

**THE USE OF ENVIRONMENTAL LEARNING SUPPORT
MATERIALS TO MEDIATE LEARNING IN OUTCOMES-
BASED EDUCATION: A CASE STUDY IN AN EASTERN
CAPE SCHOOL**

Submitted in fulfillment of the requirement for the degree
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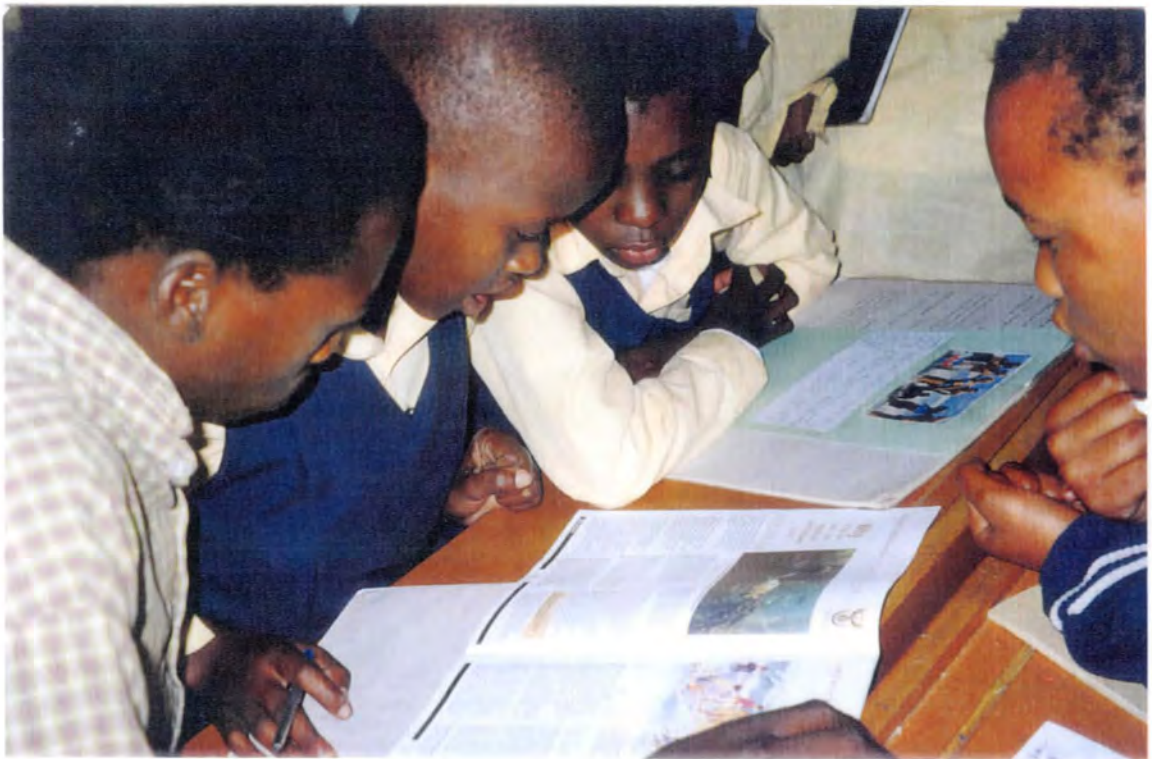
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15 December 2003

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ABSTRACT

Educational transformation and curriculum reform within the new South African Outcomes Based Education (OBE) system has introduced new roles for teachers, and a focus on environmental learning within each learning area. In an OBE system, teachers are required to mediate learning, develop learning programmes, and use a range of different learning support materials. This study aimed to explore how one teacher in an Eastern Cape school used environmental learning support materials to mediate learning within an OBE curriculum framework.

Over the past ten years a number of environmental educators and researchers have been participating in curriculum policy development and curriculum implementation research. This has led to the incorporation of an environmental focus within different learning areas in Curriculum 2005. The focus on environment in the curriculum was strengthened by the introduction of the National Environmental Education Project in the General Education and Training (NEEP-GET) band in 2001. I am employed as a provincial co-coordinator within this project (for the Eastern Cape province), and one of my tasks is to work with service providers (who provide learning support materials) and teachers (who use these materials) to ensure improved environmental learning within the OBE curriculum.

A qualitative and empirical case study was conducted in which I observed one teacher in a multi-grade class (with grade 6 and 7 learners) using learning support materials to achieve learning outcomes in three different lessons. The study employed a range of data collection methods such as questionnaires, interviews, field notes, video recording, and document analysis, photographs and journal entries. I compiled a contextual profile of the school and classroom and undertook two 'layers' of data analysis to report the findings of the study.

This research indicates that theories of learning and associated teaching methods influence learning interactions, and the use of learning support material in the class. The study also highlighted emerging issues in the use of environmental learning support materials, which relate to planning; access to materials; over-use of materials; and the relationship between learning support materials and teaching methods.

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TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGEMENTS.....	ii
TABLE OF CONTENTS.....	iii
LIST OF FIGURES, TABLES AND APPENDICES	vi
CHAPTER 1	1
OVERVIEW OF THE STUDY	1
1.1 INTRODUCTION	1
1.2 DESCRIBING THE RESEARCH FOCUS AND AIMS	2
1.3 THE CONTEXT OF MY WORK.....	3
1.4 OUTLINE OF THE CHAPTERS	6
1.5 CONCLUSION	7
CHAPTER 2	8
CONTEXTUALIZING THE STUDY	8
2.1 INTRODUCTION	8
2.2 POLICIES AND THE USE OF LSM	9
2.2.1 Overview of educational policies and implications for use of LSM	9
2.2.2 Policy-related factors affecting the use of learning support materials .	11
2.3 ISSUES AFFECTING THE USE OF LSM IN CURRICULUM	
IMPLEMENTATION	15
2.3.1 Under-resourced schools.....	15
2.3.2 Lack of capacity building in professional development.....	16
2.3.3 Institutional problems.....	16
2.3.4 Language, literacy, scope and depth of materials	17
2.4 THE ROLE OF THE TEACHER AND THE USE OF LSM.....	18
2.4.1 Constructivist underpinnings of OBE and the role of the teacher.....	18
2.4.2 Department of Education expectations of teachers	19
2.4.3 Role of materials developers in supporting and enabling LSM use.....	22
2.5 WORKING WITH LSM IN THE NEEP-GET PROJECT	25
2.5.1 The resource-based learning approach in the NEEP-GET.....	26
2.5.2 Working with environmental education partners and LSM	27
2.5.3 Professional development and the NEEP- GET	28
2.5.4 Challenges	29

2.6	CONCLUSION	30
CHAPTER 3.....		32
METHODOLOGY AND RESEARCH PROCESS		32
3.1	INTRODUCTION	32
3.2	RESEARCH DESIGN DECISIONS	33
3.2.1	Purpose of the research	33
3.2.2	A case study approach	35
3.3	RESEARCH METHODS.....	37
3.3.1	Entering the research setting.....	37
3.3.2	Observations	38
3.3.3	Questionnaires.....	40
3.3.4	Interviews	42
3.3.5	Journal entries, lesson plans and learners' work	43
3.4	THE RESEARCH PROCESS.....	44
3.4.1	Ethical issues in the research process	44
3.4.2	Data management and analysis	45
3.4.3	Validity and trustworthiness.....	48
3.5	CONCLUSION	50
CHAPTER 4.....		51
USING ENVIRONMENTAL LEARNING SUPPORT MATERIALS TO MEDIATE LEARNING IN THREE LESSONS		51
4.1	INTRODUCTION	51
4.2	CONTEXTUAL PROFILE OF THE SCHOOL AND CLASSROOM.....	51
4.2.1	The socio cultural and economic context	52
4.2.2	The school and community context.....	52
4.2.3	The classroom context.....	54
4.3	PLANNING WITH THE TEACHER	56
4.4	USING LSM AND THE ROLE OF THE TEACHER	59
4.4.1	Planning	60
4.4.2	Using different teaching methods with LSM.....	63
4.4.3	Supporting learners.....	70
4.4.4	Assessment of learning	74
4.4.5	Summary.....	78
4.5	LSM AND ENGAGEMENT OF LEARNERS	78

4.5.1	Knowledge acquisition and skills development.....	78
4.5.2	Learning in an additional language	83
4.6	CONCLUSION	84
CHAPTER 5.....		86
THE TEACHER'S MEDIATION ROLE AND USE OF LEARNING SUPPORT		
MATERIALS.....		86
5.1	INTRODUCTION	86
5.2	ROLE OF THE TEACHER.....	86
5.2.1	Teacher's competence	87
5.2.2	Teaching methods and instructional scaffolding.....	93
5.2.3	Summary.....	99
5.3	USE OF LSM	100
5.3.1	Gaining access to materials	100
5.3.2	Accessing information from LSM.....	101
5.3.3	Interpreting the LSM	102
5.3.4	Use of LSM and learning outcomes	103
5.3.5	LSM use, scope and depth.....	104
5.3.6	Use of LSM and assessment.....	105
5.3.7	Use of LSM and professional development of the teacher.....	105
5.4	CONCLUSION	106
CHAPTER 6.....		107
SUMMARY AND RECOMMENDATIONS.....		
6.1	INTRODUCTION	107
6.2	SUMMARY OF THE STUDY.....	107
6.3	EMERGING ISSUES AND RECOMMENDATIONS	110
6.3.1	Planning and multi grade teaching	110
6.3.2	Overuse of learning support materials and time allocation.....	110
6.3.3	Availability of materials and curriculum links.....	111
6.3.4	Adaptation, development and use of LSM	111
6.3.5	Language and literacy levels	112
6.3.6	Using LSM in constructivist approaches to OBE.....	114
6.3.7	Professional development	114
6.4	REFLECTIONS ON THE RESEARCH METHODOLOGY.....	115
6.5	CONCLUSION	118

LIST OF FIGURES, TABLES AND APPENDICES

FIGURES	PAGE
4.1 Byllets Combined School (showing the primary section)	53
4.2 The Grade 7 classroom	54
4.3 Environmental learning support material used by the teacher	56
4.4 Activity worksheets on marine conservation prepared by the teacher	62
4.5 Learners cutting out sentences from the Water Activity Sheet	64
4.6 Learners rearranging jumbled sentences	65
4.7 Learners observing water quality using the Water Quality Booklet	67
4.8 Food pyramid activity as completed by the learners	70
4.9 Mind maps presented by learners, and used for assessment	75
4.10 Class discussion on marine conservation issues	81

TABLES

2.1 Educator roles as described in the Norms and Standards policy	20
3.1 Analytic memo: Emerging broad categories and sub-categories	46
3.2 Refined categories and analytical statements	47
3.3 Categories developed to consider the relationship between use of LSM and the teacher's mediation role	48
4.1 LSM used to plan each lesson, and source of the materials	57
4.2 Overview of planning framework for each lesson	58
4.3 Example rubric structure used by the teacher to assess pair and group work	76
5.1 Evidence of teacher competence	88
5.2 Different teaching methods used by the teacher	94

APPENDICES

Appendix 1	Access letter
Appendix 2a & b	Questionnaires used to compile the contextual profile
Appendix 3a & b	Teacher interview schedule and interview transcript summary
Appendix 4a & b	First observation schedule and improved observation schedule
Appendix 5a & b	Teacher and researcher's journal entries
Appendix 6	Analytical memo
Appendix 7a, b & c	Exemplars of activity worksheets
Appendix 8a & b	Teacher's comments on learners' work
Appendix 9	Food pyramid introduced to learners with activities
Appendix 10	Exemplar of the teacher's lesson plan
Appendix 11	Video transcript

CHAPTER 1

OVERVIEW OF THE STUDY

1.1 INTRODUCTION

This chapter introduces the research focus and provides background to the study. It gives a brief overview of the reasons why I undertook the study and introduces the aims of the research. This research is situated within the recent education transformation framework of the post-apartheid government, which introduces an outcomes-based orientation to education and training in South Africa. This has brought wide-ranging curriculum transformation¹ to South African schools, with many associated challenges.

The chapter briefly outlines how my role as a provincial environmental education coordinator for the National Environmental Education Project for General Education and Training (NEEP-GET) in the Eastern Cape has influenced the development of this research project. It motivated me to explore the use of environmental learning support materials (LSM) in schools, given that one of my tasks is to co-ordinate the use of learning support materials provided by a range of environmental education partners (such as the Departments of Environmental Affairs and Tourism and Water Affairs and Forestry) in the province. I also provide these partner groups with support to re-orient and align their materials within the outcomes-based education (OBE) curriculum framework. It is for this reason that I decided to focus on the mediation role of the teacher and the use of learning support materials in this study. I felt that insights gained from this research would assist me to achieve the NEEP-GET and the Department of Education's strategy of enabling resource-based learning. Resource-based learning is a project strategy of the NEEP-GET, aimed at fostering environmental learning in the

¹ In 1996 the Department of Education introduced a new outcomes-based curriculum framework. This was later articulated as 'Curriculum 2005' (C2005) and policy guiding curriculum change was released in 1997 (DoE, 1997), popularly known as C2005. After a first round of curriculum implementation the Minister of Education commissioned a review of the curriculum in 1999, and following this review the curriculum was streamlined and strengthened. In 2002 the Department of Education released the Revised National Curriculum Statement (RNCS) (DoE, 2002), which replaces the 1997 curriculum policy. This study is situated within this changing curriculum context.

classroom. It is also a stated approach to achieving outcomes-based education by the Department of Education (Czerniewicz *et al.*, 2000)

I also provide a brief outline of the structure of the thesis in this chapter, and introduce the research aims and objectives.

1.2 DESCRIBING THE RESEARCH FOCUS AND AIMS

McNiff *et al.* (1996:38, cited in Mbanjwa 2002:2) state that a responsible researcher needs to be reasonably clear why he/she wants to get involved in the research issue. Lotz (1996:16, cited in Mbanjwa, 2002:2) indicates that a research project cannot be conceptualized without a focus or a research question. In this research I focused on the use of environmental learning support materials to mediate learning in the outcomes based education context. I initially planned to work with two teachers in two different schools, but because of time constraints and work pressure, I decided to work with one teacher in one school, and to conduct a more in-depth investigation in one school. This was therefore a case study conducted in one school that enabled me to get a deeper understanding of patterns of educator practice and issues associated with the use of environmental learning support materials in OBE.

My research seeks an understanding of how teachers use environmental learning support materials in class to mediate learning amongst learners, with a view to:

- Informing the professional development of teachers,
- Supporting environmental education materials developers and service providers to align their materials for use in the OBE curriculum, and
- Understand how teachers respond to curriculum policy innovations.

Maxwell (1996:14) states that purpose in research helps to guide research design decisions and is crucial to justify the study. There are a variety of factors that influence the design of the study like researcher's resources, research abilities, problems that may arise, ethical standards, research setting and data collected (*ibid*:6). Decisions to address these factors are discussed in section 3.3.

1.3 THE CONTEXT OF MY WORK

This research is influenced by my work as a curriculum developer and professional development coordinator in the NEEP-GET project. This is a project established by the Minister of Education in 1999 to foster environmental learning in OBE. It is therefore an official Department of Education project, funded by the Danish government. One of the strategies of this project was the appointment of nine provincial environmental education coordinators (one in each province). The roles of environmental education coordinators in the NEEP-GET include: curriculum developer, learning support materials developer and professional development facilitator (Neluvhalani & Lotz-Sisitka, 2002:7). I am employed in the Eastern Cape Department of Education within the Professional Development and Support of Educators Directorate, focusing on in-service training of educators to enable them to integrate and implement environmental learning in classroom contexts. This means that educators should have the skills and knowledge to develop lesson plans with an environmental focus and select, adapt and use LSM appropriately.

The reform of the curriculum and the incorporation of an environmental focus in the outcomes-based education system were initiated by the release of the White Paper on Education and Training in 1995 (RSA, 1995). The White Paper on Education and Training (1995) notes the need to integrate environmental education at all levels and phases of the education and training system. This statement led to national environmental education stakeholder meetings that resulted in environment being one of the six phase organizers in the implementation of Curriculum 2005 (C2005) (Lotz-Sisitka, 2002). These policies have been strengthened by the introduction of the NEEP-GET in 2001. As indicated above, NEEP-GET is a donor funded project that works to support teachers to implement environmental learning within South African schools, and particularly within the new South African curriculum (Squazzin, 2000). This project aims to integrate environmental learning into the classroom curriculum with a special focus on resource-based learning (*ibid*). A number of previous research findings indicate that teachers are experiencing challenges in using learning support materials to implement the curriculum (see chapter 2).

According to the project document of the NEEP-GET (DoE, 2002b) the project is operating on a large scale in most of the South African provinces. It is aimed at providing professional development to curriculum advisors and teachers to enable integration and implementation of environmental learning in schools. Some of the professional development outcomes for the project include the ability to:

- Adapt, use and develop learning support materials in the development of a unit of work (lesson plans);
- Demonstrate an understanding of a range of environmental learning methods and assessment processes; and
- Reflect on the appropriateness of the two outcomes mentioned above (DoE, 2002b).

In the past two years, I have been responsible for running a provincial pilot project with a provincial subject advisor cluster and associated teacher clusters in the Eastern Cape to capacitate teachers and subject advisors to achieve the above-mentioned outcomes. Regular workshops are run at a provincial level, and provincial and school-based curriculum development work is supported through a system of teacher clusters (in 5 districts), by curriculum support staff and service providers like the Rhodes University Environmental Unit (RUEEU); the Wildlife and Environment Society of South Africa (WESSA), the Department of Water Affairs and Forestry (DWAF); the Department of Agriculture (DoA) and the South African Institute for Aquatic Biodiversity (SAIAB). In the Makana and Cintsa clusters² teachers are encouraged to develop portfolios. These are used as evidence of applied competence, in which teachers present evidence of their curriculum development work, including examples of lesson plans, assessment activities and evidence of learners work. These portfolio's have been submitted for accreditation by a Higher Education Institution (Rhodes University) in the case of the Makana cluster, and teachers in the Makana and Cintsa clusters have submitted their portfolio's for recognition as EcoSchools (an international programme recognizing environmental learning in the curriculum and whole school development towards more sustainable

² There are currently 5 teacher clusters operating in the Eastern Cape province: Makana; Cintsa; East London; Butterworth and King Williams Town. These are run by subject advisors in partnership with service providers.

schools). In a contextual profile compiled for the project as part of the Formative Monitoring and Evaluation process, Janse van Rensburg (2003) notes that provincial cluster meetings are used to provide orientation, consider available resources and issues that need to be addressed in teacher clusters in the Eastern Cape.

From an analysis of district teacher cluster reports and through workshop monitoring as a project coordinator, it seems that those teacher clusters that are supported by service providers work well in enabling applied competence, which ensures resonance between the NEEP-GET 'spiral model' of professional development and action reflection processes (Janse van Rensburg & Mhoney, 2000). The spiral model provides a process-based model for professional development where teachers work together in clusters, and work away in schools, and then reflect on their activities, problems and achievements. The teacher participating in this study is involved in the Cintsa cluster, and has been participating in the NEEP-GET project in the Eastern Cape since its inception in the province. She works at Byletts Combined School, in a multi-grade classroom setting in a rural area (see section 4.2 for a detailed description of the school and classroom context).

This study took place between January 2003 and May 2003 in a context where government departments and environmental partners develop a variety of environmental learning support materials for use in schools. The new OBE curriculum requires LSM that promote an awareness and respect for the environment and that foster appropriate skills for addressing environmental issues. For these LSM to be effective, they should be aligned to the curriculum and its specific requirements. My work with environmental education partner groups and teachers in supporting resource-based learning (through the use of these partner-developed resources) has led me to the research question introduced in section 1.2.

As indicated above, this research aims to explore the use of environmental learning support materials in the mediation of learning, in order to support the re-orientation of partner-based resources to support the curriculum more appropriately, and to strengthen the link between curriculum requirements, materials development, alignment and use. The research took place in a school in the district of East London in the Eastern Cape.

1.4 OUTLINE OF THE CHAPTERS

Chapter one introduces the research and describes the background of the study, and its aims and objectives. It gives a brief overview of the research focus and aims, and explains the context of my work and the relationship between my work and the study.

Chapter two describes the distinctive historical and contextual factors within the study. This chapter reviews recent education policies in the light of the research focus, and considers factors affecting and influencing the use of learning support materials in the classroom in the light of curriculum change and transformation. It also reflects on the role of the teacher in the use of learning support materials, and considers the theoretical perspectives that appear to underpin these policy changes, and expectations of teachers. It also reflects on the role of materials' developers in supporting and enabling environmental learning in classrooms. In this chapter, I discuss my role in the NEEP-GET in more depth, and how the project aims to provide professional development to teachers to use learning support materials, highlighting challenges facing curriculum implementation.

Chapter three looks at the methodology applied in the study, and the associated research process. It describes my research design decisions that have been largely influenced by Maxwell's (1996:5) qualitative research design model, whose components are not fixed but allow the researcher and reader to move back and forth allowing an interactive reflectivity and reflexivity. It describes the case study approach and methodology employed to study the phenomena and clearly justifies its choice. It also explains how different methods were used in the study to collect data. Data analysis strategies are also discussed, as are issues of trustworthiness and ethical considerations in the study.

Chapter four presents the context and process of the research. In describing the research process it draws on data collected using a variety of observation methods and tools employed during fieldwork. It presents a contextual profile of the school and classroom. It presents the findings describing the use of learning support materials and the teacher's mediation role in the three lessons observed using 'thick description'.

Categorizing the data helped to define a number of analytical statements that provided a framework for discussing the findings in this chapter.

Chapter five provides a more in-depth analysis of the use of learning support materials and the teacher's mediation role, drawing on the findings reported in chapter four. The focus of this chapter is on the *relationship between* the teacher's mediation role and the use of learning support materials, and it discusses findings relating to the role of the teacher, particularly as these relate to teacher competence and teaching methods and the use of LSM. The chapter also highlights a number of dimensions associated with the use of learning support materials in mediating learning.

Chapter six concludes the research report by providing a summary of the study and highlighting key issues related to the research question described in section 1.2. I provide a set of recommendations that might inform further research on the phenomenon studied, and I reflect on the research methodology and process.

1.5 CONCLUSION

In this chapter, I have given a brief overview of the research focus and aims. I briefly described my work and how it is related to the study. I outlined the different chapters of this research report. In the next chapter I will describe the distinctive historical and contextual nature of the study.

CHAPTER 2

CONTEXTUALIZING THE STUDY

2.1 INTRODUCTION

In this chapter I discuss the historical and contextual factors that are significant within the study. These include:

- Policies relevant to the use of learning support materials (LSM) in Curriculum 2005 (C2005),
- Research findings related to the use of learning support materials in OBE,
- Insights into the role of the teacher and use of learning support materials, and
- Working with LSM within the NEEP-GET project.

This research is situated within a broader framework of curriculum transformation and longer-term processes of incorporating an environmental focus in the curriculum as described by Lotz-Sisitka (2002). It focuses on factors influencing the use of learning support materials in the classroom. This chapter provides a review of broader issues influencing the use of learning support materials and reports on research findings pertinent to the mediation role of the teacher and the use of LSM. As indicated in section 1.2, the main intention of the research is to explore the use of environmental learning support materials in mediating learning in the classroom.

This research considers the mediation role of the teacher, and the role of the teacher as curriculum developer and implementer, from the Department of Education's point of view. The research further reviews the aims of the NEEP-GET project, and considers the central role of the teacher in mediating learning in an OBE context, using environmental learning support materials. In this context, it explores challenges that arise in partner orientations to curriculum change and transformation, given that the South African government is following a co-operative approach to governance (Lotz-Sisitka & Raven, 2001), and that this has implications for co-operation in provisioning of LSM with an environmental focus within OBE (*ibid*).

Research findings from previous research projects, reported in this chapter, point to critiques of current practice, and raise issues for observation. These issues have, to a large extent, influenced the research design and choice of research question (see Chapter 3) and the research process (see Chapter 4). In the next section I provide a review of policies relevant to the use of learning support materials.

2.2 POLICIES AND THE USE OF LSM

2.2.1 Overview of educational policies and implications for use of LSM

Curriculum transformation and incorporation of an environmental focus in OBE started with the release of the White Paper on Education and Training (RSA, 1995). A principle in this White Paper states that there is a need to integrate environmental education at all levels and phases of the education and training system, in order to create environmentally literate and active citizens who are able to enjoy a better quality of life.

This statement is linked to the Constitution of South Africa (RSA, 1996) that provides the basis for curriculum transformation and development in South Africa. One of the aims of the Constitution (articulated in the Bill of Rights) is that everyone has a right to:

- An environment that is not harmful to their health or well being; and to
- Have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures

The *Eastern Cape Revised National Curriculum Statement General Overview* training document notes that to make sure that this constitutional right becomes a reality, teachers need to interpret it within the learning programmes, and in particular, in relation to the right to a clean and safe environment that is explicit in the Life Orientation learning area outcomes (DoE, 2003:87).

According to Czerniewicz *et al.* (2000:21) the Department of Education policy on Outcomes Based Education requires teachers to have an ability to identify relevant resources, then design, adapt or use them to produce relevant learning support materials. The *Revised National Curriculum Statement (RNCS) Overview* document (DoE, 2002a:9) writes that the kind of teacher that is envisaged is one who is “...

qualified, competent, dedicated and caring” and will be able to fulfil the various roles outlined in the *Norms and Standards for Educators* policy (DoE, 2000:13) (see table 2.1). The RNCS overview document also indicates that the curriculum can play a vital role in creating awareness of the “... relationship between human rights, a healthy environment, social justice and inclusivity” (DoE, 2002a:10). It further states that teachers will be responsible for learning programme development at a school level (*ibid*:16), and by implication, that teachers will need to find and use appropriate LSM in relation to the learning programmes they will develop. The *Norms and Standards for Educators* policy (DoE 2000:3) requires teachers/educators who are “mediators of learning” and who are “interpreters and designers of learning programmes and materials”. The ability to interpret and design learning programmes and materials is, in fact, defined as a ‘new role’ for educators in this policy framework. Seen in the context of the historical legacy of apartheid education, which required teachers to be technicians and implementers of centrally designed learning programmes and materials, this is, indeed a ‘new role’ for educators.

This study is set against the backdrop of these policy developments. In particular, it focuses on environmental LSM use and the mediation of learning (also described as a ‘new role’ for educators). Lotz-Sisitka and Raven (2001) argue that in an OBE system, more flexible LSM are needed for environmental learning, given that environmental issues and risks are diverse, contextual and value-laden (Fien, 1993). While textbook-type LSM can contribute to environmental learning processes, there is a need to combine these LSM with other, more flexible and locally relevant LSM to foster good environmental learning. This, in turn, has implications for the mediation role of the educator, as it requires educators to use a range of materials in contextually relevant ways.

As can be seen from the section below, there are a number of policy-related factors that affect or influence the use of LSM.

2.2.2 Policy-related factors affecting the use of learning support materials

As a means of promoting both good teaching and learning, the Department of Education (DoE, 1998, cited in Taylor & Vinjevold 1999:163) regards adequate learning support materials as essential to the effective running of an education system and asserts that these materials are, and should be, an integral part of curriculum development.

The Review Committee (2000:62) on Curriculum 2005 (C2005), appointed by the Minister of Education in 1999 to review early implementation of Curriculum 2005, describes the quality of textbooks as well as the curriculum support materials produced by the Department of Education in the implementation of C2005 as 'wooly' or 'superficial'. Textbooks were discovered to lack appropriate levels of complexity for each grade, and were simply not available in many schools. Baxen and Green (cited in Taylor and Vinjevold, 1999:172) mention that materials present in schools were insufficient and in poor condition. Most schools receive LSM late due to budget constraints and access, and delays in provisioning processes.

Besides these systemic problems, a number of problems were encountered by teachers in implementing C2005, which included problems associated with the development and use of LSM within OBE, for example from my own experience teachers continued to use didactic approaches, rather than more interactive approaches characteristic of OBE.

In the streamlining and strengthening of the curriculum, the role of the teacher has been brought into stronger focus as outlined in the *Norms and Standards for Educators* policy (DoE, 2000) (see table 2.1). A clearer understanding of the role of the educator, as this relates to curriculum implementation, is contained in the *Revised National Curriculum Statement (RNCS) Overview document* (2002:9), as outlined above. The RNCS, has, however, only recently been released, and there appears to have been little research relating to the relationship between the Department of Education's new expectation of educators (as outlined in the *Norms and Standards for Educators* policy), and curriculum implementation processes.

The Review Committee (2000:67) noted that a teacher needs to understand the curriculum framework that would inform the conceptual design of the learning programme, be an expert in the content, concept, skills and outcomes of each learning area and have access to substantial resource materials to implement the curriculum. According to Review Committee (2000:73) and my experiences and observations, rural and farm schools (historically disadvantaged schools) have minimal resources to produce learning support materials and are struggling to access the necessary LSM and textbooks to support teaching and learning. Teachers generally do not have time, the resources and skills to develop their own materials (*ibid*). This reflects some of the findings of previous research (see below). The committee concluded that teachers need textbooks along with other learning support materials and they need to be trained to use them effectively.

A review of research related to the research question of this study, indicates that the following factors have affected (and are still affecting) the use of learning support materials by teachers in the OBE curriculum context:

- **Availability of learning support materials**

Taylor and Vinjevoid (1999:169) state that President's Education Initiative researchers found out that a limited numbers of textbooks were available at the schools in various subjects, but that these were not sufficient for all learners. The Review Committee (2000:69) noted that schools received insufficient material that did not meet the needs of all grade teachers because of inadequate budget allocations and limited time associated with the provisioning process. Environmental learning materials are available through a range of service providers and partner groups (including other government departments), but their distribution to schools is sporadic, and is often dependent on the focus and objectives of the particular partner group (Lotz-Sisitka & Raven, 2001).

- **Access to resources**

Jansen (1999, cited in Review Committee, 2000:73) noted that historically disadvantaged schools did not have the same access to resources to implement C2005 compared to the well-resourced, advantaged schools (mostly former white schools). In

Czerniewicz *et al.* (2000:49) Jansen reports that access to resources constructs different teaching practices. One could therefore deduct that well resourced schools are able to construct richer, more interactive and qualitatively different teaching practices. These research findings are crucial to consider in the context of educational transformation, where all learning should be equally resourced, in order that the injustices of the past may be redressed adequately.

- **Quality of learning support materials**

The Review Committee (2000:62) writes that several submissions describe new textbooks as “wooly or superficial” or else “essentially a re-issue of the old textbooks”. This points to problems in quality assurance of textbooks, and selection procedures. Reynolds (1997, cited in Czerniewicz *et al.*, 2000) noted that teachers claimed to have had little or no pre-service training in textbook evaluation and it would therefore be unlikely that they would be able to assess the quality of textbooks produced by publishers and those materials produced by themselves. Findings in the Learning for Sustainability pilot project (Lotz-Sisitka & Olivier, 2000) and the NEEP-GET pilot research (Lotz-Sisitka & Raven, 2001) indicate that teachers tended to choose ‘easy’ materials, which implies that their skills for making qualitative judgements about materials are not fully developed.

- **Professional development and skills to use learning support materials**

Czerniewicz *et al.* (2000, cited in Lotz-Sisitka & Raven 2001:48) caution that the supply of learning support materials has to be accompanied by professional development that enables teachers to understand the pedagogical approaches underpinning the materials they use. Findings from the Learning for Sustainability pilot project indicated that even though teachers were able to ‘assemble’ learning support materials on a specific topic, they were not necessarily able to use these materials meaningfully to construct OBE learning opportunities (Lotz-Sisitka & Olivier, 2000). This supports earlier research findings of Lotz (1996) and more recent research findings of Mbanjwa (2002) that teachers have had very little exposure to professional development which assists them to develop the skills to use learning support materials within a changed curriculum context.

- **Constructivism at the center of teaching and learning**

The history of teaching and learning approaches in the South African education system is situated within behaviourist orientations supported by fundamental pedagogics (the chosen theoretical framework of the apartheid education system). This theoretical framework influenced the nature of teaching and learning processes in the historically disadvantaged schools and impacted heavily on learners' experience, and teachers' practice. According to Moll (2002: 5-6), the Department of Education (DoE) has placed constructivism at the center of the development of teaching and learning within the outcomes based education system (see section 5.2). This change in theoretical framework has significant implications for the role of the educator (*ibid*) (see section 2.4).

The impacts of earlier approaches to teaching and learning can be seen in recent research by Baxen and Green (cited in Taylor & Vinjevold 1999:172-173), when they comment in their research report that discovery learning was not encouraged and learners were seldom left to experiment with materials and that teachers did not have a sense of relationship between learning goals and learning support materials. Learners were seldom encouraged to use materials as a resource for independent learning or reading.

The above factors influenced my research question. For example, it was the focus on constructivism in OBE that led me to focus on the *mediation role* of the educator and the use of learning support materials in curriculum policy implementation. This brief overview has presented some understanding of the factors influencing the use of learning support materials in curriculum policy implementation. I will now examine insights from further studies which illuminate some of the issues associated with the use of LSM in the classroom to mediate learning.

2.3 ISSUES AFFECTING THE USE OF LSM IN CURRICULUM IMPLEMENTATION

Lotz-Sisitka (2002:97-111) notes that despite much work undertaken by various initiatives to integrate environmental learning in the curriculum at policy level, educators are still grappling with ways of enabling environmental learning in schools. In her review she indicates that while these environmental initiatives have been successful at policy development level, application in schools is still sporadic and poorly supported.

In this section I discuss issues specific to the use of LSM, the role of teachers and environmental education partners in enabling the use of learning support materials in schools.

2.3.1 Under-resourced schools

Challenges associated with participatory and democratic approaches to curriculum development became evident in classroom practice after the implementation of C2005. Czerniewicz *et al.* (2000:48-53), when looking at the classroom contexts in which LSM are used, note that research shows that teachers are enthusiastic about OBE but are unable to implement it because of under resourced schools. Lotz-Sisitka and Raven (2001:53) report that although LSM Policy Guidelines (DOE, 1998, cited in Czerniewicz *et al.* 2000:21) indicate that LSM should be viewed as an integral part of curriculum development and implementation, difficulties encountered by educators include under resourcing. Poorly resourced schools did not have access to many environmental learning (and other) resource materials except for items in the local environment like water, trees, pollution and the school yard.

Teachers in the Learning for Sustainability pilot project, and in the NEEP-GET pilot project, used LSM provided by environmental education partners like Non Governmental Organizations (NGOs), municipalities and government departments to support their professional development and the development of learning programmes for use in the classroom (Lotz-Sisitka & Raven, 2001:55-56). In my role as NEEP-GET coordinator, I have found that many partners have LSM for schools and are encouraging schools to

use these materials. The provision of these materials does hold some potential for reducing the problems associated with under-resourcing.

2.3.2 Lack of capacity building in professional development

Czerniewicz *et al.* (2000:61) noted that lack of capacity building in learning support material use to mediate learning in class, and lack of capacity to use LSM to design learning programme units is one of the barriers to effective teaching and learning. It is further noted in Lotz-Sisitka (2002) that professional development processes did not reach classrooms in order to enable teachers to understand pedagogical approaches underpinning materials and their use within the OBE curriculum framework.

According to my experience as an in service teacher trainer within the OBE curriculum implementation processes (I have been doing this since 1997), most teacher training workshops have been 'once off' training sessions. Teachers were expected to implement the curriculum in the classrooms but needed additional support to contextualize the curriculum and to make the 'transfer' from the training sessions to classroom practice. This support was not available as a result of institutional problems (see below). Thus, teachers have not had adequate support for learning programme development, and for using LSM within an OBE curriculum framework.

2.3.3 Institutional problems

From my experiences as a curriculum developer and in service coordinator in the Eastern Cape Department of Education, the lack of capacity building amongst teachers could be closely linked to institutional problems like shortages of office based in service training personnel (subject advisors) and support materials that do not provide educator guidelines (see also Mphaphuli *et al.*, 2003:15-18). Mphaphuli *et al.* (*ibid*) indicate that subject advisors are themselves unsure of how to implement the new curriculum, and that they are poorly resourced, and over-burdened. Janse van Rensburg and Mhoney (2000) and the Review Committee (2000) point to inappropriate institutional frameworks for providing teacher support for curriculum implementation, and both note that the cascade model (the preferred model of professional development for curriculum

implementation) is flawed, and does not provide adequate support for teachers. These are some of the contextual factors that influenced my study (see chapter 4).

2.3.4 Language, literacy, scope and depth of materials

Czerniewicz *et al.* (2000:48-53) notes that although teachers are enthusiastic about outcomes based education they are unable to implement it because of low levels of literacy amongst teachers. It is reported that teachers experienced problems with the language of LSM and requested that LSM be written in simpler language. The *Generic Guidelines for LSM*, produced by the Department of Education (1998, cited in Lotz-Sisitka & Raven 2001:53) refer to the need for the language of LSM to be accessible to both second language and mother tongue speakers. The *Norms and Standards for Educators* policy (DoE, 2000) requires teachers that can produce LSM appropriate to the language of competence and culture of learners (*ibid*: 53).

A key recommendation in the NEEP-GET pilot research report (Lotz-Sisitka & Raven 2001:53) is that "...attention should be paid to the skills required to use learning support materials as teachers are generally inclined to use easy materials that do not require much reading or further research". The research states that this practice might be related to "...issues of language, preparation, time and lack of clarity on required levels of scope and depth" (*ibid*). Mbanjwa (2002:79) also notes this indicator in his first cycle of research as a contextual issue associated with the use of LSM.

In the research report of the Learning for Sustainability project, Lotz-Sisitka and Olivier (2000:81) note that:

... better examples of Learning Programme Units (LPU) that illustrate competence of teachers seem to be closely associated with the processes of trialing and implementation of curriculum ideas initially worked through in professional development settings and supported by appropriate resource materials.

The report further states that the role of resource materials in constructing curriculum has been somewhat neglected. Seemingly teachers require resource materials and information to interpret issues and develop activities for teaching and learning. Teachers

also require professional development activities to try out pedagogical processes (*ibid*: 100).

I have looked closely at the above reports and in my study I used different tools to collect data on how the teacher used materials to mediate learning. In the next section I discuss the role of the teacher in the use of learning support materials.

2.4 THE ROLE OF THE TEACHER AND THE USE OF LSM

There appear to be two key factors that are significant to a consideration of the role of the teacher and the use of LSM. As indicated above, curriculum policy development in South Africa appears to be grounded in a preferred theory of learning, which has implications for the way in which the curriculum has been constructed, and the way in which teachers are expected to conduct classroom practice. This shift is reflected in a set of 'new' expectations of teachers, which have been articulated as 'Norms and Standards for Educators' (DoE, 2000), and have been released as policy guiding teacher employment, and teacher education.

2.4.1 Constructivist underpinnings of OBE and the role of the teacher

According to Moll (2002:5), the DoE strongly supports constructivism as a theory underpinning OBE learning and teaching in South Africa. Constructivism envisages learners who construct knowledge through problem solving activities that require them to draw on a variety of resources (*ibid*). In his debate to clarify constructivism, Moll notes that the DoE's view of a constructivist classroom is that educators should generally behave in an interactive manner, mediating learning in an active and interactive process. Moll (*ibid*), however, critiques the Department of Education's view of constructivism, and notes that constructivism has been superficially interpreted within OBE in South Africa. He notes that, as a result of superficial interpretations of constructivist learning theory, teachers have been viewed as 'facilitators of knowledge environments'. He questions whether teachers should be viewed simply as 'facilitators of learning experiences' (*ibid*: 6), and suggests that there is more to enabling constructivist learning than simply 'facilitation'.

Vygotskian constructivism (Vygotsky 1978:86-90, cited in Moll 2002:18) proposes that learning involves **systematic cooperation** between a learner (or learners) and a teacher (not just facilitation). Piaget (1978:16, cited in Moll, 2002:18) emphasizes the importance of the teacher's mediation role and notes that the "teacher as an organizer remains indispensable in order to create the learning situations and construct the initial devices which present useful problems for the child." The teacher, being the more experienced 'other' in the teaching and learning relationship, has a responsibility to **scaffold** the learners learning process, and to create challenges that are realized within the learners 'zone of proximal development' (Vygotsky, 1978, cited in *ibid*). The teacher is therefore envisaged in the OBE curriculum to be an "**active organizer** of the frameworks of knowledge of learners" (Moll, 2002: 18, my emphasis).

In the next section I discuss the role of educators associated with their competences as required by the *Norms and Standards for Educators Policy* (2000), and the role of the materials' developers (partner groups) in supporting and enabling the use of LSM.

2.4.2 Department of Education expectations of teachers

The Department of Education (DoE) policy on *Norms and Standards for Educators* (DoE, 2000:13) identifies seven roles for educators. These roles are further described through a range of associated competences. Of particular significance to this study, is the role description of the educator as "interpreter and designer of learning programmes and materials", and the role description of the educator as a "mediator of learning". The environmental education emphasis in the curriculum is closely linked to the educators "pastoral and citizenship" role, and all teaching and learning processes in OBE are closely associated with assessment, and thus the 'assessor' role of the educator, indicating the integrated nature of these seven roles in practice. The following broad description of these seven roles is taken from the *Norms and Standards for Educators* policy (*ibid*):

Table 2.1: Educator roles as described in the Norms and Standards for Educators policy

Learning mediator

The educator will mediate learning in a manner which is sensitive to the diverse needs of learners, including those with barriers to learning; construct learning environments that are appropriately contextualised and inspirational; communicate effectively showing recognition of and respect for the differences of others. In addition an educator will demonstrate sound knowledge of subject content and various principles, strategies and resources appropriate to teaching in a South African context.

Interpreter and designer of learning programmes and materials

The educator will understand and interpret provided learning programmes, design original learning programmes, identify the requirements for a specific context of learning and select and prepare suitable textual and visual resources for learning. The educator will also select, sequence and pace the learning in a manner sensitive to the differing needs of the subject/learning area and learners.

Leader, administrator and manager

The educator will make decisions appropriate to the level, manage learning in the classroom, carry out classroom administrative duties effectively and participate in school decision-making structures. These competences will be performed in ways, which are democratic, which support learners and colleagues, and which demonstrate responsiveness to changing circumstances and needs.

Scholar, researcher and lifelong learner

The educator will achieve ongoing personal, academic, occupational and professional growth through pursuing reflective study and research in their learning area, in broader professional and educational matters, and in other related fields.

Community, citizenship and pastoral role

The educator will practice and promote a critical, committed and ethical attitude towards developing a sense of respect and responsibility towards others. The educator will uphold the constitution and promote democratic values and practices in schools and society. Within the school, the educator will demonstrate an ability to develop a supportive and empowering environment for the learner and respond to the educational and other needs of learners and fellow educators.

Furthermore, the educator will develop supportive relations with parents and other key persons and organizations based on a critical understanding of community and environmental development issues. One critical dimension of this role is HIV / AIDS education.

Assessor

The educator will understand that assessment is an essential feature of the teaching and learning process and know how to integrate it into the process. The educator will have an understanding of the purposes, methods and effects of assessment and be able to provide helpful feedback to learners. The educator will design and manage both formative and summative assessment in ways that are appropriate to the level and purpose of the learning and meet the requirements of accrediting bodies. The educator will keep detailed and diagnostic records of assessment. The educator will understand how to interpret and use assessment results into processes for the improvement of learning programmes.

Learning area/subject/discipline/phase specialist

The educator will be well grounded in the knowledge, skills, values, principles, methods, and procedures relevant to the discipline, subject, learning area, phase of study, or professional or occupational practice. The educator will know about different approaches to teaching and learning (and, where appropriate, research and management), and how these may be used in ways that are appropriate to the learners and context. The educator will have a well-developed understanding of the knowledge appropriate to the specialism.

(DoE, 2000: 13)

The seventh role, that of a learning area / phase specialist, is the over-arching role into which the other roles are integrated, and in which *applied* competence is ultimately assessed. One of the roles associated with teachers' competency, of particular relevance to this research, is the role of 'Interpreter and designer of learning programmes and materials'. **Practical competences** associated with this role, expect the teacher to demonstrate the following:

- Designing of original learning programmes so that they meet the desired outcomes and are appropriate for the context in which they occur.
- Designing, adapting and / or selecting learning resources that are appropriate for learning area, language competences, culture, gender of learners and which are cognizant of barriers to learning.
- Evaluating and adapting learning programmes and resources, using learner assessment and feedback (DoE, 2000:16).

The educator is also expected to demonstrate **foundational competences** like:

- Knowing about sound practice in curriculum, learning programme and learning materials design including how learners learn from texts and resources, and how language and cultural differences impact on learning (DoE, 2000:17).

The educator is also expected to demonstrate **reflexive competence** and should be able to:

- Reflect on changing circumstances and conditions and adapt existing programmes and materials accordingly, critically evaluating programmes and materials in real contexts (DoE, 2000:17).

The *Norms and Standards for Educators* policy further explains that these three types of competency should be integrated within a framework of **applied** competence, and should be evident in the teacher's classroom practice. This is one of the reasons why I decided to closely observe one teacher's classroom practice, to obtain a better insight into teachers practice, and **applied competence** associated with the use of learning support materials in mediating learning. In doing this, I was exploring the *relationship between* two of the stated roles of the educator, as outlined in the *Norms and Standards for Educators* policy. As indicated earlier, this is an area where very little research has been done in the OBE context.

The *Revised National Curriculum Statement Overview* document (DoE, 2002:9) envisages a teacher who is "... qualified, competent, dedicated and caring, and who will be able to fulfill the various roles outlined in the Norms and Standards for Educators policy". Lotz-Sisitka (2002:116-117) comments on some of the challenges facing teachers in terms of the Revised National Curriculum Statement (DoE, 2002:16), which indicates that teachers will be responsible for learning programme development. Many of these are related to changes in teaching practice, and appropriate use of learning support materials. For those supporting teachers, she notes key challenges associated with a reorientation of professional development processes to support school-based curriculum development. She (*ibid*) states that attention be given especially to:

- School-based curriculum deliberations,
- Resourcing environmental learning in the various learning areas, in the context of local issues and risks, and
- A reorientation of approaches and frameworks that enable educators to make diverse methodological choices that are appropriate to context, learning area and learners.

In the analysis of the four cycles of inquiry undertaken in his action research study (aimed at investigating the use of learning support materials in a school-based environmental education project), Mbanjwa (2002:101) identifies a clear relationship between the learning outcomes achieved, the role of the educator in mediating learning and the specific learning support material used. In this study he focuses on the observable and measurable outcomes through learners' responses and evidence of learners' work, more than those reflected in the lesson plan and curriculum statement. His study indicated that the design of the learning support materials influence the learning outcomes, as well as the mediation role of the educator.

I now take a closer look at the role of teacher and the role of materials developers, and what they expect of each other.

2.4.3 Role of materials developers in supporting and enabling LSM use

As stated in section 2.2, the DoE policy (2000) requires teachers to have an ability to identify relevant resources, then design, adapt or use them to produce efficient LSM.

However Czerniewicz *et al.* (2000:21) states that there are no discussions of the balance of the different roles of user and producer, or of how they might work together in teachers' daily practice. This leads me to take a closer look at the different roles of teachers and materials developers in relation to the use of LSM.

In the NEEP-GET pilot research report Lotz-Sisitka and Raven (2000:48) note that Czerniewicz *et al.* (*ibid*) caution that the supply of textbooks has to be accompanied by professional development that enables teachers to understand the pedagogical approaches underpinning the materials they use. The report further states that there is need for a 'strong alignment ' between the curriculum framework, teacher development and the development and supply of LSM.

From the NEEP-GET pilot research project workshops, Lotz-Sisitka and Raven (2001: 50-56) report that it is essential for materials developers to expose teachers to a range of materials, and interpret their environmental learning support materials with the teachers in a practical way that will foster environmental learning in schools. The use of learning support materials enables teachers to select and adapt them to suit contexts. This process broadens the teachers' conceptual knowledge. Teachers require additional support materials that involve more complex teaching and learning processes (*ibid*).

Mbanjwa's research (2002:141) illustrated that the design of learning support materials contributes to both, teachers' conceptual development and learners' abilities to learn. In his research Mbanjwa (2002) drew on an active learning framework developed within the NEEP-GET pilot project to guide the materials development work he undertook, and then he considered how this framework had influenced the teaching and learning processes. He proposed that learning support materials should:

- Be aligned with OBE approaches and methods to promote learner-centered teaching,
- Provide information and guidelines relevant to the curriculum,
- Support curriculum planning and enable educators to access and interpret information,
- Be adaptable to suit classroom-learning situations,
- Provide conceptual knowledge and content for educators and learners to influence learning processes and learning outcomes, and
- Use language that accommodates learners with language barriers, such as learners in multi-grade classes and different cultural groups (*ibid*: 214).

Czerniewicz *et al.* (2000) note that learning support materials should provide an adequate framework for guiding learning and teaching interactions. Russo & Lotz-Sisitka (2003:16) state that research is an integral part of materials development as it contributes to planning, taking into consideration focus, scope, learner groups and establishing the need for LSM development. They also note that the way in which materials are developed, adapted and used influences the learning process. Development and use of LSM is often associated with the purpose that the developer and educator have in mind, influenced by context, good planning and a clear focus (Russo & Lotz-Sisitka, 2003:37-41). This indicates that there is an important relationship between materials developers and users. It is this relationship which has, in the past fifteen years, led to a trend towards more participatory approaches to materials development in environmental education (*ibid*). For example, I recently assisted DWAF officials in the Eastern Cape to work with teachers to get feedback on their materials to inform the redevelopment of the DWAF educational materials for the RNCS. In his research, Mbanjwa (2002) also worked with teachers to develop the materials.

The way materials are developed and used in combination with one another can also influence how learning takes place. The role of the educator in using the materials for meaning making is therefore an important factor to consider in the development of learning support materials. Seen from within the constructivist OBE context, and the *Norms and Standards for Educators* policy expectations of educators (see section 2.4.1 and 2.4.2 above), this would appear to involve selection of LSM, planning lessons using and combining different LSM, scaffolding learning interactions using LSM, supporting the use of LSM through using language and considering literacy levels and the socio-cultural contexts of learners (amongst others).

It is recommended in the NEEP-GET pilot research report that the role of partners (national, provincial and local) in providing materials for environmental learning should be explored within the NEEP-GET project, especially the project or funder defined focus which might limit the strength of LSM in providing environmental education processes in schools (*ibid*:97). In 'aligning' LSM to the curriculum, it would seem that a number of factors need to be taken into account, key amongst these being the constructivist

underpinnings of the curriculum (and associated implications for materials development) and the way in which teachers actually *use* these materials with learners.

In the next section I will review the work currently being undertaken in the NEEP-GET in relation to the use of LSM by teachers to mediate learning in classrooms.

2.5 WORKING WITH LSM IN THE NEEP-GET PROJECT

The issues discussed in section 2.4 indicate that the relationship between materials development and use of learning support materials is not a simplistic one (see also Russo & Lotz-Sisitka, 2003). The DoE's expectations of teachers, the role of teachers and materials developers in the development and use of LSM indicate that there are many challenges that require further research. As indicated in chapter one, my role as a provincial environmental education coordinator for NEEP-GET in the Eastern Cape influenced this choice of research focus.

Neluvhalani and Lotz-Sisitka (2002:10) state that amongst the more challenging and complex roles of environmental education coordinators is the role of 'Professional Supporter', meaning someone who can add value to the learning areas and capacitate others to integrate environmental learning in the curriculum. Another role of the environmental education coordinator is that of 'Curriculum Developer', meaning someone who can develop curriculum activities and learning support materials to assist with the implementation of the OBE curriculum. A further key responsibility of NEEP-GET co-ordinators is working with partners to align their materials to the OBE curriculum. For example, I have worked with the Department of Water Affairs and Forestry (DWAF) to establish ways to make their materials more relevant to the RNCS curriculum framework, and I have provided advice to a number of other groups in the Eastern Cape on how to develop their materials for the OBE curriculum.

In this section I discuss how the NEEP-GET engages in professional development for resource based learning as reflected in the NEEP-GET introductory booklet (Squazzin, 2001:6). I also aim to highlight how the project works in collaboration with environmental education partners in the use of learning support materials and the challenges facing their materials.

2.5.1 The resource-based learning approach in the NEEP-GET

A professional development programme for coordinators has been put in place and amongst the foci for development is resource-based learning and supporting environmental education partners to develop LSM in line with the curriculum. The role of the project as described in the introduction to NEEP-GET booklet (Squazzin, 2001) emphasizes the importance of resource-based learning in exposing the teachers, curriculum support staff and learners to LSM that will foster environmental learning in schools. The project highlights the selection and adaptation of LSM to suit contexts in which teachers work to broaden their knowledge and experiences of environmental issues.

The main outcomes of NEEP-GET (2002) teacher professional development programme related to a resource-based learning approach are:

- Identify and analyze environmental issues,
- Select, adapt, use and develop learning support materials, and
- Select and apply relevant methods and assessment processes.

Raven (2003a: 24-25), reporting on the NEEP-GET project in an overview of a number of research-based case studies for the formative monitoring and evaluation process in the project notes that:

In most provinces teachers and Curriculum Support Staff have been introduced to the notion of resource-based learning and through interaction with various partners have been introduced to a range of learning support materials that could support environmental learning at schools ... From the Eastern Cape case various issues are identified with respect to the use of learning support materials ... Some of the issues associated with the use of learning support materials include a lack of contextualising activities drawn from learning support materials. At times it becomes evident that learning support materials guide the choice of lesson plan focus which could become less relevant to the context within the lesson plan is being used. In other cases learning support materials are used in relation to lesson plans with the relevance of these materials not becoming apparent in their use. In this sense, the Eastern Cape case study reports that teachers rarely justify their decisions in relation to the uses and adaptations of materials and activities. Given the significance of resource-based approaches to environmental learning as envisaged through the project, this aspect might

require more attention in future professional development processes, focusing specifically on the relevance of learning support material to the lesson plan that it supports and to the context within which it is being used.

The Eastern Cape case study (which includes a case study of the NEEP-GET Makana cluster) (Lotz-Sisitka *et al.* 2003:27-28) reports that there has been a strong focus on supporting teachers to both use and adapt learning support materials. Teachers were given tasks that required them to develop learning units drawing on materials and activities introduced by service providers. While this case study raised a number of issues related to resource-based learning approaches (as outlined above), findings from this case study also showed that, with support, teachers were capable of adapting the activities and materials introduced by service providers. Teachers interpreted the materials, and gave them a different focus to that intended by the service provider through a process of conceptualizing the activities in relation to the learners' needs and the local environment.

The next section discusses how environmental education partners have been working with the DoE and teachers to develop and interpret learning support materials.

2.5.2 Working with environmental education partners and LSM

As mentioned in chapter one, a range of environmental education partners work in collaboration with the Department of Education to develop, supply and further work with the teachers to interpret materials. The Department of Water Affairs and Forestry (DWAF) is a key partner of the NEEP-GET and has embarked on the 2020 Vision for Water Education Programme (WEP) for capacity building and water awareness to:

- Capacitate educators and DoE curriculum support staff to be able to implement water activities that promote sustainable use of water and natural resources within the school curriculum, and
- Develop and provide schools with water related educational resource materials in conjunction with the DOE

In the King Williamstown cluster in the Eastern Cape, NEEP-GET clusters have worked with the Department of Water Affairs (DWAF) in aligning their LSM by developing learning programmes and identifying gaps in the material. This exercise gave the

curriculum support staff and teachers an opportunity and the skills to critically review the DWAF materials in relation to the curriculum requirements and learning programmes they developed for the specific grades.

The implementation strategy of NEEP-GET has introduced an active learning approach for implementation of environmental learning in school (Squazzin, 2001; O'Donoghue, 2001). This appears to be guiding LSM development amongst partners. For example, the DWAF water quality studies LSM creates opportunities for learners to engage in activities where they use worksheets and posters to identify water related problems, investigate causes of the problems and suggest ways of addressing the problems. Mbanjwa's (2002) research provides further evidence that LSM development is being shaped by the active learning approach introduced by the NEEP-GET. Other resources such as the *EnviroTeach* magazine (DWAF, 2002:26) also reflect that the NEEP-GET active learning approach is being used to guide LSM development and use. These active learning approaches are being linked to environmentally oriented outcomes in learning areas such as Natural Sciences, Social Sciences and Life Orientation. Outcomes being addressed include outcomes like Health Promotion, Scientific Investigations and Society and Environment relationships (DoE, 2002a). The OBE curriculum aims to meet the government's stated goals of equity, redress, democracy, access and participation through a variety of processes and approaches. LSM clearly have a role to play in supporting this goal. As indicated above, however, the process of 'aligning' partner resources to the curriculum is closely linked to how teachers use materials, which, as shown in the NEEP-GET case study research, appears to have implications for the professional development of teachers.

2.5.3 Professional development and the NEEP- GET

Czerniewicz *et al* (2000: 10) in their research report, write that resource-based learning is learner centered and promotes active learning, which requires different learning strategies such as project work, enquiry based work and topic work. In the NEEP-GET pilot research report, Lotz-Sisitka and Raven (2001:56) recommend that since teachers appear to have used LSM that they are familiar with, and that are easier to use, teachers should be exposed to, and be encouraged to use additional, more challenging materials as this might improve the quality of learning in the classroom. They identified a clear link

as this might improve the quality of learning in the classroom. They identified a clear link between the learning outcomes achieved and the LSM used, and indicated that if 'easier' materials are used, the outcomes are more superficial.

The NEEP-GET established a Formative Monitoring and Evaluation (FM&E) team to report on the progress of provincial implementation. Reddy and Lotz-Sisitka (2003) report that one of the outcomes of teacher professional development is to develop skills to adapt, use and develop LSM in the context of lesson plans and units of work. The model of professional development adopted in the NEEP-GET is aimed at establishing a process that allows teachers to develop these skills in the context of the OBE curriculum.

The NEEP-GET is supporting OBE curriculum implementation by providing guidelines to provincial and other environmental education material developers (Rosenberg, 2003). In the Eastern Cape NEEP-GET is supporting teachers in workshops to select, adapt and use learning support materials developed by partners. NEEP-GET is also developing environment in the learning area workbooks to support curriculum support staff and teachers to interpret and implement the environmental focus within the Revised National Curriculum Statements (for each learning area). These documents are being used in professional development programmes in the NEEP-GET.

Teachers are also encouraged to include the use of the school garden and local environmental resources available in the development of learning units, activities and assessment to implement environmental learning in schools, which reflects the broad conceptualization of 'resource-based' learning (Czerniewicz *et al.* 2000) adopted by the Department of Education.

Although teachers are developing the capacity to develop learning units or lesson plans, NEEP-GET is still faced with many challenges, especially those related to interactions with different stakeholders or partner groups.

2.5.4 Challenges

Although there are positive partner collaborations in the province, the NEEP-GET still faces many challenges associated with their interactions with partners and this has

implications for the successful implementation of the OBE curriculum. Key challenges that are linked to the discussions earlier in this chapter include:

- Capacity to provide support to providers to design resource-based learning materials that are consistent with the learner-centred orientation of OBE and C2005,
- Expectations from service providers and funder or developer defined outcomes of LSM,
- Pedagogical frameworks underpinning LSM development regarding scope, depth and coverage of curriculum needs and principles,
- Teacher capacity to adapt and use LSM in ways that are consistent with learning outcomes and curriculum requirements for assessment,
- Need for environmental education material developers to 'unpack' and explain LSM with subject advisors who, in turn, share these materials with teachers,
- Addressing institutional difficulties associated with access to and availability of appropriate LSM, and providing appropriate support to teachers to use LSM effectively, and
- Understanding the mediation role of the teacher and the DoE's new expectations of teachers, particularly as these relate to the use of LSM in class to support teaching and learning.

2.6 CONCLUSION

The discussions in this chapter reflect the contextual factors relevant to the research question, all of which influenced the research. These include policies relating to the use of LSM, and previous research related to the use of LSM. This review highlights that there are many systemic issues that impact on the use of learning support materials in schools. The chapter also discusses the mediation role of the teacher in relation to the new policy expectations, and new theoretical frameworks underpinning OBE, and how this influences use of LSM in classrooms. The chapter also provides an overview of how NEEP-GET is approaching working with LSM in support of resource-based learning approaches, and working with partner-based resource materials, noting the challenges associated with working with partner-based resources and resource-based learning approaches to curriculum transformation.

This chapter forms the 'backdrop' to the research that I undertook in one school in the Eastern Cape, where I closely observed the practice of one teacher, using different environmental learning support materials to mediate learning. In the next chapter I will discuss the research design decisions that guided the generation of data for my study. I also discuss the data analysis process that I followed, and consider trustworthiness and ethical issues.

CHAPTER 3

METHODOLOGY AND RESEARCH PROCESS

3.1 INTRODUCTION

In this chapter I describe the research design decisions made in this study and the methodological principles of interactive and qualitative research I used, and the research methods that were used in the study. The description provides a clear overview of how and why I applied the methodological decisions in conducting the research. As noted earlier in chapter one and chapter two, my study focused on the mediation role of the teacher, with particular emphasis on the way in which teachers use environmental learning support materials to mediate learning.

My research design decisions have been largely influenced by Maxwell's (1996) qualitative research design model. This model is characterized by five components explaining issues intended to be addressed in the research as follows:

- The research questions stating what I want to understand by doing the study (see sections 1.2 and 3.1);
- The purpose of the research (see section 3.2) stating the goals of the study and what classroom practices and issues it is intended to illuminate;
- The conceptual context, highlighting the theoretical frameworks relevant to the use of LSM and the contextual factors that influenced the use of LSM (see chapters 2 and 4);
- Methods showing what techniques and tools I applied in collecting and analyzing data (see section 3.3); and
- Validity threats to my study, how I dealt with them (see section 3.4.3) and how the data I have collected supported or challenged my ideas (see chapter 5 and 6).

These five dimensions are discussed and presented in an interactive manner to show that research is not a linear process.

3.2 RESEARCH DESIGN DECISIONS

3.2.1 Purpose of the research

As noted earlier, the purpose of my research is to investigate how the teacher uses environmental learning support materials (LSM) to mediate learning within the outcomes based education (OBE) context (see section 1.2). The research is conducted in the context of classroom practice, with a view to informing the professional development of educators and service providers in LSM development.

In designing this research, I chose to work within an interpretive orientation, and to use a case study approach. The intention was to understand and describe the teacher's mediation role as she used LSM in class. Bassey (1994:6, cited in McNiff *et al.* 1996:12) explains an interpretivist orientation to research as research that aims to describe and explain events without making judgments about them. McTaggart (1991:3) and Connoles (1993:19) refer to interpretive or hermeneutic research as research that embraces a wide variety of approaches to interpret text with a particular emphasis on seeking to understand the event or phenomena studied.

Carr and Kemmis (1986, cited in Connoles, 1993) state that interpretive perspectives have come to be regarded as an alternative basis for the human sciences and therefore are characterized by human action accompanied by reflection. Phillip (1987), cited in Connoles, 1993 and Carr and Kemmis (1986), cited in Connoles, 1993, agree that meanings are generated and shared through language and other forms of symbolism. In this study the teacher and learners engaged in discussions, reading texts, interpreting posters and pictures and reporting their findings. I generated data based on these interactions, and this formed the basis of the interpretations in this study.

Radnor (2002:20) indicates that the central tenet of interpretive research is trying to come to an understanding of the world of the research participant and what it means to them. To understand this I had to experience the ontological perspectives³ of their

³ **Ontological perspective** refers to the environment in which participants create their realities and the meaning that people make of the phenomena (Janse van Rensburg, 2001:16).

Radnor (2002:30-35). He states that a researcher is a data-collecting instrument that should keep focus, and interface with the data while developing ideas. The researcher is seen to show respect for participants, treating them as subjects, not samples and therefore applying ethics in action (*ibid*).

3.2.2 A case study approach

Bassey (1999:40) describes an educational case study as "... an empirical enquiry conducted within a localized boundary of space and time, focusing on data collection". Educational case studies generate knowledge based on observation and are mostly qualitative. Educational case study involves "... enquiry into aspects of educational activity in context to inform the decisions of practitioners or policy makers" (*ibid*: 58). In my case study I observed how a teacher mediates environmental learning using learning support materials in class with the learners. In order to construct a worthwhile and qualitative argument, sufficient data must be collected. I used a variety of data collection methods and tools like observation and interviews, questionnaires, field notes, photographs, video recording, journal entries and document analysis as techniques (see section 3.2.3).

Stenhouse (1985: 50, cited in Bassey 1999:28) states that educational case study often involves the use of case study methods that are concerned "... neither with social theory nor with evaluative judgment, but with enriching the thinking and discourse of educators through the systematic and reflective documentation of evidence". Yin (1993:85) describes a case study as a 'method of choice' when the phenomena under study is not readily distinguishable from its context. On my study I focused in a single case to present a complete description within a classroom context. As indicated earlier, I studied how the teacher uses LSM to support environmental learning in the classroom. The teacher's lesson planning, journal entries and learners work provided a systematic and reflective documentation of evidence for interpretation and analysis.

Stake (1995: 85) supports Yin's statement above. He states that "... case studies are undertaken to make the case understandable", indicating that a single case is "... not a strong base for generalization but forms a new opportunity to modify old generalizations". As mentioned earlier I focused on a single case study because my

purpose was to gather information that will enable me to understand how teaching practices using LSM are applied in the classroom. However, to get a deeper understanding of patterns of practice and issues associated with the use of environmental LSM to support learning, I observed one teacher in one school in three different learning areas, using different LSM.

As indicated above, my case study is qualitative in nature. Stake describes a qualitative case study as research that tries to establish an empathetic understanding for the reader through description that is sometimes called 'thick description'. Stake (1995: 42) cites Geertz and Erikson as two authors who see thick description as a way of "... drawing attention to concerns and values in the behavior and language of the people being studied" by the researcher. Patton (2002: 230) writes "... the purpose of observational analysis is to take the reader into the setting that is observed, describing the observational data with depth and detail". To me this thick description will enable the reader to understand what occurred and how it occurred.

Stake (1995:40) shares the view above by stating "... qualitative research uses narratives to optimize the opportunity of the reader to gain an experiential understanding of the case". Guba and Lincoln (1982, cited in Stake, 1995: 40) place high priority on direct interpretation of events, like the period over which observations were done, interactions and interpretive methods used. Persons engaged in qualitative research should be in the field, making observations, analyzing and synthesizing information (*ibid*).

In my case I observed the classroom activities and some of the contextual factors that influenced the teaching and learning processes. I applied interpretive methodologies like thick description, categorizing, validation and reporting of contextual factors observed, to describe emerging patterns of practice and issues associated with LSM use in OBE. Description of experiential understanding and realities will be illuminated during research interpretation and analysis in chapters four and five.

In an attempt to collect as much data as possible I used a diversity of research methods that I discuss in the next section.

3.3 RESEARCH METHODS

3.3.1 Entering the research setting

My main data collection method was observation but administering questionnaires and undertaking interviews preceded it. Initially I chose to work in two schools observing a lesson with one teacher in each school, but I later changed to work in one school and with one teacher. I observed the teacher in three lessons in three different learning areas, using different materials. The reason was to gain more familiarity with the school, teacher and learners, as I felt this would provide more in-depth insight into the phenomena under study. Given that the research was influenced by my role as environmental education co-ordinator, I wanted to select a teacher and school that was participating in the NEEP-GET clusters (from the intermediate or senior phases of the GET band) I am coordinating in my work situation (see section 1.4).

Drawing on ethical considerations from Cohen *et al.* (2000:51&57), Radnor (2002: 35&39) and Stake (1995:57-59) I felt that it was ethical to consider initiating official collaborations before engaging with a teacher in research. I therefore approached the district office coordinator of subject advisory work and the service provider of the Cintsa cluster to assist me in choosing a school that I would work with in my research. I identified one that was functioning well in the cluster. I explained to them that this would give me consistent and valid data for my research. We agreed that I should work with the school I had worked with late the previous year (2002) on a small-scale project involving the review of learning support materials supplied by DWAF (see section 2.5.2).

In November 2002 I wrote a letter to the principal of the school (see appendix 1) and negotiated a date for a meeting. I explained the purpose of my research in the meeting and I explained the potential benefits of the research. I requested to work with one teacher in three different learning areas with a strong focus on environmental learning outcomes namely Natural Sciences, Human and Social Sciences and Life Orientation. I also requested a date in February 2003 to present the research. This enabled me to start my case study fieldwork by March and finish it in May. We agreed to meet on the 20th February and I started my fieldwork then.

The principal and staff were very cooperative and the teacher involved in the NEEP-GET cluster volunteered to work with me. I also arranged my observation dates with the teacher so that they did not clash with her other activities. I involved colleagues such as the NEEP-GET national coordinator, my daughter and my tutor as critical friends. These people were very keen to discuss my work progress and process and they gave me constructive, challenging feedback on processes and procedures of research.

In the next section I explain the methods and tools I used to collect data for my research.

3.3.2 Observations

In the research, I was a participant observer, and I negotiated access with the principal (see appendix 1) and planned with the teacher in meeting situations (see section 4.3). Jorgensen (1989:12) states that participant observation is especially appropriate for exploratory studies aimed at theoretical interpretations. I participated in some activities but at some psychological distance. Jorgenson (1989:82) states that observation begins the moment the participant observer makes contact with a potential setting to become familiar with the 'inside world' for a focused data collection activity.

The research observations were shaped (to a certain extent) by my epistemological stance and theoretical perspectives of constructivism in the context of OBE (see 3.2.2 above), as reflected in the new curriculum policy (DoE, 1997; DoE, 2002a) and the *Norms and Standards for Educators* policy (DoE, 2000). The influence of these perspectives of on the research process is discussed in chapter five.

In this study observation was my main research method (as indicated above). According to Hopkins (1993:77) observations in educational research play a crucial role, not only in classroom research, but also in supporting the professional growth of teachers, linking together "... reflections from the individual teacher and collaborative enquiry with the researcher", which encourages the development of a "... language for talking about teaching".

The key features of classroom observation are joint planning, focus on the issue for research, establishing criteria or checklists for interviews and observations, observation

skills and feedback (*ibid*:77-80). Hopkins (*ibid*) further suggests a three-phase observation cycle involving a planning meeting, classroom observation and feedback discussion. How these features were applied in this research will be discussed further in chapter four under a description of the research process.

According to Patton (1990:203-5, cited in Cohen *et al.*, 2000:305) observation affords the researcher an opportunity to gather 'live activities' from 'live situations' and enables the researcher to understand the context of programmes and discover things not mentioned in interviews and questionnaires. Morrison (1993:80, cited in Cohen *et al.*, 2000:305) shares the same views as Patton when he states that observation enables the researcher to gather data on the physical environment and its organization, including organization of learners in class. In my observations I noticed issues around inclusivity, unplanned interactions between the teacher and learners, learner interactions amongst themselves, resource organization, curricula and pedagogic practices (see sections 4.4, 4.5 and chapter 5).

According to Stake (1995:60) observations allow the researcher to get a greater understanding of the case being studied. In my case study I used direct observation as a method to generate data. I developed an observation schedule (see appendix 4a and b) that allowed me to comment on the available learning support material for use during the lessons. It also enabled me to observe how learners and the teacher used LSM. It helped me to get an understanding of the teaching methods and assessment of environmental learning during the three lessons I observed. I recorded the observations immediately as field notes to be categorized and analyzed with other raw data later (see chapters 4 and 5). Each lesson was planned to be complete in one hour.

To complement my observational data, I negotiated with the teacher to make use of a camera to take photographs of interactions between the learners and the teacher in class to support and complement my data interpretation and analysis of critical unobserved incidents during the lessons. I also used a video camera in the first lesson to record the classroom interactions, but it had technical problems and could not be used for the other two lessons.

My role as a participant observer enabled me to focus on a wide range of phenomena like the setting, by gathering information about the participants' personalities, ethnicity, class arrangement and social status, whilst I also focused on particular phenomena related to the research question like participation levels in class, and describing what happened during the lessons.

In this field-based research I conducted naturalistic observations since I was engaged in the participant's social life (see section 4.3.1). Johnson (1975: 21-22) distinguishes theoretical field research from other research methods like surveys, as research that tries to ground its empirical observations in daily life situations of a societal member to "... understand social realities of a particular setting" and thus yields qualitative data, more than looking for cause and effect and producing quantitative data. As field researcher I tried to understand the meanings of the actions I observed.

Erickson and Wilson (1982:6, cited in Walker 1985:145) prefer the use of audiovisual media because they declare that it records "... finely shaded detail of everyday life in a setting". Revisiting an audiovisual record enables one to discover new aspects of meaning and organization that the researcher and participant did not realize at first. After improving the observation schedule with suggestions from my supervisor, I revisited the video recordings to observe the teacher's practice and issues that were illuminated through the use of LSM by learners in the classroom. Walker (1985 in McNiff *et al.*, 1996:103) states that using photography is a way of working rather than a means of illustration. Photographs that I took in the three different lessons show significant engagement with learning support materials in the activities performed by learners, and they are also evidence that the observations took place.

Administering questionnaires and semi-structured interviews preceded observations, and I will discuss these tools in the next sections.

3.3.3 Questionnaires

For initial data collection I used questionnaires adapted from the NEEP-GET project, to develop a contextual profile of the school and teacher (Appendix 2a and 2b). The questionnaires were mostly open ended with a few closed questions. Cohen *et al.* (2000:

248) and Mc Niff *et al.* (1996:99) state that open ended questionnaires enable the respondents to write free responses in their own terms explaining and qualifying their responses and expressing a broader range of ideas.

The purpose of using questionnaires was to obtain information about the teacher, like qualifications, curriculum development, class and learning areas taught so as to ascertain their relevance to the research within the NEEP-GET context. The questionnaires provided me with historical and administrative information of relevance to the school that might impact on classroom practice. The questionnaires were also used to develop a contextual profile that would provide me with insights into the context in which the project is operating, enabling me to document any aspects that might impact on the teaching and learning in the class observed (see section 4.2).

Janse van Rensburg (2003:1) describes a contextual profile as a periodic overview or scan of external factors that may impact on project activities. As indicated earlier I used questionnaires to construct a contextual profile of the school (see section 4.2).

Due to time constraints and difficulty in contacting the principal and teacher, I administered the questionnaires on the same day that I went to negotiate access to the research site, and present the study to the principal and some staff members. This interaction provided me with a chance to visit the site and reach the respondents at a low cost. I explained the purpose of the questionnaires and any areas that needed clarity and I allowed them to fill in the questionnaires in their own time and indicated that I would collect them in two weeks time. This session allowed the respondents to reply in the questionnaires with informed consent as they had enough time to reply. This is an ethical consideration cautioned by Cohen *et al.* (2000:51), where questionnaires intruded on the respondent's life.

Subsequent to questionnaires I interviewed the teacher before the planning meeting. I used these interviews to complement and verify the observations that I would make. I used a tape recorder to record the interviews and transcribed these later for purposes of reporting and analysis.

3.3.4 Interviews

For collecting qualitative case specific data, I developed a semi-structured interview schedule (see appendix 3a) and interviewed the teacher before planning and undertaking observation of lessons. I conducted an individual interview using a tape recorder to provide a rich source of data for future reference when transcribing and analyzing (see appendix 3b). Cohen *et al.* (2000:273) explain semi-structured interviews as having greater flexibility but caution that these have to be carefully planned by the interviewer and that they should provide a framework of reference for respondents' answers. Advantages of semi-structured interviews are that they are flexible, allow the interviewer to probe further, modify questions while encouraging respondents' co operation and rapport, although they can also result in unexpected or unanticipated answers (*ibid*:268 & 275).

The purpose of the interview was to gather information that has a bearing on the research question and objectives. The focus of my interview framework (see appendix 3a) was to gain an understanding of the following aspects:

- How the teacher interacts with outcomes based education (OBE) policy documents,
- What the teacher knows about environmental learning in the curriculum,
- How she implements environmental learning in the curriculum, and
- What environmental learning support materials she uses to mediate learning in the classroom.

I adopted Walker and Adelman's points about interviewing (1975:140, cited in Hopkins 1985:101). They point out that the interviewer should be interested and an attentive listener with a sense of ease, reassuring the interviewee of the importance of her/his opinions. They further recommend that questions should be reworked and the interviewer should keep focused on the research question all the time.

3.3.5 Journal entries, lesson plans and learners' work

Other tools that I used for data generation are journal entries written by the teacher and myself as researcher, the learners' work and lessons planned by the teacher showing the curriculum focus and links with learning support material chosen for use in class.

Journals helped the teacher and I to constantly analyze our feelings and reactions to what we experienced and saw. Kerfoot and Winburg (1997:74) discuss journals as tools that a) offer an effective way of bringing out what was observed during the day and b) promote reflection. The teacher and I made journal entries that we read and shared with each other, as we looked at and discussed the learners' activities and work. This sharing promoted the process of gaining different perspectives on issues regarding the use of learning support material to mediate environmental learning in class.

Our journal entries were scanty at first, but developed as we reflected and discussed after each lesson (see appendix 5a and 5b). We gained confidence in writing about what happened during the day, in class, in the school context and how we perceived activities and learning support materials use during the lessons. These insights will be presented in chapter four.

As the research unfolded I noticed how the teacher participated in a positive way in the journal writing process to enhance professional development and to improve understanding of issues. She showed an interest in an improvement in the development of her lesson plans and creativity in the selection of learning support materials.

In addition, I also reviewed the learning support materials to look for gaps like curricula links, grade specifics and language appropriateness for this multi grade class. I looked at how learning support material linked with lesson outcomes, how it provided the teacher with opportunities to interpret and access information to develop activities for learners.

In the next section I discuss how I engaged with the teacher in the research process.

3.4 THE RESEARCH PROCESS

3.4.1 Ethical issues in the research process

In this section I discuss how interactions within the study took place between the participants and myself. One of the intentions of this study is to find out how teachers respond to educational innovations as noted by Kerfoot and Winburg (1997: 20) (see section 1.2). In an attempt to engage with this objective, I had to consider the ethics of working with people and development of trust by negotiating access and getting permission from the main participants I was likely to be involved with. The reason was to obtain their cooperation and consent.

I drew on the following guidelines as suggested by Cohen *et al.* (2000:51-57), Radnor (2002:38 & 39) and Stake (1995:57-59):

- Developing clear channels of communication by formally requesting permission to carry out the investigation;
- Meeting the participants involved in the study and presenting the project outline;
- Discussing and negotiating anonymity, confidentiality and assuring the participant that withdrawal and discontinuity of participation in the project will be accepted without prejudice;
- Showing respect and trust to the participants; and
- Explaining reasons for carrying out the investigation and outlining potential benefits of the research to the participants.

I negotiated access by writing a letter to the school principal (see section 3.3.1 above; appendix 1), stating that the purpose of the study was to understand the use of environmental learning support material by teachers to mediate learning in class within the outcomes based education curriculum, with a view to explore issues associated with use of LSM. I indicated that this would inform the professional development of teachers as a benefit to them. I asked for a date for a presentation meeting with the principal and other interested staff members. I mentioned in our meeting that the study was towards my MEd (EE) degree course and negotiated the time and frame for the research.

The principal and the participants (primary school teachers) were very cooperative and welcomed the activity. I did not have a problem with gaining access and permission to work with the teacher and the school principal. As mentioned before, the teacher who volunteered to work with me was participating in the NEEP-GET teacher professional development cluster and was very keen to learn about new ways of teaching for environmental learning using learning support materials.

I informed the district coordinator and service providers supporting this cluster and they helped me with the choice of the school to work with. These were people I hoped to work with as supporters with a particular interest in my field of study.

Cohen *et al.* (2000) advise that one should guarantee anonymity and confidentiality to develop trust. When I administered questionnaires and did interviews, I first discussed with the principal and teacher concerned whether we should use pseudonyms for the school and participants, and whether I should share my findings with other support people or keep the information confidential. They both agreed that the information should not be kept confidential, as they believed that this would benefit them in reflecting on their practice in the NEEP-GET cluster and classroom practice.

3.4.2 Data management and analysis

To start with the data analysis process, I compared the interview transcript and the contextual profile questionnaires for similar or different contextual issues that might impact on the research question. I compared the classroom photographs, video transcript and learners' work (see chapter 4 and appendices) with my classroom observations, to look for similar or different patterns across the three lessons that would emerge as findings of the research (see sections 4.3, 4.4 and 4.5). I read the teacher's journal entries where she reflected on her practice and compared them against my classroom observations. All the above data was used to develop broad categories that were later refined into analytical statements.

To sort raw data according to broad categories, I drew on the step-by-step guide suggested by Radnor (2002:71) and Bassey (1999:85-88). Initial categories were benchmarked against my research question and linked with categories emerging from

the data produced. The following broad categories and sub categories (see table 3.1) emerged early on in the process of data analysis, which I captured in an analytical memo:

Table 3.1: Analytic memo: Emerging broad categories and sub-categories

BROAD CATEGORY	SUB CATEGORY
1. Role of the teacher	• Planning • Teaching methods • Supporting learners • Assessment • Professional development
2. Use of learning support material	• Accessing learning support material • Availability of learning support material • Professional development • Engagement of learners
3. Environmental learning	• Learning outcomes • What was achieved in the classroom
4. Contextual factors	• Institutional role • Researcher's role
5. Issues arising	• Teacher's role • Researcher's role • Learner engagement • Contextual issues • Theoretical perspectives • Gaps identified

Merriem (1998:182) states that names of categories can come from the researcher, the participants or sources outside the study. Categories are answers to the research question hence they should be carefully chosen and must be compatible (*ibid*).

Data was sorted and colour coded according to this set of initial categories relevant to the research question. Data transcripts and responses were coded (see appendix 6) and comments were made to illuminate aspects of the data. The coded data was organized within the categories and sub-categories outlined above. This proved to be useful in gaining an in-depth insight into the data within the above categories. Using these categories I developed a narrative to present the research findings (see chapter 4 and 5). This included producing a contextual profile of the school and classroom (see section 4.2), and describing the use of LSM in the three lessons.

In developing this narrative, I refined some of the analytical categories further, by formulating analytical statements. I drew on Bassey (1999:70), who suggests that to make sense of raw data produced in a case study it is useful to analyze it in such a way that it can be 'condensed' into meaningful statements. I therefore engaged in a process of re-organizing the first categories, by identifying analytical statements that relate to the research question. In the process of making meaning and constituting the findings of the study, I therefore condensed the five broad categories and came up with key categories and analytical statements (as outlined in table 3.2 below), which I used as a framework for presenting the findings (see sections 4.4 and 4.5).

Table 3.2: Refined categories and analytical statements

CATEGORIES & SUB CATEGORIES	ANALYTICAL STATEMENTS
Category 1: Learning support materials and the role of the teacher: Sub categories: • Planning • Using different teaching methods • Supporting learners • Assessment of learning	Analytical statement 1: Learning support material influenced the role of the teacher (see section 4.3 and 4.4)
Category 2: Learning support materials, learning processes, engagement of learners and learning outcomes: Sub categories: ▪ Knowledge acquisition and skills development ▪ Learning in the additional language	Analytical statement 2: Learning support materials influenced learner engagement and achievement of learning outcomes (see section 4.5)

To develop these analytical statements I read the interview notes, cross-referencing these with coded comments from the earlier categories. I compared learner activities in photographs and learners' work with my observation notes to verify my interpretations. Bassey (1999:70) states that the outcome of generating analytical statements should closely reflect the data. These analytical statements assisted me to present the first layer of research findings more coherently (see sections 4.3, 4.4 and 4.5).

These findings were then subjected to a second layer of analysis, and further interpretation. In Chapter 5, I considered the *relationship between* the use of learning support materials and the mediation role of the teacher, and developed another series of analytical memos, which formed the basis of a set of categories to guide the descriptions and explanations presented in Chapter 5 (see table 3.3 below).

Table 3.3. Categories developed to consider the relationship between the use of LSM and the teacher's mediation role

CATEGORY	SUB-CATEGORY
Role of the teacher (as this relates to LSM use) (see section 5.2)	▪ Teacher competence ▪ Teaching methods and instructional scaffolding
Use of LSM (as this relates to the mediation role of the teacher) (see section 5.3)	▪ Accessing information from LSM ▪ Interpreting LSM ▪ Using LSM for assessment purposes ▪ Use of LSM in relation to intended learning outcomes ▪ Issues of scope and depth in using LSM ▪ Teacher skills and teacher professional development needs in using LSM

This process of data generation and data analysis required a rigorous process of working with the data, through which I hoped to establish trustworthiness in the context of the case study.

3.4.3 Validity and trustworthiness

The New Webster's Dictionary of the English Language (1975) explains 'trustworthy' as 'reliable and worthy of confidence'. Radnor (2002: 38) contends that good or trustworthy interpretative qualitative research is associated with the explanatory and illuminating power of the situation under study.

To ensure accuracy and trustworthiness in qualitative research, Stake (1995: 107) indicates that we need protocols called triangulation. Lotz (1996:103) indicates that triangulation brings different kinds of evidence into relationship with each other, so that they can be compared. In this study I observed learners and the teacher in three

different lessons in class using observation schedules to take field notes, I interviewed the teacher using an interview tool and I analyzed learners work and the teachers planning work and journal entries. This triangulation helped me to understand the following:

- Similarities and differences in the three lessons,
- Patterns of teacher practice as she used LSM to mediate learning in class, and
- Issues emerging in the use of environmental LSM in mediating learning.

In ensuring trustworthiness, I also justified the data production process by drawing on the following research principles suggested by Radnor (2002:30-34):

- Reflexivity in the research,
- Applying multiple data generation methods (as indicated above),
- Conveying confidence and establishing a climate of interaction with participants (as reported above),
- Respecting other peoples views and inputs, and
- Confirming data through member checks.

Actors provide critical observations when involved in the case, making suggestions and interpretations to sources of data. As a way of providing member checking, the teacher viewed the video recordings and photographs, providing alternative interpretations of issues such as the difference in the active roles played by the learners as a result of multi grade teaching and unclear teaching approaches (see chapter 4 and 5).

She also reflected verbally on the interview transcripts she read and linked them to her practice. She re-emphasized how she developed the three lessons, integrating the learning area outcomes and how this integration played out in the activities such as using a communicative approach when using posters and texts to explore environmental issues, gain knowledge of scientific concepts and develop an understanding of causes of environmental problems (see chapter 4).

Merriem (1998:198) maintains that results of a research process are trustworthy when there has been an extent of accounting for their validity and reliability, and this involves conducting investigation in an ethical manner (see section 3.4.3 above).

Congruency in this case study was maintained through internal and external validity. Within a single case study Stake (1995:85) views external validity as natural generalization which people arrive at through personal engagements, looking for similarities in objects and issues in and out of context. Drawing on Stake (*ibid*) for assistance in validation of natural generalization, I have provided adequate raw data prior to interpretation, made available information about my role as participant observer in the research by using data collected and have not relied on personal opinions for description and interpretation. I have provided the reader with comments on categories that emerged from data collected (see chapter 4 and 5).

3.5 CONCLUSION

This chapter has provided insight into the research methodology, methods and the research design decisions that I made to conduct this research. I indicated that I chose a single case study with observation as my main method of data collection. I did, however, use other data generation methods such as interviewing and document analysis. I analysed the learners' work, my journal and the teacher's journal and the teachers' planning documents. I also video recorded one of the lessons, which provided me with in-depth data on the lesson concerned. I employed a process of triangulation and comparison to develop analytical categories through which I was better able to develop the narrative of the case study. As indicated in this chapter, I employed two layers of analysis in this study, with a view to providing in-depth insight into the phenomena under study. I also gave a detailed account of how I considered ethical issues in the research, and how I tried to ensure that the case study is trustworthy. The presentation of the research findings in the next chapter should enable the reader to decide the extent to which the findings from this case study are trustworthy.

CHAPTER 4

USING ENVIRONMENTAL LEARNING SUPPORT MATERIALS TO MEDIATE LEARNING IN THREE LESSONS

4.1 INTRODUCTION

In this chapter I describe the process of how environmental learning support materials were used to mediate learning in class within the outcomes based education (OBE) curriculum. I also describe the school and community contextual profile and the classroom and teacher profile to provide insight into the teaching and learning interactions that took place in the classroom.

This chapter describes, through 'thick description', three different lessons in three different learning areas and how learning support material was used in each of the lessons.

In describing these research processes, I draw on data generated through the questionnaires, interview transcripts, video recording transcripts, class observations and journal reflections. As mentioned in chapter 3, the research design decisions applied in this study helped to generate data that led to empirical findings relevant to the research questions.

4.2 CONTEXTUAL PROFILE OF THE SCHOOL AND CLASSROOM

As noted in chapter 3, I developed a contextual profile of the school, using the guiding framework provided by Janse van Rensburg (2003:1), who describes contextual profiles as an overview or scan of external factors that may impact on project activities. To develop a school and community contextual profile, and the classroom and teacher profile I adapted the NEEP-GET questionnaires as explained in chapter 3 (see section 3.3.3).



Subsequent to administering the questionnaires, I interviewed the teacher on the day I went for a planning meeting using a semi-structured interview schedule (see appendix 3a). I summarized the notes I took and transcribed the recordings to add more information that would have a bearing on my research question and its objectives (see appendix 3b). The semi-structured interview helped the teacher to respond freely and encouraged her to think further about issues related to learning support material supply and accessibility.

In this section I present the school and community, and classroom and teacher contextual profile. The contextual profiles show the contexts in which the environmental learning processes took place in the school.

4.2.1 The socio cultural and economic context

According to responses in the questionnaire the school is one of the underdeveloped and disadvantaged farm schools in the Eastern Cape. It is a government-subsidized school offering grades 1 to 9. Most parents who live locally do not work and their families are economically poor. The school and community questionnaire reflects that there is a land ownership issue between the government and the farm owners, making it difficult for the whole school to be developed.

4.2.2 The school and community context

As mentioned earlier in the study, Byllets Combined School falls in the East London District, in a rural area about 35 km from East London, near a small coastal resort named Cintsa. Byllets Combined School is about 15 km from the coast. In Byllets Combined School, the primary section that offers grade 1 to 7 is semi-detached from the secondary section which offers grades 8 to 9 by about 500 metres, but is under the supervision of one principal. Learners in the primary school include a few day scholars coming from the local farms. The secondary school has many learners, as the school has boarding facilities and learners come from different towns in the Eastern Cape.

Responses show a disparity in buildings, learner and personnel distribution between the primary and secondary sections of the school. According to my observation, the primary

section is housed in two old prefabricated buildings, with two female teachers offering two separate classes of multi grade teaching. Grades 1-3 are together in one classroom and grades 4-7 are together in one classroom, making this a multi-grade and multi-phase primary school. There is no electricity in the primary section, but the secondary section is electrified.



Figure 4.1: Byllets Combined School (showing the primary section)

The school governing body supports professional development of teachers. They allow innovative programmes to operate in the school. There is a good relationship between the school and the community. During my research visits I witnessed community members working with the learners as aids and farm owners bringing compost and newspapers for mulching in the garden in support of the permaculture gardening the primary school is engaged in. Environmental issues cited in the teacher's responses are inadequate water and sanitation supplies.

4.2.3 The classroom context

The number of learners in class range between 15 and 20 and their primary language is *isiXhosa*, but the medium of instruction is English. The teacher I observed is teaching grades 4 to 7 in one class. The classroom has inadequate furniture and resources are stored in unlocked cupboards and open shelves. In the secondary section teachers do class teaching offering one or two subjects per person.



Figure 4.2: The Grade 4-7 classroom at Byllets Combined School

The teacher I worked with is well qualified and has studied a course in environmental education in her senior degree. She holds a B.Ed (Honours) degree from Rhodes University (which included an environmental education module), and is currently studying for a Masters Degree in Rural Development. She gets in service training on environmental learning in the curriculum from the Department of Education OBE curriculum training and from the NEEP-GET cluster enrichment workshops. This latter in service professional development programme supports her with resources for environmental learning as indicated in Table 4.1 later in this chapter.

An important dimension of the classroom context, of particular relevance to this research is the teacher's knowledge and teaching styles. These are key to forming an understanding of the teacher's mediation role in the use of learning support material within the OBE curriculum context. In the questionnaires the teacher described her main teaching methods and approaches as group work, field trips, doing experiential work and using textbooks. Her understanding of the term 'Outcomes Based Education' was that it is a learner-centred approach where learners must play an active role in the learning process. She explained the term 'environment' as involving people and their surroundings, the use of resources by people and using them responsibly. In her view environment involves social, biophysical, political and economic factors. She described 'sustainability' as something that keeps on going, a process that does not end.

Responding in the interview to how she understands environmental learning in the curriculum, she mentioned that it is a way of integrating environmental concerns in the curriculum and that she uses 'environment' as a phase organizer / theme. She explained that she chooses specific outcomes with an environmental focus and uses available environmental LSM to develop learning programmes and activities.

She mentioned that she developed her resources mainly by being creative, adapting and redesigning support material from the few textbooks supplied by the Department of Education, and other materials supplied by the Department of Water Affairs and Forestry, the Department of Environmental Affairs and Tourism and the NEEP-GET project. Learners also play an active role in accessing and developing resources with the help of the teacher. She has also involved her class in the Department of Agriculture 4H *Enviro Club* where they are engaged in competitions and are supported with garden equipment and permaculture skills. She is also supported by the Wildlife and Environment Society of South Africa (WESSA), particularly with the development of the permaculture garden in the school. WESSA assists all the teachers involved in the Cintsa cluster.

4.3 PLANNING WITH THE TEACHER

In chapter one (see section 1.2) I mentioned that one of the aims of this research is to understand how teachers respond to educational innovations like curriculum policy changes and implementation. My intention was to observe how the teacher uses environmental learning support material to mediate learning in class.

I arranged a planning meeting with the teacher and drew up an observation tool that I discussed with her. In our planning we agreed that I would observe the senior phase grade 6 and 7 in three different learning areas and one lesson in each learning area. The teacher had already planned her learning units and chose environment as the theme, the learning outcomes with an environmental focus in the three lessons, and topics for each lesson. We viewed the learning support material available for use with the lessons the teacher had chosen.

Table 4.1 shows the learning support materials used in the senior phase multi-grade class for each learning area I observed. The photograph below (figure 4.3) presents a picture of the different LSM available to the teacher for environmental learning in her school.



Figure 4.3: Environmental learning support materials used by the teacher

Table 4.1: Learning support material (LSM) used to plan each lesson, and source of the materials

PHASE & GRADE	LEARNING AREA	LEARNING SUPPORT MATERIALS USED
Senior Phase (Gr 6&7)	Natural Science (lesson 1 observed)	• Senior Phase Curriculum 2005 policy document (used for lesson planning in all 3 lessons) • Revised National Curriculum Statement (used for lesson planning in all 3 lessons) • NEEP-GET Active Learning Framework (used for lesson planning in all 3 lessons) • Water Audit Kit (supplied by DWAF) • Enviro Teach resource books (supplied by NEEP-GET) • 2020 Vision for Water Programme (VFWP) handbook for teachers (supplied by DWAF) • School Environmental Policy Pack (supplied by WESSA) • Water Cycle and Ground Water posters (supplied by DWAF) • Worksheets (supplied by DWAF and developed by the teacher)
Senior Phase (Gr 6&7)	Human and Social Sciences (lesson 2 observed)	• Coast Care Fact Series (supplied by SAIAB) • Marine mammals posters (supplied by SAIAB) • Enviro Teach resource book (supplied through NEEP-GET) • Worksheets (developed by the teacher)
Senior Phase (Gr 6&7)	Life Orientation (lesson 3 observed)	• Empty food cans and packets (collected by the teacher and learners) • Worksheets (developed by the teacher) • Very few textbooks (supplied by the Department of Education)

As indicated above, the planning process with the teacher involved establishing which materials could be used in the context of the learning areas and learning outcomes already planned by the teacher. As indicated in the table below (table 4.2), the teacher had certain outcomes in mind when planning the lessons. She had also planned for integration with other learning areas, and she planned which materials would support the intended learning outcomes. This table indicates the link between learning outcomes and LSM, and the way in which LSM are contextualised through topics which enable learners to work towards achievement of the specific outcomes as outlined in the curriculum policy documents.

Table 4.2: Overview of planning framework for each lesson

LEARNING AREA	SPECIFIC OUTCOME	LESSON (CLASS SEQUENCE)	TOPIC	LSM
Lesson1: Natural Science	SO 1: Use process skills to investigate phenomena related to the Natural Sciences SO 3: Apply Scientific knowledge and skills to problems in innovative ways SO 5: Use scientific knowledge and skills to support responsible decision making Integration: Languages and communication, Life orientation, Human and social sciences	2	WATER Sub topics: • Sources of water • Uses of water • Value of water • Water management	Water cycle poster Underground water poster Our Water Our Health poster Worksheets Enviro Teach resource books Observation sheets Water quality audit booklet & kit
Lesson 2: Human and Social Sciences	SO 4: Make sound judgements about the development, utilization and management of resources SO 6: Demonstrate an understanding of the interrelationship between society and the natural environment Integration: Language and Communication and Natural Sciences	1	MARINE & COASTAL CONSERVATION Sub topics: • Understanding the concepts • Importance of the sea and the coast • Impact of humans on sea and coast • Sources of marine pollution • Action activities towards combating marine pollution	Enviro Teach magazine People and the coast poster Marine mammals poster Coast Care Fact Sheet series Work cards Water cycle poster

Lesson 3: Life Orientation	SO 7: Demonstrate the values and attitudes necessary for a healthy and balanced lifestyle Integration: Language and Communication, Arts and Culture Economic Management Sciences, Natural Sciences	1	HEALTHY FOODS Sub topics: • Choosing what you eat • Commercial methods of preserving • Healthy eating	Textbooks Worksheets Concrete objects
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Activities, key concepts, assessment tools and strategies are clearly indicated in each of the teacher's learning area lesson plans (see appendix 13). The way in which LSM assisted the teacher to mediate learning with these outcomes and assessment processes in mind, is described in section 4.4. and 4.5 below.

In the next section I present the findings of the research process, as these pertain to the three lessons.

4.4 USING LSM AND THE ROLE OF THE TEACHER

In this research I have studied how the teacher uses various types of materials in three lessons in the Natural Science, Social Science and Life Orientation learning areas (as outlined above in Table 4.2). As indicated in chapter three, to observe the three lessons I drew on the observation cycle of planning, observation and feedback suggested by Hopkins (1993:77-80). I took field notes guided by the observation tool, discussed the process of the activity with the teacher after each lesson and we also shared our journal entries after the fieldwork process.

As indicated in section 3.4.2 I developed analytical statements to guide the narrative of the report. These were derived from careful analysis of the data, through a process of triangulation. The first analytical statement developed is as follows:

Analytical Statement: Learning support material influenced the role of the teacher

To generate this analytical statement, I read the teacher's interview transcript; lesson plans and linked LSM chosen with activities and assessment strategies. The planning showed how the teacher used LSM to plan the three lessons (see table 4.2 above). I observed how the teacher introduced her lessons to engage learners in using the LSM. I also observed how she used LSM to support the learners, and how she supported the learners to use LSM. I also observed how LSM were used for assessment purposes. All of these facets provided insight into the way in which LSM influenced the role of the teacher. Data illustrating these dimensions of the way in which LSM influenced the role of the teacher is presented below in the form of a 'thick description' of the events that occurred.

4.4.1 Planning

As indicated in chapter two, the use of learning support material to enhance classroom learning is an imperative of OBE curriculum policy in South Africa. In this case, the teacher selected learning support materials that would support learners as they worked through activities to achieve lesson outcomes.

In the interview with the teacher it is reflected that as a result of insufficient supply of textbooks and other supplementary material to support environmental learning in class, the teacher chose and adapted LSM supplied by environmental education partners (see table 4.1 and figure 4.3) to plan the three lessons.

The teacher chose LSM according to the curriculum outcomes to be achieved (see table 4.2). The context of her learners (see section 4.2) like the multi grade class, difference in age, and intellectual experiences also informed the choice and development of LSM. For example for lesson 1 on 'Water' the teacher chose the Water Cycle and Underground Water posters. Learners were familiar with rural agriculture in their communities, and the urban and coastal activities depicted in the posters as they lived near the coast and had also visited their nearest town, East London. For lesson 2 on 'Marine and Coastal Conservation', the teacher chose magazines and posters that showed marine and

coastal activities that learners were familiar with as they lived along a coastline that is frequently visited and used by local people and tourists for fishing and recreation.

The development, adaptation and redesign of learning support materials is also linked to the teacher's previous learning experiences and activities such as her engagement in the NEEP-GET professional development cluster that focused on resource-based learning and also promoted integration with other learning areas. The teacher planned to select LSM that would enable the learners to actively participate and engage in meaning making. She used the same materials differently in different activities, like using posters with worksheets to identify issues, find answers to questions asked, investigate causes of environmental issues and suggest possible impacts, thus promoting resource-based learning in lesson 1 and 2. Worksheets were carefully selected from the water quality booklets to suit the activities to be done in lesson 1. In the planning phase, she redesigned activity sheets from a library workbook to suit outcomes 1 and 3 of lesson 1 (see section 4.5.1). She selected and photocopied activities from a textbook that she thought were suitable to help achieve the outcome for lesson 3. In lesson 2, as a means of working towards promoting resource based-learning, the teacher developed questions that guided learners to look for answers from texts in the *Enviro Teach* magazine, fact sheets and posters.

In her planning the teacher included a variety of learning support materials when planning activities for lessons (see table 4.1). The intended outcomes were clearly stated for each lesson (see table 4.2) and the materials appeared to be relevant to the intended purpose in each case.

- **Lesson 1**

Lesson one was on the 'Water Cycle' and 'Underground Water'. For this lesson, the teacher selected a *Water Cycle Poster* and two *Underground Water Posters*. One of these underground water posters was titled '*Our Water Our Health*'. She also adapted a *Water Activity Worksheet* for learners to work through in order to understand where underground water comes from, how it is stored and how it is used. Learners used one of the *Underground Water Posters* to compare their answers from the work in the activity sheet. For another activity, the teacher copied four worksheets from the *Water Quality Audit Booklet* (see appendix 7a).

• Lesson 2

For supporting environmental learning in lesson 2 on 'Marine and Coastal Conservation', the teacher used the *Enviro Teach* resource book developed for National Marine Week (DEAT, 2002) containing marine conservation information (DEAT, 2002:4,10,11,25-27) and a *People and the Coast Poster* and a *Our Coasts and Oceans Poster* from the Department of Environmental Affairs and Tourism (DEAT). She designed *activity worksheets* that contained questions based on the text and pictures in the resource books and poster (see figure 4.4). She also selected a *Marine and Coastal Fact Sheet* for one of the groups to use. She prepared enough learning support materials to be used by all groups of learners.

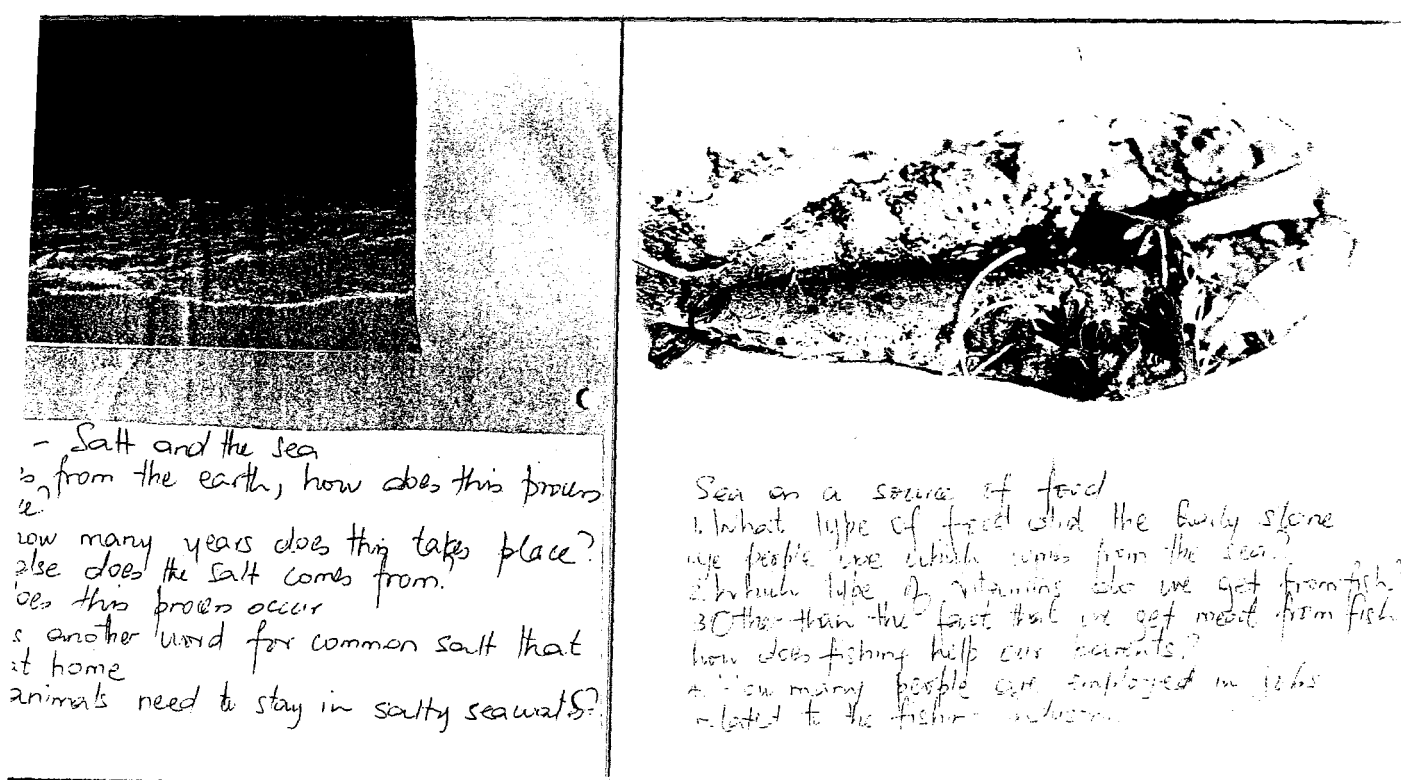


Figure 4.4: Activity worksheets on marine conservation prepared by the teacher

• Lesson 3

Learning support materials for lesson three on 'Healthy Food' were chosen from two textbooks supplied by the Department of Education. Learners did not all have books to use during the lesson and the teacher had to photocopy three activities, so that there would be enough for the learners to use during the lesson (see appendix 7b).

The teacher used these materials in the lessons in the context of different teaching methods.

4.4.2 Using different teaching methods with LSM

The teacher and classroom profile and the teacher's interview reflected that the teacher used group work, field trips, experiments as teaching methods together with textbooks, posters and magazines from different sources as LSM (see section 4.2). The transcripts of the video recordings and my field notes and observation schedules show that the teacher used LSM with a variety of instructional methods. This created a variety of learning opportunities and possibilities for meaning making (see section 4.5 below, and section 5.2.2), and thus created the opportunities for learners to work towards achieving the intended outcomes of the lessons. At the beginning of each lesson she drew on the learners' prior knowledge, as a way of 'tuning in' and introducing the lesson to them.

- **Lesson 1**

The intended outcomes for lesson one on "Water" were that at the end of the lesson the learner should be able to use process skills to investigate phenomena related to Natural Sciences, be able to apply scientific knowledge and skills to problems in innovative ways and use scientific knowledge and skills to support responsible decision making (see table 4.2).

To 'tune in' to the lesson on the Water Cycle the teacher asked the learners to brainstorm in buzz groups and develop mind maps showing sources of water. The teacher handed out the *Water Cycle Posters* to three groups of learners to discuss water activities, causes of water pollution, and potential impacts of using polluted water. The answers were written on flip charts and presented to the class by the groups.

The teacher captured words that the learners could not pronounce or could not understand and wrote them on the board and explained them as feedback, drawing on local examples in the activities such as irrigation, industrial use, oil spills, sailing and others. This activity encouraged the learners and the teacher to engage in a dialogue using English as language of teaching and learning to make meaning of the content in the learning support material (the poster).

In another activity the learners were given a *Water Activity Sheet* the teacher adapted from a library book (see Appendix 7c). She photocopied enough copies for learners to work in pairs. Two groups of learners were asked to cut out marked sentences (see figure 4.5) from the text and mix them up, so that the other two groups of learners could reorganize them into correct sentences (see figure 4.6a). She explained to learners that they should study the pictures in the activity sheet in pairs and match the sentences to the picture in an order that would show a logical process indicating the formation of underground water (see figure 4.6b). The material seemed to be appropriate for the learners as they worked co-operatively and with interest. The inquiry method used by the teacher helped the learners to discuss and reach consensus before taking a decision to match a sentence with a picture. One group completed the activity in ten minutes and they were asked to exchange their work and report on the completed tasks taking turns to read the sentences (see figures.4.5 and 4.6). As the sentences were in English, learners were given further opportunities for dialogue and meaning making in this, their second language.

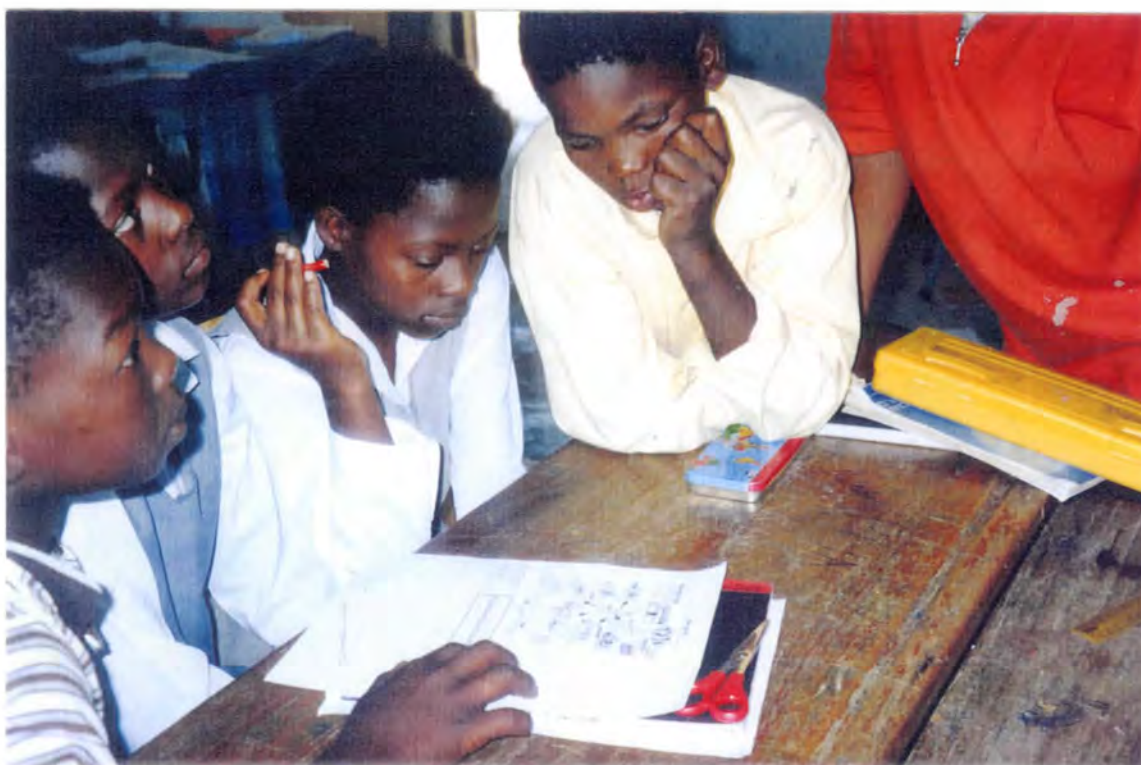


Figure 4.5: Learners cutting out sentences from the *Water Activity Sheet*



Figure 4.6: Learners rearranging jumbled sentences

In another activity learners were asked by the teacher to identify sources of water in the school, their homes and community. They were given a Poster called *Our Water, Our Health* that contained an illustration of a community and the teacher asked them to work in groups of four. The teacher asked questions related to the source of water in the poster and the learners answered that it was a borehole. In a whole class teaching activity the teacher asked learners questions on how people accessed water from the borehole, problems associated with boreholes, environmental problems associated with boreholes and advantages of using a borehole. Learners answered orally, finding answers from the posters. Learners actively participated in the task as they interacted with the pictures looking for answers and the teacher questioned them further to engage them in critical thinking experiences.

The learners used the LSM with ease as the topic of the materials was familiar to them and the pictures seemed easy to interpret (they knew of drawing water from boreholes, given that this was a common source of water in the rural area where they lived). The materials were therefore relevant to the learner's context. The answers were written on the flipchart for assessment and consolidation as a way of feedback during the lesson and at the end of the lesson.

Some integration planned earlier in the lesson plan with learning areas like Language and Communication, Human and Social Sciences and Technology was evident in the activities. Learners were able to communicate with each other and with the teacher, they came up with sound suggestions on the use and management of water in boreholes like covering water sources, repairing toilets and leaking pipes on time and avoid littering near water sources. The sentences that they rearranged and pasted correctly showed that they could explain the process of how water is pumped for use by people and animals from the borehole.

A fourth activity on a water quality audit was done the following day as time ran out because there were many activities. I felt that I had to come back and observe it as it was part of the lesson outcomes and would give me more data on the LSM used to mediate learning. Worksheets were selected and photocopied from the *Water Quality Audit Booklet* for the water quality test activity (see Appendix 7a).

The teacher read and explained the instructions in the three activities in the worksheets, then allowed the learners to work in three groups to answer the questions in the worksheet. Group 1 answered a checklist on catchment conservation and predicted pollution that may be caused by waste collecting along the river valley or river catchment. Group 2 used the worksheets selected from the *Water Quality Audit Booklet* to investigate water health risks associated with town waste depicted in a diagram in the worksheet (see appendix 7a), and group 3 tested water clarity from water they fetched from a nearby dam, borehole and tank. They recorded their findings in the worksheets provided and shared the results in class (see figure 4.7). These activities were carried out in class but were not completed for a number of reasons (see section 4.5.).



Figure 4.7: Learners observing water clarity using worksheets from the Water Quality Audit Booklet

- **Lesson 2**

The intended outcomes for this lesson were that learners should be able to make sound judgements about the development, utilization and management of resources and demonstrate an understanding of the interrelationship between society and the natural environment (see table 4.2).

At the start of the lesson, the teacher divided learners into four groups of four learners in each group and supplied them with copies of the whole *Enviro Teach* magazine (one in each group). The theme of the magazine was 'Our Coast and Oceans' (DEAT, 2002). The groups were asked to read their texts, use LSM supplied and answer questions given to each group on flipchart or paper for class presentation.

Group 1 was asked to read the text on page 5 of the magazine on 'How the sea and coast work' and answer questions given to them. She handed out two different worksheets containing questions on the 'Importance of the sea and coast to people' to group 2. She had developed the questions for learners to access information using texts selected from the magazine on page 10 and 11 (see figure 4.4 and appendix 8 a and b).

A copy of a *Marine and Coastal Fact Sheet* selected from the Marine Conservation and Education Network (MCEN) file (supplied by the South African Institute of Aquatic Biodiversity (SAIAB)), with pictures and captions was handed out to groups three and four to support learners in accessing any information relevant for answering questions on '*Impacts of people on the coast*' as they had been given a long text from the magazine on pages 25, 26 and 27. Group 3 and 4 also used the *Water Cycle Poster* and the *Our Coasts and Oceans Poster*, which depicted a lot of human activities impacting on the coast. All four groups also interpreted pictures in the texts selected for them.

Before they started work on their tasks, the teacher mobilized prior knowledge and experiences asking learners to locate their part of the coast on the wall map of the Eastern Cape and name the coastal areas between East London and Kei Mouth. Learners came up with a number of answers as they live in this area and are familiar with the coastal areas.

Learners took 40 minutes to read and answer questions, leaving no time for reporting as the teacher spent 20 minutes on the mobilization of prior knowledge and giving instructions to each group. The lesson had to carry on for another 20 minutes to allow learners to report. Although they were keen to report their findings, most of them showed signs of fatigue. The teacher indicated that she would carry on with the lesson later to allow for assessment and consolidation of reports.

• **Lesson 3**

The teacher introduced the lesson on 'Healthy Food' with an activity where learners worked in groups, each with a different food group. The different food groups were taken from copies of a food pyramid (see appendix 9). The intended outcomes of the activity were that learners should demonstrate the values and attitudes necessary for a healthy and balanced lifestyle. It seemed that the teacher intended them to achieve this outcome through being able to identify food nutrients, create and present a food pyramid, discuss food pyramids and become aware of differences in the food we eat and reasons for such differences.

Using the food pyramid and accompanying text explaining nutrients and their functions, learners were asked to answer questions contained in activities 1 to 4. Learners could

orally identify the food groups in their groups in activity 1a, as some were mostly used in their homes. At the beginning of the lesson the teacher allowed learners to brainstorm the kinds of food they normally eat in their daily lives. They were asked to state which ones contained vitamins, proteins and carbohydrates. In activity 1 learners were each given different food groups cut from the food pyramid and using these different food groups, they identified food types, discussed orally servings needed daily in this food group, decided on the most important nutrients in the food group and presented the information to the whole class.

As the learners were engaged in the activities, I noticed that they took a long time to complete the tasks in activity 1b to d and that they needed to use critical thinking skills, they had to use decision-making skills, and they had to justify the choice of food. After learners had reported on activity 1, the teacher gave a whole class lecture on patterns of food consumption, factors that can affect food availability, and explained differences between chemical farming and organic farming. She linked organic farming to the permaculture gardening the class is practicing in the school. This information sharing lasted for 10 minutes and there was only 10 minutes left for activity 2.

In activity 2 the grade 6 learners were asked to form two groups and create a class food pyramid of their choice. Grade 7 learners were asked to read three menus which identified the food eaten by three learners during the day and decide in their groups if these learners ate a balanced diet, and if necessary what should be added or taken away to make a balanced diet, linking it to activity 1. The instruction for activity 2 wanted learners to create a food pyramid of their choice, instead learners recopied the original food pyramid introduced by the teacher (see figure 4.8). According to my observation the learners did not understand the instruction although the teacher helped to clarify in simple language and in *isiXhosa* by using code-switching techniques.

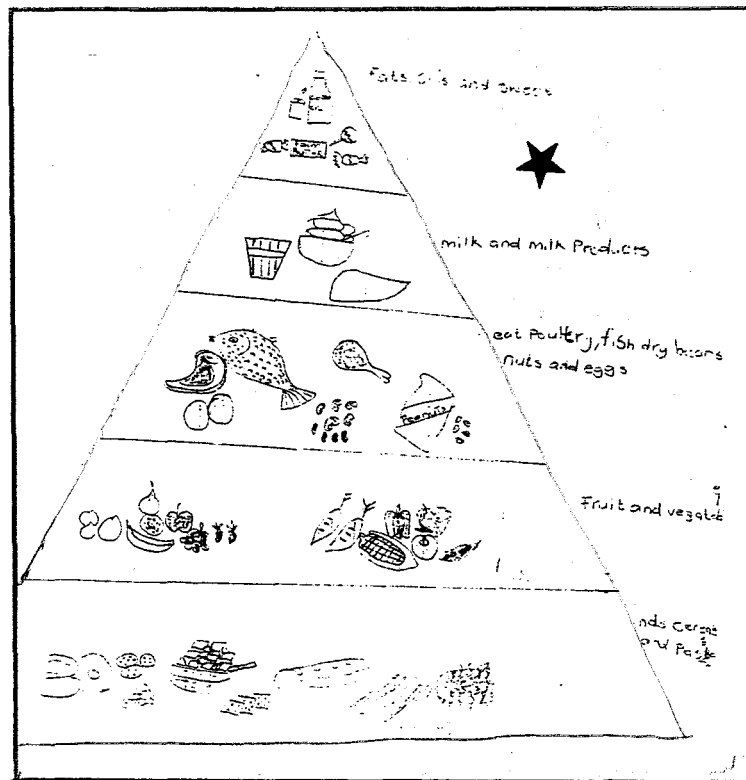


Figure 4.8: Food pyramid activity as completed by the learners

The learners only worked on two activities out of the four planned for the lesson. From my point of view this showed that the teacher planned too many long activities in a short period of time. Learners worked through activity 1 and 2 for fifteen minutes each after the introductory lecturer by the teacher, which took fifteen minutes. Learners reported their completed tasks to the class during the rest of the fifteen minutes. The teacher and learners noticed that they did not give the correct answers but did not reflect on the work done as a form of informal assessment and why it was not done correctly because there was no time left. The teacher simply signed the completed tasks (see appendix 10).

4.4.3 Supporting learners

As indicated above, the teacher played a role in planning the lessons, and selecting different materials. She also used different teaching methods when using the LSM. Another important role played by the teacher was to 'scaffold' or support the learning process, as discussed below.

- **Lesson 1**

Some learners experienced difficulty in reading and using the English language words in sentences as they reported their finished work. Words that seemed difficult were 'contaminated water', 'pollution', 'bacteria', 'recreation', and 'puddles'. The teacher supported the learners in pronunciation of difficult words by interpreting in their first language, *isiXhosa*, using code-switching techniques and by providing explanations in simpler English.

In working with the posters, she gave learners further tasks like predicting what would be the results of the water pollution issues they identified and the over exploitation or over use of sea resources by local people. Some groups even came up with possible solutions to these issues like recycling and reduction of waste. She extended their knowledge by sharing more information with them in a conversational manner, for example she explained what contaminated water was, and she told them about diseases like cholera and how they attack and affect people.

She encouraged learners to help one another as they worked in their groups. The teacher and learner relationship was good and learners were given opportunities to work towards understanding some of the key concepts such as water vapour, condensation, ground water, evaporation, seasons, drought, quality of water and others. The educator worked with the groups, helping them to make meaning of texts and pictures in the posters, controlling discipline and time for group work.

As a way of giving feedback learners' inputs were written on the board and on flipchart sheets to identify the content learned in each lesson. These were used in a consolidation session, where the teacher asked the learners to give feedback.

From the above description, it is clear that the teacher provided the learners with various kinds of support during the lesson, as they worked through the materials to find answers and investigate environmental issues. This support involved: language support; conceptual support; providing additional content and explanation of terms and concepts; support to develop skills; support to scaffold group interactions and support required to manage the learning interactions (time and discipline).

- **Lesson 2**

In this lesson the teacher explained in simple English and *isiXhosa* words in the questionnaires she designed to be used with passages from the *Enviro Teach* magazine. Words and concepts that were explained include 'recreation', 'difference between coastline and sea', 'economy', 'source of food', 'vitamins' and 'fishing industry'. She encouraged learners to use language to interpret and describe pictures accompanying the passages and fact sheets they were reading like 'the sardine run along the Kwazulu Natal shores', 'earthworks', 'coastal activities'.

The teacher supplied learners with *Enviro Teach* magazines, the *People and the Coast Poster* and *Fact Sheets* and enabled them to access information by using a variety of teaching methods like discovery learning, cooperative learning and question and answer. These methods enabled learners to gain knowledge of concepts like conservation and protection, marine resources, chemical reaction, commercial fishing, mussel harvesting, development, and others.

The teacher used language to encourage learners in groups 2 and 4 to speak by clarifying questions leading to exploring the *Water Cycle Poster* and the *Our Coast and Oceans Poster* to find answers on the impact of people on the sea and coast.

The teacher went around to the groups to provide support as learners interacted with the LSM. She explained learners' tasks in simple English and in *isiXhosa* where difficulties in reading to understand text were experienced. She read introductory parts of the passages and left learners to work independently trying to master the rest of the tasks.

The above description clearly shows how the teacher provided the learners with various kinds of support as learners worked through the materials to access knowledge, work towards developing investigation skills, reading skills, analysis skills and thinking skills. The kinds of support were: explaining instructions in simple English and mother tongue; managing learning interactions by helping learners to make meaning by interpreting pictures accompanying texts and link with the text to find answers quickly; managing group dynamics by mixing the multi grade class and arranging them in small cooperative groups, thus encouraging peer collaboration.

- **Lesson 3**

The teacher selected two activity sheets, photocopied enough for all learners and distributed them to the learners to read instructions with her help and work in pairs or groups of 4.

The teacher went round the groups helping the learners to understand the tasks and new vocabulary like 'food group', 'recommended servings', 'ingredients' and 'nutrients'. She used simpler English language and code switching. She encouraged learners to use the complete food pyramid in activity sheet 1 and notes accompanying the complete food pyramid (see appendix 9) to find information needed in activity 1.

To provide support for learning interactions, the teacher gave learners concrete objects like packaged and canned food to identify food types and their ingredients such as chemical compositions, ingredients available in their locality and how they are found.

Although the teacher tried to explain the tasks, most learners did not finish the activities, as time was not sufficient. The teacher requested learners to finish the exercises as homework and indicated that they would continue with the topic on the next lesson. Despite all of this support, there appeared to have been a breakdown in communication (learners appeared not to understand the instructions) and the grade 6 learners could not produce the model of the food pyramid required in the activity instruction.

From the description above there was clear evidence of different kinds of support provided by the teacher such as language support, conceptual support (in this case she used concrete objects and diagrams to provide conceptual support), support for skills development as they communicated during discussions using the different LSM. She also helped learners to use the LSM and she was engaged in managing the groups to ensure progress.

Besides planning the lessons, selecting the materials, using different teaching methods and providing support to the learners during the lessons, the teacher played an important role in assessing the learning.

The teacher's lesson plans (see appendix 13) indicate that she made use of assessment tools like mind-maps, worksheets, rubrics and assessment methods such as observation, peer assessment, comments by educator during the process of learners' working and reporting. These approaches and strategies indicate that the teacher has a fairly sophisticated view of OBE assessment. The Revised National Curriculum Statement (DoE, 2002:18) provides a detailed indication in each learning area of how assessment in OBE should be carried out. It emphasizes that assessment should:

- Provide clear criteria prior to the activities and use a variety of assessment strategies,
- Be integrated within the teaching and learning process and be varied in terms of assessment methods,
- Help learners to make judgments about their performance, set goals for progress and provoke further learning,
- Be linked to learning outcomes and assessment standards should be used to benchmark achievement of learners,
- Be continuous within the process of learning to inform learners about progress so as to improve learning, and
- Be used as constructive feedback to learners as support for growth.

The *Norms and Standards for Educators* policy (DoE 2000:15) emphasizes that the role of the teacher as an assessor is to understand how to integrate assessment into the learning and teaching process; understand the purpose, methods and effects of assessment and be able to provide helpful feedback to learners (see table 2.1). While the teacher has not yet been fully oriented to working with the RNCS, and the above framework for assessment is therefore not 'expected' to be reflected in her practice, it does provide a useful framework to interpret aspects of her assessment practice. In this section I describe assessment practice, as observed during the three lessons.

- **Lesson 1**

The teacher used a range of assessment techniques to monitor learning achievements in order to decide on what further learning intervention is required and to improve the quality of the LSM. To assess prior knowledge of learners in the water study lesson, the teacher asked learners to brainstorm in buzz groups, developing mind maps that show

sources of water on flip charts. They interacted with the *Water Cycle Poster* and the *Underground Water Poster* and orally and in writing named the importance of water, uses of water, how water is polluted and dangers of polluted water (see table 4.3). Peer assessment was done as learners presented their mind maps on the wall comparing them with the poster contents (see figure 4.9)



Figure 4.9: Mind maps presented by learners, and used for assessment of prior knowledge

The teacher assessed the learners' work on the development of ground water (when they used the *Water Activity Sheets*), and their understanding of how water is used and made written comments on the learners' workbooks (see appendix 10). The teacher and the learners used an assessment rubric on the chalkboard and made class comments on the work presented, such as group 1 was "... able to identify sources of water and trace the flow of water" and group 2 "... was able to identify water sources, but did not mention at what stage underground water was formed". Unfortunately I could not obtain

a copy of the rubric as the assessment was done on the chalkboard. The rubric used in the assessment was designed as follows:

Table 4.3: Example rubric structure used by the teacher to assess pair or group work

Assessment task / criteria	Excellent	Achieved	Needs improvement	Not achieved
- Investigate water sources - Investigate water pollution agents and identify impacts	***	**	*	-

The rubric was designed with the learning outcomes and assessment criteria for outcome 1 and 2 of lesson 1 in mind. Learners used the LSM to help them recall water sources and identify and interpret pictures showing water pollution. The comments in the rubric are interpreted to gather information about learner performance and indicate further learning needed in the activity to achieve the learning outcome.

The teacher observed learners as they interacted with the LSM interpreting pictures to make meaning of messages. Logic, reading skills and language use were assessed informally as learners used the water cycle poster to explore, identify and locate activities of people and describe their impact on the water sources. The teacher commented verbally and sometimes in writing on the learners' work where they rearranged jumbled sentences. I could not see how and when she recorded the assessment of learners' work as I only observed one lesson in a unit of 5 to 6 lessons.

As the learners read the sentences tracing the formation of underground water, they were given an opportunity to demonstrate abilities to explore and match sentences with pictures in the activity worksheets. They shared their finished tasks amongst the groups for assessment and their processes were compared to the original copies as they reported. Those who needed more time to improve on their tasks were given an opportunity to do so during their spare time with the help of other capable peers. From my observation the effective use of the *Water Cycle Poster* and the *Underground Water Posters*, and the successful completion of the *Water Activity Sheet* contributed to achieving the outcome of investigating phenomena related to the Natural Sciences. If the water quality audits had been conducted in the field, this activity may have been

more successful, as I observed that learners did not really complete the activity sheets in the *Water Quality Audit Book* correctly, as these actually required learners to engage in fieldwork.

- **Lesson 2**

In the lesson on 'Marine and Coastal Conservation' the teacher assessed cooperative learning. She observed how the groups worked together, listened to groups reporting effectively in their home groups and how well they interacted with the texts in the resource books. I cannot say whether she recorded or how she recorded the observations, but she made comments in learners' workbooks (see appendix 11) and she provided constructive feedback to clarify some concepts such as 'desalination', 'chemical reaction', 'sodium chloride', 'concentration of salts', 'body fluids' and others.

- **Lesson 3**

In the Life Orientation lesson on 'Healthy Food' the teacher assessed learners' prior knowledge as they named the types of nutrients in the food they eat daily. Their presentations in activity 1 showed how they actively engaged with the LSM (food pyramid and canned foods). The teacher commented on the design of the food pyramid created in activity 2. She orally commented that learners did not meet the requirements of the assessment task of building their own food pyramid based on what they normally ate.

Throughout the lessons, it seemed that the teacher was doing a lot of informal group assessment, responding to learner responses and giving feedback as the learners continued with the work. This shows that much of the assessment was integrated into the teaching and learning process. The teacher also used different approaches to assessment, and assessed learners at different points in the lesson. What was not clear, however, was whether there were clearly defined criteria (except in the case of the rubric used on the board) for the assessment processes; or how the teacher was recording the assessment of learning. Written work in learners books (worksheet activities) provided a good source of evidence for assessment, and the teacher appeared to be responding to learners work through marking the work, and through providing constructive comments.

4.4.5 Summary

From the above descriptions, it is clear that there is a strong relationship between learning support materials and *the role of the teacher*. In the three lessons that I observed, learning support materials influenced the planning that the teacher undertook; they influenced the different methods used by the teacher; the kind of support she provided and the assessment process in the lessons (to some extent). In the next section, I consider how learning support materials influenced the *learning processes amongst learners*.

4.5 LSM AND ENGAGEMENT OF LEARNERS

Besides observing the practice of the teacher to identify ways in which LSM influence the mediation role of the teacher (as reported in 4.4 above), I also observed the engagement of learners, and considered the learning processes that were supported by the LSM in the three lessons. This provided further useful insight into the use of LSM and the mediation role of the teacher.

Based on early data analysis, I was able to develop an analytical statement related to LSM and learner engagement, which I formulated as follows:

Analytical Statement: Learning support material influenced learner engagement and achievement of learning outcomes

To generate the above analytical statement I observed learner participation in the classroom and recorded their participation using field notes and an observation schedule (as indicated in chapter 3). I also analyzed the video transcripts, revisited the video recordings and viewed photographs of learners and the teacher at work. I analyzed the learners' work and reflected on journal entries, and identified the possibilities for knowledge, skills and values development.

4.5.1 Knowledge acquisition and skills development

In the section below, I analyze the learning processes, with a view to identifying:

In the section below, I analyze the learning processes, with a view to identifying:

- Knowledge being explored by the learners,
- Skills being developed by the learners, and
- Attitudes / values considered by the learners.

I was not involved in formal assessment of the learners, and I am therefore not able to comment on whether each learner actually **demonstrated** that they acquired this knowledge, or developed the specific skills, or assimilated / used the attitudes or values being developed. This kind of assessment would require a more in-depth engagement with both learners and teachers, and falls beyond the boundaries of this study. In the following section, I therefore identify the knowledge development; the skills development processes and the processes of exploring or deliberating attitudes and values, in the context of each lesson, and in the context of the group as a whole. I do not therefore comment on individual learner achievement.

- **Lesson 1**

In lesson 1 the learners used a *Water Cycle Poster* to investigate water sources and activities. They also discussed in groups, developed mind maps of water activities and water sources in their own contexts on flip charts and reported to the whole class, displaying their completed tasks (see figure 4.9). It would seem that these activities enabled learners to:

- Develop knowledge of water activities and water sources in context, and
- Develop their mind mapping (graphic representation) skills and reporting skills.

In the activity involving the reconstruction of jumbled text, learners interpreted information by reconstructing jumbled text provided by the teacher in the *Water Activity Sheet* to show knowledge of the storage of underground water. At the end of the task the learners compared their answers with the information provided in the *Underground Water Poster* provided and described by the teacher. It would seem that these activities enabled learners to:

- Develop knowledge of how underground water is stored, and
- Develop their skills to compare information and to organize information into a logical sequence.

In the '*Our Water, Our Health*' poster learners identified water tanks and water pumping for domestic use and water pumped to dams for animals to drink, through interpreting pictures in a poster. Environmental issues like waste matter dumped under trees, oil spilling into the underground water from broken pipes, waste from toilets flowing into the borehole water system and use of open space as toilets were orally identified by learners. Through this interaction learners were given opportunities to develop the skill of interpretation of information in visual texts. It would seem that these activities enabled learners to:

- Develop knowledge of sources of water, how water is used and environmental issues associated with underground water,
- Develop understanding of scientific, technological and indigenous knowledge systems of how water is collected, used and stored, for example use of springs and windmills to collect water and how water is pumped to the water tank for use by animals and irrigation,
- Consider human impacts on underground water and related health risks, and
- Develop their skills to interpret visual texts.

In another task learners used worksheets adopted by the teacher from the water quality study booklet (see appendix 7a) to conduct investigations and collect data on the quality of water in the stream and dam near the school. This activity was done in class through prediction and question and answer instead of fieldwork and learners were not able to interpret findings as required by the worksheets. It would seem that these activities enabled learners to:

- Develop knowledge of water pollution and water quality,
- Develop their skills of interpreting worksheets, and
- Consider attitudes and values regarding the use of natural resources.

This activity would have been more successful if learners were able to develop their investigative skills through a fieldwork activity. By not enabling the appropriate skills development, the lesson was not as successful as it could have been.

The availability of LSM and appropriate use (to an extent) by learners, with the teacher's support enabled the learners to develop knowledge, skills and attitudes required for achieving the outcomes the teacher identified in her planning (see table 4.2).

- **Lesson 2**

In this lesson the teacher used the marine and coastal conservation LSM as discussed in section 4.4 above. She developed stimulating questions based on the texts in the materials, and using these worksheets and the materials, she encouraged learners to explore answers.

In the first activity on recreation, learners expressed their own point of views on questions such as reasons why people visit the Eastern Cape coastal resorts and brainstormed the benefits to the local people and the province. It would seem that this activity enabled learners to:

- Develop knowledge of coastal recreation practices and their benefits,
- Develop their skills to engage in critical discussions, and
- Consider the actions of other people.

Using the *Enviro Teach* magazine learners studied sources of seafood and their nutritional value. Learners were supplied with fact sheets on People and the Coast. They examined a variety of human activities along the coast, and discussed harmful activities, those that improve the coast and considered which activities may use up resources if not properly managed (see figure 4.10).



Figure 4.10: Class discussions on marine conservation issues

Through interaction with the content of the LSM in groups, learners in this lesson were able to mention economic benefits from tourists who buy locally made crafts and the

teacher mentioned that jobs like tour guiding along the coast have been created by the Department of Environmental Affairs and Tourism. They were also able to acquire communication, investigating, critical thinking, recalling and reporting skills. With help from the teacher and other peers in the groups learners developed confidence in reporting and they enjoyed the lesson. It would seem that these activities enabled learners to:

- Gain knowledge of seafood and its nutritional value, and knowledge of coastal resources and their management and use,
- Develop positive attitudes towards use of natural resources along the coast, and consider their wise use and management, and
- Develop reading, interpretation, critical thinking, recalling and reporting skills.

The teacher chose an appropriate topic and LSM that were relevant to the learners' context as they lived along the coast. The learners were engaged in reading texts to find information and understand marine environments and how they work, investigating the importance and value of the sea to man and animals, and how peoples' activities impact on the sea and coast. Learners worked towards understanding the interrelationships between humans and the natural environment, thus leading towards realizing the intended learning outcomes (as outlined in table 4.2). During this activity, learners were also engaged in discussions that enabled them to understand the need to engage in local action projects like energy saving, waste management and they linked these activities with the action project of organic gardening they were practicing in their school.

I noticed that most of the work was orally done and there was very little writing done by the learners, if any, in the activities. It seemed that there was too much to read and learners did not get a chance to write down answers.

- **Lesson 3**

In this lesson learners discussed differences in the food we eat and why. Making use of the food pyramid presented by the teacher they identified patterns of food consumption and were able to come up with reasons why people eat different kinds of food. From the concrete objects showing canned food learners were able to investigate contents of the cans and packets. They read the ingredients and could say which ones contained chemicals and why. For example one learner replied that "... chemicals were used to

chemicals and why. For example one learner replied that "... chemicals were used to preserve food but were not good for our health" reflecting this learner's prior knowledge

Although learners misinterpreted the instructions for activity 2 and could not do the task as desired (see section 4.4.2), it would seem that these activities enabled learners to:

- Gain knowledge of food types and their nutritional value,
- Develop their reading and communicative skills, and
- Consider healthy eating habits.

This engagement with LSM in groups and individually supported learners to work towards achieving the intended learning outcomes like being able to make informed decisions regarding environmental and personal health (as indicated in table 4.2), although this is a long term process that needs more engagement with different topics, LSM and activities throughout the phase.

From the above discussion, it seems that, through the use of a range of LSM, learners were provided with a range of learning opportunities to develop knowledge, skills and attitudes relevant to the intended learning outcomes. As indicated above, some of these learning opportunities worked effectively, and learners gained maximum benefit from the opportunity. Others did not work as well, and this affected the learning process and the effectiveness of the lessons, and ultimately learners' ability to show competence in the light of the expected learning outcomes, as identified in curriculum policy. Effective use of LSM appears to be closely linked to the achievement of learning outcomes. This study was not able to probe this in great depth, and it would seem that much more in-depth research is required to clearly establish the way in which individual learner achievement is related to the effective use of LSM. As indicated above, this research only established what learning opportunities were made available to learners through the use of the LSM.

4.5.2 Learning in an additional language

As indicated in section 4.2 above, the official language of teaching and learning in the school and class I observed was English. The learning support materials selected by the teacher were also written in English. The teacher and classroom questionnaire indicates

that the primary language spoken by learners is *isiXhosa*. The teacher used English when teaching but the video transcripts showed that she was code switching (using English and *isiXhosa* interchangeably) to explain difficult words that learners could not understand. She also used *isiXhosa* when she explained instructions that learners could not understand as she went around supporting the groups. Despite excellent language support provided by the teacher (see section 4.4.3), it would seem that the language of learning and instruction (English) affected learners' ability to engage successfully in the lessons on at least two occasions when learners were reading marine information and following the instructions in lesson 3, activity 2. The high levels of language support provided by the teacher also point to the difficulties that learners experience in learning in their second language, and to the importance of language in enabling learning.

The video transcript (appendix 4c) shows that some learners struggled with reading and spelling the English language. English language was used during class brainstorming, answering open-ended questions and group discussions. While use of the English language was not easy for all learners, this engagement encouraged development of communication processes like speaking, reading, reporting and social skills like listening, and valuing one another's point of view.

The learner centeredness of the materials, and the way in which the teacher used them in co-operative group-based interactions using guiding questions, allowed the learners to interact and explore further than the teacher's questions during group discussions. I observed that in some cases when learners found difficulty in reading and talking, learners tried to support one another. The teacher encouraged learners to speak by asking more questions to clarify points further. As indicated earlier, however, there was very little evidence of written work. Most of the interaction was taking place orally. This may be the result of language difficulties, but it could also be the result of the teacher planning too many activities for a short period of time.

4.6 CONCLUSION

In this chapter I described the research findings in detail. I outlined the contextual profile and the way in which LSM were used by one teacher in a rural Eastern Cape school. The contextual profile was developed to better understand the way LSM are used. It

indicates the conditions in which the teacher teaches, and the challenges she faces with regards to resourcing and teaching a multi-grade group in a poorly resourced environment. The contextual profile also revealed that she does receive good support from the school management in terms of support for curriculum change. The contextual profile revealed further that the teacher is self-motivated and that she has completed an Honours degree with an environmental education module as a major, and that she has a good understanding of both environmental issues and OBE.

In analyzing the way in which LSM influence the role of the teacher, I was able to identify that LSM influenced the way in which the teacher planned her lessons. The LSM also influenced the methods that she used, and from the evidence provided, she used a range of teaching methods. Of interest, is the many different ways in which the teacher supported learning, and learner engagement with LSM. The LSM also influenced the assessment processes that took place to a certain extent.

The LSM also influenced the engagement of learners, and provided a range of opportunities for learners to gain knowledge and develop different skills and attitudes. Insights were also gained in terms of language and learning, and findings show that the teacher used a number of strategies (such as code-switching) to provide learners with language support. Despite substantial support provided by the teacher, learners still struggled to make full use of the learning opportunities provided, as a result of language difficulties experienced.

A number of issues have been identified in the presentation of this data, which will be analyzed and interpreted critically in chapters five and six. Chapter five considers the *relationship between* the use of LSM and the teacher's mediation role in more depth, and reflects on teacher competence and use of LSM, and teaching methods and LSM, and the theoretical underpinnings of OBE and the use of LSM (as outlined in chapter 2). The chapter also considers different dimensions of using LSM that are relevant to the mediation role of the teacher.

CHAPTER 5

THE TEACHER'S MEDIATION ROLE AND USE OF LEARNING SUPPORT MATERIALS

5.1 INTRODUCTION

This chapter reviews and discusses findings that emerged during the research process. It draws on empirical data analyzed in chapter four, highlighting the following dimensions of the teacher's mediation role, particularly as it relates to the use of learning support materials:

- The role of the teacher (including teacher competence and teaching methods used) (see section 5.2)
- Use of LSM (including accessing and interpreting LSM and using LSM in assessment) (see section 5.3)

The findings in this chapter are based on a second layer of data analysis (as described in section 3.4.2). The factors described in this chapter provide insight into the teacher's mediation role and the use of LSM as a process of Outcomes Based Education (OBE) implementation. I discuss the contextual factors influencing the use of LSM both by the teacher and learners. I critically reflect on the influences of teaching and learning theories and policies on the patterns of teacher's practice to mediate environmental learning in the classroom.

5.2 ROLE OF THE TEACHER

In this section I discuss the mediation role of the teacher as it relates to the use of learning support materials. I do this through reflecting on the teacher's competences such as selecting materials, adapting and changing materials for a specific purpose. The discussion shows how the teacher has used more than one material in combination to construct teaching and learning activities.

I also discuss the teacher's mediation role by considering the way in which she supported learners with language problems, monitored groups engaging in using LSM and provided conceptual support through asking learners questions to clarify their answers.

I will discuss the different teaching methods that the teacher actually used and how she used them to enable environmental learning processes within the context of the C2005 specific outcomes.

5.2.1 Teacher's competence

In my study the teacher's interview transcripts and lesson plans (see appendix 3b, and table 4.1 and 4.2) show that she used a variety of LSM to plan activities for lessons. This is verified in the lesson plans she developed for the 3 lessons I observed (see example in appendix 10), and through the observations I engaged in (see sections 4.4 and 4.5).

The Department of Education's expectations of teachers are reflected in the *Norms and Standards for Educators policy* (DoE, 2000, see section 2.4) and the *Revised National Curriculum Statement Overview* document (DoE, 2002:9). Amongst the seven roles defining the competence of an educator is the role of a 'learning mediator'. One of the practical roles associated with educator competency is that of being an 'Interpreter and designer of learning programmes and materials'. As indicated in chapter two, the teacher is expected amongst other things to demonstrate the ability to design, adapt and select learning resources appropriate for the learning area, language, culture and gender of learners (DoE, 2000:17, see table 2.1) to enhance mediation of learning.

The following table (table 5.1) shows the role that the teacher played and some of the practical, foundational and reflexive competences achieved, in terms of the *Norms and Standards for Educators policy* requirements (see section 2.4.2) (DoE, 2000). In the table some of the requirements, as outlined in the *Norms and Standards for Educators policy* are listed. To reflect on the teacher's competence, I reviewed the evidence of the teacher's mediation role presented in chapter four, and how the use of materials influenced this role, and compared this to the requirements in the *Norms and Standards for Educators policy* (see table 5.1). In this way, I was able to gain a better perspective

on how the use of learning support material influences the mediation of learning in the classroom.

Table 5.1: Evidence of teacher competence (as compared with the Norms and Standards for Educators policy requirements)

ROLE OF THE TEACHER	EVIDENCE OF TEACHER COMPETENCE
ROLE: Interpreter and designer of learning programmes and materials (see section 2.4)	MAIN COMPETENCES: Developing lesson plans; selecting, adapting, designing and using learning support materials
<i>The educator will:</i> Design learning programmes and materials that meet the desired outcomes and are appropriate for the context in which they occur to show practical competence. Adapt and/or select learning resources that are appropriate for the age, language competences, culture and gender of learning groups or learners. Design original resources including	Learning programmes were developed with curriculum requirements such as learning outcomes, appropriate selection of learning support material, activities and assessment strategies. Learners were actively engaged in activities that enabled them to work towards achieving the intended learning outcomes (see section 4.5). The lesson plans were appropriate for the context as the topics were drawn from the learners' local environments such as the water sources they used and sea and coast they lived nearby (see section 4.4). However, the water quality audit sheets were inappropriately used, as these should have been used in fieldwork. They were therefore not properly contextualised. From the lesson plan for lesson 1 I noted that the teacher selected the <i>Water Cycle Poster</i> and <i>Our Water, Our Health Poster</i> and used them with a <i>Water Activity Sheet</i> which she adapted from a library storybook. She also selected four worksheets from the <i>Water Quality Audit booklet</i>. In lesson 2 I observed that she used more than one type of LSM in combination. Fact sheets were selected from the fact sheet file and were used with the <i>Our Coast and Oceans Poster</i> to supplement texts selected from the <i>Enviro Teach</i> magazine. In lesson 3 the teacher selected activities from a textbook, and combined this with a selection of practical objects in the lesson. The materials were appropriate for the learners as they were accompanied with pictures of their culture and practice within their teenage group, and some also depicted the rural / semi-urban nature of their communities. The teacher developed worksheets with questions

charts, models, worksheets and more sustained learning texts that are appropriate for the subject, age, language competence, gender, and culture of learners; cognizant of barriers to learning; to show practical competence. Reflect on changing circumstances and conditions and adapt existing programmes and materials to show reflexive competence. Adapted from the <i>Norms and Standards Policy for Educators</i> (DoE, 2000:16&17)	based on the texts selected from the <i>Enviro Teach</i> magazine and the posters used in lessons 1 and 2. The questions were used to support and guide learners to investigate answers related to the marine environment, the value of the coast and the impact of people on the coast and on water use and storage. In one activity in lesson 1 the learners were grouped into their grades, but the teacher noticed during reflections that the grade 7 learners were more active than the grade 6 learners and she decided to mix them in the next activity. This reflexive process seemed to work well as learners shared their experiences, but the teacher was worried about compromising the time, scope and depth of activities and content for the grade 7 learners. This reflected the problems of multi-grade teaching, but also the teacher's ability to be reflexive. During another informal reflection meeting with the teacher, she alluded that she needed more time to study and choose the water quality study worksheets more carefully, and consider time allocation and fieldwork for that activity, again showing evidence of her reflexive competence.
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ROLE: Learning mediator	MAIN COMPETENCES Creating opportunities for learning; mediate learning in a manner which is sensitive to the diverse needs of learners; construct learning environments that are appropriately contextualised; communicate effectively; demonstrate sound knowledge of subject content
<i>The educator will:</i> Use the language of instruction and second official language appropriately to explain, describe and discuss key concepts in a particular learning area to demonstrate practical competence. Draw on a variety of resources; knowledge, skills and processes of relevant learning areas; learners' existing knowledge, skills and experiences for teaching to demonstrate practical competence.	In lessons 1,2 and3 the teacher used code switching (from English to learners' first language which was <i>isiXhosa</i>) or simplified English and clarified terminology or concepts that the learners found difficult to understand and pronounce like contaminated water, pollution, bacteria, recreation and puddles, delicacies, harvesting, desalination and others. This provides evidence that she was able to scaffold learning through using languages of instruction and second official language (additional language) to explain and discuss key concepts. The key concepts and words she explained were found in the LSM. In lesson 1 the teacher drew on learners' prior knowledge when she asked them to brainstorm (in a whole class session) sources of water and how rain is formed. In lesson 2 they discussed in pairs activities that enabled local people to make money along the coastal places at Cintsa (their area) and in the Eastern Cape. In lesson 3 learners referred to the information accompanying the food pyramid and were asked to

Use key teaching strategies such as higher order level questioning, problem-based tasks and projects; appropriate use of group-work, whole class teaching and individual self study as evidence of practical and foundational competence.	write down food they normally eat and identify the type of nutrients in them. All of these activities were linked to the use of LSM. This provides evidence of the teachers' ability to draw on learners' existing knowledge, skills and experiences for teaching. She engaged learners in group-work and monitored them as they worked on problem-based tasks. She used a range of co-operative learning strategies to guide group work, and she used group work in a variety of ways (see section 4.4). For example, in lesson 1 she helped learners as they read and rearranged the jumbled sentences. She went round to clarify questions to help the learners as they read through marine texts and were trying to find answers to the questions in the activity worksheets designed by the teacher (see figure 5.1). Each group had LSM to work with, and this enabled the teacher to leave them to work on tasks in groups. She also asked a range of different questions, and encouraged learners to think critically about issues observed in the posters. The Water Activity Sheet required learners to analyse and synthesise information, reflecting a concern for higher order thinking skills. In lesson 1 she engaged the learners in a problem based task (the auditing of water quality), but because the fieldwork did not take place, the lesson was not very successful. The reason for this is that the LSM (worksheet) was not adequately used. I observed answers from whole class teaching in lesson 1 and 2 in which learners were able to identify environmental problems affecting borehole water, the coast and sea. The LSM supported the learners to identify the issues. These were captured on a flipchart, analyzed and the teacher gave a summary and feedback. The problems were not, however, addressed through action projects or further investigations. From the evidence above, it seems that the teacher only engaged learners marginally in problem based tasks.
Understand the pedagogic content knowledge (concepts and methods) of the particular learning area being taught to show evidence of foundational competence. Adapted from <i>Norms and Standards Policy for Educators</i> (DoE, 2000:15-17)	The teacher created a range of learning opportunities to enable the development of knowledge, skills and values relevant to the different learning outcomes and learning areas (see section 4.5). This shows evidence that the teacher is able to interpret the learning outcomes. Evidence of OBE assessment practice also shows the teachers foundational competence.

The table above provides evidence of the teacher's competence in relation to the two roles identified as important to the research question (see chapter 2).

From the observations I made involving the lesson plans and the selection, adaptation, development and use of LSM in the three lessons, the teacher showed *practical competences* in the development of lesson plans, the designing of activities and use of LSM, as well as in her role as mediator of learning. She chose relevant learning support materials that were appropriate to the context from different sources and designed activities that would give learners opportunities to achieve the learning outcomes for a particular lesson focus, and based the activities on the LSM. She used more than one type of material in combination in lesson 2 to guide learners in their investigations, and provided learners with appropriate support to engage with the LSM and the intended learning outcomes.

The teacher demonstrated *foundational competences* by showing sound knowledge of OBE curriculum requirements regarding the scope and depth of content in the learning areas, and in her assessment practice. It would seem, however, from the evidence presented that the teacher did not have adequate foundational competence in terms of *problem based learning approaches*, given that these were only marginally addressed, or poorly addressed in the lessons. I would, however, have had to follow the full sequence of lessons to provide more substantial evidence of this.

In one case the teacher showed evidence of reflexive competence when she re-organised the groups following reflections that the grade 6 and grade 7 groups were not participating equally well. In further informal reflective meetings (indicated in table 5.1), the teacher indicated how she would be making changes to her plans regarding selection of worksheets, her teaching methods and non-achievement of some learning outcomes. Since I observed one lesson in a unit from each learning area, I was not able to see how the teacher has reflected on the lesson outcomes that were not achieved, and I therefore cannot tell whether or how she changed materials and/or her mediation role accordingly, such as in the water quality studies in lesson 1 and activity 1 and 2 in lesson 3 where there was very clear evidence of poor understanding displayed by learners. I am therefore not able to comment much on the demonstration of *reflexive competence*.

The fact that she did, however, reflect on the lessons critically, provides some evidence of the teacher's **reflexive competence**. Raven (2003b: 311) in her research on reflexive competence noted that:

... critical reflection and reflexivity appear to be two terms that are often conflated and taken to mean the same thing ... critical reflection allows for the development of critical insight into current practices and actions [as evidenced by the teachers reflections] ... and is integral to developing reflexive competence.

Lotz-Sisitka and Olivier (2000:98) also note "...the development and observation of reflexive competence is ... a longer term issue".

Other teacher competences I noticed in classroom interactions were that she considered a range of possibilities for action to take place, through selecting a wider range of learning support materials, and through using them in different ways. She also combined the materials and linked the use of the materials to learners' prior knowledge and experience. In particular, it seemed that this teacher had high levels of competence in providing adequate support to learners (see section 4.4.3), and to scaffold learning. This allowed understanding and knowledge to develop. The strategies she used included using simpler language and code switching to *isiXhosa* to explain difficult and new concepts and provided scaffolding in the group-work and pair-work (see section 4.4.3 for a comprehensive overview of the support strategies used by the teacher).

Previous research undertaken by Lotz-Sisitka and Olivier (2000:75) noted that curriculum development requires a "...complex of processes and skills..." to compile, select and adapt LSM for use in the context of a particular learning area and learner development needs. This research has highlighted some of these processes and skills (see table 5.1 above). This research has also indicated that the use of different LSM contributes significantly to the learning possibilities (see section 4.5) and *the way in which LSM are used* by the teacher in her mediation role, influences the available learning opportunities. Lotz-Sisitka and Olivier (2000:97) note that "... resource materials are crucial in supporting teachers to design original learning programmes that meet outcomes".

As indicated above (and outlined in section 4.4 and 4.5), *the way in which learning support materials are used* influences the learning opportunities. As can be seen from the evidence in chapter 4 and table 5.1 above, the *teaching methods* used by the teacher are therefore important.

5.2.2 Teaching methods and instructional scaffolding

The teacher mentioned in the interview and questionnaire responses (see appendix 2b & 3b) that she relied on environmental education partners to access LSM for lessons whose outcomes have an environmental focus. She developed questionnaires and activity worksheets from the LSM (see section 4.3 and 4.4). She used a variety of teaching and learning methods (see section 4.4). In the table below (table 5.2), I draw on the data presented in chapter four to describe the teaching methods used by the teacher, and I consider the role of LSM in these teaching methods. These teaching methods are described in table 5.2 as:

- Active learning processes (which includes mobilizing prior knowledge of learners; stimulating and encouraging investigations and problem based learning; and promoting discovery learning),
- Co-operative learning, and
- Instructional scaffolding (which is integral to the above two teaching methods).

The following table (table 5.2) shows how the teacher used these different teaching methods, and this provides further insight into the relationship between the use of learning support materials and the mediation role of the teacher. In the table I describe the different teaching methods used by the teacher, and provide a commentary, which highlights the relationship between the teaching method and the use of LSM.

I discuss instructional scaffolding in the table, and then consider these methods and the significance of instructional scaffolding in the light of the constructivist orientation of the OBE curriculum (as outlined in chapter 2).

Table 5.2 Different teaching methods used by the teacher

TEACHING METHODS	COMMENTS ON LSM AND THE TEACHERS' MEDIATION ROLE
ACTIVE LEARNING PROCESSES a) Mobilizing prior knowledge: In lesson 1 the focus was 'water'. To find out what learners already knew, the teacher asked learners scaffolding questions in a brainstorming session, such as sources of water, uses of water and dangers found in water in the settlements where they stayed. The focus area used for lesson 2 was Marine Conservation. Learners were asked to locate the coastline nearer to their communities from a wall map of the Eastern Cape in class and from their available atlases. They were also asked to identify towns and areas along the coast where people visited for pleasure and business. In lesson 3 learners were grouped in fours. They were encouraged to recall individually by making a menu/list of what they ate the previous day, identify nutrients in each food type and report to the group. More oral work was done than writing in these activities.	• The teacher used the Active Learning Framework (provided in LSM) as an organizer for planning to create learning experiences. • Knowledge already existed amongst learners from previous experiences in class, and she was able to link this to the use of LSM. • Learners showed that they had previous knowledge gained from social interactions with parents, visits to places of interest, books, television, radio and so on. • Finding information in the LSM encouraged discovery learning in learners and developed interest in the lesson. The topic was contextualised through the opening activity (using LSM) as learners lived near the coast. • Learners were engaged with making links to 'real aspects', like locating their coast on the wall map of the Eastern Cape and available atlases, finding local towns they frequently visit or stay. • The LSM that the teacher used assisted her to mobilize the prior knowledge of learners. She wrote questions on the chalkboard, allowed them to look for answers and respond orally. • Group work encouraged learner interactions, making meaning of concepts through activities and use of LSM. • The LSM provided a 'capital' of ideas and concepts that the learners could work with in their groups.
b) Finding information and investigating environmental issues: In lesson 1 the teacher divided the learners into three groups and gave out three different sets of posters to work through in three different activities. In activity 1, learners used the <i>Water Cycle Poster</i> to identify activities taking place in the poster and their impacts to the waterways, people and land. The <i>Our Water, Our Health</i>	• In this activity I observed that the group doing the water quality audit did not go out to investigate and audit water sources near the school as the audit sheet required. The LSM was therefore not appropriately used, and thus influenced the learning outcomes. I feel that the exercise would be more appropriate if the investigations were done on site instead of predicting answers in class. This points to a need for the teacher to carefully study the intentions of the LSM before using them. • Most groups did not finish their tasks as there were many hands on activities and not sufficient time was given to the processes to take place

Poster was used by the learner groups to investigate technological developments in the environment and how human activities impact on the environment. The teacher provided learners with worksheets selected from a water audit booklet for the water quality test lesson. The teacher read and explained the instructions in the worksheets before they started finding information and doing investigations in pairs.	(see appendix 8a,b). In this case, the teacher used too many LSM, and was therefore not able to achieve the purpose of the lesson. • In her reflection journal the teacher explained that she was not yet competent in using the worksheets in the water audit booklet and needed more support and interpretation so that she can contextualize it further for use by her learners.
c) Discovery learning: In lesson 1 and 2 learners used activity worksheets and posters to make meaning of texts they interacted with. They rearranged jumbled sentences to develop a flow chart of the development, storage and use of underground water.	• The use of LSM contributed to discovery learning as learners were finding information and investigating environmental issues in this lesson. Learners read the sentences linking them to pictures to make meaning and logic of the text. The LSM therefore provided opportunities for interaction and meaning making.
COOPERATIVE LEARNING: In lesson 2, four groups of four learners each were set up and each group was given a text adapted from the Marine and Coast <i>Enviro Teach</i> magazine to read, answer questions and report to the class in twenty minutes. The teacher developed questions for learners to answer and gave them <i>Fact Sheets</i> to use as support material as they read the passages in the texts. Each group worked on a separate topic. The aspects of the topic were 'Salt and Sea', 'Sea as a source of food', 'Sea for recreation' and 'Impact on our coast'. Each group elected a reader and reporter. They read through the passage, gathering information and prepared a report to present to the class.	• Some learners took a lot of time to read through the texts to find information to answer questions. This could be linked with low literacy levels of the learners, or the material was not written for the specific grades and needed modification. What was important, however, is that each group of learners had LSM to work with. • The questions in the worksheets assisted learners to interpret the pictures and content / concepts contained in the LSM. The teacher assisted each group with the task, allowing them to progress faster with her assistance. • Contextuality and focus of LSM also assisted learners to make meaning of the content, although the passages were long for the time allocated for the activity, and they had too much to read. • Learners understood the content of the questions but struggled to put answers in English (the language of instruction). • Learners participated actively and with interest in this activity and the LSM supported the learners as a teaching tool to find the answer. It would seem that the co-operative learning activity would not have worked without the LSM provided (the

	information) and the LSM developed by the teacher (the worksheets). The LSM helped learners towards developing investigative and thinking skills in cooperation with their peers. • A key issue for this kind of activity is to ensure that all the learners have access to the LSM, otherwise the activity will be done by one or two learners only.
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INSTRUCTIONAL SCAFFOLDING: In lesson 1 the teacher chose the <i>Water Cycle Poster</i> for learners to find information on activities related to water use only and investigate environmental issues related to water pollution. They were provided with worksheets, which they used with the teacher's instructional scaffolding to complete the task of organizing the sentences into logical order. The teacher first provided learners with information from the <i>Underground Water Posters</i> supplied as a start to guide them as they attempted to master the task. In the Marine lesson, she used <i>Fact Sheets</i>, and in the Healthy Eating lesson, she used information on the food pyramid from a <i>textbook</i>. In lesson 2 she read the introductory parts of the Marine and Coast magazine topics to a group and left the rest of the passage for the learners to read collaboratively and follow instructions. She created question-based worksheets to guide learning processes. The teacher also used LSM to scaffold and support group interactions such as the cutting and sentence structuring activity. The teacher monitored groups giving support in translating difficult words. For example in the 'Salt and Sea water' topic she explained words such as 'chemical reaction' and 'flavour'. Here the teacher provided support and extended the scope of learning using selected material and activities (see section 4.4).	• I observed that learners in this class received a lot of instructional support from the teacher and other peers. This support was given at two levels in the multi-grade teaching context, which demanded that the teacher provide support for intermediate grades 4 and 5, and senior phase grades 6 and 7 (at the same time). All learners were taught in one class but in different phases, and she had a challenge not to compromise any phase or grade. • The teacher used information resources to scaffold learning in each of the lessons. These information resources came in different forms (posters, fact sheets, textbook information). She also used other kinds of resources (eg. audit sheets and worksheets with questions) to scaffold learning. • The teacher guided the learners to use the LSM in different ways (eg. by starting to read a passage, and then leaving the learners to complete the reading task). Slower learners were also guided by more capable learners in group-work or work that they could not perform independently because of difficulty in level. This instructional method is described by Vygotsky (1978) in Schunk (1996:215) as a process where a more knowledgeable other assists learners to develop in their Zone of Proximal Development. • Use of LSM in group-work allowed for peer collaboration. This reflected collective activity and allowed learners to engage in cooperative tasks using relevant tools (the LSM) to construct knowledge (Bruner, 1984 in Schunk, 1996) • Language scaffolding is crucial in enabling learning, as language is key to enabling conceptual development, and therefore key to learning.
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From the above table, and from the descriptions of her practice in sections 4.4 and 4.5, it is evident that the teacher used a range of LSM in her teaching. These LSM were integral to the methods used. In some instances LSM were used to mobilize prior knowledge and experience of learners. In other instances LSM were used to engage learners in investigations and problem-based learning (although these attempts were not very successful); and in other instances LSM were used to promote discovery learning. LSM were also used to foster co-operative learning, and the use of LSM was integral to this process.

Section 4.4.3 indicates the importance of learner support in working with LSM within these methods. The table above illustrates that the teacher engaged various strategies to scaffold learning interactions.

It is clear from evidence provided in section 4.4 and 4.5 that LSM were selected and developed with a specific purpose in mind such as the achievement of specific outcomes in the different learning areas (see section 4.3). This purpose influenced the way learning support materials were used (see section 4.4 and 4.5). Section 4.5 illustrates the relationship between learning support materials, knowledge, skills and attitude development, and the achievement of learning outcomes.

As is shown in this study, the teacher created many learning opportunities for her learners to work towards achieving the intended outcomes. She did this through:

- Selection, adaptation and development of LSM,
- Using different teaching methods to encourage interaction and meaning making, and
- Scaffolding learning.

These methods could be characterized as being 'constructivist' in their intent. Moll (2002:5) writes that the Department of Education looks towards constructivism to provide a theoretical framework for the teaching and learning called for by the Outcomes Based Education (OBE) policies in South African schools (see section 2.4.1). Constructivism envisages the teacher to be the 'active organiser' or mediator of learning experiences where learning is an active process involving learners in meaning-making interactions with the teacher, LSM and others (*ibid*, see also section 2.4).

According to my lesson observations and video recording transcript, the teacher created a climate of learning where the learners constructed knowledge individually or collectively rather than passively absorbing it. Learners were exposed to an active learning approach (developed to guide environmental learning processes in the NEEP-GET) involving mobilizing of prior knowledge, finding and using information, undertaking investigations and reporting (O'Donoghue, 2001). She placed the learners at the center of the learning process by allowing them opportunities to work co-operatively on collective activities (see table 5.1). According to Wilmot and Euvrard (undated) cooperative learning encourages peer collaboration and enhances cognitive and social development.

Vygotsky in Schunk, (1996:214) considers the social environment critical for learning through cultural objects. As the learners interacted with the material it was easy for them to identify relationships between the materials and their context, for example, the marine conservation magazines and posters they used were relevant to their experiences as they lived along the coast and were used to coastal activities. The emphasis placed by the teacher on language support indicates the importance of language in learning processes, an aspect that is emphasized by Vygotsky (in Schunk, 1996) in his theory of social constructivism (see section 2.4).

Instructional scaffolding was a key characteristic of all three lessons (see section 4.4 and 4.5). Learners worked with the help of the teacher and other more capable learners on tasks that the learners could not perform alone because of difficulties such as language, creativity, and developing logical processes. This reflects the need to scaffold learning in meaningful ways, through organized activity. The concept of the 'Zone of Proximal Development' (ZPD) articulated in theories of social constructivism indicates that this is a key dimension of an educator's mediation role. Vygotsky (1978) in Schunk (1996:215) defines this ZPD as "... the distance between the actual developmental level and the level of potential development determined through problem solving under adult guidance or in collaboration with more capable peers ". While there was much evidence that the teacher was attempting to assist learners to reach their potential development level through the questions, materials and support she provided, this was not always done

through problem-based learning approaches, although learners were required to answer questions.

In lesson three I observed that the teacher went round helping learners working with the activity sheets. In activity one each learner was asked to make a menu of what she/he ate in the morning and were instructed to compare their answers to the model of the healthy balanced diet. They were also asked to work in mixed groups developing food models of their choice, and were assisted by the teacher in various ways to achieve the lesson objectives (see section 4.5). Although the teacher helped the learners, they showed difficulty in understanding the terms and concepts in the language of instruction (English) in the activities. The teacher actively scaffolded learning through code switching, and explaining concepts and terms when required. The four activities were too many and long for the period of twenty minutes. Before learners could complete an activity, they were asked to pass on to the next one. This compromised the teacher's ability to scaffold learning.

The teacher appears to have only marginally engaged with problem based learning approaches, and misinterpreted a problem-based LSM (the audit sheet). This also appears to have compromised the teachers' ability to mediate learning.

5.2.3 Summary

From the above analysis, insights were gained on the teacher's mediation role through an analysis of the teachers practice in relation to the *Norms and Standards for Educators* policy. This analysis revealed the important role that LSM play in enabling teachers to 'play their role', and demonstrate competence in terms of this policy framework. An analysis of the teaching methods used by the teacher pointed to the particular role that LSM play in assisting teachers to scaffold learning within constructivist approaches to education (the preferred theory underpinning OBE in South Africa). The important role of LSM in enabling teachers to create constructivist learning opportunities, and in enabling them to support learning was emphasized. Much of this is, however, dependent on the types of materials selected and used and how the teacher actually uses materials. This study has shown that there are many different dimensions associated with the use of LSM.

5.3 USE OF LSM

Previous research identified findings associated with the use of learning support materials to mediate environmental learning in the classroom. Lotz-Sisitka and Olivier (2000: 90) indicate that to use resources for appropriate content, teachers must be able to access information and resources and know how to interpret them. The DoE (1997, cited in Czerniewicz, 2000) claims that LSM should empower practitioners to run learning programmes in a flexible, dynamic and learner-centered manner. From this study, it seems that 'use of LSM' involves more than simply picking up a LSM and using it. It involves:

- Gaining access to materials,
- Accessing information from LSM,
- Interpreting the LSM,
- Considering the use of LSM in relation to intended learning outcomes,
- Considering issues of scope and depth in using LSM,
- Using LSM for and in assessment processes, and
- Considering teacher skills and teacher professional development needs in using LSM.

In this section I discuss the different dimensions of using LSM. Key amongst these are: gaining access to materials, accessing information from the materials and interpreting the materials. These processes take place in the context of curriculum requirements, and how LSM are selected and interpreted in relation to the outcomes and assessment requirements is another important dimension of using LSM.

5.3.1 Gaining access to materials

As outlined in chapter two, research findings in Lotz-Sisitka and Raven (2001), Czerniewicz *et al.* (2000) and Taylor and Vinjevold (1999) indicate (see section 2.2) some factors that affect access to the use of LSM by teachers as being:

- Unavailability of LSM through poor provisioning systems in the Department of Education,

- Lack of access to environmental education centers to many historically disadvantaged schools like farm and rural schools where there are no environmental education centers, NGOs and active government departments for support of environmental learning,
- Limited professional development of teachers and lack of skills to use LSM, and
- Poor quality materials, for example new textbooks are described as 'woolly' or quite superficial.

Taylor and Vinjevold (1999:169-171) further stated in their research report that textbooks were available at the schools although they were not always sufficient quantity for all learners.

According to the teacher and the evidence gained in this study, limited textbooks were available from the Department of Education and she relied on the partners' materials. She adapted, adopted and developed LSM from the publishers' and environmental education partners' materials to suit her lessons, learners and curriculum requirements as shown in table 4.2. As stated earlier there is need for teacher development around interpretation and use of LSM supplied by publishers and environmental education partners. The involvement of the teacher in the NEEP-GET professional development workshops served to broaden her pedagogic approaches as these resources challenged her creativity. They were also the source of many of the materials. She showed an ability to use LSM effectively within a constructivist approach to OBE (see section 5.2 above). In this case, the combination of pedagogical orientation (through the LSM containing the active learning framework) and a range of LSM that could be used with learners (gained in the NEEP-GET professional development context), provided the teacher with an appropriate range of LSM to mediate learning.

Once the teacher had gained access to the materials, she was faced with the challenge of accessing information from the LSM and interpreting the LSM in her teaching context.

5.3.2 Accessing information from LSM

The teacher selected relevant LSM, read it and used the information to develop lesson plans for the three lessons (see table 4.1). Russo and Lotz-Sisitka (2003:49) note that

without a teacher's prior selection of learning support materials, the learners could be confused and overwhelmed by lots of materials provided for them.

At the beginning of each lesson the teacher provided learners with posters, magazines with selected texts to use with fact sheets and activity worksheets developed or adapted by the teacher, as illustrated in lesson 1, 2 and 3 (see section 4.3 and 4.4). To do this, the teacher had to carefully read through the LSM before the time to identify which information would be useful / meaningful to the learners. The teaching methods used by the teacher gave learners an opportunity to access information and make meaning of content in the learning support materials used (see table 5.2 above).

5.3.3 Interpreting the LSM

The lesson plans (see appendix 13) show that the teacher selected LSM from a variety of materials with outcomes, assessment standards and active learning processes in mind. She aligned, adapted and interpreted some LSM according to Curriculum 2005 requirements using the policy documents (DoE, 1997).

According to my observations the teacher used the active learning approach and adapted worksheets in lesson 1 to enable learners to investigate water quality of a stream flowing at the back of the school. The worksheets were designed for learners to conduct a process of investigation on water quality by collecting data, recording observations, evaluating data and communicating findings to others in class.

I observed from the learners' work that learners did not carry out the tasks according to the instructions of the worksheets (see table 5.2). In her reflection journal entry (see appendix 5a) the teacher wrote that she needed more time and capacity building with the learning support material she used, to make the lesson more effective. She also mentioned that posters needed to be accompanied by teacher's guides to make learning grade or phase specific.

Lotz-Sisitka and Raven (2001:56) noted that in most provinces non governmental organizations (NGOs), environmental education projects, environmental education centers and government departments appeared to be key in providing schools with LSM

and support. They also noted that, however, the LSM supplied to schools from these sources were project or funder defined rather than responsive to school defined environmental issues and context.

Although the above statement refers to alignment of LSM to curriculum requirements, this did not affect the teacher's interpretation. She selected and adapted LSM as a vehicle to support teaching and learning outcomes and also combined and used these with other appropriate resources.

In this case the other government departments and environmental education partners largely supplied the LSM she was using rather than the Department of Education (DoE) (see appendix 3b). Most of the material is designed to suit the objectives of each supplier or organization (eg. DWAF materials emphasise water issues, and not curriculum issues) and very few textbooks are available from the DoE. The selection, development, adaptation and use therefore depend largely on the teacher's creativity and competences to interpret the materials.

5.3.4 Use of LSM and learning outcomes

From the evidence provided in this study, it seems that the teacher used the specific outcomes as the starting point for selecting and interpreting the LSM she used in the three lessons.

In the Human and Social Sciences lesson, the teacher explained in our informal chat after the lesson that she chose learning outcomes 4 and 6 (see table 4.2) and looked for available LSM that would give her the topic for the lesson. Marine education and conservation was chosen as a topic because LSM for use was available (see table 4.1). Mbanjwa (2002:101) in his research findings noted that there was a clear relationship that emerged between the learning outcomes achieved, the role of the educator in mediating learning and the specific LSM used. He, however, recommended that further research be undertaken to explore this relationship further. In this study, better use of the Water Quality Audit Sheets would have strengthened the achievement of investigation skills in the Natural Sciences, and thus the achievement of the intended learning outcome. This shows that there is a clear relationship between these three

dimensions of OBE: LSM use, teacher's mediation role and achievement of the learning outcomes. Table 5.1, table 5.2 and section 4.5 further illustrates the close relationship between mediation, effective use of LSM and contributions to the achievement of learning outcomes.

As noted above, Czerniewicz *et al.* (2000:21) indicate that the role of LSM in the classroom is to "...support and drive ..." curriculum change by empowering practitioners to run learning programmes in a flexible, dynamic and learner centered manner. The Department of Education policy on LSM (DoE, 1998, cited in Czerniewicz *et al.*), and the Department of Education policy describing the *Norms and Standards for Educators* in terms of competency requirements, requires teachers to have an ability to identify relevant resources, then design, adapt or use them to produce efficient LSM (*ibid*, see section 2.4 and section 5.2). As indicated in chapter 2, there is very little insight into the balance of the different roles of user and producer, of how they might work together in teacher's daily practice. This study has shed some light on the relationship between 'user' and 'producer' and has illustrated how 'user' and 'producer' relationships exist in classroom practice. The 'user' relationship with the 'producer' is, as indicated in this study, heavily dependent on the mediation role (and related competencies) of the educator.

5.3.5 LSM use, scope and depth

Lotz-Sisitka and Olivier (2000:97) noted that resource materials are crucial in supporting teachers to design original learning programmes that meet outcomes, provide activities, ideas and concepts at appropriate levels of scope and depth for the phase.

What I observed in the teacher's development of learning programmes was that she chose the outcomes, followed by the focus topic, appropriate LSM and activities. She indicated the integrating outcomes and assessment strategies (see appendix 13). Planning of activities did not show difference in the depth of content for the multi-grade class. Learners were mostly engaged in the same activities and grade 6 learners were not on par with grade 7 learners. They were slower in reading and working with texts. The teacher had to mix the grades so that the more knowledgeable learners worked with the slower ones. This context clearly demanded much support from the teacher, in the

and depth in the context of LSM use in multi-grade teaching and learning in any depth. This would require more in-depth, intensive observations and analysis, which fell beyond the scope of this study.

5.3.6 Use of LSM and assessment

In a constructivist classroom the DoE (2000:12, cited in Moll 2002:7) sees assessment as interwoven with teaching and learning. In the three lessons (see table 4.2) the teacher used LSM to assess learners as they worked through their tasks referring to the posters, activity sheets and text provided (see section 4.4.4). Using worksheets assisted the teacher to assess the learner's competence. The assessment tasks (instructions for different activities) given to learners as they interacted with the learning support material and one another, supported by the teacher, enabled assessment to take place in a continuous manner. Assessment of learning did not form a major focus of this study, and further research would be needed to establish how LSM are used to support assessment within an OBE context. The description in section 4.4.4, however, shows how LSM helped the teacher and learners to assess performance from the learners' work and reports.

5.3.7 Use of LSM and professional development of the teacher

There were evident links between learning outcomes and LSM used. The LSM used also contributed to promoting professional development of the teacher in choosing and developing activities for the lessons. Mbanjwa (2002) also indicated that LSM provide an important professional development function amongst teachers, as they read and inform themselves of new information, new ideas and new ways of teaching.

The teacher in this case study showed high levels of professional competence (see section 5.2 above). She adapted LSM to the context of the learners and designed worksheets that enabled discussions and creative thinking amongst the learners (see appendix 7 and 8). The methods she used with the LSM were appropriate to engage learners in participatory activities and assisted in meaning making. There was, however, evidence that she did not interpret some of the LSM well (for example the audit activity) and this influenced the learning outcome. There was also further evidence that she

and this influenced the learning outcome. There was also further evidence that she selected too many LSM for the time available, and this also compromised the learning processes. In the case of the Healthy Eating activity (lesson 3), the LSM seemed to be too complex and the teacher was unable to mediate the instruction effectively, particularly in the context where learners were learning in their second language.

These are all potential areas for ongoing professional development to support the use of LSM in OBE.

5.4 CONCLUSION

This chapter has reviewed the relationship between use of LSM and the mediation role of the teacher. Consideration of the Department of Education *Norms and Standards for Educators* policy framework, with associated competences and the teachers' practice, revealed that there is a strong relationship between use of LSM and the mediation role of the teacher.

The relationship between the use of LSM and the mediation role of the educator was further explored through an analysis of the teaching methods used by the teacher. This revealed the significance of scaffolding learning in constructivist approaches to OBE. It also revealed that LSM can be used to scaffold learning, and that scaffolding of learning is required when LSM are used. It also pointed to the important role of teachers as active organisers of learning interactions (Moll, 2002), which seems to be key in their mediation role.

The study also revealed that there are many different dimensions to the 'use of LSM' by teachers, and indicated that these vary from using LSM in assessment, to considering the professional needs of educators in using the LSM.

In the next chapter I summarize the study, outline some of the emerging issues and make recommendations.

CHAPTER 6

SUMMARY AND RECOMMENDATIONS

6.1 INTRODUCTION

In this case study I employed a qualitative and empirical research method (see section 3.2) to study a phenomenon in depth. This orientation enabled me to narrate activities that took place in the study using 'thick description'. To employ rigor I worked with a single case, observing one teacher and the same class of learners over three successive lessons within a localized space.

In this chapter I will summarize the study, and consider the findings of the study in relation to the research question. I also highlight issues emerging from the study, and make recommendations. I finally review the research methods and methodology to provide a critical perspective on the research process.

6.2 SUMMARY OF THE STUDY

As indicated in chapter one, the aim of the study was to understand how teachers use environmental learning support materials to mediate learning amongst learners in the OBE context (see section 1.2). To establish a context for the study, I considered recent policy changes in education in South Africa (see section 1.3 and chapter 2). I considered my role as environmental education co-coordinator, and the intentions of the project that I work within, the NEEP-GET project (see section 1.4 and chapter 2). This project has adopted a strategy of resource-based learning. In chapter two of the study, I considered the changed policy context of education in more depth, particularly as this relates to teacher professional development, LSM provision and use and curriculum implementation within OBE. I also reviewed previous research on learning support materials in OBE. This highlighted a number of issues relevant to the research question, which focuses on the **use of learning support materials** and the **mediation role of the educator**.

According to Merriem (1998:198) all research is concerned with producing valid and reliable knowledge in an ethical manner. In chapter three I therefore described and justified the chosen research methodology and methods used, and outlined the way in which I considered validity and ethical issues in this study. In chapter four I presented the findings that emerged from a first layer of data analysis. Through 'thick description' of the three lessons observed, I was able to show how the teacher used learning support materials to mediate learning in her classroom. The 'thick description' illuminated a number of important dimensions associated with the use of LSM and the teacher's mediation role.

These were analyzed further in chapter five, which placed emphasis on the *relationship between* the use of LSM and the teacher's mediation role. Findings in chapter four and five revealed that the teacher displayed competence in planning her lessons, choosing, adapting and using LSM in ways that were responsive to context and learners. The teacher showed practical and foundational competence in her role as interpreter and designer of learning programmes and materials, and mediator of learning. This was evident in the way she used learning support materials, and the way in which she planned her lessons within an OBE framework, and in the way she scaffolded learning. She integrated learning outcomes, and conducted assessments while working with the LSM in diverse ways.

The teacher used a variety of teaching and learning methods that reflected constructivist approaches to learning, which has been described by Moll (2000) as the preferred orientation to learning in South Africa's OBE curriculum. Methods used included active learning processes and co-operative learning. In all cases she scaffolded learning in different ways, and used LSM to scaffold learning, and she scaffolded learner interactions with the materials.

The teacher had access to a range of environmental LSM developed by environmental education partners. These were mostly not phase or grade specific. Although she tried to support the learners by adapting worksheets relevant for the activities planned and developing guiding questions, learners found difficulty in interpreting the worksheets and reading from text. This caused delays in time allocated and learners could not finish some activities. The achievement of learning outcomes was therefore compromised.

As indicated in section 4.3 and table 4.1, the teacher relied more on the supply of LSM from environmental education partners, as a result of insufficient supply of textbooks to support the environmental focus in the OBE curriculum in class.

In her planning she used a variety of LSM when planning activities for lessons (see section 4.3). The intended outcomes for the three lessons are reflected in table 4.2, and these guided her choice and selection of LSM. The teacher also planned the integration of learning outcomes and clustering of assessment standards in the learning areas like Language and Communication, Life Orientation, Natural Sciences and Economic Management Sciences. To support learners to achieve these outcomes, the teacher adapted, designed and used a variety of LSM in group work, experiments and text interpretation activities drawing on learner's prior knowledge. The LSM were also used to encourage active learning and were used to foster co-operative learning.

The learners were engaged in learning processes that were aimed at developing a range of skills, knowledge and attitudes (see section 4.5). For example in the three lessons, learners used worksheets with posters and texts as they developed content knowledge, logic, communicative skills, thinking and reasoning skills. They were able to identify environmental issues like water pollution, over fishing and its impacts and other problems in their locality caused by for example, unhealthy eating habits. However, not all the activities were successful, and in lesson 1 learners needed more time and fieldwork engagement to conduct water quality investigations, categorize and interpret information and be able to suggest actions if necessary. The teacher mentioned in our reflections that multi-grade teaching made planning difficult since approaches to multi-grade teaching are not clearly defined. My observations also revealed that learners struggled with concepts that were presented in English.

I turn now to a discussion on some of the emerging issues as identified in this case study, and make recommendations based on the study.

6.3 EMERGING ISSUES AND RECOMMENDATIONS

6.3.1 Planning and multi-grade teaching

The multi-grade class was one of the factors that influenced the teacher in the choice of LSM (see section 4.2). The development, adaptation and redesign of appropriate LSM for multi-grade teaching and learning depended largely on the previous experiences of the teacher, because no clear OBE policy on practices in multi-grade teaching is available.

I observed in the lesson plans that activities did not show difference in the depth of content. Grade 7 learners were engaged in the same activities as grade 6 learners and in the same groups. This would seem to require ongoing research.

This study recommends that more in-depth research be undertaken to explore the issues associated with use of LSM in multi-grade classrooms, particularly as this relates to scope and depth of the intended outcomes, and the teachers' mediation role.

6.3.2 Overuse of learning support materials and time allocation

The learning support materials used by the teacher and learners were appropriate for all three lessons, but she was anxious to use all of them because of the many activities she developed and that had an impact on time allocated. Although the learners worked actively with the LSM and were enthusiastic in their group work and reporting, they could not finish all activities and communicate findings well to the class. In particular, learners did not have adequate time to engage with the amount of learning support materials handed out, and were not required to produce written work, and in the cases where they did produce written work, I observed that they had made many mistakes / misinterpretations. It would seem therefore that the use of too many materials in one lesson compromises the learning outcomes.

This study recommends that the teacher should therefore rather use less material more thoroughly, in order to allow learners enough time to engage thoroughly with the materials and report comprehensively on their learning. This has implications for

materials developers too, and materials developers should develop materials that can be realistically used by teachers (not too many activities).

6.3.3 Availability of materials and curriculum links

From observations in the classroom, I noticed that textbooks were stored in the shelves and cupboards, but I was not sure of their content regarding the environmental focus within the curriculum. In the interview transcript (see appendix 3b) the teacher mentioned that she relied on partners for environmental LSM support as noted by Lotz-Sisitka and Raven (2001:56). The Department of Education supplied very few textbooks as top up and they did not have an environmental focus. There were only two textbooks available and relevant for the Life Orientation lesson and there were not enough for each learner in class. The teacher had to make copies on the school photocopier for learners to work in groups and pairs. This shortage of LSM does not allow the learner to work at her / his pace and extend the classroom work.

The teacher therefore drew on a range of LSM provided by environmental education partners. These materials provided her with enough scope to plan lessons according to the intended outcomes, but these materials were not 'phase or grade' specific. This required that the teacher develop worksheets to mediate the learners' use of the LSM.

This study therefore recommends that when the teacher uses partner resources, she should carefully consider the appropriateness for the phase and grade, and develop supplementary worksheets to scaffold learners use of the materials where necessary, and that she should make sure that these are adequately used by the learners.

6.3.4 Adaptation, development and use of LSM

As mentioned in chapter two and in section 5.2, the *Norms and Standards for Educators* policy (DoE, 2000) and the *Revised National Curriculum Statement* (DoE, 2002) see teachers as "interpreters and designers of learning programmes and materials". The teacher is expected to identify the requirements for a specific context of learning and select and prepare suitable textual and visual resources (*ibid*).

Russo and Lotz-Sisitka (2003:37&47) note that LSM are often developed with a specific purpose in mind that influences the way materials are used and can be combined to enhance the learning interactions. Table 4.1 and table 4.2 show how the teacher developed and combined different LSM to plan the lessons with outcomes in mind. Table 5.1 illustrates the relationship between the use of LSM and the educator's mediation role. The study revealed that the educator tended to use too many materials, and that there was no clear evidence that learners were actually achieving the intended learning outcomes (due to the mainly oral interactions, and also because I was not able to observe the full unit of work and the final assessments). The study also revealed that the teacher appeared to lack foundational competence of problem based learning approaches, which led to a misinterpretation / misuse of problem-based LSM, and thus compromised the learning outcomes in this lesson. This finding indicates that there may be a relationship between foundational competence and the effective use of LSM, but this would require further research with more substantial data.

Considering the use of LSM in relation to time available, pedagogical intent and intended outcomes seems to be one of the key competencies required by educators in the mediation of learning.

This study recommends that further research be undertaken to explore the relationship between use of LSM, time available, pedagogical intent and intended outcomes (or the relationship between foundational and practical competence in using LSM). This would include further research into the relationship between the use of LSM and assessment.

6.3.5 Language and literacy levels

Bruner (cited in Baumann *et al* 1997:69) states that thinking is greatly enriched and facilitated by language and language is used for communicating the process by which we learn to think. Czerniewicz *et al.* (2000:52) note that teachers had problems with the language of LSMs and were requesting that learner support material be written in simpler language. Lotz-Sisitka and Raven (2001:47) indicated that one of the issues of resource-based learning is not only the accessibility of learning support materials, but a concern about teachers and learners not being able to use resource materials. Czerniewicz *et al.* (1999) (cited in Lotz-Sisitka and Raven 2001:48) note that the supply

simpler language. Lotz-Sisitka and Raven (2001:47) indicated that one of the issues of resource-based learning is not only the accessibility of learning support materials, but a concern about teachers and learners not being able to use resource materials. ~~According to~~ Czerniewicz *et al.* (1999) (cited in Lotz-Sisitka and Raven 2001:48) note that the supply of resources should be accompanied by professional development of teachers to understand pedagogical approaches underpinning the materials they use.

In this study, I identified that learners found difficulty in interpreting worksheets and could not answer questions because of low language and literacy levels. I also noticed learners were struggling to read and pronounce words in the English additional language. While the teacher attempted to scaffold learning through code switching, this appeared not to be completely adequate, as the teacher mentioned in her reflections that she needed more time to work with learners to read and understand the activities. Learners' work also revealed that more time and support was needed for learners to use the materials effectively. Mbanjwa (2002:126) argues in support of the above research finding, noting that language used in the design of LSM is one of the reasons why educators and learners did not use the LSM effectively in his study.

Bruner (cited in Bauman, 1997:70) states that language is a major factor at all levels of internalizing knowledge. The Revised National Curriculum Statement for the Languages Learning Area (DoE, 2002:5) indicates that language is used to "... communicate appropriately and effectively in a variety of contexts and develop tools for thinking and reasoning". The teacher gave learners opportunities for writing and representing thoughts in text or graphically. The teacher gave verbal instructions and read instructions for learners to perform. However, at the end of each activity there was very little evidence of learners' work. They did not succeed in finishing the tasks.

This study recommends that, when using LSM, the teacher needs to clarify instructions, provide a realistic number of tasks and allow learners more time to do the tasks to mediate learning effectively amongst learners. When second language is being used as medium of instruction, this would seem to require ongoing language scaffolding through various techniques (such as code switching, explaining concepts, using simpler language and encouraging learners to write more).

learners through scaffolding their language use, and access to new vocabulary and concepts. She also supported learners to work together in groups, and to use the LSM appropriately. She provided learners with questions to guide their interactions with the content of the materials, and she used group work and established co-operative learning and active learning approaches to encourage collaboration. She also mobilized learners' prior knowledge in different ways in the three lessons, and drew on their knowledge and experience in context. She also used a variety of interactive teaching methods. All of these point to the teachers' ability to support learning in ways that can be described as 'constructivist' in the sense that she encouraged learners to engage in challenging activities to make meaning through interacting with her, with the LSM and with other learners in a social context. In this process, the teacher was the 'active organiser' of learning interactions, through her choice of LSM and the tools that she provided to assist learners to use the LSM.

This study therefore recommends that when using LSM within a constructivist orientation to OBE, teachers should consider using a range of interactive teaching methods, and different strategies to scaffold learning. Providing language support appears to be an important scaffolding strategy.

In the context of this case, the study recommends that the teacher use less LSM, and scaffold the use of these LSM more carefully to give the learners more time to achieve the learning outcomes successfully.

6.3.7 Professional development

One of the intended aims of this study was to inform the professional development of teachers in the use of LSM within OBE. The insights gained in terms of the teacher's mediation role, and her practices (as outlined above) are all important dimensions of professional development for teachers.

In the context of the NEEP-GET, this case study could be used to consider how teachers use environmental LSM to mediate learning. The case study could provide useful insight into the mediation of learning (and how the teacher scaffolded learning), and it could provide useful insight into issues associated with the use of LSM (as outlined in chapter

5 and in the section above). Some of the insights that could be shared in a professional development programme for teachers may include:

- providing language support when using LSM to mediate learning,
- selecting and interpreting LSM for learning outcomes,
- using LSM in assessment,
- using more than one LSM in combination,
- using LSM for problem-based learning, and
- using LSM in multi-grade classrooms (amongst others).

This study recommends the use of this case study within the NEEP-GET and other professional development programmes, to gain a better understanding of issues associated with resource-based learning.

This study also recommends that professional development should be considered by the Department of Education and service providers, to assist teachers to interpret, use and develop learning support materials that are provided by environmental education partners, in the context of the constructivist orientation to the OBE curriculum.

The study also recommends that professional development programmes should consider the *relationship between* the teacher's mediation role and the use of LSM (as outlined in chapter 5).

6.4 REFLECTIONS ON THE RESEARCH METHODOLOGY

As indicated above, the study illuminated issues associated with the use of LSM and the teacher's mediation role using variety of research methods and tools mentioned in section 3.3. Findings are not generalized. Coding and analysis has been done and appendices attached to this report as evidence (see appendix 6), which helps to establish validity.

The study has used different data collection sources on the same phenomenon studied to ensure triangulation and enable thick description as explained by Patton (2002:23), Cohen *et al.* (2000:112) and Janse van Rensburg (2001:9). The questionnaires and

interviews reflect the socially constructed nature of the researched phenomena. Use of the contextual profile helped to provide insight into the socio-historical context and practices and how these shaped the research results, and affected teacher and learner performances and practices. I found this contextual profile to be vital to the interpretations of the data and through triangulation with other research tools like video recordings transcripts, photographs, class observations and analyzing journal entries I feel that I was able to provide a thick description that represented the teacher's work ethically and appropriately.

I tried as far as possible to involve the teacher by reflecting on her practice and learner performance at the end of each lesson. The teacher also viewed the video and made reflective comments. We shared our journal entries to ensure reliability of the data, although I feel I did not create enough time for reflections. I feel that it would have encouraged more reflexivity amongst both the teacher and myself if I had arranged for a reflection meeting to discuss learner and teacher performance regarding LSM use and support processes. It would have been useful to view the photographs and share journal entries after each lesson in a separate 'reflection meeting'.

Through a process of self-reflexivity, I noted my views in a research journal. I became true to the context of the case by describing what was in the data and what came out of it. After one of the reflection meetings with my supervisor, we agreed that I should rework the observation schedules, as the initial ones used in lesson one did not give an adequate description of what happened. The change worked very well and I was able to comment in more in depth in the following two lessons. This enabled me to gain a much more in depth view of the lessons. Fortunately, I had video taped the first lesson, so I was able to revisit the lesson using the re-designed observation schedule.

I therefore consider the observation technique good for monitoring and observing classroom interactions and research associated with the use of learning support material. I found the video data useful, as I was able to revisit the classroom interactions after the on site observations, even though the quality of the tape was not very good. Unfortunately I was unable to video the second and third lesson, due to technical problems.

To ensure validity and reliability in this research I applied triangulation of data sources and data collection methods. I compared data from the contextual profiles developed from questionnaires, teacher interviews, journal entries and planning tools with the data from classroom observations notes, video recordings and photographs showing engagement of learners. I found the triangulation process useful as it helped me identify and compare similar and different issues associated with the use of LSM within the study, as they were not always consistent. Triangulation also helped me to establish the categories of analysis, and the analytical statements.

In the research I played a challenging role of a participant observer (see section 3.3). I was conscious of my ethical responsibility and power relations that might influence the research process. To address the issue of power relations and ensure trustworthiness a number of ethical issues were negotiated at the beginning of the study like access, relationships with the teacher, my research goals, and co-operative planning (see 3.4). I verified the teachers and learners' responses by discussing my notes, tape and video recording transcripts with the teacher and allowed her to check credibility and verify responses. I also employed face validity with the teacher's journal. This process was necessary to verify my observation notes and share the teacher's feelings to enable us to benefit from the research in terms of professional growth. Throughout the research I was conscious of the potential way in which my role as provincial education officer may be perceived by the teacher, and the way that this may influence the lessons. In the first lesson, for example, I noticed that she was quite nervous. In my view, the fact that I had a previously co-operative relationship with the teacher reduced the possible power effect that may otherwise have influenced the research, and after our reflective engagements she seemed to relax and participate more naturally.

Cohen *et al.* (2000:181) state that a case study "... provides a unique example of real people in real situations". My study was conducted within a class in social interactions. I feel that the case study method was appropriate for this research question, as this case study allowed me to collect multiple sources of evidence using multiple data collection tools that enabled me to understand educational activities that might bring action and change in future, in educational settings. To enhance the case study, I could have observed more of the lessons in the different units of work, but time and the scope of this study did not allow me to do this.

tools that enabled me to understand educational activities that might bring action and change in future, in educational settings. To enhance the case study, I could have observed more of the lessons in the different units of work, but time and the scope of this study did not allow me to do this.

6.5 CONCLUSION

This chapter summarizes learning that came out of this case study and provides emerging findings and recommendations that could contribute to OBE processes of curriculum implementation in schools and LSM development amongst partner groups. The findings of this case study could also be used in professional development of other educators.

In the light of curriculum change, the use of LSM appears to be an integral dimension of the mediation of learning within OBE. The focus of the study was to observe how the teacher used environmental learning support materials to mediate learning in class as required by the DoE. The study revealed that there is a close relationship between the use of LSM and the teacher's mediation role, and that there are many different dimensions associated with the use of LSM and the teacher's mediation role. Teacher competence, teaching methods and instructional scaffolding and ways of accessing and interpreting LSM according to outcomes and assessment requirements are all important dimensions of this relationship.

The study also highlighted issues associated with the use of LSM and the mediation of learning, key amongst these is the need for language support and scaffolding of learning interactions in different ways, as learners use LSM. Overuse of LSM also emerged as an important issue to consider, as did the way in which LSM are selected and interpreted in relation to the learning outcomes. The study also pointed out that further research is needed to establish the relationship between LSM use and assessment of learning. The study also revealed that in this case, most environmental LSM were provided by environmental education partners (and not in textbooks or by the DoE), which provided the teacher with challenges to select appropriate LSM for particular learning outcomes.

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Appendices

Appendix 1

TO: The Principal

FROM: Nomalungelo Nduna
Department of Education
Zone 6
Zwelitsha

DATE: 10 September 2002

SUBJECT: Requesting access to conduct a Case Study

Dear Sir/Madam

I am a bone fide Master of Education Student at Rhodes University, Grahamstown. I am required to undertake a case study as part of my course requirements, leading to a long-term participatory research for the year 2003.

The topic of my study is "THE USE OF ENVIRONMENTAL LEARNING SUPPORT MATERIALS TO MEDIATE LEARNING IN THE OUTCOMES BASED EDUCATION".

In my work context I am coordinating the National Environmental Education Project in the General Education band (NEEP-GET), in the Eastern Cape province. I am based at the provincial office in the Curriculum Management and Professional Development Chief Directorate, in King Williamstown.

I therefore request you to allow me to carry out this exercise in your school as it is participating in the NEEP-GET pilot. I further request to work with the teacher participating in the pilot project and in the Natural Science, Human & Social Science and Life Orientation learning areas.

I would be very pleased if we can arrange a between: September 16 to 23. I hope that this study will engage the teachers in their professional development where we can share methods and processes of using Learning Support Materials.

Thanking you for your cooperation.

Yours truly

Nomalungelo Nduna.



DEPARTMENT OF EDUCATION

NATIONAL ENVIRONMENTAL EDUCATION PROJECT - GET FORMATIVE MONITORING QUESTIONNAIRE

School and community profile

[to be filled in by participating teachers]

1. Name of school Bifelt's
2. Province and district Eastern Cape, East London
3. Closest town East London
4. What grades are offered at your school? Tick (✓)

Grade	Tick (✓)
1	✓
2	✓
3	✓
4	✓
5	✓
6	✓
7	✓
8	✓
9	✓

5. Are any environmental education activities taught/ provided for at your school? Specify.

Yes, my school is involved in a NEEP programme

6. List a few examples of environmental education learning support materials and other resources that are available at your school.

books, posters

7. Do you have access to environmental education resource materials/support services outside of your school? If so, list examples.

Yes, from the NEEP projects, Marine Conservation file, posters from Wild life through their facilitator

8. Does your school have any links with or access to environmental education centres? Describe these links or access briefly.

Yes, my school is involved in a cluster for EE

9. Is your School Governing Body supportive of curriculum changes in the school? Elaborate and mention examples if applicable.

Yes, They do allow for all the programmes to take place in the school

10. Is your school principal supportive of curriculum changes in the school? Elaborate with examples if applicable.

Yes, he is because he encourages the teachers to attend all the available workshops

11. Briefly describe the socio-economic context of your school.

The school is situated on a farm most of the parents are not working

12. Briefly list and describe any environmental issues or problems in or near your school.

Water pollution, lack of water and sanitation as we are using a borehole which sometimes stops working

13. Briefly describe the relationship between the broader community and your school.

The relationship between the community is effective in the sense that some white people have come and help the school

14. Describe collaborative activities/initiatives that exist between the community and your school.

We have a school magazine which we work together with community members on terms of funds.

15. If possible, include a photograph[s] of your school and briefly elaborate on what the photograph illustrates.

16. If you have any other relevant information that you would like to add, please feel free to do so.

There is a problem in terms of development as I have mentioned that the school is situated in a disadvantaged area the question of land is the problem for development to take place.

Thank you for completing this questionnaire — your responses are very important to the successful support and evaluation of the project.

Who you are and what you do does make a difference! BYLETT'S COMBINED SCHOOL

Thank you!

Mr C.M. Ponton
PRIVATE SCHOOL / CP / E.L. 6100
TEL 043-738777
REL. OF - L. 6100
DATE 12-03-03



DEPARTMENT OF EDUCATION

NATIONAL ENVIRONMENTAL EDUCATION PROJECT - GET **FORMATIVE MONITORING QUESTIONNAIRE**

Teacher and classroom profile

[to be filled in by participating teachers]

1. Name [optional] VUMISWA MBUYA ZWE
2. School BJLETT'S
3. District EAST LONDON
4. Which grades do you teach? Tick [✓]

Grade	✓
1	
2	
3	
4	✓
5	✓
6	✓
7	✓
8	
9	
10	
11	
12	

5. List your formal qualifications
SPTD, BED (EE)

6. For which learning areas/subjects are you responsible?

All Learning Areas

7. What is the average size of your classes? Tick [✓]

Number of learners	✓
0-15	
15-24	✓
25-29	
30-34	
35-39	
40-44	
45-49	
50-54	
55-59	
60 or more	

8. What is the average age of the learners in your classes? Tick [✓]

Learning area/subject	Grade	Average age
Mhmmms	All GRADES	15yrs
NS		
TECH		
LLC		
AdL		
LD		
HSS		
EMS		

9. What is the primary language[s] spoken by your learners?

XHOSA

10. Briefly describe the main teaching methods and approaches that you use (e.g. group work, lectures, practicals, field-trips, text book etc.).

Group work, field trips, experiment, Text books

11. Briefly describe the learning support materials that you use most often in your teaching.

Policy document, posters, books

12. Briefly describe what you understand by the term Outcomes Based Education.

It is a learner centred approach where learners must play an active role in the learning process.

13. What do you understand by the term environment?

It involves people and their surroundings. The use of resources by people and whether they use them responsibly. It involves social, biophysical, political and economic factors.

14. What do you understand by the term sustainability?

It means something that keeps on going. A process which does not end.

15. Briefly describe your past and present involvement in environmental education.

I belong to the Deep Umto in Contra East

16. Briefly describe any issues in your classroom and/or school context that hinder your teaching activities.

The multigrade teaching where I have to teach all the learning areas

17. List and describe the in-service training that you received during the last three years. Also mention who was responsible for providing the INSET (e.g. DoE, NGO [name], University [name] etc).

DoE, the subject adviser were responsible, the Deep project.

18. If you have any other relevant information that you would like to add, please feel free to do so.

Thank you for completing this questionnaire. Your responses are very important to the successful support and evaluation of the project.

Who you are and what you do does make a difference!

Thank you!

BYLETT'S COMBINED SCHOOL
PRIVATE BAG X2067, E.L. 5200
TEL: 040-738 5100 FAX: 040-738 5105
PRINCIPAL/DEPUTY _____
DATE _____

USE OF LEARNING SUPPORT MATERIAL TO MEDIATE ENVIRONMENTAL LEARNING IN THE CLASSROOM: A STRUCTURED INTERVIEW SCHEDULE BASED ON OPEN ENDED QUESTIONS.

A. SCHOOL AND EDUCATOR INFORMATION

School name: Bylets Combined School

District: East London

Educator's Name: Mrs Vuyiswa Mbuyazwe

Grade teaching: Grade

Learning area observed: Natural Science

Date: 20 February 2003

B. RESOURCE MATERIALS

1. Did you receive any OBE curriculum training in the learning areas you are teaching? *Yes*

2. In implementing the outcomes based education (OBE) curriculum 2005 (C2005), explain how you integrate environmental education in your curriculum.

Use SDs in all Lf Areas, enviro issues locally

3. How do you access learning support material (LSM) for classroom practice (lesson planning and teaching and learning) e.g. from the department and service providers?

DoE, Support from EE coordinator, NEEP-GET workshops

4. Which materials do you use for the Natural Science unit you are doing to support environmental learning outcomes?

Water cycle poster, underground water posters, 20,20 Vision for WEP, water audit kit (SWAP)

5. How do you get support to interpret, develop and use the learning support materials you use for teaching?



School photocopies, work with other teachers, learners
NEEPDET workshops, Make meaning by myself - creativity

6. How do you involve learners in the development and use of LSM? The development



of LSM like worksheets

7. Which are the main challenges you experience in choosing/accessing and developing LSM?



Little support from other sources. Have to make links
with other Dept. eg DWAF

TEACHER INTERVIEW TRANSCRIPT - 20 February 2003

A. School and educator information

Bylets Combined School is situated at Cintsa East in the East London district. The educator I interviewed was Mrs V. Mbuyazwe, **teaching a multi grade class** from grade 5 to 7.

B. Questions and responses on learning support materials access, development and use

As a warm up interaction I explained to the teacher that the purpose of the research was to develop a contextual profile for the research already explained in the access letter. We talked about the classes and learning areas she was teaching and she told me that she was teaching grades 4 to 7.

Initially I agreed with the teacher to focus on three lessons in the Natural Science learning area in grades 6 and 7, but my supervisor recommended that I observe three lessons in three different learning areas in this multi grade class (Natural Science, Social Sciences and Life Orientation). This observation would give me more data on patterns of practice and issues of learning support material use. The teacher agreed to this arrangement as I would not require her to change her planning but work within it.

The first question was to find out if the teacher any outcomes based education (OBE) training in the three learning areas I was going to observe.

The teacher answered that **she had received training in OBE.**

Secondly I asked how she integrates environmental education in her OBE curriculum 2005 (C2005) implementation.

She answered that she **uses specific outcomes and integrates across the learning areas.**

Responding on how she accesses learning support materials (LSM), she mentioned that she **uses local resources**, for example in Natural Science she makes use of the surroundings, the school garden. She also mentioned that she gets other **LSM from the NEEP-GET workshops, the NEEP-GET coordinator and books from the Department of Education.**

Fourthly I asked her which materials she uses for the Natural Science Unit she has planned to do in order to support achievement of environmental learning outcomes. She mentioned that she **uses the water cycle poster, underground water poster, School Water Action Project field booklet and kit.**

Responding to the fifth question on how she get support to interpret, develop and use LSM for teaching, she mentioned that she made **meaning of LSM by herself**, got **support from other teachers in NEEP-GET workshops** when developing lessons, and **used the school photocopier** to develop LSM. She mentioned that **learners** also play part in the **collection and development of materials.**

The major **challenge** was **getting and designing** enough materials for lessons.

THE USE OF LEARNING SUPPORT MATERIALS TO MEDIATE ENVIRONMENTAL LEARNING IN THE CLASSROOM.

A LESSON OBSERVATION TOOL (a)

A. Researcher's details:

Name: Nomalungelo Nduna

Designation: Provincial Environmental Education coordinator

Date of observation: 12 March 2003 (Lesson 1)

B. General School and Educator Information

School name: Bylets Combined School

District: East London, Cintsa East

Educators name: Mrs Nomvuyo Mbuyazwe

Grade observed: 6, 7 & 8

Is it a multi grade class? Yes

Learning area observed: Natural Science

No of learners in the class: 10

Language of instruction: English

Home language of learners in class: Xhosa

Geographic location of the school: Rural - Farm

For this particular lesson?

Any learners with barriers to learning in this class: Not visible

What resources are available for use in this class? Posters, flipcharts, worksheets

C. The learning environment

	Insufficient	Sufficient	Highly sufficient	Not applicable
Is the class clean and tidy?	✓			
Classroom resources are arranged in a designated space in the class.	✓			
Chairs and desks are suitable for flexible learning activities.	✓			
Required LSM for the lesson are readily available.			✓	
Overall comments: Not a ^{good} learning environment caused by unforeseen circumstances (cropped up)				

D. Methodology / Instructional practices

		Insufficient	Sufficient	Highly sufficient	Not applicable	I	S
						NS	NA
How does	Educator manages and emphasizes time frames. ?	- books and other resource material, are stored in boxes and old cupboards					S
Does the	Educator gives clear instructions.						NA
	Educator states learning outcomes at the beginning of the lesson?	- the teacher times the learners by allowing them to discuss.					8
How are	Principles of outcomes based education are emphasized. (what)	- rights of animals and cultural activities in context					
Are	Activities are relevant to learning outcomes? ^{eg judgment about development}	- groups learners make use of entire teach information in pages given to answer ques prepared by the teacher & reaching & understanding from it					
understanding	Activities are relevant and applicable to real world context.						
Correlation	Activities are extended beyond learner's immediate context.	- Reading the questions supported by the teacher according to grade learners					
new society	If the activities mentioned below are evident, how are they applied?	Self look for answers in the article. 'find out'					
stayed	* Educator encourages learner activity. (scaffolding, support) discussions						
environment	* Educator encourages learners to express their own ideas and values. Predictions, Discussing posters, mind maps	Monitoring the groups by going round and helping them to interpret the paragraphs in the article. - Learners report to the class					
contributed?	* Social skills are taught.						
new			Manip				
ceased			L.S.M.				
not how	* Integration of learning areas is evident. ^{with} L.S. (reading, speaking) Math: Mind map logic.	Lesson - integrates with L.S. & natural Sc. as learners find, discuss & find out					
the portfolio	Educator facilitates a process of peer learning.						
can and	Educator accommodates learners' needs by code switching.						
ceased	Educator uses different of facilitation. ^{groups} group work, lecture, questions						
out their	Educator asks questions that allow learners to reflect.						
beach	Overall comments:						
was it is							

--	--	--	--	--

E. Learner behaviour

	Insufficient	Sufficient	Highly sufficient	Not applicable
Learners' responsibility of their tasks.			✓	
Learners are fully engaged and focused on activity.			✓	
Engagement in constructive verbal exchanges between learners and educator.			✓	
Learners are co-operative and helpful with each other.		✓		
Overall comments: How teams are working with materials?				

F. Use of LSM

Indication of sufficiency appropriateness of resource materials in use during the lesson:

	Insufficient	Sufficient	Highly sufficient	Not applicable
Textbooks and curriculum-based activity books and worksheets			✓	
Media-based material		✓		
Library material (worksheets)				
Teacher resource materials such as charts, flashcards, pictures, puzzles		✓	✓	
Teaching equipment such as maps, scientific apparatus		✓		
Learning support materials used are appropriate for the grade level		✓		
Learning materials used are appropriate for learners ^{with} different backgrounds - ^{do not} (one from same)		✓		
Learners' work is visible in class		✓		
Overall comments on the use of				

- Evidence of selection of LSM + what has been selected.
- Evidence of adaptation of LSM + how materials have been used.

--	--	--	--	--

E. Learner behaviour

	Insufficient	Sufficient	Highly sufficient	Not applicable
Learners' responsibility of their tasks.			✓	
Learners are fully engaged and focused on activity.			✓	
Engagement in constructive verbal exchanges between learners and educator.			✓	
Learners are co-operative and helpful with each other.		✓		
Overall comments: How teams are working with materials?				

F. Use of LSM

Indication of sufficiency appropriateness of resource materials in use during the lesson:

	Insufficient	Sufficient	Highly sufficient	Not applicable
Textbooks and curriculum-based activity books and worksheets			✓	
Media-based material		✓		
Library material (worksheets)				
Teacher resource materials such as charts, flashcards, pictures, puzzles		✓	✓	
Teaching equipment such as maps, scientific apparatus		✓		
Learning support materials used are appropriate for the grade level		✓		
Learning materials used are appropriate for learners ^{with} different backgrounds - (one from same)		✓		
Learners' work is visible in class		✓		
Overall comments on the use of				

- Evidence of Selection of LSM + what has been selected.
- Evidence of adaptation of LSM + how materials have been

learner support material, resources and equipment: <i>Is the lesson done for the first time with the learners? (For methodology)</i> <i>- Use of consumable material (glue, prestick.)</i>				
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G. Assessment:

	Insufficient	Sufficient	Highly sufficient	Not applicable
<i>How does</i> Educator uses learners' prior knowledge at the start of a new lesson		✓		
Peer assessment		✓		
Assessment of higher order of skills		✓		
<i>Is the</i> Indication of assessment tools		<i>not applicable</i>		
<i>that are</i> Indication of assessment methods		✓		
Overall comments on assessment:				

THE USE OF LEARNING SUPPORT MATERIALS TO MEDIATE ENVIRONMENTAL LEARNING IN THE CLASSROOM.

A LESSON OBSERVATION TOOL 2

A. Researcher's details:

Name: Nomalungelo Nduna

Designation: Provincial Environmental Education coordinator

Date of observation: 14/05/2003

B. School and educator information

School name: Bylets Combined School, Cintsa East

Educators name: Mrs Nomvuyo Mbuyazwe

Grade observed: 4,5, 6 & 7 (a multi grade & multi phase class)

Learning area observed: Human and Social Sciences

Geographic location of the school:

What resources are available for use in this class?

C. The learning environment

How is the general appearance and arrangement of the classroom?

General appearance and learning environment satisfactory & conducive to learning. Learners work in groups previously arranged in the class for the activity work.

How are classroom resources arranged and stored?

Resources are arranged according to activities and are used very well during the lesson. Other resources and books are generally stored in cupboards & shelves.

Are learning support material readily available for use by learners and the teacher?

Required learning support materials are readily available for development & use. Resources available for use are people & the coast posters, water cycle poster, Enviro Teach, Coast Care fact sheets, work cards, waste material. The ^{C2005} policy document was used to plan the lesson. Very few textbooks are available and the teacher has to adapt other materials from magazines and use her creativity, making photocopies for activities.

D Methodology

How does the educator manage the classroom teaching time?

The teacher varies her teaching styles and sets time for educators to perform their activities and all the work is planned in advance.

Does the teacher state learning outcomes at the beginning of the lesson?

The teacher introduces her lesson by linking it to the previous theme in the unit, mobilizing prior knowledge and explaining the purpose of the lesson at the beginning.

How are the principles of outcomes based education emphasized?

Using a variety of teaching & learning methods, the teacher is able to achieve the outcomes of the lesson. She engages learners in brainstorming sessions, allows them to investigate answers in groups and report findings. Learners use learning support materials in a social context to knowledge through discussions.

How are the activities relevant to the learning outcomes?

Learners are given an opportunity to discuss pictures and link readings to what is happening in pictures, reading questions & seeking answers in text. The teacher introduced the activities by using the Active Learning framework, enabling learners to find out about importance of the sea, impacts of pollution & overuse of sea food to sea community & people and how this can be reduced.

How are the activities relevant and applicable to the real world and how are they extended beyond the learner's immediate context?

Audits are planned for a fieldtrip to the nearby sea. To develop values & attitudes amongst learners, the lesson is linked to energy use, waste management and action projects are planned at school linking to technology learning area.

How does the teacher apply her mediation role to support environmental learning in class?

- The teacher allows learners to brainstorm and identify sea resources, analyse them according to importance of people's daily living. eg. economy, tourism, industry
- Through the use of marine texts from Enviro Teach learners were exposed to reading and answer questions from word cards designed by the teacher.
- She explained difficult activities where learners found difficulties and helped the groups to read through the texts and answer questions, learners were encouraged to report on their findings and they did the activities very well and with interest.

E. Use of learning support material (LSM)

What evidence shows selection of LSM by the teacher?

Learning Support

- Materials were selected from a variety of resources ranging from poster, fact sheets, magazines and enviro sheets and were adopted for use for the lesson as shown in the main picture showing materials available for use in the classroom for supporting environmental learning.
- Worksheets were developed by teacher and used to answer questions from the texts.

How are the learning support materials adapted?

- Learning support materials are adapted from other sources of supply eg. Department of Water Affairs, Marine & Coastal management, School Water Action Project and new materials are developed by photocopying and adapting for the lesson on marine conservation. They are used for tuning in, finding out, reporting & planning for action

How are the LSM used?

- The LSM is used to identify sea & coast as resources distinguishing the importance of the sea species
- ~~Posters~~ Posters are used to discuss activities of human beings along the coast & in the sea and how they impact on the sea & sea species.
- Learners are engaged in cooperative learning through group and pair work constructively.

How do learners engage with the learning support material during classroom activities?

- Using marine conservation ^{resources} as a topic to expose learners to the understanding of use & management of natural resources
- They identify sea species, analyse and explain their value to existence. They develop the care & value of natural resources through discussions, sharing findings, investigate & analyse information
- Learners have an opportunity of distinguishing the right from wrong actions regarding the use of natural resources.

F. Assessment

How does the educator use the learners' prior knowledge?

- Questions are asked at the tuning in stage of the lesson to find out how much learners know about the lesson introduced.

What are the indications of assessment tools and methods?

- Learners are assessed in groups and in pairs as they ~~at~~ work and finish on time, report and share findings with the whole class.
- Learners' work in workbooks is shared amongst themselves and the teacher also assesses knowledge constructed, arrangement and whether the task was completed.

Journal entry describing contact sessions within the MEd. Research project. It indicates the role of the teacher in the use of Learning Support Material, to mediate environmental learning in the classroom.

JOURNAL ENTRY

MEETING: Planning meeting and two observation lessons

CONTACT PERSON: M. Mbuyazwe

PLACE: Bylets Combined School

DATE: 20/2/2003; 12/3/2003; 14/3/2003

DURATION: Day 1: 2 Hrs ; Day 2: 1 Hr 10 mins; Day 3 1 HR 30 mins

Planning Meeting (Reflections)

20-2-03

This was an important stage because before anything could take place planning is vital. We planned about how we are going to work together and what did we want to achieve. I know my role and responsibilities in terms of what to do. This was a negotiation process where we shared about the whole process. Mbuyazwe told me that she will concentrate on the LSM and she brought me resources which played an effective role in lesson plan planning. Also the use of argument, she made it clear that I have to use it. This made me very comfortable and confident for what I am doing.

12-03-03

REFLECTIONS ON SOURCES OF WATER

How + did the Activity

learners draw their mindmaps to illustrate water from rain until it reaches underground. Thereafter they used a water cycle poster to compare with what they had done in their groups. They had to fill in a worksheet with words

that show underground water. They had to talk about the problems encountered at school in relation to our groundwater. In conclusion learners use underground water poster to identify environmental issues and health problems and come up with solutions or alternatives.

What I liked about the activity
Learners were actively involved, sharing their ideas, observing the pictures. The watercycle poster with its arrows was a good resource. By the time the early conclusion learners could easily identify environmental issues and health problems. The use of resources make the activity very effective because learners could talk and think.

What I didn't like

Some learners find it difficult to find out what was happening in the poster. Others couldn't even read the words. I didn't know how to use the poster and it took me a long time to plan.

Improvements

If the poster could have a guide so that it would be a user friendly. In terms of learners that cannot read, will make spelling lessons so as to address the reading and writing problem.

Water Quality

17-03-03

In doing this activity I used mostly that small booklet from water kit. The worksheets helped me in conducting the lesson but those worksheets were a bit confusing. They are not straight forward. For example when it asked my learners to observe water in terms of colour, they told me what colour the water is, whereas I wanted the water like good / not so good / OK. To further clarify this I have realised that next time I will change the worksheet and design them in another way. Then the format of those worksheet in that book will be used in conclusion. In fact the whole kit is not easy to understand even the use of slide to see levels of pollution is not easy to understand. I didn't know how to use the slide until Lurji came to my school. I also gained a point of improvement when Lurji told me that when using that worksheet on catchment area history, I should take the learners outside so that they could see what they are talking about.

14/05/03 My Journal entry (Researcher's)

Lesson observation 3

I arrived at Bylets school at 11.30am due to transport problem. The learners were out for 30 minutes break. The teacher took me through the learning and teaching materials she was using for the lesson. The lesson she was going to present was a Social Science learning area. The outcomes chosen were SO 4 (Make sound judgements about the development, utilization and management of resources) and SO 6 (Demonstrate an understanding of the interrelationship between society and the natural environment). The theme chosen is environment and the ~~the~~ topic is marine conservation.

Resources ~~used~~ available for use are: People and the coast poster, water cycle poster, Enviro-teach, Knot care fact sheets, work cards, waste material. The C2005 policy document is used for preparation + choice of SKVA to be taught. The teacher informed me that she used ~~the~~ the resources to plan her lesson and developed other materials from additional resources like magazines, fact sheets, cartridge paper, used photocopier to have enough copies for the learners.

The class is ~~comprised~~ of a multigrade class of grade 6 & 7 learners. They use their rule books for writing. Textbooks are not available ^{enough - may be one or two copies} for the ~~whole~~ ^{entire} class, what the teacher does is to photocopy the exercises or activities she wants the learners to use.

Teacher's role

Introduction: Question and answer from

facts sheets ^{distributed to groups} while learners are ^{what they see} investigating and discussing answers.

- The learners are sitting in group
- Key words and concepts built.

Diamonds, swimming, birds eating fish, sharks, people and what they do, beach & bay, tortoise

- Discussion on caring and protecting the sea.

- Importance of sea food & the sea - ^{brings} money
Jobs/Work, rain ^{cloud} formation, sea food,
(renewable water cycle) - water vapour using the
Water cycle poster and the teacher leads
this discussion by asking questions

- Activity 2 - 'Fishing out'

In groups of grade 6 and grade 7
learners are given the curio teach and
questions by the teacher. They search the
questions and find out answers from the

for sub topics they read from articles
on page 5, 10 & 11 eg P5 - Salt & sea (Group 1)

P10 - Recreation (Group 2) P11 food (Group 3, grade 7)

and P10 - sea as a source of oxygen (Group 4, 6th)

from a group ^{one learner} read questions and one reports.

- Assessment is done by group peers.

- From the readings new words came up eg
natural 'Stone age people' and the teacher explained
the meaning & how they related with the sea
and ^{the} ^{interrelationship} ^{with people} - Reading done by learner and the teacher
is always explaining, more - More role (literary)

- Utilizing
prior experience

- Investigating
skills,

- Learning what
they see

* Active Learning
Framework &
construction
underpin of
teaching & learning
Process & content
lines

Information
given after
brainstorming
Discussions,
communication

Learner participation

- Integration

with LCC
& HSC
shown where

- Learners are
given an
opportunity to
read and
discuss

about pictures

- They also
posed their
questions to
the teacher eg
is it not better
not to have
sharks so that
no people are
eaten?

we - Questions are related to the learners
 context eg. Visitors to Cintra East coast & why
 re they concepts 'economy' (Group 2)
 visited - Occur, chemical reaction, diluted salts
 - The teacher sometimes use the mother
 tongue 'Yhosa'
 - Scientific names like 'Sodium
 chloride + H_2O adaptation of animals to salty water
 were explained.
 - Work away task & Research on, economic
 cultural & religious stories about
 relation ~~of~~ between people the sea
 2 Find out about licences on fishing

Thinking skills
 are sharpened
 & value &
 attitudes
 developed
 towards
 tourists
 as they bring
 money & boost
 economy of
 the area &
 country's
 benefit

The teacher gets skills and capacity
 building from S Advisor (DOE) & NESP (Valuable)
 GET service provider (Laura Conde)

1. ROUGH BROAD CATEGORIES

Appendix 6

DATE: 23 July 2003

SUBJECT: CATEGORISING AND INTERPRETING DATA

THEME B: USE OF LEARNING SUPPORT MATERIAL (LSM)

<u>SUB CATEGORY</u> box	<u>Comments</u>	<u>REFERENCE</u> <i>reflection</i>
Accessing LSM	- Materials ^{are} supplied by the NEET - GET cluster service provider during workshops and by the Provincial coordinators for NEET-GET. - Other material is <u>supplied</u> by the aquarium in East London, Department of Water Affairs, Department of Environmental Affairs, the Department of Education * The teacher uses the material <u>to plan her lesson activities</u> and mediate environmental learning in class with learners. * She <u>adapts and redesigns</u> LSM to suite learners' context & needs especially where there shortage of material. She photocopies from magazines and also from the textbooks as they are very few and not enough for all learners, then cuts and pastes on cartridge paper to redesign questionnaires and worksheets for the Marine Conservation lesson, and the Water lesson and Healthy food lesson. (Non availability of textbooks led to teacher's development of creativity)	- Researcher's Journal 1 (RRJ1) - Teacher Interview Transcripts Appendix 5 (TIT Apps) - Figure 4.2 & 4.3 - Teach Reflection Journal 1 (TRJ1) - RRJ1 - Fig 4.10a, 4.10b, 4.10c, 4.10d, 4.10e - RRJ3 - Field Notes (FN2)

SUBCATEGORY BC

COMMENTS

REFERENCE

Professional Development
Creativity

Development of LSM

Interpretation of Learning

(Norms & Standards)

* The teacher showed ability to adapt and redesign learning support material from other materials to develop activity worksheets with learners, creativity is developed.

The teacher acknowledges the importance of negotiating and sharing the process of research before it starts. She

she mentioned that resources played an effective role in lesson unit planning and also the use of policy documents.

This process made her confident and comfortable for doing her work. As we continued to reflect after each lesson and shared journal entries, the teacher improved her planning. The second and third lessons showed integration of other learning areas in the planning stage.

The teacher used the Active Learning Approach in the second and third lesson explicitly and the learners showed a lot of enthusiasm and participation increased.

Worksheet 1

Teacher's Reflection Journal 1

20/2/03 (TRJ1)

TRJ 1

TRJ 1

Sub Category Bd	Comments	REFERENCE
Engagement of learners Active learning	• learners develop mind maps tracing the water cycle, using the water cycle poster up to groundwater • Using activity sheets and sentences cut from text, learners <u>trace</u> route of ground water to the surface and are supported by the ground water poster to <u>compare</u> with their work	Lesson Learning Activities (LLA P1) Fig. 4.5 + 4.6a + 4.6b
Interaction with LSM	• learners answer questions related to water importance, usage, water cycle and problems in water in their books	Figure 4.6(c) (learners' work 1) Learners work 2 12/3/03
LSM Elaborates & modifies childrens' Schemata	• learners use the LSM to negotiate meaning, construct new knowledge, develop new skills and engage in critical thinking and have fun in and out of class in water quality studies • learners use LSM to make meaning of text and report findings supported by teachers worksheets and texts in resource books on marine conservation.	Figures (photographs, video recording and learners work) App 4 4.7a, 4.7b, 4.7c, 4.8a, 4.8b, 4.8c
Collaborations	• learners take leadership roles in reporting their findings and engage in communication, writing answers in books • Using the Enviro Teach, worksheets developed by the Teacher and Marine Fact Sheet, learners use enquiry	Figures (Photographs 4.9a, 4.9b, 4.9c, 4.10f. Figure 4.9b

Sub-Category Bd	Comments	Reference
Engagement of learners in communication *	Skills to investigate geographical and environmental concepts like sea & coast, sandy beaches, location of their sea, economical value in the HSS lesson on Marine Conservation • learners brainstormed ideas as they discuss questions from the teacher. and mindmaps were developed from the ideas like causes of marine pollution, effects of marine pollution, sea resources. • Learners ^{identified} and analysed sea resources identified in pictures and from their own prior knowledge according to their importance as support systems to people and other animals at sea. • This activity was done in groups and learners write their findings and reported. • In the life Orientation lesson learners interacted socially with the LSM as they discussed the activities 2, 3 and 5. This enabled them to make informed	RR13 Learners work Figure 4.9a Fig 4.9b Field Notes (FN 2) Fig 4.9c Field Notes (FN 2) FN 2



recreation

1. Why do people love visiting our coastline for recreation.
2. Do other people from other countries come and visit Costa Rica coast. What do they like about Costa Rica.
3. If there are people visiting Costa, what does this mean in terms of its economy and S.A as a whole.

Water activity sheet 7

Water from underground

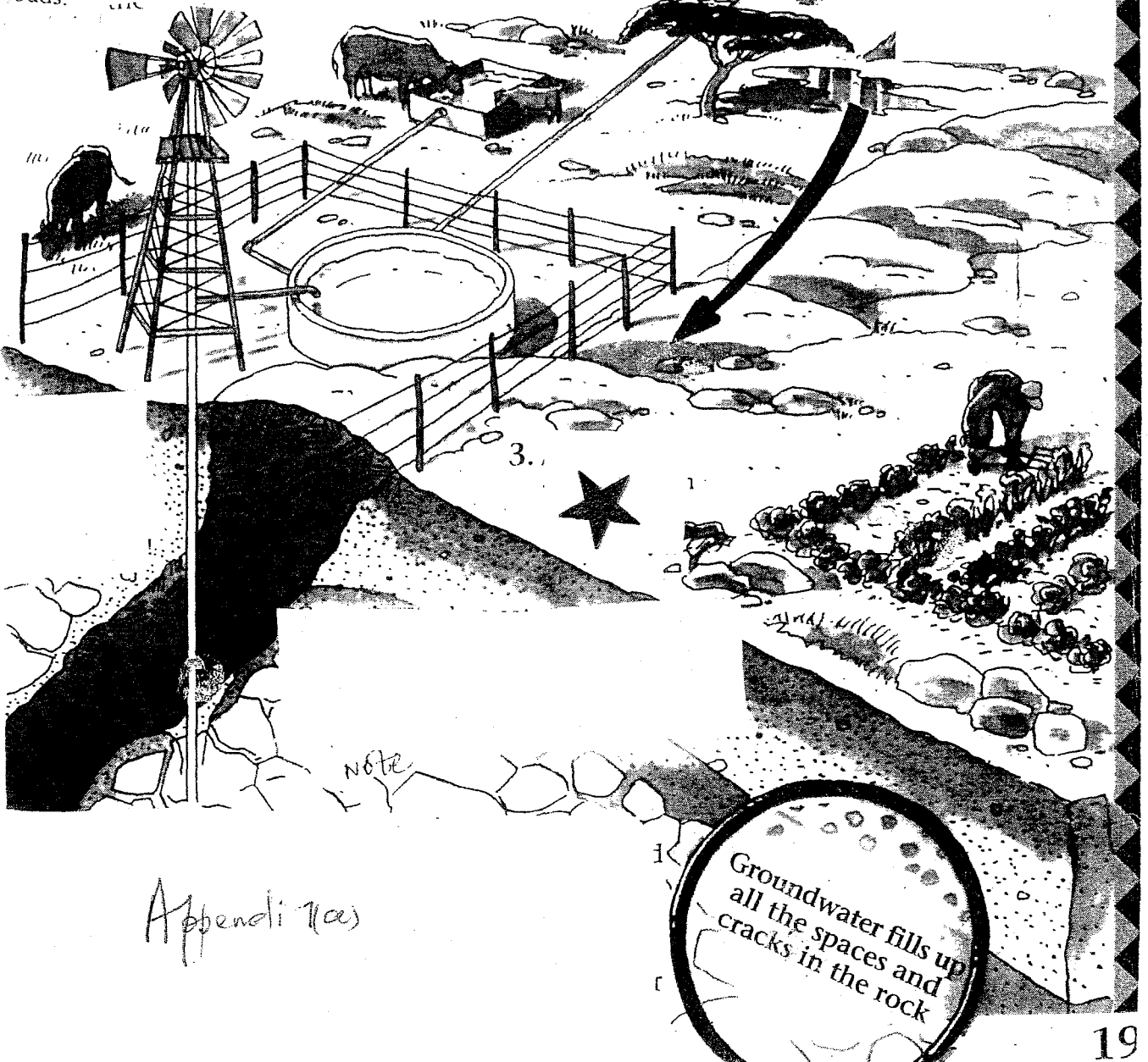
Some of the rain soaks into the soil and is used by plants. Some collects in puddles, rivers and dams.

Some of the groundwater we pump up and use could have been underground for hundreds or even thousands of years!

A very small amount of rain soaks into the ground.

Rain falls from the clouds.

Groundwater does not stay in the same place. It moves very slowly downhill. In some places the groundwater is near the surface of the ground and the water comes out as a spring. Do you know anyone who collects water from a spring?

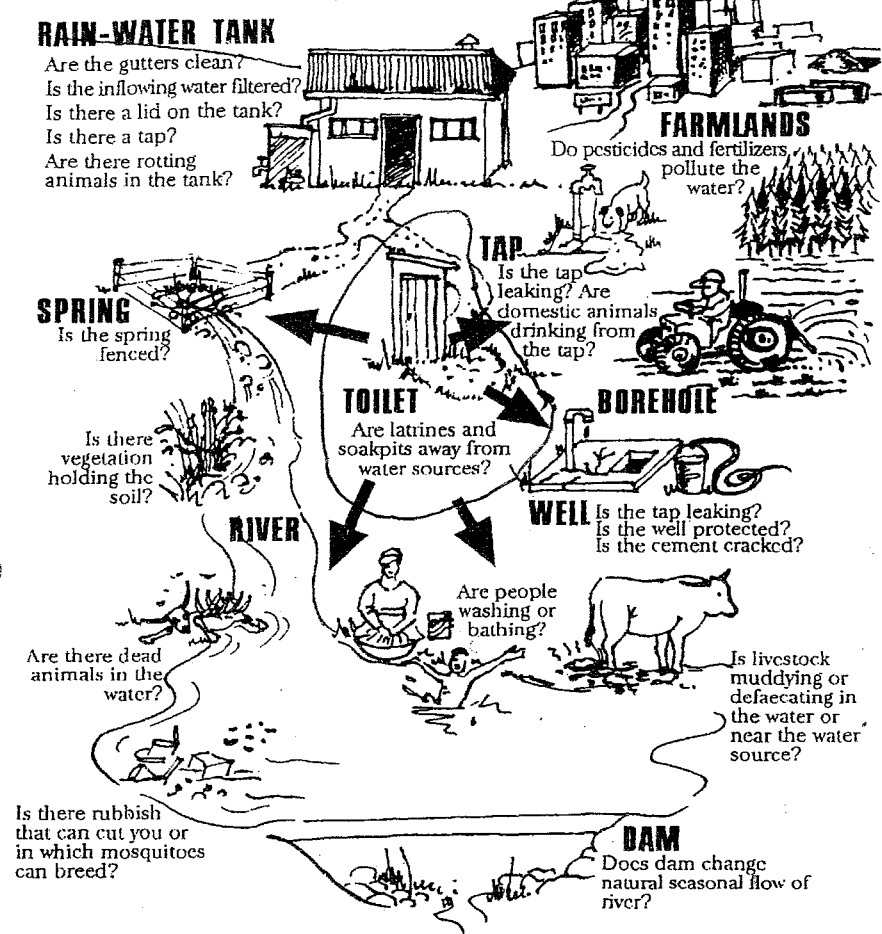


Appendix 7(a)

group ...
 10meters ...
 TOWN WASTES
 Are dump and sewage works well managed and away from waterways?

17-06-2005

Appendix 7c



Our water supply is
 (Tick an agreed audit score and transfer to page 19.)

BAD	not so good	OK
-----	-------------	----

Health risk is
 (Tick an agreed audit score and transfer to page 19.)

BAD	not so good	OK
----------------	-------------	----

Question

Answer

Grade 24/05/2003

W/S/S

Appendix 8a



- (a) The salt in the sea comes not only from the sea itself, but also from the earth.
- (b) This process has been happening over millions and millions and of years so the sea has become salty over time.
- (c) The salts also come from the sea itself.
- (d) ~~Through this process~~ this happens through chemical reactions in the very deep sea where the outer crusts of the earth sometimes shift.
- (e) There are many kinds of salts diluted in the sea, but the most common one is sodium chloride.
- (f) The concentration of the different salts dissolved in seawater is similar to that of body fluids (water) solution with salt and other minerals inside the bodies of animals.

Val
Excellent

Phumlen

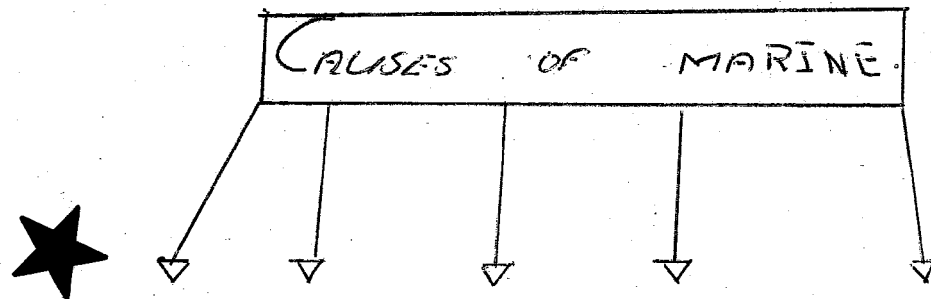
Damoyi

Grade 7

Appendix 8b

MARINE POLLUTION

H.S.S.



Factories

ships

cars

People

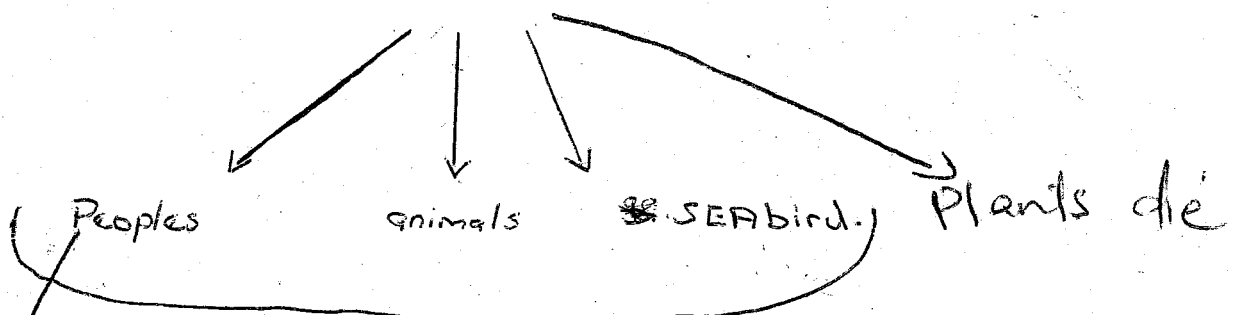
MINES

WHY DO WE HAVE POLLUTION?

money dump chemicals
enjoyment Noise
oil
Ignorant dump toilet dirty water.

EFFECTS

KILL people, people, animals



Culture is affected
Region is affected
POLLUTION.

LOSS OF BIODIVERSITY

LOSS OF JOBS

Excellent
M

FOR THOUGHT

his activity, you will:

Identify nutrients in food.

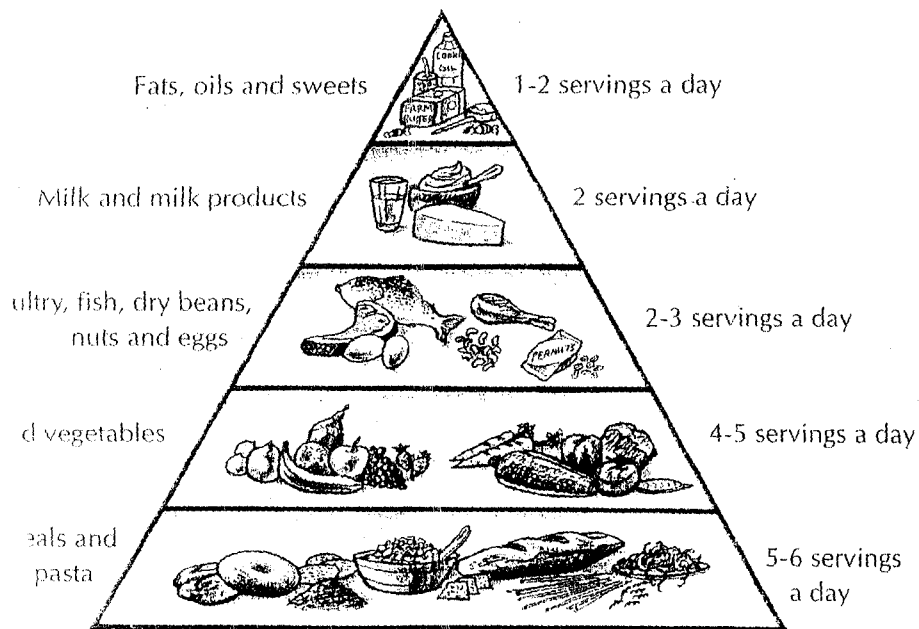
Create and present a food pyramid.

Select on, summarise and discuss food pyramids.

Become aware of differences in the food we eat, perhaps because of our different cultural backgrounds.

Groups

The teacher will divide the class into 5 groups. Each group will work with a different food group from the food pyramid.



Nutrients are substances in food that nourish the body, so that it will grow strong and healthy.

Carbohydrates are the main nutrient found in the **Grains and Starches** group. It provides the body with energy.



Calcium - is the main nutrient found in the **Dairy** group. It helps to build strong teeth and bones.



Protein - is the main nutrient in the **Meats and Beans** group. It helps to build strong muscles.



Vitamin A - is the main nutrient found in **Vegetables**. It gives us healthy skin and helps us see well.



Vitamin C - is the main nutrient found in **Fruit**. It helps the body to heal and grow new cells.

Activity 1

- Study the food pyramid and discuss the foods in the food group given to your group.
- Write down the recommended number of servings needed daily in this food group.
- Write down the name of the most important nutrients in this food group.
- Present the following information on your food group:
 - Name of food group.
 - Foods that are included in this group.
 - The most important nutrients found in this group.
 - The function of these nutrients in the body.
 - How many servings we need per day.

Activity 2

Work in groups

Build your own food pyramid.

Create a class food pyramid on a large sheet of paper. Each group will be responsible for its own food group.

PROGRAMME ORGANISER	ENVIRONMENT	ACTIVITIES	RESOURCES	KNOWLEDGE	SKILLS	V. A T T	ASSESSMENT
CRITICAL OUTCOMES	LEARNING OUTCOMES						
★	SO5- Use Scientific knowledge and skills to support responsible decision making	★ 1. Talk about Water Sources around the school ★ • Identify the water source ★ • Observe the water through colour and smell. ★ • Talk about possible health risk in the environment	★ Observation sheet ★ Worksheet	★ borehole ★ Dam ★ Tank ★ Tap ★ PH latrine ★ Rubbish ★ Vegetation ★ gutters	★ Identify and analyse ★ observe ★ interpret ★ Identify several points of health related attitudes to the problem	★ Cooperation ★ Presentation ★ Tool - worksheet ★ Method - Peer	★
★	SO3 Apply Scientific knowledge and skills to problems in innovative ways	★ 2. River Catchment History ★ • Groups will be divided and given some questions as the guiding activity to observe and talk about the river catchment	★ checklist ★ Worksheet	★ Natural ★ Vegetation ★ Wetland	★ Analyse ★ observe ★ interpret	★ Technique - ★ Appreciation ★ Presentation ★ Tool - Checklist ★ Method - Peer	★
		★ 3. River Quality ★ Learners will be arranged in groups and answer the 3 questions that will be provided	★ Worksheet	★ Litter ★ Dead ★ animals ★ Sewage	★ observe ★ analyse ★ observe ★ experiment ★ decision in a ★ making	★ Answer ★ Technique ★ of the water ★ Method - peers ★ Tool - worksheet	★
		★ 4. Learners will be bug and find how sensitive the pollution is in the dam at the school	★ Budget	★ Insects ★ Sensitive	★ observe ★ compare ★ experiment ★ compare	★ Answer ★ Technique ★ Method - ★ Tool - Worksheet	★

DRÖGHTIGKEIT ERNÄHRUNG

(Critical, Outcome)	Learning Outcome 2
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SC3- Use Scientific Knowledge and Skills to support responsible decision making

303 Apply
Scientific
knowledge
and skills
to problems
in new and
ways

A NEW STILLBORN

- ★ Tell About Water Sources around the school.
- ★ Identify the water source.
- ★ Observe the water-through colour and smell.
- ★ Talk about possible health risk in the environment.

the River Catchment History Groups will be divided and given some questions as the Quadrants activity to observe and talk about the river catchment

3. Power Quality observation-recorders will be carried in groups and answer the 3 questions that will be provided

4.  learners were a bugathol and
find how sensitive the
pollution is in the clam
at the school.

RESOURCES

Observed
Sheet

25/8/87

Checklist

Worksheet

Buckley

Knowlton

Love to
Lani
Tank
Tap 

Pitlatrine
Rubbish
Vegetation
Judlers

Natural Vegetation Wetland

Wetland

Letterhead
Animals
servo.

Insects Sensitive

544175

Identify
analyse
observe
interpret.

Identify points of views related to the problem

Analyse.
observe
interpret

observe
analyse
criticism
experiment
education
marketing

observe
compare
experiment
compare

1. 凡

Co-Operative

development
health
attitude

Appreciation
sense of
belonging

Answer
to the
quality
in a
year

★ Award

Assessment

Technique.
Presentation
Tool - work sheet
Method - Peer

Terbongue -
Presentation
Tool - Checkbook
Method - Pen
Terbongue

Technique. Exper
Method. Failure
Tool. Workshop

VIDEO RECORDING TRANSCRIPT

DATE: 12 March 2003
VENUE: Bylets Combined School
LESSON 1: Water
SUB-TOPICS: Water cycle, Water quality
CLASS: Grades 5, 6 and 7 (Multi grade class)
LEARNERS IN CLASS: 16

Activity 1: (10 minutes) Drawing on prior learning

The lesson started at 11h00 to 12h00 with the first topic on water cycle. Learners were divided into 4 groups. Learners were given papers and asked **to draw** the water cycle as they imagined it to be. After five minutes they put up their group diagrams and **report** to the class clapping after each reporter as a way of encouragement. They critically **assessed and discussed** the logic of water flow against a water cycle poster put up by the teacher. The principal and service provider helped by giving posters to the groups.

Figure 4.8 Learners assessing completed water cycle diagrams

Activity 2 (10 minutes) Water cycle

Using a water cycle poster (see figure 4.3) the teacher explained how water is generated. She explained the words like condensation, evaporation and precipitation. Learners were then asked **to write** a paragraph or flow diagram of how rain develops. Learners showed their completed tasks to the teacher and she marked the learners' work and made comments in writing. At the end of the lesson learners could report that:

- Water evaporates from the sea, land, dams and rivers and condenses into clouds.
- Rain falls and flows down mountain slopes and falls on the earth as precipitation

Activity 3 (10 minutes) Ground water

Learners were divided into two groups. Group 1 was asked to **cut out** sentences highlighted by the **teacher (see figure 4.9)**, mix them and hand them over to group 2. Group 2 worked for 5 minutes in pairs **reading, discussing, making informed agreements and rearranging and matching sentences** with pictures in another

worksheet to **develop a sequential** story of underground water formation, storing and use (see appendix 6 and 7). They read the completed task to the class.

Learners did group assessment using the original worksheet. Those who could not finish or do the task correctly were allowed to make corrections at home.

Figure 4.9 Learners cutting and rearranging underground water sentences

Activity 4 (10 minutes)

Sources of water

The teacher asked questions to **answer in their workbooks** such as:

- What are the sources of water in the school?
- What problems do they get from the borehole used by the school?
- What causes pipe blockages?
- At what time of the year does the dam get dry?

After 5 minutes the teacher allowed learners to read their answers. Learners were asked to **suggest possible solutions** to the problems identified.

The teacher put up a poster showing a borehole and human activities (see figure 4.3). For 5 minutes learners were asked to **identify environmental problems** in the poster, how they might affect the community, water systems, vegetation and animals. They came up with statements such as:

- Open toilets and waste coming out
- People using water full of germs (contaminated water > teacher's input)
- Oil coming out of the pipes into the water in the dam causing pollution
- Abantwana badlala ngamanzi amoshakale (children playing with water and wasting it)
- Ibhokwe isela amanzi amdaka (a goat drinking polluted water)
- A child toileting in the open space and causing pollution

The teacher wrote all answers on a flipchart

Learners were asked to **predict** how the issues identified could be ~~dangerous to the~~ water systems (effects of pollution on water). They came up with answers such as:

- Rain will fall and wash the ~~waste from~~ the child's toilet

- Rubbish under the tree flows into the waterways and spoils underground water with germs
- People drink the contaminated water and get diseases like cholera and skin rash

The lesson ended up with the teacher explaining the processes of precipitation, underground water formation and storage for use and contamination of water.

My comments:

Knowledge has been constructed through social interaction with learning support materials used (posters). The teacher encouraged learners to speak by repeating and explaining her question where learners could not understand, such as understanding how precipitation occurs

The teacher invited the principal and service provider and they gave support by handing out learning support materials to the groups and encouraged learners.

Learners were engaged in activities that promoted skills like reading, communication, taking decisions and assessing
They understood the development of underground water as they read the sentences.

Learners were rushed in doing the activities, they seemed to need more time to read and understand the content of the sentences, especially the learners in grade 5. Some learners struggled to read. The teacher and other learners who were fluent enough helped those who were having difficulty in reading. The teacher commented after the lesson that the problem of multi grade teaching played out when learners had to do the same activity although they were not on the same par in language proficiency.

According to my observation the teacher had a problem of planning different activities and LSM for the two grades using one topic (scope and depth).

The overall impression was that although the lesson had many activities, it was well planned and the LSM used was relevant to the activities. Teaching was learner centered. Most work was done by learners did most of the explorations using the posters. The teacher used the active learning approach (see appendix. She allowed learners to engage in finding and sharing information, exploring and questioning ideas and reporting issues identified. The teacher was scaffolding as she helped learners in groups and when they reported.

