Orientation)*. Pretoria: Government Printer.
- South Africa. Department of Education. (2003b). *Revised National Curriculum Statement Grades R-9 (Schools) – Teacher's guide for the development of learning programmes (Languages)*. Pretoria: Government Printer.
- South Africa. Department of Education. (2005). *National Protocol on Assessment for Schools (Grades R-12)*. Pretoria: Government Printer.
- South Africa. Department of Education. (n.d.). *A teacher's INSET programme for Foundation Phase (Grades R-3)* (Workshop handout, 2005). Bisho: The Department.
- South Africa. Department of Environmental Affairs & Tourism. (1999). *State of the Environment in South Africa: An overview*. Pretoria: Government Printer.
- South African Bill of Rights: Chapter 2. (1996). Retrieved January 06, 2006, from <http://www.polity.org.za/html/govdocs/constitution/saconst02.html?rebookmark=1#24>
- Stake, R. (1995). *The art of case study research*. London: Sage Publications.
- State of environment report. (1999). Retrieved November 13, from <http://www.ngo.grida.no/soesa/nsoer/issues/social/index.htm>
- State of the Eastern Cape environment report. (2004). Retrieved November 22, from <http://www.environment.gov.za/soer/ecape/issues/land/index.htm>
- Timmermans, I., & Gon, J. (2003). *Environmental Learning and Professional development: A case study of the NEEP-GET Makana Cluster –Eastern Cape*. Draft Research Report, Rhodes University Environmental Education Unit, Education Department, Grahamstown.
- Tudge, J. (1990). Vygotsky, the zone of proximal development, and peer collaboration: Implications for classroom practice. In L. Moll (Ed.), *Vygotsky and education: Instructional implications and applications of sociohistorical psychology* (pp.155-172). Cambridge: Cambridge University Press.

- van Harmelen, U., & Bolt, G. (2000). (Learning, knowing and theories of learning).
BED position paper, Rhodes University, Education Department, Grahamstown.
- Ward, K., & Schnack K. (2003) Perspectives on the Eco-Schools Programme: An environment/education dialogue. Environmental Education, Ethics and Action: Policy in - Practice. *Southern African Journal of Environmental Education*, 20 142 – 149.
- Wilmot, D., & Euvrard, G. (1998). *Cooperative learning*. BEd lecture notes, Rhodes University, Education Department, Grahamstown.
- Yin, R.K. (1984). *Case study research: Design and methods*. London: Sage Publications.
- Yin, R.K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks: Sage Publications.

ANNEXURE A

CODED VIDEO TRANSCRIPT

Eyesibini ithi baphi aba bantu bakulo mfanekiso? Eyesi
dhotini ithi. Kutheni besenza lento nye? Niza kuncedisa ke
ngomfanekiso X2 Qalisani ke ngokuncedisa ngomfanekiso
Ngobani aba bantu basemfanekisweni, kwezeke ntoni.
Benza ntoni? Kayphi? Kutheni besenza le nto nye.
Uphinde uyigugule ke ipicture
Kwezizwa ntoni apha?

Helping them in their small groups by asking questions and answers about the picture

★ Bapushine, bazakusitya, yigadi yaphi le? wenza ntoni
uyayikhupha lento phaya egadini akayifuni, indaba yintoni
le nto? Yinto yegadi, itheni yintoni le segadini? Uphaphi
legadi, itheni ela phepha pha egadini. Kubhalwe ntoni
kwela phepha? Uyayazi ukuba yegadi ^{notaba} kubhalwe ntoni
kwela phepha? Kubhalwe ukuba siyakha ^{shakha} iiflawa. Ziyakhungu
bakade iiflawa, akufuneki zikhungu kaloku. Fuoka kubhalwe
ntoni? Zintle iiflawa ^{samkuzitha} mhlamunzi bayakwela
igama laleflawa ^{mhlamunzi kubhalwe} isunflower leyo. Liguqule ke ngoku
yonge kwelunge cala.

Answer group

Kayphi apha? Kusechidweni. Kwezeke ntoni esichidweni? Kudlalwa
idisc. Baphi abantwana abadlalayo. Zintoni ezi zisesichidweni
Yinkunkuna kweplastiki.
Kulilo ntoni kweisikolo? Kukhugadi uyayibona igadi ^{uyayibona igadi}
Dijani ngca yesikolo, nemithi kweisikolo uyayibona ngca yesisikolo
yesisikolo kulaga ^{red} eulaba Mana? imbi. Abantwana beseke
benza ntoni. Bazakusetya ^{red} indink. Bazikhupha kulento yenkunkuna
indink? Bazakutya, bakhupha kulento yenkunkuna? Ezatoti
zedinku bazifaka enkunkuneni.

Benza ntoni aba, bayantcencenkeshela. Mjenge wenza ntoni
uyayala. Jonga lo ^{yellow}

001:10

Bayasikelela utoti kungaboni indaka, OK - listen very carefully
If you have got your yellow cap on you are gonna tell
us about the picture. If you've got your yellow cap on
take the picture and tell us. We're waiting. If you've got
tell us about the picture. We're waiting to listen. or yellow

ANNEXURE B

JOURNAL REFLECTIONS

A story was ^{We cannot always build the future for our youth, but we can build our youth for the future.} ^{Franklin D Roosevelt} **thursday 23**
SCHOOL GROUNDS WATER AUDIT
 Corner lesson plan Next to the staff room ✓
 There was a tap left dripping and I put a basin under it for about twenty minutes (estimated time) and we measured the water with a cup and we got 4 cups.
 Next to the netball court - I left a basin to catch water from learners dripping standing with cupped hands. After about an hour a 15 x 21 cm basin was heaping full. 15 x 35 cm
 Activity - dripping with hands
 learners keeping time and opening the tap to the same strength they usually open it.
 1st time - 46 seconds
 2nd time - 7 seconds ??? confusion
 3rd - 14 seconds
 4th - 11 seconds 1L
 The same was done with washing hands. Messy activity, was done, catching the water in basins, the other teacher who helps keeping the time.
 Important projects
 1
 2
 3
 4
 5
 6

Done by	Date	Time	Reading in m ³	multiply by 1000
Teacher	22-06-2005	12:55	02125,5358 m ³	2125535,8 kl
Teacher	23-06-2005	7:30	02129,4599 m ³	2129459,9 kl
Learners	23-06-2005	(before we did activity) between 9:00 and 10:00	02130,1193 m ³	2130119,3 kl
Teacher	23-06-2005	1:45	02135,2720 m ³	2135272,0 kl
Teacher	24-06-2005	7:50	02139,4444 m ³	2139444,4 kl

ANNEXURE C

ANALYTIC MEMO

Learner	What has been drawn as a problem?	Coloured face	Reason	Solution
L1f	Tap is not properly closed. Sucker sticks.	☺☹	Water is wasted. We are going to run out of water. Paper and sucker sticks make our school dirty.	Green grass and throwing litter into bins.
L2f	Tap is dripping. Paper, leaves, sucker sticks, yoghurt cup.	☺☹	Sad, because it makes the school dirty. Happy the tree makes school beautiful.	Tap closed, bucket of water on steps.
L3f	Tap is not properly closed. Sucker stick.	☺	Feel bad about the tap that is not properly closed. We are going to run out of water.	Green soccer field.
L4f	Tap pouring water down, lion.			Tap closed
L5f	Learners drinking with cupped hands and mouth.	☹	Three of them, rushing for water but water must not be wasted, we pay for water and it is difficult to pay money for water.	Green soccer field, grass under jungle gym and picking up of litter into bin.
L6f	Tree, butterfly, bird.	☺	I like trees.	Green soccer field, litter thrown into bin and tap closed.
L7f	Cleaner getting water from tap with a bucket.	☺	Water is not dripping.	Green soccer field. Litter picked up.
L8f	Dripping tap.	☹	It is difficult to pay for water.	
L9f	Litter. Stagnant water.	☺☹	I feel bad about blind people. They can't do things for themselves.	Cleaner with bucket and mop and green grass.
L10f	Dog	☺	Like dogs.	Cleaner with bucket and green grass.
L11f	Bone for dogs, dog, chips	☺☹	I like trees they give us shade. Chips make house dirty.	Green soccer field, bucket on steps.

L12f	Tap is dripping and banana peels lying on the ground.		Water is wasted. Banana peels will injure us when we play. We will run out of water.	Cleaner mops with a bucket of water, green grass and tap closed.
L13f	Bread, sucker sticks, chips packets	☺	It's not nice when people go past litter, they must pick it up. I like bird eating bread. It cleans the school.	Green soccer field and litter into the bin.
L14f	Long grass, dogs.		Feel bad about dogs coming to eat bread and bones thrown on the ground.	Playing on green soccer field, tap closed and bucket to wash the steps.
L15f	Tree, birds, running tap.		It's beautiful.	Green soccer field. Tap closed
L16f	Dripping tap.	☹	Sad, the tap is not closed properly	Green soccer field.
L17f	Tree, house, someone carrying a container.			
L18f	Papers, leaves, crayons, feathers, ants		I don't like papers, they make the yard dirty. I like trees because they give us shade.	Mopping steps with bucket, litter in bins and green patch under jungle gym
L19f	Bones, leaves, bread, child wasting water, sucker sticks	☹	Wasting of water that is paid for, bones make school grounds dirty, it's not right to throw bread on the ground.	Watering green soccer field with hosepipe, tap closed.
L20f	Water dripping, bread pieces on ground	☹	Littering and dripping tap is not right.	Closed tap, putting litter into bins, green soccer field.
L21f	Dog.	☺		Green soccer field.
L22f	Sweet papers, apple cores, chips, bones, yoghurt cup, sucker sticks.	☺☹	Sad, litter makes the school dirty. Tree is right, it make the school look beautiful.	Cleaning steps with a bucket of water, collecting things into a container
L23f	Drinking with cupped hands	☹	Water is paid for.	Mop and bucket, tap closed.

L24f	Dripping tap	☹☹	We are going to be without water. I like the butterfly and my worksheet.	Picking up litter and throwing it into the bin, mopping steps with a bucket.
L25f	Sweet papers, dripping tap		Feel bad my school is dirty, dripping tap wastes water and litter.	Grass on the soccer field and under the jungle gym. Tap closed.
L26f	Flowers, tree, butterfly	☺	I feel good about outside, it's beautiful.	Putting litter in the bin. Green soccer field.
L27f	Paper	☺	Sad about this because it makes yard and street dirty.	Green soccer field, picking up litter and a closed tap.
L28f	Dog	☹		Green soccer field. A mop and a bucket.
L29f	Children drink and leave tap not closed	☹	We will be without water.	
L30f	Leaves on the ground. Dripping tap.			Green soccer field.
L31f	Tap left running, birds on tree, bucket collecting water under running tap.			Washing a car with a bucket, a closed tap, putting litter in the bins and washing floors and steps with a bucket and mop. Green soccer field.
L32f	Sucker stick, bread		Feel bad about these; they make school and playground dirty.	Green soccer field.
L33f	Dripping tap	☺	The tap cannot switch off.	Putting litter into the bin, a mop and a bucket, green soccer field and a closed tap.
L34f	Bread	☹☹	Birds come to eat bread thrown on grounds. I like the bench for us to sit on.	

L35f	Dog		Feel bad about dogs coming to eat bread and bones thrown by us on the school grounds.	Green soccer field.
L36f	Houses	☹☹		Green soccer field.
L37f	Apple core, yoghurt cup, coke bottle, sweets	☹	These things must be thrown into the bin and not on the ground.	Closed tap.
L38f	Papers	☹		Green soccer field.
L39f	Dog	☺	Feel bad about the dog at school	Putting litter into the bin, a closed tap and green soccer field.
L40f	Bread, dog	☺	Birds and dogs come to eat bread and bones thrown on the grounds.	Litter in the bin.
L41f	Dripping tap	☺	I like the picture.	Green soccer field.
L42f	Sweet papers, sucker sticks	☺	They are going to make ants come.	
L43f	Bread, bones, leaves	☺☹	Birds are here to pick up the pieces of bones and bread on the ground.	Putting litter into the bin.

*Blank blocks indicate incomplete worksheets

ANNEXURE D

LETTER OF CONSENT

Ntaba Maria Primary School
P.O.Box 901
Grahamstown
6140
21 November 2005

Dear Parents

As you know that I am conducting research and I have asked permission to use your child's work. I was also taking photographs and videos in the process. It has been an ethical consideration for me to ask your **written permission** to again use your child's photographs in the written report of the research. The report will not reveal any names of learners; but will allocate codes to them.

If you agree, please fill in the slip below and return it to me.

(Tear along the dotted line)

REPLY SLIP

I/We, (please print your full names)

agree that my/our child (please print your child's name in full)

_____s work and photographs may
be used in the research and I understand that this will be treated with due respect.

(Signatures)

(Date)

Yours sincerely



S. Mambinja (Miss)
(Grade 1 teacher)

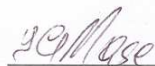
REPLY SLIP

I/We, (please print your full names)

YALEKA MASE

agree that my/our child (please print your child's name in full)

DUNA MASE _____s work and photographs may
be used in the research and I understand that this will be treated with due respect.



(Signatures)

22/11/05

(Date)

Yours sincerely



S. Mambinja (Miss)
(Grade 1 teacher)

ANNEXURE E

LESSON PLAN 1

LESSON PLAN on: Audit of school grounds GRADE: 1 DURATION: 4 periods LEARNING PROGRAMME: Life Skills	
LEARNING OUTCOMES AND ASSESSMENT STANDARDS: LIFE ORIENTATION(INTEGRATION WITHIN) LO1: Health Promotion – the learner will be able to make informed decisions regarding personal, community and environmental health. AS2 – Explains why the people in the picture are doing what they are doing to keep their environment healthy. LO2: Social development – the learner will be able to demonstrate an understanding of and commitment to constitutional rights and responsibilities, and to show an understanding of diverse cultures and religions. AS1 – Explains why the school rule about littering should be followed. LO3: Personal development – the learner will be able to use acquired life skills to achieve and extend personal potential to respond effectively to challenges in his or her world. AS3 - Shows different feelings about school grounds, including respect for other living things such as people, animals and the environment.	INTEGRATION: (INTEGRATION ACROSS) TECHNOLOGY LO1- The learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technologies. AS1 – Makes Makes simple products from a range of materials provided. LANGUAGES - FIRST ADDITIONAL LO1- The learner will be able to listen for information and enjoyment, and respond appropriately and critically in a wide range of solutions. AS5 – Shows respect for classmates by giving them a chance to speak, and by listening to them.
LINKS WITH PREVIOUS LESSONS: Story about <i>Sichola-chola iingceba</i> (isiXhosa level 1 Molweni readers.	LINKS WITH NEXT LESSONS: Priority areas identified as learning opportunities in the school grounds.

CORE KNOWLEDGE: Auditing the school grounds in order to identify environmental learning opportunities (issues).	CONTEXT: Our school grounds
LEARNING ACTIVITIES: Activity 1 – Picture discussion to stimulate learners' thinking skills. Numbered heads co-operative group work. six learners per group to talk about the pictures. For example all the number 1's come together to form a group. They are given a picture in order to answer three questions which are: What is happening in the picture? Where do you think that is? Why are they doing what they are doing? A reporter is chosen to report on behalf of the group. Photographs of what happens in our school grounds are also discussed in groups. Learners say what they see happening in the pictures and also say if they are happy or sad about it and what could be done about it. Activity 2 – Start by doing a fun activity to train their eyes to see. Let them find the girl Ntombi in the picture of the playground. Talk about what they see in the picture. Talk about blindness and tell them that blindness can be experienced by all cultures. Let them do a blind walk in the class and ask a friend to guide them on that walk. Ask questions afterwards about how they felt, trusting their friends – Did their friends warn them of something? Make binoculars that will help them see on our school grounds. Activity 3 – Divide learners into groups of six to eight. Go outside on the school grounds to look at how the school grounds look like through the binoculars. Allocate different sections for each group. Give each learner in the group a worksheet to draw the picture of the portion they are allocated as it is and colour in the face that demonstrates their feelings about what they see. Later in class talk to them one by one about why they feel the way they do.	
PLANNED ASSESSMENT TASKS FOR RECORDING:	RESOURCES: Pictures of school grounds and activities in Eco-Schools. Photographs of our school. Toilet roll inners, string and glue. Worksheets.

EXPANDED OPPORTUNITIES: They draw what is happening outside Ntaba Maria after Activity One without going outside; only using their imagination. They draw the pictures showing what must be done after Activity Three.	TEACHER REFLECTION: Record the learners' responses in a research journal and in their worksheets.
CRITICAL AND DEVELOPMENTAL OUTCOMES: CO 1,2,6 and DO 2	

ANNEXURE F

DRAWING OF PROBLEMS



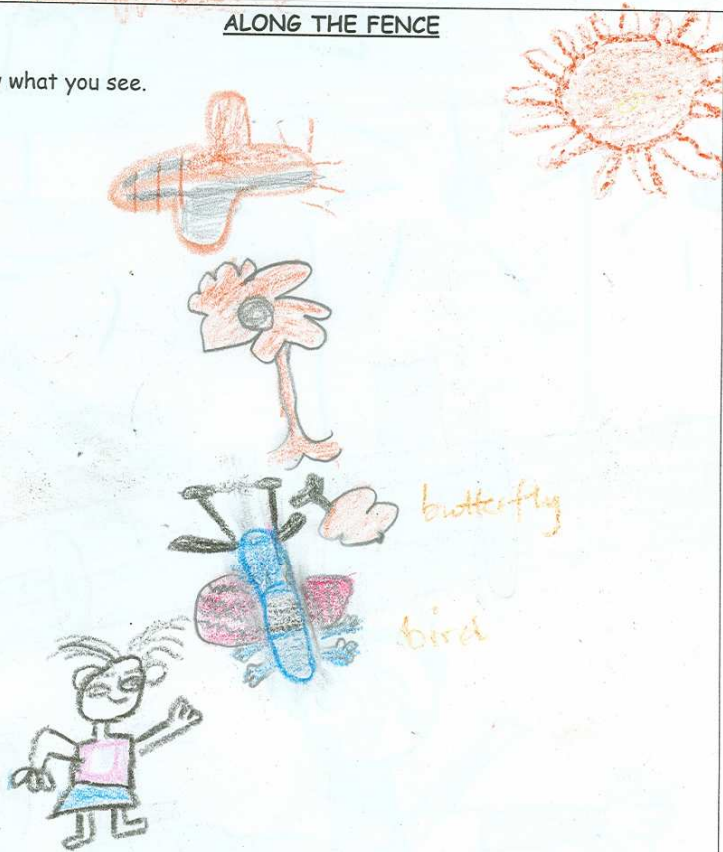
ANNEXURE G

LEARNER'S AUDIT WORKSHEET

L6f

ALONG THE FENCE

Draw what you see.



Colour in the face that shows how you feel.



Why do you feel like this?

Because... I love trees

ANNEXURE H

A MYTHOLOGICAL STORY

For the Love of Water

In this story, the Water Snake , Zilenzi steals (captures) the little girl Nomvulazana , from her village.

Nomvulazana was a little girl who lived in a little small village with her mother and father. She was a happy little girl. She was also a very special little girl. When she was a baby her mother took her to Mamtshawe, the traditional healer. Mamtshawe showed Nomvulazana's mother the sign on the baby's hand and prophesised that one day Nomvulazana would save her whole tribe. She also sang this strange song:

Igama lam nguZilenzi ndihlal'emanzini.Ss ss ss.

Amanzi bubom kuthi soke emhlabeni.Ss ss ss.

Nomvula did not know what all of this meant and kept it a secret in her heart. Nomvulazana had many friends: the little stream where the women used to go and collect water for the village was her friend. Also the buck, the squirrels, and the trees; all of them were her friends.

Then, just as she started school, her whole life changed a drought came to her country. There was no food to eat. The cattle were dying of thirst and hunger. There was no water to drink. The voice of the little stream was quiet. The deep pools where the women used to go to fetch sweet water were stinking and green. The water was polluted because people threw dead dogs and all kinds of rubbish into the water. When the villagers went to the toilet, they also used the river. The trees looked like skeletons because there was no rain. Even the buck and the squirrels were gone. The people had set traps for them so that they could have meat to eat. Nomvulazana was a very sad little girl. All her friends were gone.

Then one day, when she was out in the field, she saw a strange green animal that made her laugh and she followed it all the way to the hill. She even followed the strange green animal when it hopped into a crack between two rocks.

Nomvulazana squeezed through the rocks. But there was just blackness underneath her and she fell until she landed on something that felt like cold, dry sand. It was so dark that she could not see anything. Nomvulazana started to cry because she was so scared and

her mother was so far away. Suddenly there was a bright light and when she opened her eyes, oh! horror of horrors, there was a big snake in front of her with a jewel between its eyes, and she had these strange words:

Igama lam nguZilenzi ndihlal'emanzini.Ss ss ss.

Amanzi bubom kuthi soke emhlabeni.Ss ss ss.

The snake's name was Zilenzi and he was the one who guarded the jewel of jewels- the secret of the water. He had locked up the water because the villagers did not show respect for it: they dirtied and polluted the water and wasted it. Zilenzi decide to send Isele back to Nomvulazana's people to tell them that Zilenzi had captured the little girl. Isele was the green animal that had led Nomvulazana to Zilenzi. He was to tell Nomvulazana's people that unless they made an offering to Zilenzi, they would never see Nomvulazana again.

When Nomvulazana's mother and father received this news, they were heart broken. They did not know what to do. The other grown-ups were not interested. They said that they had enough trouble of their own. It was only the children who wanted to help.

They went to old Mamtshawe, the traditional healer, and she told them exactly what to do. They had to prepare an offering for Zilenzi; they had to prepare the seven pots of water wisdom.

The first pot of wisdom is for food- we must take the tastiest meal of our village.

The second pot is for clothing- we have to take a blanket made of wool in which to wrap a newborn baby.

The third pot is for our homes where we stay warm and shelter from the rain - we have to take branch from the tree which is used to build the frame work for our homes.

The fourth pot is for cleanliness and health - we have to take clean water which we have fetched from the spring, high up in the mountains.

The fifth pot is for enjoyment - we have to catch the laughter of the little ones when they play in the water, just as little streams laugh when they jump over the rocks.

The sixth pot is for our art and tradition - we have the song "*Sifikil'ezibukweni*" about water that little ones used to sing.

The seventh pot is for God - we have to catch the water that is used to baptise or cleanse our people.

The children were helped to make these pots from clay. When the pots were finished, the children filled them with the seven items of water wisdom. Some of the items were difficult to come by. They struggled to find any laughter to fill the fifth pot, because just about no one, not even the children, laughed anymore.

When everything was ready, old Mamtshawe and Nomvulazana's good friend, the young boy packed all the pots onto the donkey cart for their journey to the hill. The old Mamtshawe noticed that all the villagers had gathered at the entrance of the village.

When she saw the people in front of her she said:" At first the children were alone in this task, but now we are all together.

"That is good. You are the leaders. Our people are being tested. The child with the sign on her hand and the water is locked up in the deep and dark bowels of the earth.

"Only through the right behaviour will our earth and our people be saved. Today I am leaving with this brave, boy warrior on my side. I will not return. The time has come for me to return to the home of my father and mother and to the home of their fathers and mothers. But the boy will return and he will bring back the precious child, the one with the sign on her hand. For Surely the Snake of all Snakes will be pleased with the offerings you have prepared with great care. But only when the child returns will the real task begin, since the child is returning to teach you: to teach you about our mother, the Earth, and Her Waters, and how to respect Her and the Water."

"Our people have lost their respect for our Mother, the Earth, and they have lost respect for each other. The child will teach you so that your hearts, which are sleeping within you, can wake up, and so that your eyes can be opened. Listen to the child! For if you do not become quiet and listen and learn and act to be Water Wise, you will live to see my prophecy come true. Our Mother, the Earth, will cast you off her back. Listen and Learn my people".

ANNEXURE I

LESSON PLAN 2

LESSON PLAN on: Water		GRADE: 1
DURATION: 4 days initially, with ongoing monitoring activities		LEARNING
PROGRAMME: Life Skills		
LEARNING OUTCOMES AND ASSESSMENT STANDARDS: LIFE ORIENTATION LO1: Health Promotion The learner will be able to make informed decisions regarding personal, community and environmental health. AS2 – Explains steps to ensure personal hygiene and links these steps to environmental health.	INTEGRATION: (INTEGRATION ACROSS) SOCIAL SCIENCES (GEOGRAPHY) LO3: Exploring issues The learner will be able to make informed decisions about social and environmental issues and problems. AS1 – Identifies and describes issues affecting personal health or safety in the school and/or home environment [the issue]. MATHEMATICS LO1: Numbers, Operations and Relationships The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems. AS3 – Knows and reads number symbols from 1 to at least 100 and writes number names from 1 to at least 34. LO4: Measurement The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts. AS5.3 – Estimates, measures, compares and orders three-dimensional objects using non-standard measures: • capacity (e.g. spoons, cups).	

LINKS WITH PREVIOUS LESSONS: Exploring issues identified in the school grounds audit.	LINKS WITH NEXT LESSONS: Developing knowledge and understanding of looking after this natural resource. Learning to respect this life-sustaining resource. Changing their behaviour and bad user patterns towards water.
CORE KNOWLEDGE: Finding out if they are wasting water in their everyday activities on the school grounds. Water that could be saved or used for something else. Importance of water in the environment.	CONTEXT: Our school grounds

LEARNING ACTIVITIES:

Activity 1 – Teacher tells the mythical story “For the love of water”. Here the snake is associated with water. It captures the little girl from her village because the people did not respect water, they wasted it. The people were tested. The girl with the sign on her hand was taken. The water was locked up. Only through the right behaviour will our earth and people be saved. Through this story the learners are sensitised about the importance of water in people’s lives and in the lives of animals and plants. They do this through predicting what will happen next, singing and answering questions at the end of the story. They learn the song “*sifikil’ezibukweni*”. Afterwards they are asked to draw a picture of the story.

Activity 2 – Looking after water activity. Learners look at pictures about this. They talk about them describing what is happening. In this way the teacher finds out what they already know. Learners also learn from each other. Teacher asks them to think of what they would say if they were asked to talk to the people in the pictures. Learners’ responses are recorded in a diary when possible.

Activity 3 – Learners audit water use to find out if they are wasting water in their everyday activities on the school grounds. They are divided into groups. One group goes outside on the school grounds with the teacher; others are left in class doing measuring activities. Outside the learners are taught how to read the dial type water meter. They write down the numbers (digits) that they see and put “cubic metre”, this is where the teacher will put a comma afterwards. They read the dials in an anticlockwise direction, starting from the dial just below the cubic metre. They write the number each dial is pointing to, if the dial is between 1 and 2 they only write 1. Thereafter they do water auditing activities i.e. drinking by hands, hand washing, using hosepipe for washing hands, washing cement floors and school bus. They catch water using basins and a bucket. They measure using 1litre bucket.

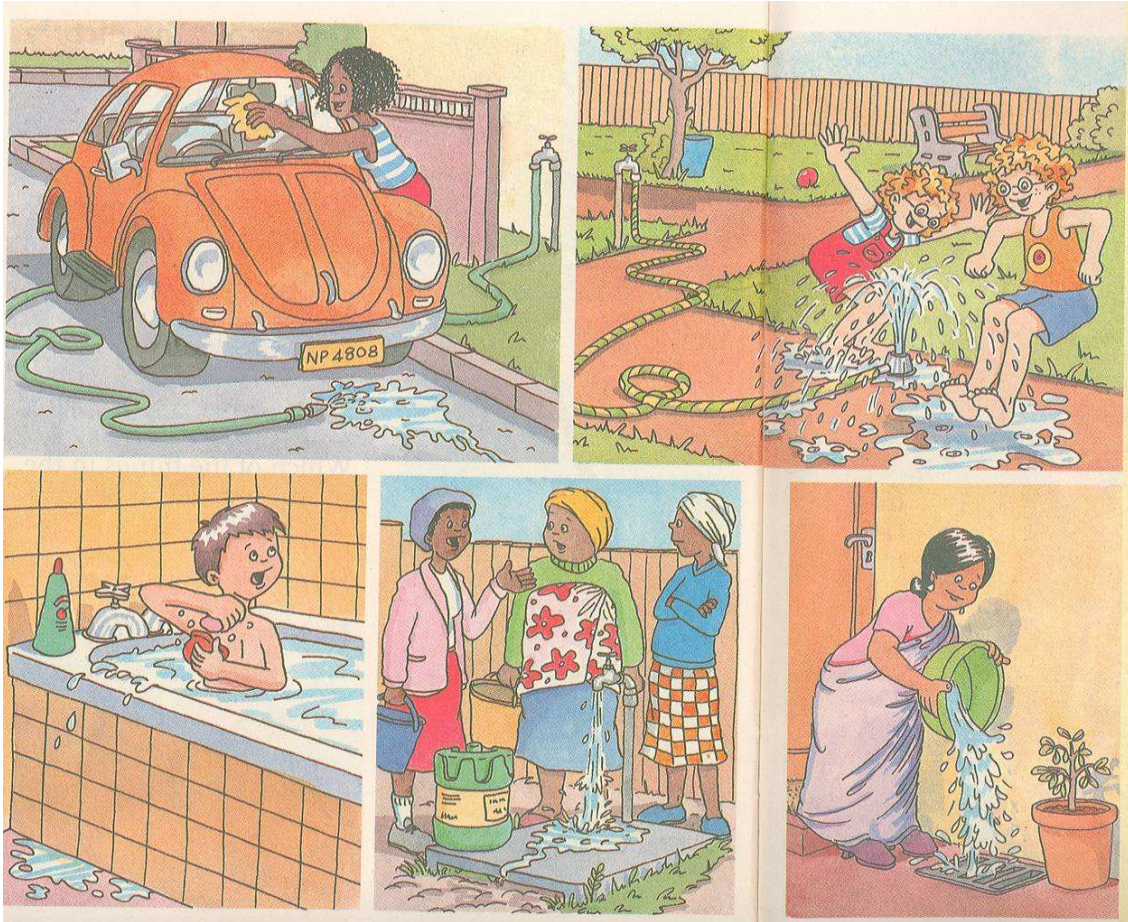
Activity 4 – Activity on measuring water. All learners are given the worksheets that were done yesterday by those who were in class.

Activity 5 - Story about the journey of Amanda the drop of water that travelled from the sea and back to the sea. This is done to develop the understanding of where water comes from and how it reaches people and animals. Teacher asks questions about the story and afterwards they sing “it’s a cycle”.

PLANNED ASSESSMENT TASKS FOR RECORDING: Oral responses recorded by teacher. Checklist for predicting, answering questions about the story. Explains what to do to respect water to ensure personal and environmental health. Rubric for measuring water capacity.	RESOURCES: Real clay pots and items inside them, books with water pictures, worksheets, measuring units e.g. cups, spoons, carton, etc., stop watch, basin, bucket, water metre, tap, hosepipe and poster of the water cycle.
EXPANDED OPPORTUNITIES: Singing songs about water.	TEACHER REFLECTION: After looking at learners' drawings, I found out that they only drew the characters in the story; they did not show the consequences of people's actions. I then re-told the story and emphasized the people's actions and what happened when the water was locked up. Thereafter they were asked to draw the story again and their descriptions of the pictures were written on their worksheets. After Activity Two I recorded learners responses in dairy. At the end of Activity Two, after school the teacher reads the water metre in preparation for next day's activities. During the water audit activity I noticed that learners cannot measure. Those in the classroom doing activities had the same answers for measurement. This made me to do another activity that will help them develop skills for measurement. This activity took the place of Activity Four instead of teaching them about how water reaches people and animals.
CRITICAL AND DEVELOPMENTAL OUTCOMES: CO 3 and DO 1	

ANNEXURE J

USES OF WATER



ANNEXURE K

GUIDED WATER AUDIT SHEET

WATER AUDIT RESULTS

Activity	Amount of water wasted after a minute		
	1 13sec	2 11sec	3 12sec
Drinking with hands 	13sec 1l 200 ¹ / ₂	1l 100	400
Handwashing 	13sec 1l 100	13sec 1l 100	7sec 1l 100
Hosepipe 	1min 18l		

23 June 2005

L3mb

Other uses of water

Measuring water

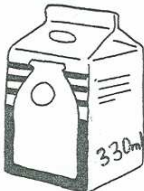
		20
		2
		5
		5
		3

ANNEXURE M

MY OWN MEASUREMENTS

Other uses of water

Measuring water

		20
		2
		5
		5
		10

20

See the Teacher's Resource Book page 114 for five lessons on the topic 'Other uses of water'.
This activity is part of Lesson 5. See the Learner's Book page 38.

ANNEXURE N

ASSESSMENT RECORDS

* Activity: Measuring water capacity using table spoon, teaspoon, egg cup, carton, yoghurt cup and cup.

NUMERACY LO4: MEASUREMENT

AS5.3 - Estimates, measures, compares using non-standard measures:

- Capacity (e.g. spoons, cups).

Names: L1ma L2ma L3ma L4ma

✓ one learner

✓ one learner

✓ one learner

✓ one learner

Criteria	4-has exceeded the requirements	3-has satisfied the requirements	2-has partially satisfied the requirements	1-has not satisfied the requirements
Estimates	Is able to estimate capacity of all containers with ease.	Is able to estimate capacity of some containers accurately.	Is able to estimate capacity of a few containers. ✓✓	Cannot estimate capacity of containers. ✓
Measures	Is able to measure capacity of all containers with competence.	Is able to measure capacity of many containers accurately. ✓	Is able to measure capacity of some containers. ✓✓	Cannot measure capacity of containers. ✓

Activity: Measuring water capacity using table spoon, teaspoon, egg cup, carton, yoghurt cup and cup.

NUMERACY LO4: MEASUREMENT

AS5.3 - Estimates, measures, compares using non-standard measures:

- Capacity (e.g. spoons, cups).

Names: L1ma L2ma L3ma L4ma

✓ one learner

✓ one learner

✓ one learner

✓ one learner

Criteria	4-has exceeded the requirements	3-has satisfied the requirements	2-has partially satisfied the requirements	1-has not satisfied the requirements
Estimates	Is able to estimate capacity of all containers with ease.	Is able to estimate capacity of some containers accurately. ✓	Is able to estimate capacity of a few containers. ✓✓	Cannot estimate capacity of containers.
Measures	Is able to measure capacity of all containers with competence.	Is able to measure capacity of many containers accurately. ✓	Is able to measure capacity of some containers. ✓✓	Cannot measure capacity of containers.

ANNEXURE O
RECORD OF WATER AUDIT ACTIVITIES

28/06/2005

1st - 46 sec - less than 1 l

2nd - 7 sec - 1 l bucket nearly full

14 ~~sec~~ sec

3 3 sec

4 Same? ^{handwashing} ~~hygiene~~

5 11 sec 1 l

the same ?? does it refer to 3 sec above of 4 and 5 as in the video transcript.

Nosepipe

1:46 green basin 27 l

1:00 blue 20 l

ANNEXURE P CONSEQUENCES OF WATER MISUSE

