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A case study of the integration of environmental learning in the primary school curriculum

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DECLARATION

I declare that this study entitled

A case study of the integration of environmental learning in the primary school curriculum

is my independent work and it has not been previously submitted for a degree or any other examination at this or any other university.

Mmahlomotse Sekinah Sehlola **Date**

…… ……

DEDICATION

This dissertation is dedicated to those who really love me, especially my mother, my grandmother, my uncle, my partner, my sisters, my cousins and my daughter. Secondly, I dedicate this work to the four teachers from Tshwane South Region in Gauteng Province, without whom this study would not have been a success.

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ABBREVIATIONS

AERA	American Educational Research Association
CI	Curriculum Implementer
CTMM	City of Tshwane Metropolitan Municipality
DEA&T	Department of Environmental Affairs and Tourism
DoE	Department of Education
EE	Environmental Education
EECI	Environmental Education Curriculum Initiative
ESKOM	Electricity Supply Commission
GDE	Gauteng Department of Education
HOD	Head of Department
IEA	International Association for the Evaluation of Educational Achievement
NEEP	National Environmental Education Programme
NEEP-GET	National Environmental Education Project for General Education and Training
NGO	Non Governmental Organisation
OTL	Opportunities to Learn
PNBG	Pretoria National Botanical Garden
RSA	Republic of South Africa
SA	South Africa
SANBI	South African Biodiversity Institute
SASA	South African Schools Act
SIMS	Second International Mathematics Study
SMT	School Management Team
USA	United States of America
WSEC	Walter Sisulu Environmental Center
WSSD	World Summit on Sustainable Development

SUMMARY

In line with international developments, the Department of Education in South Africa (SA) recognises environmental education as a key vehicle to respond to the national and global environmental crisis (DoE, 2001, P. 3). For this reason, the post-1994 education provision sought to infuse environmental education into the new curriculum called Curriculum 2005. The White Paper on Education and Training (RSA, 1995) perceived environmental education as a means to a better quality of life for all people and argued that it should be integrated at all levels of the SA Education and Training system. The White Paper further stated that "environmental education, involving an inter-disciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of the education and training system, in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources" (RSA, 1995, P. 22).

How have the schools responded to this challenge by the new integration policy? How is the environmental learning provided for in the primary school curriculum across SA? What resources exist to make environmental policy workable in schools, and how are these resources mobilised and organised to promote learning? These and other questions formed the basis for the present inquiry.

An Opportunity to Learn (OTL) study was conducted to explore how one primary school in SA provides OTL about the environment. The main aim of the study was to understand the manner in which teachers integrate environmental learning in the school curriculum. A qualitative research approach was used as a mode of inquiry for this study. Interviews, classroom observations and document analysis were used as data collection methods. The findings of the study suggest that *Sechaba* Primary School has managed to integrate environmental learning in its curriculum through the help of non-governmental organisations (NGOs) and other stakeholders.

The research concluded by arguing that OTL about the environment appear to be enhanced where there are strong connections between the schools and NGOs.

Specifically, the following set of recommendations was documented:

First, local leadership and agency are required to pursue the various opportunities and resources to build the school's capacity for environmental learning. Schools should be encouraged to designate and support local leaders to take responsibility for driving the integration of environmental learning into their curriculum. Such integration is too important and maybe too demanding to be left to individual teachers independently in their own classrooms.

Second, converting the latent capacity and/or physical and intellectual infrastructure for environmental learning into real OTL about the environment for the students will continue to remain a challenge for some of the teachers while others have managed the integration in some exemplary fashion. Opportunities for teachers to observe each other, plan together and work collaboratively on issues of integration should be created at school and district level.

Third, it is critical that all teachers undergo in service training regarding the implementation of environmental education, and such training should provide teachers with enough time to learn. One of the major limitations of the Department of Education's programme of implementation of the new environmental learning policy has been the inability to provide teachers with enough time to learn and implement the new ideas of the revised national curriculum statement.

Finally, it is important to reiterate the importance of providing adequate resources for implementation of environmental learning from the Department of Education. Having said that, however, the case of *Sechaba* has demonstrated how such resources can also be mobilised from elsewhere outside the system. Encouraging beneficial partnerships between schools and NGOs may in itself be a valuable resource to

encourage many primary schools in SA for whom government resources in this field continue to remain inadequate.

KEYWORDS:

Opportunities to Learn (OTL)
Environmental Education (EE)
Environmental Learning
Curriculum integration
Case study
Teacher professional development
Resources for learning
Non-Governmental Organisations

CHAPTER 1

1. BACKGROUND AND INTRODUCTION TO THE RESEARCH STUDY

1.1 INTRODUCTION

Prior to 1994, the school curriculum in South Africa (SA) was designed primarily to perpetuate the systematic inequalities among the various population groups in the country. The structure of the education system for black people then (during the apartheid era), was directed by the Bantu Education Act of 1953. Bantu Education provided black people with the kind of education that was of less quality in terms of resources, qualified teachers, schools, *etc*., while other racial groups were by comparison provided with relatively better education (DoE, 2000). Christie (1991) highlights the fact that black education was generally ignored, thereby resulting in inadequate provision of educational opportunities for the black learners.

After 1994, significant initiatives were undertaken to create a fair and equitable society in an attempt to correct past inequalities of the apartheid regime. A new education system, aimed at developing an equitable system that offers good quality education and training to all learners, was put in place. The main aim was to provide equal educational opportunities for all school going children in the country (Pretorius & Lemmer, 1998). However, in spite of these laudable initiatives, Yamauchi (2004) observes that opportunities for education in public schools in SA are still unequal among racial groups, even after apartheid. This observation, notwithstanding, there have been significant initiatives within the system, amongst which has been the introduction of Environmental Education (EE) in primary schools. EE was introduced as a theme to be learned by all learners, through the implementation of the National Environmental Education Project for General Education and Training (herein referred to as NEEP-GET). The NEEP-GET focused on the development of teachers, teacher educators, and

curriculum implementers to fully implement EE in the SA schools. The primary aim was to encourage the implementation of environmental learning programmes in the schools and the classroom context (DoE, 2004).

In a Report of the National Environmental Education Programme for General Education and Training Pilot Research Project, Kader Asmal (then Minister of Education) declared that through the NEEP "the SA government would contribute towards redressing the imbalances of the past so that all SA, urban and rural, present and future would enjoy a decent quality life" (DoE, 2001). In other words, the NEEP was also designed to help equalise the learning opportunities in this subject area for all SA learners irrespective of the geographical location. What is critical to explore at this juncture, however, is the question of how the many primary schools in SA have responded to this call by the Minister and the extent to which they may have created the OTL EE, as a result of the new national policy initiatives.

1.2 BACKGROUND TO THE RESEARCH PROBLEM

According to the South African Schools Act (SASA), No. 84 of 1996 all learners have a right to access basic and quality education irrespective of race, ability, gender and socio-economic background. This is premised on the Constitution of the Republic of SA (1996), which states that everyone has the right to basic education which the state, through reasonable measures, should make progressively available and accessible (Constitution of the Republic of SA, 1996). Accordingly, no person should be denied an opportunity to receive an education to the maximum of his or her ability.

In line with international developments, the Department of Education in SA recognises EE as a key vehicle to respond to the national and global environmental crisis (DoE, 2001, p. 3). For this reason, the post-1994 education provision sought to infuse EE into the new curriculum called Curriculum 2005.

The White Paper on Education and Training (Republic of South Africa (RSA), 1995) perceived EE as a means to a better quality of life for all people and argued that it should be integrated at all levels of the SA education and training system. The White Paper further stated that “environmental education, involving an inter-disciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of the education and training system, in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources” (p. 22).

How have the schools responded to this challenge by the new integration policy? How is the environmental learning provided for in the primary school curriculum across SA? What resources exist to make environmental policy workable in schools, and how are these resources mobilised and organised to promote learning? These and other questions formed the basis for the present inquiry.

Furthermore, the Constitution of the Republic of SA 1996 protects the right of every citizen to “an environment that is not detrimental to his or her health” (South African Constitution, 1996, p. 11). The newly-developed Curriculum 2005 thus recognised the importance of the environment in the curriculum through the phase organiser on ‘environment’, and through a number of other environmentally focused specific outcomes (DoE, 2001, p. 3). According to the Revised National Curriculum Statement Grades R-9 (Schools) (DoE, 2001) phase organisers which originated with C2005 have been scrapped and environment is dealt with and provided for in the curriculum as per learning area statements.

The Manifestos on Values, Education and Democracy (DoE, 2001) identifies ten fundamental values of the Constitution. The Manifestos further identifies 16 strategies for familiarising young South Africans with the values of the Constitution of which one refers specifically to the environment:

Promoting ethics and the environment (DoE, 2001, p. 7-8).

The curriculum aims to develop the full potential of each learner as a citizen of a democratic SA. It seeks to create a lifelong learner who is confident and independent, literate, numerate and multi-skilled, compassionate, with respect for the environment and ability to participate in society as a critical and active citizen (DoE, 2001, p. 8). The Revised National Curriculum Statement has tried to ensure that all the Learning Area Statements reflect the principles and practices of social justice, respect for the environment and human rights as defined in the Constitution (p. 10). For instance:

- Natural Sciences learning area statement is based on the appreciation of the relationships and responsibilities between science, society and the environment,
- Social Sciences learning area statement is concerned with what learners learn and how learners learn, and how learners construct knowledge. The Learning Area Statement encourages learners to ask and find answers to questions about society and the environment in which they live.
- Life Orientation learning area statement focused on its five areas which address the human and environmental rights outlined in the Constitution,
- Economic and Management Science learning area statements are concerned with entrepreneurial skills and knowledge needed to manage human lives and environments,
- Technology learning area statements are based on economic and environmental factors and wide range of attitudes and values need to be taken into account when developing technological solutions. It is in this context that technology is defined as “the use of knowledge, skills and resources to meet people’s needs and wants by developing practical solutions to the problems while considering social and environmental factors”. (DoE, 2001, p. 22-28).

The latter efforts were bolstered by the Department of Environmental Affairs and Tourism (DEA&T) together with the Environmental Education Curriculum Initiative (EECI) who contributed to the transformation of the school EE curriculum, by encouraging the establishment and implementation of learning programmes around the phase organiser 'environment' within Curriculum 2005. The aim of these initiatives was to enhance the quality of education in SA schools and the quality of life of the SA people through effective EE (DEA&T, 1998). However, the quality of education received by the learners is determined by, among others, the conditions of the schools, better-trained teachers and improved methods of teaching and learning (DoE, 2000). An important question to ponder at this point in time of the country's democratic transition is whether the education reform policies of the new government have resulted in equity in the classrooms. In other words, what kind of learning opportunities have resulted from these policy changes and specifically what do the classrooms look like compared to the past? This is the question that this study sought to explore with respect to environmental learning. That is, what does the integration of environmental learning into the primary school curriculum look like in the classroom?

1.3 STATEMENT OF THE PROBLEM

Most of the policy changes discussed earlier do not address themselves specifically to the issue of how environmental education should be provided to learners of different backgrounds. This has been left, in most cases, to the schools and teachers in the classrooms. It is against this background that the present study sought to investigate whether these policy changes have resulted in equity in the various classrooms of SA schools, especially with respect to the provision of environmental learning in schools? How equitable are the resources and the environmental learning curriculum in the various schools? In this study, I investigated the Integration of environmental learning in the primary school curriculum using the case of one primary school as a focus. I was interested in

detailing how one SA primary school structures the opportunities for teaching and learning about the environment, in order to understand better how teachers in SA implement a new curriculum provisions in their classrooms, especially in a marginalised area like EE that has no specifically defined curriculum and learning content.

Research has shown that schools differ in the way they provide students with OTL. Some schools focus on a few learners with highly qualified teachers, while others focus on a large numbers of learners with less qualified teachers. Eventually, it would seem that those students who are taught by less qualified teachers have fewer OTL than those who are taught by highly qualified teachers (Stein, 2000). Other OTL studies have demonstrated that black students are more likely to be taught by less qualified teachers, have less access to resources, and high-quality instructional practices. As a result their OTL become less (Oakes, Ormseth & Camp 1990; Oakes & Lipton, 1990).

One of the main weaknesses of the OTL literature, however, is that there are few studies: if any- that are conducted in developing countries, and almost none reported particularly for the SA context. Most of the existing OTL studies are based on American and European schools and focus mostly on Science and Mathematics. Yet, little is known about what actually happens in many classrooms, generally, causing some students to achieve and others not to achieve (McDonnell, 1995; Porter, 1989; Stevens, 1993; Wang, 1998). This is the problem I sought to investigate with respect to the teaching and learning of EE in the SA context.

1.4 AIMS AND OBJECTIVES

The aim of the study was to establish how environmental learning is integrated into the school curriculum at one primary school, *Sechaba* Primary School in the

Gauteng Province of SA. To accomplish this aim the following objectives were pursued:

- to explore the types of resources (human and non-human) that primary schools employ for the teaching and learning about the environment;
- to investigate the way these resources are identified and organised to maximise the OTL about the environment in the school; and
- to find out the manner in which the specific organisations of resources for the teaching and learning about the environment in the primary schools can be explained.

1.5 RESEARCH QUESTIONS

Using the context of one province in SA, I sought to answer the following specific research question:

- What kinds of resources (human and non-human) do primary schools rely on for the teaching and learning about the environment?
- How are these resources identified and organised to maximise the OTL about the environment in the primary schools?
- How can the specific organisations of resources for the teaching and learning about the environment in the primary schools be explained?

1.6 SIGNIFICANCE OF THE STUDY

When I was doing my primary schooling, around the 1980s, EE was not included in the school curriculum. As a consequence, I have personally had very limited

OTL EE during my own course of study. The only environmental activities that I found myself engaged in were used as forms of punishment and not as an integral component of environmental learning activities (for example, picking up papers, cleaning the toilets, doing gardening *etc*.). Later on as a primary school teacher, I quickly realised early on in my career that, learners had little or no understanding of what EE was all about.

My own personal experiences and observations find resonance with the literature that point to a general problem with the integration of EE into the curriculum in SA in the past. The nature of environmental knowledge at classroom level differed noticeably from one department to another and from one school to another. Such differences were further fuelled by the variations in pupil/teacher ratios, teacher qualifications, financial provisions and quality of educational facilities. To what extent has the situation changed for many of today's students compared to my time as a primary school student in the 1980s? It is this particular question that prompted me to study the issue of integration of environmental learning in the primary school curriculum. More specifically, the study sought to investigate whether or not students of today are provided with any better OTL about the environment in the primary schools. The results of such an investigation would contribute to a broader understanding of how to design better policies for implementing EE in the primary schools.

Through this study, I explored how *Sechaba* primary school set about to create OTL about the environment. My particular interest was to investigate whether learners who were previously marginalised now have better access to environmental learning and how the environmental learning opportunities are structured and delivered at school level. Using the concept of OTL, it should be possible to explore the nature of quality of the provision of environmental learning.

Environment is a cross-curricular phase organiser which makes possible the incorporation of environmental concerns and processes into all programmes in all phases. According to the DoE (1998) using environment as a phase organiser in a school curriculum is a resource by which teachers and learners can be able to enthusiastically react to environmental problems like pollution which SA is experiencing (DoE, 1998). Through this study I intend to contribute to the existing body of OTL studies by making known what happens in the classrooms of SA, specifically what is taught in the name of EE and how it is taught, and with what combination of resources.

1.7 OUTLINE OF CHAPTERS

This study is divided into five chapters.

CHAPTER 1

This chapter orientates the reader by focusing on the background to the research problem, research questions, aims and objectives of the study, and significance of the study.

CHAPTER 2

This chapter explains the Literature review and conceptual framework of the study.

CHAPTER 3

This chapter focuses on the research methodology and data collection methods during the investigation.

CHAPTER 4

This chapter outlines the findings and data analysis of the study.

CHAPTER 5

Concluding comments, recommendations and implications are documented in this chapter.

CHAPTER 2

2. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 INTRODUCTION

In this chapter I review literature on OTL. Then, I examine the concept of OTL in the context of the infusion of environmental learning in the school curriculum. I divided the chapter into three sections: Section one discusses how the concept of OTL is conceptualised in the literature. Section two, focuses the discussion on the various initiatives of research on the infusion of environmental learning in the school curriculum. The last section then discusses the conceptual framework that I used to study the integration of environmental learning in the SA school curriculum.

2.1.1 Conceptualisation of OTL

The concept of OTL has long been established in the research literature. It was first introduced by the International Association for the Evaluation of Educational Achievement (IEA) as an instrument to validate the differences in student's mathematics achievement across different nations. It was then revised in the Second International Mathematics Study (SIMS), where OTL was conceptualised in terms of the curriculum (McDonnell, 1995). Since then, the concept has been used as a mechanism to determine whether students' mathematics achievement differences are caused by differences in what they are exposed to in class, rather than their ability to master the subject content (McDonnell, 1995). The concept was further developed to establish whether schools provide students with equal OTL, irrespective of their abilities (McDonnell, 1995).

With regard to assessment, Winfield (1987, p. 438-439) defined OTL as "the provision of adequate and timely instruction of specific content and skills prior to taking tests", and proposes that OTL be measured by indicators such as "time

spent in reviewing, practising, or applying a particular concept or by the amount and depth of content covered with particular groups of students". Furthermore, the American Educational Research Association (AERA) (2000) maintains that learners who fail tests should be afforded significant opportunities for remediation that focus on knowledge and skills on the test, and offered sufficient time for them to sort out any weaknesses in that area before retaking the test. OTL has also been defined as the relationship between the information learners were taught and the information on which they were tested. Baratz-Snowden (1993) notes that if learners are held accountable for their learning, then schools should also be held accountable for affording learners with OTL in order to meet the standards that have been set. This means that the instructional content and adequate time to learn are crucial indicators of learning opportunities.

In addition, the definition of OTL has been extended to include the quality of resources, school conditions, curriculum, as well as the teaching that learners experience (Education Policy Brief, 2000). In this regard, it becomes clear that the types of resources including the state and the situation of the school with respect to the syllabus and the instruction students receive determine the OTL. In relation to the present study, I investigated the kinds of resources that *Sechaba* Primary School was able to generate for the integration of environmental learning in the school curriculum, and how the resources are used to create OTL about the environment.

Porter (1993, p. 1) observes that OTL were intended to "maximise fairness and equity for students". OTL were defined as equitable conditions or circumstances within the school or classroom that encourage learning for all learners. Similarly, Stevens (1993, p. 1) asserts that OTL "……..is a major equity issue for students who are at risk of not developing academically to their fullest potential". In other words, the concept of OTL was established to ensure justice for students who were academically marginalised. Traditionally, OTL were identified as standards that symbolised what schools and teachers must do if the given curriculum and

achievement standards were to be met. OTL includes the provision of curricula, learning materials, teachers, and instructional experiences that enable learners to achieve high standards (Porter, 1993)

In the context of teaching and learning, OTL refers to what teachers do in their classrooms when they are teaching students and whether or not they offer students adequate access to information and resources to allow them to study the curriculum for their age and grade level (Stevens, 1997). According to Stevens (1997, p. 4), OTL involves four variables that have a powerful influence on teachers' and student learning. The variables are: 1) content coverage; 2) content exposure; 3) content emphasis; and 4) quality of instructional delivery.

These four variables are defined as follows:

- **Content Coverage** involves whether or not students cover the core curriculum and whether or not there is a match between the content of the curriculum taught and the content of the test or the assessment that the students have to take;

- **Content Exposure** entails the time that is prearranged for students to learn (time on task) and the depth of the teaching of the subject;

- **Content Emphasis** refers to which topics within the curriculum teachers emphasise and which students are selected to receive instruction in low or high order skills; and

- **Quality of Instructional Delivery** concerns how teaching practices have an impact on students' academic achievement (Stevens, 1997, p. 4).

The focus of this study was on the integration of environmental learning in the school curriculum at one Primary School. The study sought to explore, among

others, the availability of teachers who are qualified to teach about the environment; the availability of teaching and learning resources; the amount of time available to learn; the organisation of the classroom; the size of the class; and the use of outdoor learning activities to support learning about the environment (McPartland & Schneider, 1996; Oakes, *et al.,* 1990; Oakes & Lipton, 1990; Stevens, 1993).

2.2 REVIEW OF THE RESEARCH ON OPPORTUNITIES TO LEARN (OTL)

2.2.1 Organisation of resources in schools and in classrooms

In a review of the literature on OTL, Oakes, *et al*. (1990) describes several varied findings. In a survey conducted in the United States of America (USA), Oakes, *et al*. (1990) revealed that black students who come from low socio-economic backgrounds were generally grouped in low ability track classes. Those students were taught by less qualified teachers whose teaching practices did not emphasise investigative approaches, and they generally had less access to resources resulting in the students receiving limited OTL. On average, as students are grouped in low ability track classes they tend to be exposed to less rigorous content and their OTL become less and eventually this affects their academic performance (Callahan, 2005; Oakes, 1989).

Furthermore, in most cases, the low socio-economic class students were more likely to be placed in low ability track classes even though they had the ability, and are taught by less qualified teachers resulting in poor academic performance. Sharing the same opinions are Oakes and Lipton (1990) and Baratz-Snowden (1993, p. 313) who suggested that the tracking system was not good for students in low and middle group classes because it segregated them within the same building and thus tended to disadvantage them. Murry and Mason (1997) concur with Oakes, *et al.* (1990) and Oakes and Lipton's (1990) as they contend that there is a strong relationship between student achievement

and race, inadequate resources and funding. Similarly, Stein (2000) asserts that there is a connection between teacher qualification, classroom practice and OTL. This implies that teachers who are trained to teach particular subjects like EE for example, do better in the classroom in terms of their teaching practice than teachers who are not qualified to teach those subjects. All of these authors seem to make the same point that OTL are limited in the schools helping low socio-economic background students relative to the schools enrolling high socio-economic class students because the schools do not have equal or similar sets of resources. The main point is that the existing resources for the teaching and learning at schools and accessibility to those resources afford students with OTL. In general one can assume that those students who attend poorly resourced schools are likely to perform badly as compared to those who attend well-resourced schools. This premise informed the present study, which intended to explore how environmental learning is incorporated in the public primary school curriculum in an urban area. The study explored the availability of resources for the teaching about the environment at *Sechaba*, and their use inside and outside the classroom. In other words, the study examined OTL about the environment in terms of the types of resources (human and non-human) that the school employs for environmental learning and their deployment to promote such learning.

2.2.2 The use of resources and instructional practice

Stevens (1993) points out that students' socio-economic status should not be related to the problem of low academic achievement, but that the problem arises in the classroom, with teachers' teaching practices and the quality of the presentations of their lessons. From this view, it becomes clear that socio-economic background does not cause poor or better academic achievement but that the teaching strategies used by teachers in the classrooms are related to academic achievement.

Using secondary analyses of multiple case studies to examine how teachers teach reading lessons in their classrooms, Stevens (1993) revealed that teachers in poor urban schools tended to use very restricted instructional approaches that deny students of the OTL the core curriculum for their age or grade level. Specifically, the findings demonstrated that teachers did not know how to teach reading lessons effectively. This means that those teachers were likely to use instructional methods that do not encourage learners to think, understand and search for information by themselves. It is in this context that my study at *Sechaba* also sought to investigate how teachers deal with EE curriculum. In particular, the study sought to understand teaching practices and the material resources that are deployed to establish environmental learning opportunities at the school.

In the same way, Goertz (1994) has also conducted a secondary analysis of a survey to determine the ways teachers offer mathematics instructions. Goertz conceptualised OTL in terms of instructional practices (ability grouping, time on mathematics instruction, and mathematics activities); topic coverage; resources; course-taking; and teacher experience and training. Goertz (1994) found that learners who come from low socio-economic backgrounds received instruction in traditional classrooms; that the instruction was teacher-centered; and that more time was spent on rote learning and less on hands on activities; and that learners were more likely to do problems from the textbooks compared to learners from high socio-economic background.

Similarly, Herman, Klein and Wakai (1996) suggest that students in urban classrooms were more likely to have current mathematics texts and were engaged in current instructional practices which provided them with better OTL than those in rural and suburban classrooms. The findings, further, indicated that teachers from low socio-economic background received less in-service training in maths as compared to teachers from high socio-economic background. In view of these findings, the present study was also intended to explore the professional

development training opportunities that teachers have in the area of EE, and how the training assists them to incorporate environmental learning in the school curriculum.

Tornroos (2005) who conducted a survey to investigate correlations between textbooks, OTL and student achievement, reports that textbooks seemed to work well as measures of OTL assuming that teachers and/or learners used these textbooks for learning as intended. Furthermore, Haggarty and Pepin (2002) examined mathematics textbooks and their use in lower secondary classrooms in England, France and Germany and suggested that learners in different countries were taught mathematics differently and thereby have different OTL mathematics both of which are influenced by textbooks and teachers. The research by Goertz (1994); Haggarty and Pepin (2002) Tornroos (2005) thus highlights the way instruction is linked to textbooks as resources for providing better OTL. The present study also explored textbooks and other teaching and learning materials as a factor that shapes OTL at *Sechaba*.

Wang (1998) takes the view that, students' attendance rate, content coverage, content exposure, and quality of instructional delivery are all important determinants of students' achievement of test scores. Furthermore, Wang (1998) argues that measures of OTL are necessary not only for interpreting students' tests results, but also for assessing the quality of their educational environments. Wang (1998) maintains that by describing school and classroom processes, OTL variables can provide information about what students study, how the subject content is taught and how students learn. OTL variables can also help explain why students' performance differs within classrooms and across classrooms.

2.2.3 Arrangement and application of resources

OTL means that all groups of students are presented with appropriate learning opportunities (Yoon & Resnick, 1998). Yoon and Resnick (1998) conducted

surveys to examine issues of instructional validity of an assessment, OTL and equity in the context of California Mathematics Renaissance program. The main purpose of the study was to examine the relationship between professional development opportunities for teachers, the types of instruction presented to students and students' performance. Additionally, Yoon and Resnick (1998) identified OTL in terms of school curriculum, time devoted to instruction, types of classroom activities, and in-service education for teachers. Yoon and Resnick (1998) endeavoured to demonstrate the ways in which the resources in the schools were organised in terms of school curriculum, instructional time, classroom activities as well as teacher professional development which is another dimension that this study sought to explore.

Findings by Yoon and Resnick (1998) revealed that the students whose teachers took part in the Renaissance programme appeared to have more experience with improvement-oriented classroom activities compared to students whose teachers did not participate in the program. Furthermore, students from low socio-economic class were less likely to receive improvement methods of teaching compared to students from high-socio-economic class. Similarly, teachers who participated in the Renaissance programme appeared to have more opportunities to participate in different improvement-oriented professional development activities. These teachers were more successful in producing good academic results among their students partly because they were more likely to involve their students in problem solving, explanation of problem solutions, group work and other reform-oriented activities. This indicates that teacher professional development helps teachers to do better in terms of the teaching practice, which eventually affords students with better learning opportunities.

The present study also explored the nature and the use of resources for the teaching and learning of EE in the primary schools together with teachers' own OTL through professional development.

2.2.4 Instructional Content

In the study 'Investigating test content and curriculum content overlap to assess Opportunity to Learn', Winfield (1993) discovered that OTL is also determined by content coverage. This means that students have OTL only if teachers are able to cover content or implement a particular subject concept. Winfield points out that there should be a correlation between instructional content and curriculum content, i.e., what the teacher is teaching in the classroom must be in line with what is included in the curriculum. Conversely, teachers may provide adequate content coverage for all learners. However, learners with different language, and cultural background, particularly, limited English speaking learners, may not benefit fully from the same instruction (Wang & Goldschmidt, 1999).

Praeger (2003) conducted a survey in Washington to evaluate the extend to which students had the OTL the content and skills necessary to receive a high school certificate. In the study it was found that there is a good general progress towards affording all students with adequate OTL skills required before taking the high school assessments. Teachers need continuation of professional development and the resources should be made available in order to provide students with OTL before taking the tests. For these reasons, my study looked at what teachers were doing in the classroom in terms of the teaching and learning about the environment. I examined the content of the lesson, the textbook(s) and other resources employed for environmental learning.

2.3 LITERATURE REVIEW ON ENVIRONMENTAL EDUCATION

2.3.1 INTRODUCTION

The previous section discussed literature on OTL and emphasised how the OTL literature links to the present study. This section examines literature on EE and how it informed the study of OTL EE in the primary schools in SA. The aim of

reviewing literature on EE was to find out how different scholars conceptualised EE curriculum in relation to the teaching/learning. The section begins by defining the term environmental education, the review of EE literature, and it closes by highlighting the themes that emerge from the literature discussed.

2.3.1.1 Environmental education

Environmental education (EE) "is a process which develops awareness, knowledge and understanding of the environment, positive and balanced attitudes towards it and skills which enable students to participate in determining the quality of the environment from a local level to an international level" (Gough, 1992, p. 36). This indicates that EE equips learners with abilities and the information about the environment and also shapes their thoughts and feelings in the direction of the environment so that they can be able to address environmental problems that might emerge locally and internationally.

2.3.2 ENVIRONMENTAL EDUCATION AND OPPORTUNITES TO LEARN

Most EE studies (Kenny, Militana & Donohue, 2003; Madruga & da Silveira, 2003; Vaughan, Solorazano & Ray, 2003) focus on the issue of outdoor learning activities as a source of students' OTL. Vaughan *et al*. (2003) argued that for EE programmes to succeed, field trips with outdoor learning are essential to actually observe what has been taught in the classroom. This implies that classroom alone is not enough for environmental learning to occur but should be accompanied by practical experience outside the classroom. This was also highlighted by Kenny *et al*. (2003) who argue that outdoor environmental lessons to schools on their own properties or private properties lead to powerful learning about environmental issues. Field trips stimulate learners because they are able to associate theory and practice, that is, they are able to relate what they have learned in the classroom to what they see in the field (Mandruga & da Silveira, 2003). This gives us a clear picture that involving students in the field activities

seems to create vivid learning opportunities in EE. The present study examined the place of outdoor activities at *Sechaba* Primary School.

Similarly, a study of 'Young Children, Environmental Education, and the Future', Davis (1998), argued that outdoor learning practices such as gardening, repairing soil erosion, collecting fallen leaves, *etc.,* are the basic practices that enable learners to learn more about the environment. Indoor learning activities (classroom activities) limit learners' environmental learning opportunities. "Children need places where they can explore, get dirty, touch living plants, insects and other forms of life" (Davis, 1998, p. 21). Children need to make friends with the nature in order to enhance their environmental learning. Furthermore, education about the environment inspires learners to understand how natural systems work and to understand their interaction with human systems.

However, Cedere and Andersone (2004) contend that EE should not be taught as a separate subject, but should be integrated into the curriculum of all natural sciences because environmental problems cannot be isolated from the problems of Chemistry, Physics, Biology and Geography. Berlanger (2003), on the other hand, indicated that environmental problems cannot be separated from the problems related to economic development. Belanger (2003) further argued that ecological problems and economic problems have an impact on environmental problems and vice versa. According to Zhanbao (2004) EE trains students to develop correct concepts and to act in an environmentally friendly manner, that is, it corrects misconceptions children have about the environment. As EE curriculum is taught as incorporated theme within various learning areas, my study sought to explore the ways in which *Sechaba* Primary School has managed to integrate it into its curriculum. The study also investigated the ways in which it is being taught, and what type of resources are used and how are they employed.

Malone and Tranter (2003, p. 289) conducted a survey to investigate the potential of school grounds to offer natural learning environments for children during their school day. They identified school grounds as places where learners associate with the social, cultural, and ecological areas of childhood. School grounds offer access to real-life natural experiences such as biodiversity, recycling, food webs, etc. Supporting this view, Le Roux (2001, p. 91) emphasises that school grounds can offer many learning opportunities during local studies of the plant and animal life, gardening, and recycling project. In their study Malone and Tranter (2003) found that school ground is an expansion of children's general learning such as gardening and farm lessons. Connell, Fien, Lee, Sykes and Yencken (1999) share the same view about school grounds and reported that permitting children to explore things for themselves in the natural world encourage the connection between experience and developing environmental knowledge. Schools provide students with environmental information, particularly in subjects like geography, science, chemistry and biology.

From the above discussions, school grounds have been identified as a resource that schools utilise in order to afford students with environmental learning opportunities as they expose students to environment related issues like gardening, plants, insects, *etc*. My study looked into how *Sechaba* used its ground or surroundings as a resource for the teaching and learning about the environment.

2.4 CONCEPTUAL FRAMEWORK

In the previous sections I reviewed literature on OTL and the literature on EE and its inclusion in the school curriculum. My intention was to provide a conceptual framework for this study. In this study, therefore, OTL provides the conceptual framework. Adapting McPartland and Schneider (1996)'s conceptualisation of

OTL, my study explored the following six key variables that affect students' learning:

- Availability of teachers who are qualified to teach environmental education and the quality of teaching;
- The teaching and learning resources;
- Time to learn;
- The organisation of the classroom;
- The size of the classroom; and
- The outdoor learning activities.

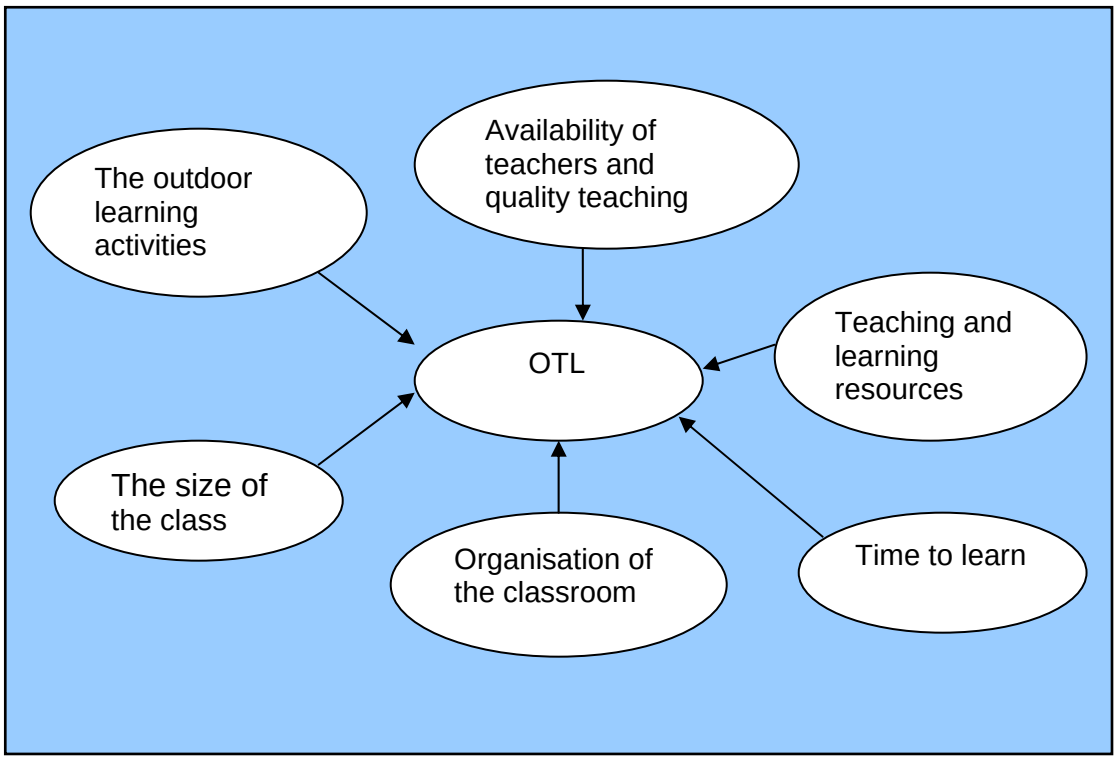


Figure1. Opportunity to learn Model

2.4.1 AVAILABILITY OF TEACHERS AND QUALITY TEACHING

Evidence suggests that the nature of teaching is reliant on the qualifications of teachers for the particular courses they teach, the availability of teaching

resources and teachers as they work collaboratively in a specific course and students' participation in non-academic activities (e.g. debate) (Porter, 1991). Other scholars contend that students who are taught by qualified teachers and who have teaching experience tend to perform better than those with less qualified teachers (Greenberg, Rhodes & Stancavage, 2004; Rivkin, Hanushek & Kain, 1998). This is because experienced teachers are more effective with students than inexperienced teachers (Goldhaber, 2002). In order for students to be offered equal OTL, Oakes and Lipton (1990) maintain that all teachers should have teaching qualification, should be expert in their subject areas and should be able to engage learners in the learning process. They further state that students in poor and minority schools suffer from poorly qualified teachers because their schools find it difficult to attract qualified and experienced teachers.

Porter (1991, p. 18) listed the following characteristics of teacher quality: firstly, quality teaching is the degree to which the objectives of the lessons prepared by teachers correlate with learning outcomes expected from the students. The second characteristic of quality teaching is the degree to which teachers acknowledge good accountability for student success or failure in accomplishing the desired student results. The third characteristic of good teaching is the degree to which teachers are understandable to students about what they are teaching. Porter (1991) further indicates that quality teaching is created to maintain what students already know and it considers the misconceptions that the students bring into the classroom. In other words, good teaching builds on students' prior knowledge and it tries to deal with their misunderstandings. It is also planned to improve the opportunities for students to create their own knowledge without inactively absorbing what the teacher is telling them. This implies that if the schools offer students a chance to develop their own ideas on a particular problem or topic then it means that they are provided with the OTL a particular subject. This informed this study as it intended to investigate instructional practice of EE with respect to the kind of teachers who are presenting the EE lessons and how the lessons are prepared.

2.4.2 TEACHING AND LEARNING RESOURCES

The study investigated the availability of resources for learning and their accessibility to learners. According to Schwartz (1995) students should have access to textbooks and educational facilities so that they can be able to learn. Lack of teaching and learning materials affect students' OTL and encourage the use of rote-learning techniques by teachers and learners and also interfere with teachers' capacity to teach well (Elmore, 1991; Gordon, 1987). A programme of learning cannot function without resources. The extent and type of existing resources, the way they are assigned and employed is essential for learning. The success of the learning programme is influenced by the choice of teaching resources, and the accessibility and use of out-of-class resources (Aydelott, 1995, p. 2-4).

Resources such as textbooks, library, laboratories, sufficient classrooms, and adequate desks for students are also important in creating students' OTL. Inadequacy of such resources also limits opportunities for students (Aydelott, 1995). Therefore, this study examined the issue of teaching and learning resources from the perspective that the availability and accessibility of human and non-human resources, and the way they are deployed afford students with better OTL.

2.4.3 TIME TO LEARN

This study explored how much time the students at *Sechaba* were involved in environmental learning. In other words, through this study I investigated what students and teachers were doing throughout the scheduled teaching and learning time. The study looked at what teachers taught and how much time is allocated for environmental learning activities.

Research indicates that the time students spend making sense of ideas and experiences is more important than extra-curricula activities (Oakes & Lipton, 1990). Carroll (1963) argues that OTL is the amount of time allocated to the learner for the learning of a specific task. In agreement with this perspective, Slavin (1989) conceptualised the amount of time available for learning in terms of *allocated time* and *engaged time*. Allocated time is the time planned by the teacher for a specific lesson which is used for instructional activities. Engaged time, on the other hand, is the time students are involved in learning tasks. Engaged time results from quality of instruction, student motivation and allocated time. This shows that OTL are determined by the amount of time allocated to the teaching and learning.

2.4.4 THE ORGANISATION OF THE CLASSROOM

Another dimension which this study looked into is how the learners interact with the teachers throughout the teaching and learning process, and the way their interaction influence the teaching and learning about the environment. The study of the classroom organisation indicates that the classroom environment has an effect on learners' way of learning (Kruger & van Schalkwyk, 1997). The classroom should be organised and managed in a way that will form part of the learning environment and lead to effective learning. Kruger and van Schalkwyk (1997) identified two frameworks for classroom organisation: the first framework is *physical* (non-human resources) which includes the classroom space, furniture and teaching materials. The arrangements of the classroom space should be in way that the needs and the demands of the learners are met. Second, framework is *social* which refers to the interaction between the teacher and the learners. This means that a good relationship between the teacher and the learners contribute to a successful teaching and learning.

Evidence from Pritchard (1999), suggests that a good relationship between the learner and his or her classmates and with the teacher can be developed in small

classes rather than in large classes. A good relationship also influences the academic performance and the behaviour of learners. This implies that good relationships during teaching and learning contribute to better teaching and learning which eventually affect learners' academic achievement in a positive way.

2.4.5 THE SIZE OF THE CLASS

The study sought to investigate how big or small the classroom is in terms of the number of learners and how does the size of the class affect learners' OTL about the environment. In their studies, (Bennet, 1996; Nye, Hedges & Konstantopoulos, 1999; Prichard, 1999; Rice, 1999; Rousseau & Powell, 2005) demonstrate that small classes provide better learning environments than large classes. Class size and the number of learners in the classroom impact the nature of teaching and learning process. In large classes it is difficult for teachers to use small group practices or more investigative approaches and large classes also affect the interaction between the teacher and the learner (Anderson, Ryan & Shapiro, 1989; Bennet, 1996).

Furthermore, class size affects particular aspects of classroom practices and learners' classroom characteristics. For instance, large classes influence classroom practices such as time spent with each individual learner, teachers' workload, teachers' emotional state, time for assessment and learners' learning and movement around class (Bennet, 1996). Pritchard (1999) further states that class size reduction alters the structure of the classroom situation, because each learner gets more attention from the teacher, and more time to speak. Students in small classes are motivated to become more involved in classroom learning activities. This implies that in large classes teachers find it difficult to maintain discipline and individual attention, as a result they have insufficient time to teach a huge group of learners and also learners have inadequate time to learn.

Smaller classes are perceived as easier to manage and they experience fewer disruptions and behavioural problems (Pritchard, 1999; Rice, 1999, p. 3).

2.4.6 THE OUTDOOR LEARNING ACTIVITIES

This study was aimed at understanding the way environmental learning is integrated in the school curriculum at *Sechaba*. In other words, the study sought to understand whether the environmental learning takes place only in the classrooms or in outdoor learning activities e.g. field trips. As already indicated, many studies in EE demonstrate how outdoor learning activities are important in creating OTL about the environment (Belanger, 2003; Cedere & Andersone, 2003; Kenny *et al*., 2003; Madruga & da Silveira, 2003).

2.5 CONCLUSION

This chapter has focused on OTL, describing the concept from the teaching and learning approach; and it has also looked into EE, on the integration of environmental learning in the school curriculum. The literature reviewed in this chapter helped me to identify the conceptual frameworks and methodologies for exploring the incorporation of environmental learning into the primary school curriculum. In the next chapter, I discuss the research methodology used for the present study and how data was collected.

CHAPTER 3

3. RESEARCH METHODOLOGY: DESIGN AND DEVELOPMENT

3.1 INTRODUCTION

This study followed the qualitative approach, since qualitative approaches lend themselves easily to exploratory and inductive research (Trochim, 2001). This approach helped me to understand the occurrence of events in their natural settings and how people at the primary school in question defined these events from their own perspectives. Through this approach, I explored how one primary school has implemented environmental learning in its curriculum. More specifically, I was able to investigate the manner in which teachers provided for EE as an integrated theme within other learning areas in their classrooms. The qualitative approach also facilitated my understanding of the structure of teaching and learning of EE at the participating school from the viewpoints of the individuals involved.

In order to make sense of the data, I made use of the interpretivist approach, which relates to "…direct observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds" (Neuman, 1997, p. 68; Neuman, 2000, p. 71).

The analysis of data involved the interpretation of the participants' explanations of the way they had integrated environmental learning in the school curriculum, as well as the kinds of resources the school had for the teaching and learning of EE, with particular reference to the manner in which they were mobilised and employed. Furthermore, I sought explanations regarding the way the arrangement and application of these resources were seen as helpful to the integration of environmental learning in the school curriculum.

3.2 RESEARCH DESIGN

This study investigated the approaches used at *Sechaba* Primary School in integrating environmental learning in the school curriculum. In particular, I sought to understand the way primary school teachers implemented the new EE curriculum as an integrated theme within different learning areas in their classrooms. A case study approach was adopted in order to enable a detailed understanding of what took place in the classrooms in terms of the teaching and learning of EE. More specifically, I investigated the kinds of resources that were used, how the resources were employed, and how the implementation of resources affected the teaching and learning of EE.

Semi-structured interviews, with teachers and learners, were used. This involved direct observations of classroom lessons and also an analysis of documents such as handouts from EE workshops, school environmental policy, and other relevant EE documents used by the school. The goal of the study was to explore how the participating primary school had incorporated EE in its curriculum. To reach this goal, this study focused on the following three research questions:

- What resources (human and non-human) do primary schools rely on for the teaching and learning about the environment?

- How are these resources identified and arranged to maximise the OTL about the environment?

- How can the specific organisations of resources for the teaching and learning about the environment in the primary schools be explained?

3.3 DESCRIPTION OF THE FIELD

The study was conducted in the Mamelodi area, in the Tshwane South Region of Gauteng Province. Mamelodi is located to the east of Pretoria, 20 kilometres. Gauteng Province is one of the nine provinces of SA. It is bordered by the Magaliesberg Mountains to the north and east, the Pretoria-Witbank highway to the south and Eersterus Township to the west. The major part of this area is urban and inhabited by a variety of ethnic groups that include Ndebele, Zulu, Tsonga, Venda and Sepedi speaking communities. I chose *Sechaba* Primary School as a case study because it is not far from my home, and it is in the location where I reside. In addition, I selected a primary school since the new EE curriculum policy in the SA schools only applies to the primary schools and is yet to spread to secondary schools.

3.4 GAINING ACCESS AND SEEKING CONSENT FROM SCHOOL PRINCIPAL

Before I started my investigations about how *Sechaba* integrates environmental learning in its curriculum, I personally went to the school to discuss with the principal and teachers about my study.

On my arrival, the caretaker took me to the staffroom where I found the deputy principal together with two other teachers. I greeted them and I asked them if I could see the principal of the school. One of the teachers told me that he was the principal and that I could talk to him. I indicated that I needed to discuss a few issues with him and suggested that we go to his office. He then took me to his office where I informed him about my study and its purpose. After telling him that I wanted to conduct my study at his school, he sounded relieved. This was because he thought I had come with some bad news from home since my surname is Sehlola and he is related to the Sehlola family: Although related in that way, we didn't know each other though. When he heard that I wanted to

investigate about learning opportunities in EE, he quickly went to call a teacher (*Mr. Lehlabile*) who is a leader in EE. The first question *Mr. Lehlabile* asked me was, “who referred you to this school (*Mr. Lehlabile*, 2007)”. My reply was, “I first went to the South African National Biodiversity Institute (SANBI) situated in Pretoria to ask for a list of schools that are participating in their EE programme. From the list, I randomly chose one school that is close to the place where I reside. This was how I selected your school”. He told me that he had asked me the question because their school is one of those schools around Gauteng that is actively participating in EE programmes. I went on to arrange for me to collect data for my study, through interviews with the principal, Head of Department (HoD), 2 teachers, and observations of Natural Science, Social Science and Life-Orientation lessons in Grade 7 classes.

Mr. Lehlabile asked me about the types of questions that I intended to ask teachers during the interview, so that when he informed them they would know what would be expected of them. I then requested to speak to the teachers so that I could personally inform them about my study and request for permission to include them. *Mr. Paul* who was the deputy principal of the school went to check if the teachers were free, and came back with some of them. On his arrival, he told me that they were not teaching so he found it wise to come along with them. At that moment, *Mr. Paul* introduced me to the teachers and informed them that I was there to ask for permission to conduct a research about EE. *Mr. Paul* requested them to participate in my study. Their involvement would be in the form of interviews and classroom observation to see how they teach EE in their classrooms.

The teachers appeared uncomfortable at first, and then I reassured them that the data I was going to collect from them would be used for the purpose of my study and their names would not be revealed. They then agreed to participate in my study. *Mr. Lehlabile* advised me to also observe Grade 6 lessons because most of teachers who intended to participate in my study also teach Grade 6 learners

hence Grade 7 lessons are the continuation of Grade 6 lessons. I therefore decided to also observe Grade 6 lessons as I had initially planned to observe as many lessons as I could so that I could be able to make inferences about how environmental learning is integrated in *Sechaba*'s school curriculum. We arranged that I could start with data collection at any time. As I had not at that stage been allowed by the Department of Education to collect data, I promised them that I would bring a letter from Gauteng Department of Education, which permits me to conduct my study in their school.

My visit to the school was preceded by a letter I had written to the Gauteng Department of Education, requesting permission to conduct the study in their schools (see Appendix A for approval letter).

Following my visits to the school, I then wrote letters formally requesting permission from the principal including statements regarding the participants' position and rights in the study as required by University of Pretoria Research Ethics Committee (see Appendix I). I also wrote letters requesting permission from the parents of the learners involved in the study (see Appendix D). I visited the school myself and handed out letters to the principal and again explaining the purpose of my study. The principal formally granted me permission to conduct the study and also signed the letter in my presence.

3.4.1 *SECHABA* PRIMARY SCHOOL

The school is located near a main road; about 1 km from the main road. The environment around the school is lined up with trees and beautiful flowers in the garden. The school began operating in 1956. It had 8 teachers and 400 learners at its inception. By then it was strictly called a higher primary school because it catered for learners from Standard 3 to 6. Currently, the school starts from Grade R-7. All the Grades have 2 classes, except Grade 0 which has 1 class. The

school has 20 staff members including one principal, deputy principal and two HoDs, 2 administration assistants, and one general worker.

The school has a library which is also used as the deputy principal's office, and there is no Science laboratory. The school's library is used by both teachers and learners. Teachers use it to get information from different books when preparing lessons, while learners use it for reading story books, poems, *etc*. There is a computer laboratory which has twenty-five computers and a television which is used to instruct learners on how to use computers. Interestingly, learners are provided with opportunities to use computers to search for information about certain issues regarding their subject areas. There is one photocopying machine and one computer, which are normally used for administrative purposes.

Generally, each class consist of 20-40 learners. The school starts at 07h45 am and knocks off at 14h00 pm. When the principal arrives at school he rings the bell at around 7h30 for the first time to make learners aware that soon they should assemble, and after sometime he rings the bell for the second time for the learners to gather in front of the classrooms for the morning prayer. Teachers and learners assemble in front of the classrooms every morning for prayer before lessons commence. Each lesson takes about 30 minutes, sometimes 60 minutes depending on the time scheduled for the learning area for that day.

The school has a feeding scheme, and there are two women who prepare lunch for the learners. Their standard meals are samp and beans or porridge and beans. All learners eat lunch at school, but still some learners bring their own food since they claim that the food is not delicious, so they prefer buying food or bringing their own.

3.5 SAMPLING

The main aim of sampling was to determine how my study was going to be conducted at *Sechaba*. The sample for this study included four teachers in the school, made up of the principal and HoD, and four learners. The key informants were three teachers because my particular interest was to investigate what goes on in the classrooms in terms of the teaching and learning of EE. The aim of including the principals, HoD, and learners was to get a clear picture of how EE is being taught as an integral subject. More specifically, the intention was to explore the types of resources and how the resources are being utilised for environmental learning, and the manner in which the organisation of resources is useful to take advantage of OTL about the environment. I selected a small sample size because I wanted to study the integration of environmental learning in the school curriculum in depth. In fact, I wanted to have an in-depth understanding of how one primary school (*Sechaba*) incorporates environmental learning in its curriculum from the viewpoints of the participants rather than attempting to generalise to a larger population. I used a qualitative method which required me to explore the occurrence of events in a natural setting in order to obtain detailed information.

I targeted the Intermediate and Senior Phase level of the school, specifically the grade 6 and 7 teachers. This was based on the fact that there is a link between Grade 6 and 7, since Grade7 is the continuation of Grade 6. Consequently, I expected the Grade 6 and 7 teachers to have moved further ahead in their teaching practice and I anticipated that they would have clear insight on how to teach EE across other subject areas like Natural Science, Social Science, Life Orientation, *etc*. I worked specifically with the Natural Science, Social Science and Life Orientation teachers. The idea behind this selection of lessons was to get an understanding of whether teachers have knowledge and expertise to teach EE across a range of learning areas.

3.6 DATA COLLECTION METHODS

I collected data using different methods such as tape-recorded interviews, video-taped classroom observations, and analysed documents such as hand outs from the workshops attended by teachers, the school's environmental policy and other important EE documents, which are used for teaching and learning. Using the various methods helped me to validate and triangulate the data. I first conducted interviews with teachers to collect data about the types of resources available for the teaching and learning about the environment across other subject areas, how the resources were utilised during teaching and learning, and how the application of the resources helped in environmental learning. Each interview lasted about 45 minutes to 1 hour. I then observed the presentations of lessons to investigate how teachers go about putting into practice the available resources for the instruction of EE. Lesson observations lasted about 30 minutes to 1 hour depending on the time programmed for the lesson on that day. Lastly, I interviewed a group of four learners to obtain data about how they made sense of EE as an integrated topic into various subject areas. Interviews with the learners lasted about 45 minutes.

As explained in the previous paragraph, I used various data collection methods to capture how *Sechaba* facilitates the integration of environmental learning in the classrooms. Interview questions and observation structure (see Appendix E, F and G) was developed in line with the research questions that I formulated for this study.

At *Sechaba* primary school, I spent about three days in succession, although my initial plan was to spend five consecutive days in order to have enough time to interview four teachers and four learners, to observe three lessons and to collect documents. However, due to the public service strike and the school party I could not spend the planned five days.

The first day (23 April 2007) I arrived at school at about 7:10 in the morning. When I arrived, the gates were closed to indicate that nobody had arrived. I stood there for about 15 minutes, and then teachers and learners arrived gradually. The caretaker opened the gate for us. Upon my arrival, I went straight to the administrative office to introduce myself and inform the administrative assistant about my visit to the school. She went to inform the principal about my presence. When she came back she informed me that the School Management Team (SMT) was still having a meeting. I waited in the administrative office for about 10 minutes. After 10 minutes, the HoD came to take me to the principal's office. On my arrival at the principal's office, I found out that SMT meeting was still on. I greeted them and they offered me a chair. The principal asked me to introduce myself and to indicate the purpose of my visit. I explained my visit to the SMT but some of them, like deputy principal, HoD, as well as the principal were already aware of my visit.

The principal (*Mr. Rudi*) asked me what I wanted to start with, between interviews and classroom observations. I indicated that I wanted to start with the interviews. *Mr. Rudi* took me to the staff room where he introduced me to the staff members and reminded some of the teachers who were taking part in my study that I was going to start with data collection. While I was busy talking to some of the teachers, (because we appeared to reside in the same area around Mamelodi) *Mr. Rudi* quickly went to check the time-table for the teacher who was free to begin with the interview. Lucky enough, *Mr. Paul* who was the coordinator of the EE programme at the school was free and he agreed that I start interviewing him. Before we could start with our conversation, I began by updating him about the type of information I needed from him so that he could feel relaxed. This was because most of the teachers who were involved in the study appeared to be frightened by the fact that they were going to be interviewed and observed while teaching.

Actually, prior to the interview with each educator, I explained the purpose of my study, I assured teachers that the information they would provide would be kept confidential and it would be used for the purposes of my research only. I then asked each of them to read the consent letters and sign them if they agree to participate in my study, as an indication that they consented to participate in the study willingly.

Before I could start with the questions, I asked each interviewee if I could tape record our discussion so that I could be able to collect detailed information for my study that would help me to answer my research questions sufficiently. I began interviewing the first teacher (*Mr. Paul*) at about 9:00am and the interview lasted for about 1 hour (i.e. it started from 9:00 -10:00). *Mr. Paul* then went to call the Natural Science teacher (*Mr. Moleka*) for an interview. *Mr. Moleka* agreed to be interviewed. Our conversation started from 11:10 and ended at 12:15.

After the interview with *Mr. Moleka* I quickly went to ask the principal, *Mr. Rudi* if he was free and ready to be interviewed. He asked me about the kind of data I needed from him and to me he appeared restless about the issue of being interviewed. I explained to him and he then agreed that we start the interview. We began our conversation at 13:30 and ended at 14:30, and by the time we completed the discussion it was end of the school day. The learners had left a long time before the educators could leave, as educators were expected to stay a while longer after the learners have left. Before I left the school premises I requested the school time-table so that I would know when to observe which lessons. I interviewed three teachers (*Mr. Paul*, *Mr. Moleka* and *Mr. Rudi*) on the first day.

I arrived at 08:00 on the second day (24 April 2007). I met the principal, *Mr. Rudi* who was standing in front of the classrooms. *Mr. Rudi* was waiting for learners who arrived late at school. On my arrival I noticed that he was ready to beat up the late comers with a stick, but when he saw me he was shy and stopped and

instructed them to go to their classes. I greeted him, and updated him that I was there to carry on with my data collection. I then went to the computer laboratory where I interviewed the teachers. I found, *Mr. Paul*, the educator I interviewed the previous day. I greeted him and then he immediately went to call *Mr. Lehlabile*. *Mr. Paul* came with *Mr. Lehlabile* and then I greeted him and informed him about the purpose of my visit. I made it clear to him about the kind information I needed. My intention was to make him feel comfortable and free. He understood but his facial expression showed that he was not comfortable, and he told me that he would only be available after two hours as he was going to offer a Sepedi lesson.

I went to speak informally with *Mr. Paul* about EE at their school. He took me around the school premises where he showed me the water tank supplied by Pick' n Pay, the solar panel donated by the City of Tshwane, as well as the retrofitting bulbs contributed by the Electricity Supply Commission (ESKOM). I waited for about two hours, preparing myself for further data collection. After two hours, *Mr. Lehlabile* arrived for an interview. I explained to him why I was conducting the study and made it clear to him that I am a Masters student and that I needed the information only for the purposes of my study. I assured him of confidentiality of the information that he would provide me. I gave him a consent letter to read, after reading he told me that he was willing to participate in my study. I then asked him to sign the letter as an indication that he agreed to be involved in the study willingly. Before we could begin with our dialogue, I asked if I could tape record our interview in order to obtain detailed data and be able to transcribe. He agreed and we carried on with our interview. We started at 10:00 and finished at 11:00. During our discussion he seemed not to understand some of the questions, so I had to explain in order to clarify them. Subsequent to our conversation, I went to observe a Life Orientation lesson. Before I could start with the observation I engaged *Mr. Lehlabile* in a 5 minutes interview to gather data about what he planned to teach throughout the lesson. Following the interview, I observed the Life Orientation lesson which lasted for about 1 hour. I then

involved him in a 10 minute post-observation interview where I collected information about whether he managed to accomplish what he intended to do. Before we could complete our discourse, it was lunch-time and he asked to be excused since his colleagues were waiting to have lunch with him.

After our discussion, we agreed that we would see each other the following day to observe some more Life Orientation lessons. I subsequently expressed appreciation of his cooperation and patience. It was then lunch, and since there was no shop near the school, I went to the vendors who sell food to buy myself something to eat. I had lunch for about 45 minutes, talking about general life issues with the vendors. They told me that they were not aware of my presence at school. I went back to the computer laboratory to see if I could have a discussion with the *Mr. Moleka* with regard to classroom observation. He was busy packing his stuff as he was leaving for a senior teachers' workshop with one of the senior teachers at school. It was the end of the day at school and I left.

The first thing I did when I arrived on the third day (25 April 2007) was to go to the Natural Science class and Social Science teachers to remind them that I was there to observe their lessons. I quickly approached them because their lessons were the first ones on the school time-table on that day and they agreed. I began with a pre-observation interview with Natural Science educator, *Mr. Moleka* to obtain data about what he prepared to do when I would be observing his lesson. Following the interview which lasted about 5 minutes, I then observed the Natural Science lesson which lasted about an hour. I followed him to the next class where he was going to present the same lesson. During the classroom observation, field notes were taken and my assistant was taking video photos so that I could have a clear picture of what took place in the classroom. The reason for using a video-tape and taking field notes was to have rich information that would help me to understand what and how resources are used for the teaching and learning of EE across other subject areas.

After observing the first lesson, we went to the computer laboratory where I started with the post-observation interview with *Mr. Moleka* to gather information about whether he had achieved what he anticipated to. After the interview, I began reading my field notes in order to make sense of them. I sat there for about 30 minutes waiting for the next lesson.

After 30 minutes *Mr. Paul* called me to go and discuss what he prepared to do in the classroom. Before observation we had a conversation about what he intended to do in the class. The classroom was overcrowded, and learners were sitting on the old desks and they were seated in groups. There was no furniture in the classrooms, only desks and a chalkboard. I observed the Social Science lesson for about 30 minutes. Field notes and video photos were taken. When the lesson was over I instantly engaged *Mr. Paul* in an interview to find out if everything went according to the plan. I went back to the computer laboratory to wait for the Life Orientation lesson. I was busy reading the field notes in order to make sense of whether the data correlates with what the questions sought to answer. I waited there for about an hour.

After an hour I went to the staffroom to check if *Mr. Lehlabile* was prepared to go to the class. He was ready to go to the class. However before going to the class we talked about what he prepared to teach during the session. Our discussion lasted for about 5 minutes. I followed *Mr. Lehlabile* to the classroom. On our arrival in the class, *Mr. Lehlabile* greeted the learners and wrote the questions that learners were suppose to answer, after studying the waste dump, on the chalkboard. He then told learners to go to the garden, where they would be involved in an outdoor learning activity. Outside the classroom learners were observing while sorting out recyclable and non recyclable waste materials to make compost. During the activity, I was observing while taking filed notes; my assistant was recording data using video and digital camera. The lesson lasted for about 1 hour (10:30-11:30). Subsequent to the lesson I interviewed *Mr. Lehlabile* to find out how the lesson went.

Following our discussion, I went to the computer laboratory to wait for the final lesson to end so that I could interview the learners. Learners were excited about the fact that they were going to have a discussion with me. The last lesson of the day took about 30 minutes and it was the end of the school day. Learners who were selected to participate in my study came to me to ask if we could begin with the interview. I asked them to give me the consent letters they had collected from their parents before we could start. All the consent letters were signed as an indication that the parents agreed to their children's participation in the study. I first explained my study and even explained what EE is and what it entails. Our conversation lasted for about 45 minutes (14:30-15:15). I thanked the learners for participating in my study.

On my fourth day (16 May 2007) I went to the computer laboratory to have a conversation with *Mr. Moleka* about what he planned to teach in a Natural Science lesson. After interviewing him I followed him to the classroom to observe the way the he incorporates EE into Natural Science. I discovered that his classroom had; 30 learners (14 girls and 16 boys). The classroom had a chalkboard which was used for instruction and 18 desks which were arranged into groups of three. Learners were organized into groups; each learner had his or her own Social Science textbook. The physical space was sufficient for free movement.

The teacher started the lesson by greeting the learners. He introduced me to the learners; thereafter he continued with the lesson. I was taking field notes while the administrative assistant was taking a video. The lesson lasted for about 30 minutes. I followed him to the other classroom where he was going to present the same lesson. The aim was to explore how the lesson would be presented for another group of learners. The lesson was followed by an interview to capture data about what *Mr. Paul* thought about the lesson he just presented. On my arrival on the fifth day (28 May 2007), I waited for about two hours ahead of the

Life Orientation lesson. While I was waiting, I examined the data collected up to that point to see if it made sense and what patterns it was beginning to offer.

Afterwards, I went to the principal's office (*Mr. Rudi*) to make him aware that I had come to pursue further data collection. After that, I went to *Mr. Paul* who was in the staffroom to inform him of my presence and also to remind him about the lesson observation. He was busy talking and laughing with his colleagues when I arrived in the staffroom. I talked to him and he nodded to indicate that he agreed with what I was saying. According to the school time-table his lesson was scheduled before lunch time.

Subsequently, *Mr. Paul* called me to begin with our pre-observation interview. After the interview, we hurried to the class for the lesson observation. Learners were making noise because there was no teacher in the class. When we entered the class they kept quiet. *Mr. Paul* greeted them and introduced me. I asked the administrative assistant to take video pictures while I was writing field notes. The classroom had 28 learners (14 girls and 14 boys), with the desks arranged in groups. There were 6 learners in each group and they were seated on four desks. The classroom was tidy, with no papers on the floor. The physical space was large enough for the teacher to move freely. The teacher used Sepedi and English during his lesson presentation and most learners had Social Science textbooks.

After the observations, I then went to the school principal to express my sincere gratitude for allowing me to conduct my study at the school. I expressed my appreciation for all the information he had given me. I quickly went to the teachers, including those who were not participating in my study, to express my appreciation for the warm welcome that they had shown to me and for accommodating me in their schedules until I finished with data collection. I also thanked them for permitting me to conduct my study at their school and for all the effort that the principal had made to convince the teachers to work with me.

3.7 DATA ANALYSIS

In this section, the methods used in presenting and analysing data are discussed. The collected data was analysed using a qualitative approach. According to Macmillan and Schumacher (2001, p. 460-480) and Creswell, (2002) qualitative analysis is an inductive process of organising data into categories and identifying patterns among these categories. A preliminary data analysis was done while data was being collected. During interviews and observations some issues were further explored and analysed in order to understand the features of the schools and the subjects within the schools. Some of the questions which I asked during interviews were reformulated to redirect my study and to help the participants to provide detailed explanation of how they incorporate EE into other learning areas. During the observations, I took field notes which included my comments, my thoughts and views on the observations. I recorded everything that came to my mind in relation to my study throughout the observations. After spending sometime in the field, I read my data and began writing summaries and integrating ideas that emerged (Bogdan & Biklen, 1998; Cohen, *et al*., 2000).

A more detailed analysis was done after the interviews, document analysis and observations were completed. In preparing data for analysis I transcribed data from the audiotapes, videotapes and the field notes into text, that is, I redrafted them into scripts. The data was then arranged into the file folders. After the data was organised and transcribed I read it, to obtain a general understanding of the findings. I used a coding system to create a description of events for analysis. The data was thereafter categorised into sections and they were labelled in order to express meaning. After the entire text segment had been coded, similar codes were grouped together and I looked for redundant codes with the aim of reducing the codes to a controllable number. I subsequently united the themes to see if they reflect an order of events (Creswell, 2002).

3.8 VALIDITY AND RELIABILITY

To validate and make the data reliable, I used methodological triangulation (peer review, selecting a typical case and member checking). Triangulation is the use of two or more methods of data collection in the study of human behaviour (Cohen *et al.*, 2000; Macmillan & Schumacher, 2001, p. 407-408). In this study, semi-structured interviews, observations and documentary analysis were used to triangulate the data. I first interviewed the participants using the same questions and then went to the classrooms to observe what was happening in the classroom in terms of teaching and learning of EE as an incorporated theme within other subjects. The aim was to confirm that what was said by teachers happened in the classrooms. I analysed documents such as hand-outs from workshops that were attended by teachers, the environmental policy of the school, and other relevant EE documents used at the school for environmental learning. Documentary analysis provided confirmation of the data. After transcribing data, I gave data (transcripts) back to the teachers to confirm whether the information provided definitely corresponded with what they had said or taught.

In addition, I also did member checks by telephone with teachers. Furthermore, field notes, tape-recorded, video-taped and digital camera data set was used for confirmation, by comparing the data collected from interviewees with recorded data and photographs. The strategy of participant observation, which consisted of combining in-depth interviews with field notes and document analysis as a means of supporting evidence, was also used to validate and make data reliable. Face-to-face interviews were used to get close to the participants for confirmation of data, hence increasing validity.

I repeatedly read the data to see if the segments, descriptions and explanations provided a clear understanding of the situation at Sechaba. My intention was to see if the collected data made sense.

3.9 LIMITATIONS AND ETHICAL ISSUES

3.9.1 Limitations

This study was conducted in the Tshwane South District in the Gauteng Province. Only three teachers from Grades 6 and 7 formed part of this study. The findings of this study were therefore not generalisable because of the fact that only one primary school within the Tshwane South District participated in the study. The convenience sampling of the teachers within the Tshwane South District because of accessibility and time has channelled the study, thus reducing the possibility of being universally generalisable. Nonetheless, I attempted by all means to overcome these problems. A thick, rich description of events in the research process was used to address these issues, so that the results can provide useful lessons for others involved in related issues of this study or similar studies.

3.9.2 Ethical principles

The study of how environmental learning is integrated in the school curriculum is very complex since it concerns the participants' points of view and understanding of the curriculum. The study required me to conduct interviews with the participants and observe what they do in the classrooms in order to explore the manner in which they incorporate environmental learning within other learning areas. For this reason, it was important to consider ethical issues. In this respect, I visited the Gauteng Education Department and briefed them on the objectives and imminent benefits of this study. Before the interviews and classroom observations were carried out, consent was sought from the participants. I explained that participation in the research project was voluntary and confidential. I also explained that they would not be asked to reveal any information that would expose their identities, unless they were willing to be contacted for individual follow-up interviews. Face-to-face interviews were carried

out, and the interviewees were again briefed about the objectives of and the reasons for the study.

To ensure confidentiality and anonymity of the participants, the interview transcripts were recorded under pseudonyms, which did not require interviewees to provide their names and ages. The privacy of the interviewees was respected and care was taken to prevent any possible harmful effects, such as breaking the rules of cultural values, of the study.

3.10 CONCLUSION

This chapter presented a description of the research design. The study followed the qualitative research method. This chapter also explained the methods of data collection and analysis. Data analysis as the most important phase of research needed to be done with inventiveness so as to allow uniqueness of the study to bring in appropriate, significant and useful results. Although qualitative research permits flexibility and freedom of movement, it is eventually the directions of the procedures and method that provides the study its authentic, logical and interpretive element.

CHAPTER 4

4. FINDINGS OF THE STUDY

4.1. INTRODUCTION

In this study the concept of OTL was used to investigate the impact of the new environmental learning policy on the way one primary school in SA structured the teaching and learning of EE. This study sought to understand the manner in which primary school teachers incorporated environmental learning as an integrated topic, into the various learning areas in their classrooms. Classroom observations, interviews, and documentary evidence collected from teachers, principals and learners, were used to make sense of what the OTL about the environment looked like in some of the primary school classrooms of Gauteng.

In this chapter, the findings are presented in the form of a case study of one primary school, *Sechaba* Primary. This case study report begins with the contextual descriptions of the schools, i.e. the academic and non-academic environments and their influence on the teaching and learning processes with respect to environmental learning. To develop the case, data was obtained through interviews, observation of lessons and analyses of documents in order to identify evidence of what the OTL about the environment looked like at the school. Using the case study report, I sought to answer the following research questions:

- What kinds of resources (human and non-human) do primary schools rely on for the teaching and learning about the environment?

- How are these resources identified and organised to maximize the OTL about the environment in the primary schools?

- How can the specific organisations of resources for the teaching and learning about the environment in the primary schools be explained?

4.2. The *Sechaba* Primary School case study

To understand how the school provides OTL about the environment, I conducted individual interviews with four teachers about their experiences, knowledge and skills with respect to EE, the nature of the school and the types of resources the school has for teaching about the environment. I also conducted a focus group interview with grades six and seven learners to understand what they learned about the environment from lessons observed and from their school in general. I also observed classroom lessons to explore the manner in which lessons about the environment are presented and how the material and intellectual resources are deployed. In addition to that, I collected all the necessary documentation for analysis including:

- the environmental policy of the school;
- the handouts of EE workshops attended by teachers;
- the EE lesson plans;
- the references of texts used for the teaching/learning about the environment; and
- Certificates of participation in the EE projects.

My exploration of how the school structures the OTL about the environment describes the context, the knowledge and skills teachers bring to the school for the teaching about the environment, the school's participation in EE programmes, and the material resources and how they are deployed to pursue the goal of environmental learning.

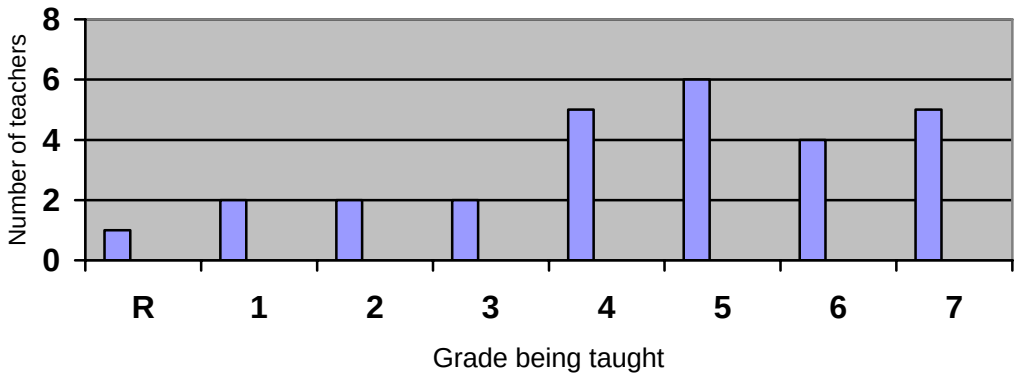
Mr. Rudi, who received his primary education at the school and has taught at the school for 35 years, is the principal of the school. He explained during our discussion that the school was founded in 1956 with about 400 learners and 8

teachers. The school originated in an industrial area in Eersterus (Pretoria East). Since the school was located near a jam factory, it was then called the “Jam school”. It initially catered for black, white and coloured children of the factory workers in Eersterus and Koedoespoort. With the aggressive implementation of the Group Areas Act (separating the racial groups) during the apartheid years, the school subsequently relocated to Mamelodi West and then finally moved to a site on the Mamelodi East Township and was to cater for only Black children. It accommodated Setswana, Sepedi and XiTsonga speaking children. As a result, it has since ‘given birth’ to two other primary schools, viz. *Hlanganani* and *Tsalanang* that were to cater for XiTsonga and Setswana speaking learners, as these were no longer offered at *Sechaba*. The name of the school was later changed when the school relocated to Mamelodi East, from Jam Factory to *Sechaba* (*sechaba* is a Sotho word meaning community) primary. The name *Sechaba* was given as a way of thanking the community for having contributed R20.00 per household towards the construction of the school (*Mr. Rudi*, 2007).

In discussing some of the early history of the school with *Mr. Paul*, who is the deputy principal of the school, and who is also one of the oldest teachers at the school (having taught here for 27 years), he described how the number of teachers and learners has been increasing gradually every year since the school’s inception with 8 teachers and 400 learners to the present figure of 620 learners and 17 teachers. The staffing complement at the school includes the principal, two Heads of Department (HoDs), and an Early Childhood Development teacher. As with many schools in the Black townships, enrolments at *Sechaba* have been declining in the past decade since the scrapping of apartheid barriers that have resulted in the migration of black learners to better resourced former whites-only schools in the neighbouring cities and suburbs.

The school enrols learners from Grade R to 7 and the allocation of staff is as follows (Figure 1).

Figure 2: Teacher allocation at Sechaba Primary school



I began my inquiry by trying to understand the human resource capacity at the school, especially with respect to their capacity to create opportunities for environmental learning at the school. We began our conversation with *Mr. Paul* by looking at the staff complement of the school. *Mr. Paul* informed me that of the 17 teachers, one has a Bachelor of Technology in Education Management, four have Bachelor of Education Degrees, two have Bachelor of Education Honours, one a Secondary Teachers' Diploma, while nine have Primary Teachers' Diplomas. However, *Mr. Rudi* affirmed that even though the human resources of the school, in particular the teachers have been improved in terms of numbers, most of them do not have qualifications in EE. Of the 17 teachers, only one has any formal training in EE with a Certificate in EE. *Mr. Rudi* put it in this way:

> Most of the teachers at this school do not possess qualifications in Environmental Education. Only one teacher has a qualification in Environmental Education. The one who went deeper into the training of Environmental Education is *Mr. Lehlabile* who attended lessons at SANBI and Rhodes University. When he was

> going to attend a course or workshop, they would send a letter of notification to us (*Mr. Rudi*, 2007).

This explanation was supported by *Mr. Paul* who said that:

> We don't have enough teachers who are qualified to teach Environmental Education. I have interest in Environmental Education but I am not qualified to teach it. Only Mr. Lehlabile has qualification in Environmental Education. We should get Environmental Education teachers. I am saying this because if you look at our environment where we live, especially our community, people don't look after the trees, they chop them. For example, we have 100 pitches around the school premises, and people don't know anything about trees. They take them away, and fruit trees are taken away. If there were enough Environmental Education teachers they were going to teach learners about the importance of trees and plants in general (*Mr. Paul*, 2007).

These discussions with *Mr. Paul* and *Mr. Rudi* suggest that while the number of teachers has increased since the school's inception, there remains a shortage in terms of quality teachers who are competent to teach about the environment. In exploring the issues regarding the OTL about the environment, it is important to bear in mind that it is not the quantity of teachers that creates learning opportunities about the environment but other such issues as their qualifications and quality of their presentations of lessons that provide enhanced opportunities to learn within a school.

In my discussion with some of the teachers about their qualifications, experiences, knowledge and skills, it became clear that many of them have been involved in teaching for a fairly long period, although there is a problem that many of them were deployed outside of their areas of specialisation. This mismatch in deployment seems to have increased subsequent to the introduction of the new curriculum – curriculum 2005 and its revised versions. *Mr. Lehlabile*,

who is one of the teachers at the school and the only one to have a formal qualification in EE, expressed it this way:

> I am Mr. T Lehlabile; I started working here in 1986. I am teaching Sepedi in Grades 6 and 7, Life Orientation in Grades 6 and 7, and Social Sciences in Grade 6. This is my first school after obtaining my teaching qualification. I have 21 years teaching experience and I have been teaching Sepedi and Religious Education which are my major subjects. I came to teach Life-Orientation after the introduction of the new curriculum because Life Orientation encompasses Religious Education, and Social Sciences came into the picture after the restructuring of the curriculum. I have not specialised in either History or Geography. My qualifications are National Professional Diploma in Education; last year in 2006 I obtained a one year Certificate in Environmental Education with Rhodes University. I completed the course and I found it most fulfilling because it has increased my interest in environmental issues (*Mr. Lehlabile*, 2007).

The issues around qualification and expertise are raised clearly in *Lehlabile's* utterances. While experienced and possibly competent in general pedagogy, the problem is that of having to adapt to a new curriculum, together with the kind of expertise and specialisations that it requires. To secure their jobs, teachers are often expected to teach in any of the new learning areas introduced with the new curriculum.

Mr. Paul similarly, raised the same issues of deployment and expertise as follows:

> My name is *Mr. K Paul*. In my training I did Junior Secondary Teachers' Certificate. I proceeded to study Secondary Teachers' Diploma with Vista University, Further Education Diploma with University of Pretoria, and Bachelor of Technology in Education Management with Tshwane University of Technology. I have 27 years teaching experience but never received any formal training in Environmental Education. Before I came to teach at this school, I was

> teaching at Moila high school in Mpumalanga, I resigned because I wanted to work at a school nearby home. I came to teach at this school, after my younger brother who was attending this school (doing Standard 5) which is now called Grade 7 came home, here in Mamelodi during lunch time to inform me that they want a teacher at their school. That is how I started teaching at this school. I am presently teaching technology in Grades 6 and 7, Arts and Culture in Grade 6, and Social Sciences in Grade 7. When I started teaching here I was teaching English and Geography, which were my major subjects at college. I came to teach Arts and Culture because there was no Arts and Culture teacher for Grade 6 learners. As far as Social Science is concerned, I taught it because Geography was converted into Social Science during the introduction of the Outcome-Based Education. My interest is more on Technology because Technology is about the present, you teach children about processing, like why we have canned fruit or why we have cars (Mr. Paul, 2007).

The story was the same for *Mr. Moleka*, another one of the teachers I interviewed at the school. A major theme that emerges is that of poor deployment and utilisation of the experience and expertise at the school, coupled with the lack of specialisation and/or sufficient depth in the field of EE. *Mr. Moleka* put it in this way:

> My name is *P Moleka* I started teaching here in 1990. Before I came here I was teaching in Mpumalanga, Kwa-Mhlanga in a High school called Langa. In fact I started teaching in 1987 after graduating from the college. My area of specialisation is History and English. I moved from Langa High school to teach at this school because Kwa-Mhlanga was far from my home; I was tired of traveling on daily basis from Pretoria to Kwa-Mhlanga. I am not teaching the subjects that I specialised with, but I am teaching Natural Science, mainly because of the introduction of the new curriculum. One thing that makes me to be inquisitive is because I like reading and I like challenges. I am also teaching Arts and Culture in Grades 6 and 7. I am a Grade 7 class teacher. Regarding Environmental Education, I am not qualified to teach it, I only attend workshops based on environmental issues. I am a senior teacher; up to so far I have not performed

> duties regarding senior teaching. It is only recently that I have started attending the courses regarding the duties of senior teaching because as senior teachers, we are required to perform managerial tasks and participate in activities related to school management. I participate in sport committee as a soccer coach (Mr. Moleka, 2007).

Although, the school seems to have few teachers who are qualified to teach about the environment, it has two teachers who provide leadership for the teaching of EE throughout the school. These two teachers became leaders in EE mainly because they have a passion and interest in environmental issues. Their curiosity and interest in EE were shaped by the workshops on the environment that they attended during the apartheid era and also by the events of World Summit on Sustainable Development (WSSD) which took place in SA in 2002. Here is how *Mr. Lehlabile* put it:

> While I was here at school I was told that there is a workshop about Environmental Education at the camp; I said to myself let me go and see what is happening at the camp. A camp that we visited was a sort of a game reserve, we attended that workshop in the former Bophuthatswana homeland, and the schools in Bophuthatswana were teaching Environmental Education, so we had to learn from them because they were teaching us at the parks about animals. We used to visit Pilanesberg Game Reserve, next to Sun City for the whole weekend learning about animals and their habitats. Environmental Education for me became so interesting. That is how I developed passion about it (Mr. Paul, 2007).

For *Mr. Paul*, it was about learning mainly from other teachers within the Bophuthatswana schooling system of the old order. It is worth noting that Bophuthatswana is one of the apartheid homelands that spearheaded the teaching and learning of EE in yesteryears. In that system, the Bophuthatswana Parks Board was one of the leading institutions, assisting schools and colleges of education with the introduction of EE as a subject in their curricula. Thus, the

learning of EE in the context of the Game Reserve that *Mr. Paul* speaks about was developed for these purposes.

Similarly, *Mr. Lehlabile* described his professional development and initiation experiences in EE as follows:

> In fact I was encouraged by the Johannesburg Summit which was held in South Africa in 2002. The summit was about different countries coming together to address environmental problems such as air pollution, land pollution, sea or water pollution that other countries or should I say superpowers are causing to developing countries. I was observing the events of the summit with a critical eye and that made me aware of the damage that human kind is contributing to the destruction of the earth (*Mr. Lehlabile*, 2007).

During our conversation with *Mr. Paul*, he affirmed that as a project coordinator at the school, he has formed the EE committee, which comprises of teachers, learners and grounds men at the school. According to *Paul*, the committee - also called the enviro-club - was formed on the request of the SANBI, which had offered to provide teachers with professional development workshops about the teaching of the environment, hence supporting EE at the school.

Furthermore, the school then registered with Share-Net to be an eco-school, so that it could attract the attention of other stakeholders who could provide teachers with additional professional development and training about the teaching of the environment and to allow for the school to seek out additional teaching resources from the Share-Net and other environmental organisations to improve the teaching about the environment. *Mr. Paul* described the developments around the formation of the school's EE committee and the pursuit of further OTL for the teachers and learners at *Sechaba* as follows:

> This committee was formed because SANBI wanted the committee to play an important role in promoting Environmental Education at our school. We formed a

> committee, the environmental committee known as enviro-club which consisted of 5 teachers and we got 2 grounds men to take the environmental project forward. Sometimes we have to take the learners outside the classrooms to go and work and then we take them back into the classroom and they continue to help us because when learners are in the classroom the grounds men carry on with what learners had started outside the classroom. Furthermore, as a leader I registered our school with the assistance from *Mr. Lehlabile* to be an eco-school. We have registered the school with a non-governmental organisation (NGO) called Share-net so that we could attract other organisations to workshop us about the teaching of Environmental Education, and to get resources from those organisations (*Mr. Paul*, 2007).

Indeed the school seems to have taken the initiative to enlist the help of other NGOs and Institutions to improve its capacity to provide better OTL about the environment for both its teachers and learners. While the resident human capacity of the school, in terms of its personnel who are qualified in the area of environmental learning seems to have been low, the leadership and agency of some of the teachers at the school seems to have compensated somewhat for the capacity problems. The school's EE committee seems to have been a key agent or structure for creating a platform for OTL EE at the school. *Mr. Lehlabile* further described this important role of the environmental education committee when he said that:

> Because Environmental Education in our school is a venture, for the first time as a leader I started a garden which of course the teachers would use as a teaching resource and they will integrate Environmental Education into other learning areas. I have also established an enviro-club, an environmental committee which comprises of teachers and learners so that we can be able to enter competitions that will inspire teachers and learners about environmental issues. The main duty of the enviro-club is to engage in the environmental competitions. Having been registered as an Eco-school, the Share-net have sent us materials like posters, small booklets about plants and animals, for us to help teachers to conduct their lessons in the classroom. As an eco-school we have registered with the Share-

> Net so that teachers at our school can be trained in the form of workshops about Environmental Education (*Mr. Lehlabile*, 2007).

Of interest to me about these leaders was the critical role they played in identifying resources for the teaching and learning about the environment in and outside of the school. In my discussions with the environmental leaders of the school, it became clear that they have identified physical resources such as gardening tools like hosepipes, cheeters, spade, fork; fertlisers, indigenous trees and flowers; teaching and learning resources such as posters about the environment, booklets about plants and animals, and booklets about how to plan EE lessons; and other intellectual resources such as knowledge about the environment as key to their drive for building the capacity of the school to teach about the environment. *Mr. Paul*, for instance, reports that:

> As leaders in Environmental Education we managed to connect our school with stakeholders such as Nestle Company (Growth Wild (PTY) LTD) which donated fifteen indigenous water wise trees to replace the alien trees and also supplied the school with compost and the fertiliser tablet. With the resources that SANBI provides, it conducts workshops for us, thereafter we have to go back and do the practical part, in this instance gardening. SANBI has provided us with plants such as indigenous trees and flowers; they even demonstrated how to plant them. Most of our plants have been contributed by SANBI, and they demonstrate planting. SANBI also gave us a fork, spade, hosepipe and cheeters. Pick' n Pay Company through their "Wish Campaign" donated 46 citrus trees, compost bags, JOJO water tank (large plastic tank for liquid storage) and R5000 for the implementation of water harvesting project for the indigenous and vegetable garden (*Mr. Paul*, 2007).

In the same way, *Mr. Lehlabile* corroborated the story by *Mr. Paul* when he related that:

> We have in the past requested donations such as garden tools, seeds and funding for the development of our school environment. We have Pick' n Pay

> Company. In trying to save tap water, we thought of capturing rain water, and the only way of doing that was to link with stakeholders like Pick' n Pay, and we requested for a donation of a JOJO water tank. Pick' n Pay managed to provide us with a JOJO water tank and we have put it behind the classrooms so that we can capture rain water during the rainy season. By so doing we are going to save municipal water; we will be irrigating our plants using the very same rain water. Nestle Company donated indigenous trees, compost as well as fertiliser tablet for the school to remove the alien trees and plant water-wise trees. Our school is an Eco-school, it has registered with Share-Net, and so Share-Net also provided us with booklets that we can use for the teaching of Environmental Education. Gauteng Department of Education as well donated Environmental Education booklets that guide us on lesson planning for environmental lessons and it has also donated posters about the environment. We also use garden as a teaching and learning resource (*Mr. Lehlabile*, 2007).

From this exposition by *Mr. Paul* and *Mr. Lehlabile*, it is clear that the environmental leaders at the school play a significant role in the quest for acquiring resources for the teaching of EE. Apart from the material resources that they searched for, they also went for the financial resources while constructing human resource clubs such as enviro-club. The physical resources like the school gardens were also harnessed for teaching and learning. While all these elements of building the school's capacity were critical to the OTL about the environment at *Sechaba*, what was more striking though was their attention to what I call the "intellectual resources" that include knowledge and learning about the environment for the teachers at the school. *Mr. Paul* captured this idea of intellectual resources for me as follows:

> As a leader I create the infrastructure for the teacher that I am going to work with, for example, if we start on a gardening project, my responsibility is to identify the land, to prepare the place and after that I have to sit with the teacher and explain to him that there is a project that is coming in and it is provided by this organisation, please organise the learners, here is the material and work on this. So, mainly I have to create the infrastructure (Mr. Paul, 2007).

There are two interpretations in which the notion of infrastructure is used by *Mr. Paul* in the foregoing passage. First there is the physical infrastructure for example, the land, the gardening tools, *etc*., which he refers to. But also, and perhaps more importantly, infrastructure is also used to refer to the intellectual tools for teaching and learning about the environment – such as sitting with the teachers to explain things and compiling teaching and learning materials and lessons. That is one example of not paying attention to only the physical infrastructure but also making sure that the teachers are prepared intellectually for the task at hand.

Finding some interest in the intellectual resources question, I pursued the question further and asked the principal, *Mr. Rudi*, what specifically the leaders do in EE? *Mr. Rudi* gave the following explanation on this issue:

> They guide, they don't just talk, they are involved in the teaching of Environmental Education, and they lead by actions or examples. They are busy now establishing another garden. They are doing the planting of flowers, they do the selection of flowers, they are the ones who are involved in the planting, they are the ones who are doing planting with the learners, they show the learners what to plant and how to plant, and where, and they supervise as to whether they are doing the right thing (*Mr. Rudi*, 2007).

What seems clear from this discussion is the elaborate role and support from the leadership (EE leaders) in creating extensive OTL for both the learners and the teachers in EE.

Besides generating the infrastructure for teaching and learning about the environment, the leaders collectively with members of the enviro-club have drafted an environmental policy for the school. According to *Mr. Lehlabile* SANBI requested the committee to draft the environmental policy in order to provide guidelines on how the school should run in terms of EE. The policy also helps to

direct the NGOs who are prepared to assist the school in terms of EE on what the school is doing in relation to the environment. Reading from the environment policy of the school, I found that the mission of the school is:

> To use the school garden and resources of the school to inspire and enable learners, educators and community to take responsibility to healthy environment and have the environment protected (Environment Policy, 2005).

Furthermore, the policy states that the learners, educators and community will try to:

(i) Preserve the environment /engage with environmental issues for more meaningful learning;
(ii) Manage resources more wisely/conserve and minimise electricity use
(iii) Improve the school grounds and plant more indigenous trees
(iv) Sustain vegetable and flower garden
(v) Manage existing plants/shrubs/trees (Environment Policy, 2005).

Noticeably, the school is concerned about the protection of the environment and its resources including plants, water and electricity. It tackles the environmental issues by using the school garden to stimulate learners, educators and community to be in charge of their environment and to conserve it.

Reading from the school's documentation on the issue of their participation in environmental programs, it was interesting to observe that the school has come up with a project to address environmental issues within the school context. Energy saving, school greening, climate protection and waste management are the key issues the school intended to address. The document highlights that ESKOM provided the school with the retrofitting bulbs in order to save energy; the City of Tshwane Metropolitan Municipality (CTMM) supplied the school with the waste bins for the school to carry on with the recycling project which was supported by Collect-a-can and Mondi. SunTank Company installed a solar panel

and a geyser system to reduce the use of energy for the heating of water in the preparation of food for the disadvantaged children at school (2003).

Moreover, the documents also shows that SANBI's human resources department had visited the school in 2004 to concentrate on the issue of school greening. The school's environment committee accepted an invitation to be part of the SANBI's "Greening of the Nation" project and the staff underwent training to implement and sustain an indigenous decorative garden (2003). Trying to understand deeply what these external non-governmental organisations (NGOs) and stakeholders have done to help the school to provide OTL about the environment, *Mr. Paul* explained that:

> *Sechaba* Primary School has introduced Environmental Education. The first project that we have started is the one instigated by SANBI. Then we were told by SANBI to draft sort of a garden plan. We first started by drafting a garden plan which was divided into three phases. We were given about three phases. The first phase, we had to do it for a year. The garden that we have started was a flower garden, we started a flower garden and in that garden we planted flowers that are water-wise, meaning the flowers that conserve water. This was done for a year; we began the first phase in 2005. Then we carried out the second phase in 2006 where we have planted trees and flowers that are also water-wise. Those that consume water had to be taken out and we also had to introduce that we are conserving water so that we don't irrigate them on a daily basis. The last piece of a garden will be done this year in May where we will be planting trees and flowers.
>
> The other thing that we have done is to install the solar panel. The aim of putting up the solar panel is to save energy. Then what we did, we installed the solar panel and then inside the kitchen room there is a geyser which does not use electricity, we disconnected it from the electricity, the heat from the solar panel heats water into the kitchen, then the cook use that water. Again, as a means of saving energy we have used a reflective paint for the roof and the inside part of the classrooms, in winter it is much warmer and in that way we are trying to save

> energy. And then with electricity again we have taken the old used lights out and then we installed what we call retrofitting bulbs, the retrofitting also saves energy (*Mr. Paul*, 2007).

The analysis of the documents and the interviews seem to suggest that the school has become adept at using community resources such as people from the CTMM, people from ESKOM, and people from SANBI to help deal with some of the environmental issues like energy saving, gardening, and waste management. However, the way these resources were all deployed for the purposes of teaching about the environment was not always clear in the case of *Sechaba*. For this reason, I pursued this question during my observation of lessons and interview with teachers at *Sechaba* and will discuss it later in this chapter.

On the question of whether and how the teachers took advantage of opportunities to attend workshops with regard to the teaching and learning of EE, I discovered that many of them had actually attend workshops organised by SANBI/Rhodes University and Walter Sisulu Environmental Center (WSEC). Reading from the handouts that the teachers received from the workshops (See Appendix G), and from the interviews with some of the teachers, three national workshops at Rhodes University and three tutorials, one at Pretoria National Botanical Garden (PNBG) and two at WSEC were specifically cited as having been useful for the school's programme of developing the intellectual resources and capacity of the teachers in EE. Some of the workshops dealt with such issues as: how to link the indigenous water-wise garden into the curriculum, how to save water, types of plants, kinds of animals, types of soil, compost making, and how to establish a garden. *Mr. Lehlabile* described these opportunities for professional development and learning as follows:

> We normally attend Environmental Education workshops organised by SANBI, Rhodes University and Walter Sisulu Environmental Center. I attended three National Workshops organised by Rhodes University, one tutorial organised by SANBI and two workshops organised by Walter Sisulu Environmental Center.

> These three organisations are helping us to integrate Environmental Education into the school curriculum. From the workshops we attended, we have learned quite a number of aspects like composting issue. In eliminating greenhouse gases, which are wasting our oxygen in the atmosphere, SANBI encouraged us to plant indigenous trees because these trees conserve water and we were also motivated to plant them so that they should produce oxygen during the night. We started our school garden with the help from SANBI. At Walter Sisulu Environmental Center, they also taught us about the issue of composting, how to prepare soil for planting, and they also taught learners about different types of animals and how animals should be conserved (Mr. Lehlabile, 2007).

Mr. Rudi supported *Mr. Lehlabile*'s account of the teachers' professional development when he explained that:

> I attend per invitation. I once attended at Walter Sisulu Environmental Center where they were teaching us about different kinds of plants. The other one was organised by SANBI and they also taught us about planting of trees and flowers. SANBI taught us about nature and trees. Learners were also taught directly at Walter Sisulu Environmental Center (Mr. Rudi, 2007).

These learning opportunities that were created through the networks with the NGOs and other external structures were not limited to the teachers only. When I discussed with the learners what they gained about EE during their visit at SANBI and WSEC they responded as follows:

> **Thabo**: We learned about different types of soil like clay soil, sandy soil and loam soil.
> **Dorah**: We learned about keeping our environment clean.
> **Thobeka**: They were teaching us about making compost.
> **Hlengani**: We learned about planting (Interview, 2007).

While many schools would be content with creating such opportunities for teacher and learner development on an ad-hoc basis, *Sechaba*'s engagement

with the community organisations and NGOs was remarkable in that it was forward looking and based on some formal medium term agreements with the external organisations. *Mr. Lehlabile* captured these developments with respect to SANBI as follows:

> To be able to establish indigenous water wise garden, SANBI wrote us a letter to request teachers and learners to attend skills workshop training. SANBI made recommendations such as designing garden plan, management plan. The school then got a permission letter from the Department of Education for the engagement in the greening of the environment project. An agreement was concluded for a period of three years for skills development for teachers and educators. In 2005 and 2006 SANBI unveiled the first and the second water wise garden of the school (*Mr. Lehlabile*, 2007).

Once more the question of leadership and agency becomes more evident in this quote when we examine the extensive processes that are involved in concluding agreements with such NGOs and stakeholders who wish to assist schools in building their capacity for environmental learning. Seeking approval from the Department of Education for such external involvement requires patience and care in negotiating the terrain. The "Green Team" as the environmental committee is sometimes called at *Sechaba* was able to negotiate this terrain with relatively minimal difficulty. For many schools, the process itself may have been discouraging.

4.3 THE TEACHING AND LEARNING OF EE AT SECHABA

In order to understand how teachers implement EE curriculum in the classrooms and how they use the existing resources for the teaching about the environment, I built into my investigation an opportunity to do classroom observations in three learning areas; Life Orientation, Natural Sciences and Social Sciences to establish how environmental learning is included in these areas at *Sechaba*.

MR. LEHLABILE AND ENVIRONMENTAL LEARNING

I observed a Grade 7 Life Orientation lesson, which was presented by *Mr. Lehlabile*. *Mr. Lehlabile* is of medium height, a light in complexion male with short hair. He is in his early forties. He is the HoD of guidance and has a reputation as one teacher who is actively involved in the teaching of environmental issues at school. He possesses a National Professional Diploma in Education from the former Technikon Pretoria and has studied EE as a course at Rhodes University. At the time of the research, he was responsible for Life Orientation, Social Sciences and Sepedi. When I visited his school for the purposes of research, I was told about him, when some teachers described him as an energetic teacher who is always involved in the environmental programmes of the school.

During pre-observation interview, *Mr. Lehlabile* remarked that he planned to teach learners about how to make compost. His major goal was for learners to be aware that waste materials like *vegetable peelings and leaves, fruit peelings and tea leaves* can be reused to fertilise the soil. He explained that he would involve learners in a question and answer activity where they would be expected to give their own experiences and understanding of what they know about compost.

In observing *Mr. Lehlabile*'s class, something interesting came out of the lesson on Life Orientation. What was interesting in the lesson was how *Mr. Lehlabile* worked with the knowledge he has gained from the workshops during the lesson. In one of the lessons I observed, he was exploring how compost can be useful for plant growth and how it was a necessary source of soil fertiliser. *Mr. Lehlabile* explained to the learners how plants need rich soil in order to grow and develop. To illustrate his development of this lesson on compost, I draw on a segment from the observation notes:

> *Mr. Lehlabile*: Good morning class.
> Learners: (they all stood up) Good morning Sir.

Mr. Lehlabile: How are you doing this morning?

Learners: Fine thank you and how are you Sir.

Mr. Lehlabile: I am fine thank you, you may be seated. Today I am going to teach you about compost making, about what?

Learners: Compost making.

Mr. Lehlabile: When I talk of compost making, I am talking about how to make compost. Compost making means how to make compost, it means what?

Learners: How to make compost.

Mr. Lehlabile: So today I am going to teach you about how to make compost and after teaching you about compost making I want you on Wednesday during Life Orientation lesson to observe the waste dump near the gate inside the school yard, sort recyclable and non-recyclable materials and make compost. It is that okay?

Learners: Yes, Sir.

Mr. Lehlabile: let me tell you my dear learners, we depend on plants for food and for beautifying our local environment. So plants need rich and healthy soil to bloom very well. To do what?

Learners: To bloom very well.

Mr. Lehlabile: To bloom is to grow, so plants need rich and healthy soil to grow very well, isn't it?

Learners: 'It is, Sir.

Mr. Lehlabile: There are different types of soil, some soil support the life of plants than others. Remember, we have types of soil, can you name them (learners raise their hands), yes *Jane*, let's hear from you.

Jane: Clay soil.

Mr. Lehlabile: Good, clay soil.

Thabo: Loam soil.

Mr. Lehlabile: Good *Thabo*, loam soil, let's hear *Lungile*.

Lungile: Sandy soil.

Mr. Lehlabile: Good, we also have sandy soil. Now tell me which type of a soil is good for planting? Yes, *Keketso*.

Keketso: Loam soil.

Mr. Lehlabile: Good, loam soil is good for planting. Now tell me what will happen to the soil, after throwing a peel of a banana or orange on it.

> *Tiisetso*: Nothing will happen to the soil because the peel of banana will be rotten.
> *Mr. Lehlabile*: Is it true?
> *Martha*: No, the peels will get rotten and thereafter will make the soil to be fertile.
> *Mr. Lehlabile*: Good, *Martha*, the soil will be fertile. Now to fertilise the soil we must make compost. Compost is manure that is used to fertilise the soil. To make compost is simple and cheap because you can only make use of rotten vegetables, and fruits. For example, a carrot that grows using nutrients from the soil is eaten by people. When people throw away the leaves and peels, these wastes can go back to the soil to decompose and provide nutrients for new cycle growth. So, now when we make compost we make use of vegetable wastes, we mix them with soil, we sprinkle water to make it moist, and then we leave it for some days for compost to form (Observation, 23 April 2007).

For the foregoing lesson, *Mr. Lehlabile* used mainly a Life Orientation textbook and his preparation notes. The class had 29 learners (14 boys and 15 girls) which seemed to be manageable for him as he involved learners easily in a question and answer activity. Although the learners were seated in small groups of six with enough space to allow for movement in between, there was no real group activity during the lesson I observed. The whole lesson lasted about 30 minutes.

In conclusion *Mr. Lehlabile* summarised the lesson by explaining to the learners that compost is like manure. He continued to describe that the refuse that people throw away on a daily basis can be turned into compost. Unfortunately, time was not enough for them to prolong the lesson on compost making. The lesson was stopped with a note that learners would be involved in a practical activity in the subsequent Life Orientation period where they would be making compost.

During this lesson, *Mr. Lehlabile* did not encourage any form of co-operative learning among the learners as he only expected individual learners to respond to his questions. Interestingly, this entire Life Orientation lesson was entirely

about the environment because the focus was on compost making and the purpose of preparing compost.

Asked about how he prepared the lesson and whether he had achieved what he anticipated, he commented as follows:

> The lesson was about compost making, which means that I was teaching learners about how to make compost as you have observed. Compost is an important environmental issue because it is another method that we can use to recycle, or can I say to reuse wastes. We were taught during our third workshop at Pretoria National Botanical Garden (PNBG) that using compost is important because it returns nutrients to the soil and it also helps the soil to hold water and it prevents soil erosion. With this lesson I wanted to educate learners that waste materials, especially rotten vegetables, leaves, flowers, and other food can be used to make the soil rich and ready for planting. I am impressed by the way learners were answering the questions, it showed that they have a thought of what compost is. I was not surprised by the way they were actively participating when responding to the questions because they were also taught about composting issue during educational excursion at Pretoria National Botanical Garden (*Mr. Lehlabile*, 2007).

From this lesson I observed that resources do not only mean physical resources that teachers use during the lesson but they also imply the knowledge that teachers impart to the learners (that is, the intellectual resources). On the other hand, while knowledge in and of itself is useful in creating potentially rich OTL, it is the manner in which the teacher presents such knowledge to the learners that will ultimately generate real OTL about the environment.

As discussed earlier, *Mr. Lehlabile* was proud to discuss the OTL about the environment that had been availed to him and his colleagues through the SANBI projects. In our conversation and during the observation of his lesson on

compost, he illustrated how the workshops had helped him plan and conduct his environmental lessons with the learners.

> The compost (See Picture 1) issue is one of the things that we have learned from SANBI. In eliminating greenhouses which are gasses that are wasting our oxygen in the atmosphere, SANBI encourages us to plant indigenous plants so that indigenous trees should produce oxygen during the night (*Mr. Lehlabile*, 2007).

Mr. Lehlabile seems to have taken the focus on environmental learning quite seriously, even though the lesson we observed in his classroom did not seem to be as effective (as he would have liked). To compensate, and help the learners further develop an understanding of the concepts involved in making fertiliser through compost, *Mr. Lehlabile* took the learners on a practicum within the school grounds where they had to make compost for the school as illustrated in the following pictures:

Picture 1: Making compost at *Sechaba* Primary School

Mr. Lehlabile sought to create further links between what he did in class with some “outdoor activities” where the learners participated in the preparation of the soil for gardening by changing the composition of the soil in the school gardens. The learners were involved in an outdoor learning activity as part of a task of recycling. They were supposed to observe the waste dump around the school yard, classify recyclable and non-recyclable waste, and evaluate actions to address an environmental health problem. In the pre-observation interview with *Mr. Lehlabile*, he indicated that the aim of the outdoor lesson was to inspire and to help learners to be responsible for a healthy environment and to protect the environment by composting the waste material to make the soil rich. The outdoor task was constructed as follows:

> *Mr. Lehlabile*: I am giving you an activity and in that activity you are supposed to study the waste dump around the school yard and after watching the waste dump, you must answer the following questions:
> What kind of litter or waste is seen there?
> Who litters? When does littering takes place?
> What are the end results of dumping?
> What can waste be used for? (Observation, 25 April 2007)?

After the questions, *Mr. Lehlabile* required the learners to do a hands-on task.

Picture 2: Learners from *Sechaba* Primary School examining and sorting recyclable and non-recyclable wastes

The instructional method used was a hands-on activity as learners were learning by doing. They took action by observing, studying and sorting non-recyclable and recyclable waste materials. They sorted out plastic and paper for recycling and covered vegetable wastes with soil to make compost. During the lesson, *Mr. Lehlabile* told the learners the story of a carrot that grows using nutrients from the soil. In his own words, he told the learners: *"a carrot is eaten by people who throw away leaves and peels, this waste can go back to the soil to decompose and provide nutrients for a new cycle of growth"* (2007). In the story of the carrot and through their observation of the waste dump, the learners learned that nothing is rubbish or unusable. They discovered that soil is fertilised through natural processes by dead plants and animal material. In the post-observation interview, *Mr. Lehlabile* emphasised that his lesson had been guided by different

Grade 7 Life-Orientation textbooks, hand-out about compost that he got from National Department of Agriculture as well as the sample lessons he had obtained from the SANBI workshops and the Rhodes University Course.

Overall, it was interesting to notice how *Mr. Lehlabile*'s classroom practice on environmental learning was guided and supported by the professional development and intellectual resources he had accumulated from his attendance of workshops and tutorials by the NGOs he worked with. It was also significant to notice that *Mr. Lehlabile* made a determined effort to link his classroom lessons with the outdoor activities at the school.

MR. MOLEKA AND ENVIRONMENTAL LEARNING

During the visits to *Mr. Moleka'*s Grade 7 Natural Science class, I observed a rather different approach to the teaching about the environment. Interestingly, Natural Science was not *Moleka'*s area of specialisation, however as discussed before he was deployed in this learning area by default. *Mr. Moleka* is a short, dark male with a bald head who is very pleasant and engaging in conversation. He is in his late thirties and is a senior teacher who has twenty years of teaching experience. He has a Secondary Teachers' Diploma, which he obtained from a college of education in Mabopane located in the North West Province of SA. His area of specialization is English and History. However, since the introduction of the new curriculum (Outcomes Based Education), he has offered to teach Natural Science which he found easy despite the fact that he did not do it at the college. He described himself as somebody who likes to acquire knowledge about different subject areas, so he never found it difficult to teach Natural Science. An untold story of this deployment in the unfamiliar subjects like the Natural Sciences in this case was all about securing the job by volunteering to teach the 'harder and more valued' subjects in the new curriculum. *Mr. Moleka* started teaching in a secondary school in the former Kwa-Ndebele homeland of the apartheid SA in a region called Kwa-Mhlanga. He relocated to Mamelodi to

teach at *Sechaba* Primary School as he “hated the daily travel from Pretoria to Kwa-Ndebele” (*Mr. Moleka*, 2007).

In one of my visits to his class, *Mr. Moleka* described how he intended to cover the theme on environment, in the context of a study of birds, particularly owls. His major goal was for the learners to recognise owls as birds that are endangered and need to be conserved. He intended to introduce the lesson by playing an audiotape with a sound of an owl. Furthermore, he planned to draw on learners’ experiences about owls and build on that prior knowledge to engage learners in a discussion about common ideas and beliefs about owls. In the pre-observation interview *Mr. Moleka* drew attention to the fact that his preparation of the lesson was guided by the booklet about owls he got from Pretoria Zoological Garden during their educational excursion in 2006.

> In my preparation of this lesson I used this booklet (showing the booklet). I got this booklet from Pretoria Zoological Garden last year during our educational excursion. We went to the garden so that our learners would learn about different types of animals. The environmental educator at the Zoological Garden also spoke about the importance of owls. I found it interesting and I realized that people have misconceptions about owls. Therefore I learned that it is better to educate these learners about the importance of owls so that they will know that an owl needs to be protected like any other animal (*Mr. Moleka*, 2007).

The class consisted of 30 learners who sat in mixed gender groups of six. *Mr. Moleka* began by putting a poster displaying an owl on the chalkboard, and wrote “an owl” on the board. At the beginning of the lesson, he played an audiotape with the aim of provoking the learners’ thoughts and for them to come up with views and beliefs about owls.

The class was full of posters relating to EE, containing information such as the dangers of fire, water pollution, and waste disposal. In the presentation of the lesson, a number of resources were used such as a poster of an owl; a poster of

a food chain, a chart displaying a rat and grass; two artificial (man-made) owls, an artificial wing, and a radio. At the beginning of the lesson, *Mr. Moleka* asked the learners if they had ever been to the zoological garden and what they had seen there:

> *Mr. Moleka*: 'Have you ever gone to the zoological garden?'
> Learners: 'Yes'.
> *Mr. Moleka*: 'What did you see at the zoological garden? (Many learners lifted their hands up). Yes *Lindiwe*, let's hear from you'.
> *Lindiwe*: 'Lion'.
> *George*: 'Kangaroo'.
> *Mpho*: 'Sea lion'.
> *Mbali*: 'Tiger'.
> *Mathews*: 'Zebra'.
> *Mr. Moleka*: 'Good, now I am going to play the cassette and you must tell me what sound of an animal it is'. (He played the cassette for about five minutes and I could here learners whispering, it is a bird, it is an eagle, it is a sea lion, etc. Then learners raised their hands up). 'Yes, let's hear *Gloria*'.
> *Gloria*: 'An owl'.
> *Mr. Moleka*: 'Good, it is an owl, when last did you see an owl? (Observation: 16 May 2007: 9h30-10h30).

In the pre-observation interview with *Mr. Moleka* I discovered that the aim of this lesson was to correct the misconceptions learners (people) have about the owls. He planned this lesson because according to him EE is also about animals, so learners need to be taught about animals in order to know how to take care of them.

After the recording and the discussion identifying the animal making the sound, the lesson continued as follows:

Mr. Moleka: Today I am going to teach you about an owl. What type of an animal is an owl?' (Learners raise their hands).

Zoleka: 'A bird'.

Mr. Moleka: 'An owl is a bird, do you all agree?

Learners: 'Yes'

Mr. Moleka: 'Then, if I ask you, what features make a bird, what are you going to say? (Learners were quiet for about 2 minutes suggesting that many of them did not quite understand the question). Let me give you an example, a lion has two legs, a hairy neck, a tail, and a tough skin (this example stimulated learners to develop a sense of what some of the characteristic features of an owl might be; they began raising their hands). Yes, let's hear *Thandi*'.

Thandi: 'A bird is something that lives on a tree and it can fly'.

Mr. Moleka: 'Yes, good, a bird has wings so it can fly'.

Lungile: 'A bird has two legs'.

Ratile: 'A bird has a beak '.

Mr. Moleka: 'An owl is a *nocturnal bird*; a *nocturnal* is an animal that is active during the night and passive during the day. The opposite of nocturnal is *diurnal*. A *diurnal* animal is the kind of an animal that is active during the day like a human being and passive during the night. People are saying lots of things about an owl; we call them myths, which are not true. An owl is like any other bird. It plays an important role in the food chain, remember we said an owl eats a mouse or rat and a rat eats plants. An owl should not be killed but it should be conserved like any other animal because it is important. Remember, when you kill it you are breaking the food chain. An owl does not come at home to bewitch you but it comes to control rats because they are troubling us (Observation: 16 May 2007).

Following these explanations and questions about an owl, *Mr. Moleka* then gave learners a 10 minutes activity. He was certain that the learners would be able to do the task on their own while he was acting as a facilitator. In that activity, the learners were expected to discuss in small groups what ideas, beliefs and myths people have about owls. During the discussion, the learners were focused on the

task and shared with each other actively as captured in the following report-back segment from the lesson:

> **Group A:** People say owls are witches.
> **Group B:** People don't like owls because they say they bring bad luck and nightmares.
> **Group C:** People are afraid of owls, when they see them they try to kill them.
> **Group D:** People say an owl likes to sit on the tree and when it comes at home it means somebody at home is going to die.
> **Group E:** People say an owl likes to sit on top of the roof of a house and it makes noise and it disturbs them when they are asleep at night.
> (Observation: 16 May 2007: 10h00-10h10)

In wrapping up these answers *Mr. Moleka* reiterated that '*owls are not witches and do not come home to kill people but they come home to control the rats'* (Observation: 16 May 2007: 10h12). Once more, *Mr. Moleka* explained to the learners that when they kill an owl they are breaking a food chain. He emphasized that an owl should be conserved like any other animal. These explanations from *Mr. Moleka* suggest the intellectual understanding he has about environmental (particularly animals) conservation. His descriptions indicate the concern he has about the myths people have concerning owls which eventually make them to destroy nature, in particular, animals.

During the post-observation interview, *Mr. Moleka* declared that he was impressed with the lesson, as many of the learners had participated actively during the discussions. For him, the familiarity of the subject on owls was the major reason for that kind of participation by the learners. For *Mr. Moleka*, such learner engagement was an important criterion by which he judged the success of his lesson. The reference to the learners' day-to-day experiences with owls was for him also a key ingredient in the success of the lesson. *Mr. Moleka* was excited that the lesson had gone according his plan, and in fact exceeding his

expectations when the learners began to engage him more with their own puzzles and questions. The following discussion segment is illustrative:

> *Nolwazi*: What are the animals that eat owls?
> *Mr. Moleka*: It can be eaten by eagles.
> *Kabelo*: What skills does an owl have?
> *Mr. Moleka*: An owl can see properly, it can fly silently in order to kill its prey.
> *Thandi*: Where does the spotted owl live?
> *Mr. Moleka*: In an urban area.
> *Xolani*: What type of a skin does and owl have?
> *Mr. Moleka*: It is covered by some feathers.
> *Gugulethu*: Why do people kill owl?
> *Mr. Moleka*: Because of their beliefs.
> *Pearl*: What happen when I see an owl at night?
> *Mr. Moleka*: It won't do anything to you; it only needs rats, an owl does not care about people
> *Lindiwe*: where do people found owls?
> *Mr. Moleka*: owls live on the tree. Another thing an owl does not make its own nest but uses other animals' nests.
> *Siyabonga*: others when they see an owl the throw it by stones
> *Mr. Moleka*: Don't throw it with stones; remember when you throw an owl with a stone you are breaking the food chain (Observation: 16 May 2007).

Indeed, the learners seemed interested and asked all sorts of questions about owls. It is important to note though that their questions were routine and appeared as if they were rehearsed.

Mr. Moleka also did not engage the learners on their questions but threw out some answers as if he was an expert. He made no attempt to uncover the source of the students' questions and facilitate a discussion around them. For him, the most important thing was the fact that the learners had appeared to be engaged and participated actively during the lesson by answering and asking questions. He ascribed the improved participation levels to the fact that the

lesson was relatively easy after their previous lessons and discussion on vertebrate and invertebrate animals and how animals adapt to the environment. On the question of how he selected the activities, explanations, examples, and what concepts to focus on during the lesson, he made it clear that "*I used the materials I got from the zoological garden during our educational excursion last year in 2006"* (*Mr. Moleka*, 2007).

During my conversations with the learners, after the Natural Science lesson, I was able to observe that the learners were indeed also excited about the lesson. The learners confirmed that they had enjoyed the lesson largely because it had been based on familiar experiences and was about an animal that they know. They stated that the lesson was linked to EE because environment is also about living things like animals. This is how they responded to my questions regarding their experiences of this particular lesson:

> *Thandi*: I enjoyed the lesson because our teacher was using real stuff like artificial owl, artificial wing, a radio, and a poster of a food chain.
> *Palesa*: This was an interesting lesson because our teacher gave us a chance to talk about what we know concerning owls.
> *Kabelo*: I liked the lesson because our teacher was teaching us about the animal that I have once seen.
> *Lungile*: I enjoyed the lesson because I have learned that owls are not witches but they come home to help us with the rats. I also learned that owls are part of the environment because they are living things and when we see them we must not kill them, but protect them (Interview: 16 May 2007).

The discussions with learners seem to suggest that learner engagement and response improved as they are provided with opportunities to make contact with the teaching and/or learning resources and are provided with opportunities to converse among themselves about issues relevant to the lesson.

The abovementioned lesson presented by *Mr. Moleka* was unusual because of the tangible resources he used, the knowledge that he has about animal conservation, the use of human resources particularly learners to disclose their knowledge about owls in order to rectify the myths they had concerning owls, and how he created time for learners to ask question. During the lesson *Mr. Moleka* showed a lot of inventiveness and creative skills in his teaching. Unlike in the other lessons observed, *Mr. Moleka* began a lesson by asking learners if they had ever gone to the zoological garden, as a way of commencing the lesson. Contrasting the other lessons where the teacher would talk often, *Mr. Moleka* gave learners a chance to voice out their thoughts and to ask questions regarding owls.

In summary, it is clear from the data that *Mr. Moleka* regarded learner engagement and participation as an important factor that lead to productive contributions to successful teaching and learning about the environment. For the aforementioned lesson we can conclude that *Mr. Moleka*'s approach of the teaching about the environment at *Sechaba* is effective because he integrates his information and understanding, learners' experiences, and material resources to make the lesson clear and comprehensible to the learners.

MR. PAUL AND ENVIRONMENTAL LEARNING

Another focused observation regarding the teaching and learning about the environment at *Sechaba* was done in *Mr. Paul*'s class. *Mr. Paul* was trying to integrate environmental learning within the Social Science learning area. His lesson was similar to the other two, i.e. Life Orientation and Natural Science, in that it attempted to educate learners about the environmental issue of pollution. The main aim of his lesson was to familiarise learners with what pollution is and how dangerous it is to people's health. However, *Mr. Paul* was also different from *Mr. Lehlabile* and *Mr. Moleka'* s pedagogical approaches in that he used realistic

examples in his teaching about the environment as a way of inspiring learners to participate.

In the pre-observation interview with *Mr. Paul*, he told me how he planned to teach learners about pollution. He focused on pollution because he wanted to make learners aware of the causes of pollution and how pollution affects people's health. He presented a Grade 7 Social Science lesson in a class of 28 learners (14 boys and 14 girls) who also sat in mixed gender groups of four. *Mr. Paul* began the lesson by greeting the learners; subsequent to the greetings he told them to open their Social Science textbooks.

Following is a segment typical of the lesson and how he conducted it.

> *Mr. Paul*: Turn on page 97 in your textbooks. Today you are going to learn about pollution. What is pollution? (Learners were silent). *Mr. Paul* repeated the question 'what is pollution? (Still, there were no answers from the learners). Then he continued to explain that 'as the wind blows, the rain will start to fall. After the wind has blown, the rain has fallen, the environment changes, as the environment has changed it affects all of us. How it affects us, when the weather changes, everybody is affected and everything is affected. The grass changes its colour from green to…….
> *Muzi*: Brown
> *Mr. Paul*: And what else changes?
> *Whitney*: People start changing their way of dressing.
> *Mr. Paul*: Sir, people start catching coughs.
> *Mr. Paul*: Yes, our health become affected, and what else, the season changes, and what about the day? In winter and in summer, the days are not the same. In winter the day is
> *Learners*: Short.
> *Mr. Paul*: And the night is…
> Learners: Long.
> *Mr. Paul*: In summer, the day is….
> Learners: Long

Mr. Paul: And the night is…..

Learners: Short.

Mr. Paul: During winter, everything is affected, isn't it? The air pollution starts to increase during winter time because people start to make fire, they start making fire using coal. When you make fire the smoke of the fire causes air pollution. What do we call the gas that comes from the stove?

Lindelani: Carbon monoxide.

Mr. Paul: Carbon monoxide.

(Observation: 28 May 2007: 10h00-10h15)

At the opening of the lesson, *Mr. Paul* began by asking learners what pollution is. However, learners appeared quiet to indicate that they had no hint of what pollution means. *Mr. Paul* realised that learners do not know the answer, and then he attempted to orientate them with what pollution is by talking about the smoke that pollutes the air. He made an effort to provide learners with knowledge of how the environment can be affected. Definitely, *Mr. Paul* wanted learners to have an understanding of what pollution is and how it can be caused. As the lesson continued, *Mr. Paul* carried on asking learners questions:

> Let's hear, what causes pollution? (Observation, 28 May 2007)

Learners were quiet for a few minutes suggesting that they had to think a little more about their responses. After repeating the question several times, and getting the same blank and nervous stares from the learners, *Mr. Paul* decided to engage the learners by providing the explanations himself as follows:

> The atmosphere surrounding the earth is made up of Nitrogen and Oxygen as well as other gases that are present in very small quantities that include the green house gases such as carbon dioxide, methane, ozone, water vapor and nitrous oxide. So this pollution damages the environment, the weather, animals, plants and agricultural sites. There are different types of pollution such as environmental pollution, water pollution, air pollution, noise pollution, soil pollution, etc (Observation, 28 May 2007).

At the beginning of the lesson, learners appeared silent and bored as the teacher (*Mr. Paul*) continued to give explanations of the things that perhaps they were not farimiliar with. Most of the time learners did not appear to be actively engaged in the lesson as they did not respond to several questions from the teacher. *Mr. Paul* continued to give explanations of each concept and stopped at different points to ask a question as if to awaken the learners who seemed bored and/or uninvolved. Still failing in his attempts to elicit participation from the learners, he tried to vary his approach by giving them a practical example, for them to have a better picture of what he was talking about. An extract from his lesson went as follows:

> Environmental pollution refers to all the ways that we harm the natural environment that include the air, water and soil pollution. Air pollution occurs when industries and vehicles release large amounts of gas and particles into the air so that natural processes can no longer keep the atmosphere in balance. In the industries when water from the drains goes inside the river, what will happen to that running water into the river? (Observation: 28 May 2007:10h15)

It was really after this practical discussion of pollution that he was able to make a breakthrough of sorts. Some learners began participating actively. It is fair to suggest, as in this case, that the learners needed something that would connect the lesson with their practical experiences and knowledge of pollution. Additionally, the pace at which learners participate in a lesson is often determined by the familiarity of the concepts used during the presentation of the lesson. In the case of the pollution lesson, an illustrative segment on how the learners' engagement peaked after that practical example is captured below:

> *Thato*: That water will be dirty, Sir.
> *Mr. Paul*: Good, when water from the drains goes inside the river, the water into the river becomes polluted.
> *Grace*: Sir, water pollution is when people at the salon, after washing our hair pour water on the street.

> *Mr. Paul*: You have tried but the answer is not correct. Yes Joyce what do understand by water pollution and how does water pollution affect our health?
> *Joyce*: Water pollution is dirty water, like when people dump dirty things inside water, and its danger is that people are going to be affected by cholera.
> *Chwayita*: Even people who are staying next to the river, and dams they throw things inside water. They pour dirty water after doing the washing inside water in the river and they pollute that water.
> *Mr. Paul*: Yes, water pollution can also be caused by people who throw wastes in the dams and rivers.
> *Lolita*: And people who drink that water will catch cholera.
> *Charmaine*: And when a fish in the river will die when the water is polluted. (Observation: 28 May 2007:10h30)

In the post observation interview, *Mr. Paul* mentioned that he was not impressed by the learners' participation or specifically the lack thereof during the lesson. For him, the reason for the non-participation was because the learners were not familiar with the topic. This was in spite of the fact that learners may have encountered so many instances of pollution in their day to day living. Even when the learners had been able to talk about some specific instances of pollution as illustrated in the previous segment, *Mr. Paul* still did not see the contradiction in his reasoning about why the learners had struggled to engage with the lesson. His proposed solution in this case was to "repeat the same lesson" some other time so that the learners would have a clear understanding of what pollution is. *Mr. Paul*'s lesson provided the evidence for my earlier point about the fact that OTL do not necessarily result from the fact that the teachers are knowledgeable and had attended the relevant professional development workshops on EE but are created in the practical situation of teaching and learning in the classroom. Teacher knowledge by itself does not create rich OTL for the learners but provides the infrastructure or a potential resource upon which such OTL can be created.

The case of *Sechaba* provides us with an example of how one primary school went about creating the infrastructure for providing OTL about the environment. The major findings arising from this case study will be discussed in the next chapter.

CHAPTER 5

5. SUMMARY OF THE FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter summarises the findings and discussion, presents a conclusion and makes recommendations. The main aim of the study was to investigate OTL EE in a primary school. More specifically, the study was conducted to develop an understanding of the manner in which environmental learning is integrated in the primary school curriculum and to make sense of how primary school teachers implemented the new EE curriculum in their classrooms. To do this, I therefore examined more directly the case of how *Sechaba* Primary School (one of the primary schools in the Gauteng Province) went about finding and organising resources to create better OTL about the environment. Formally, the study was aimed at answering the following research questions:

- What kinds of resources (human and non-human) do primary schools rely on for the teaching and learning about the environment?

- How are these resources identified and organised to maximise the OTL about the environment in the primary schools?

- How can the specific organisations of resources for the teaching and learning about the environment in the primary schools be explained?

In the preceding chapter, I presented some of the major themes arising from the data collected, in the form of a case study of the integration of environmental learning in the primary school curriculum. In the section that follows, I entertain a

discussion on some of the major findings from the case study of *Sechaba*, specifically in relation to the literature on OTL EE outlined in chapter two.

5.2 SUMMARY OF FINDINGS

In Chapter four, I began a discussion on both the human and non-human resource capacity at *Sechaba* Primary School. I explored specifically the teachers' capacity to create opportunities for environmental learning at the school. The results suggest that *Sechaba* Primary has relatively few teachers who are qualified to teach about the environment. The one teacher leader who has a qualification in EE underwent training in Environmental Studies at Rhodes University. This teacher has, for the most part, taken the lead in the integration of environmental learning in the school curriculum, with assistance from the school's deputy principal. While the Deputy Principal has shown interest in EE; he however, has no special qualification in the field. The two teacher leaders at *Sechaba*, *Mr. Lehlabile* and *Mr. Paul*, have played a critical role in identifying resources for the teaching and learning about the environment in and outside the school.

A myriad of their activities designed to improve the capacity of the school to create better OTL about the environment included some of the following: creating human resource clubs such as enviro-club, registering the school with Share-Net to be an eco-school, drafting an enviro-policy, seeking out financial resources, and other intellectual resources such as knowledge and learning about the environment for the teachers at the school. Given the findings regarding the ability of this school environment leaders to mobilise physical resources, intellectual resources as well as financial resources, the major story of the present research is therefore that of a case of mobilising resources for environmental learning and how such resources are used in the teaching and learning about the environment with a view to providing better OTL about the environment at the school.

Furthermore, the findings suggest that the school formed partnerships with NGOs, not only for gain in the material resources of the school, but also for the professional development of teachers in the field of environmental studies. Learners also benefited from these partnerships through enrichment of content and practical knowledge about the environment. These professional development sessions, in turn, enabled the provision of structured learning opportunities about the environment at *Sechaba*, including the hands-on projects that resulted from the partnerships with the NGOs.

In the next segment of this chapter, I divide the discussion into three sections. First, I examine the human and non-human resources with respect to the teaching and learning about the environment at the school, then I analyse the institutional systems and frameworks for the implementation of environmental learning at the school, and last, I explore partnerships between the school and other stakeholders working in the area of EE.

5.2.1 The availability and utilisation of human and non-human resources for the teaching and learning about the environment at *Sechaba* Primary School.

In this section I discuss the findings related to, firstly the human resources and capacity, and teacher professional development; the physical resources; and the information and Intellectual resources that the school has for the teaching and learning about the environment.

5.2.1.1 Human resources, capacity and teacher professional development

Often times the issue of teacher shortage is given as a reason for the poor OTL, especially in scarce and/or new subjects or focus areas such as EE. This was an important issue to investigate in the case of *Sechaba* Primary, when looking at

the resources available for environmental learning. The results of the study revealed that *Sechaba* Primary School, in fact, seems to have enough teachers to fulfil its broader mandate in primary education. The average teacher/pupil ratio in the four classes that I observed was 1:35, considering that the school of 620 learners had a total of 17 teachers. In spite of these numbers, as discussed in chapter four, the quality of the learning experiences in EE were at best average at *Sechaba*.

Yes, it is important to emphasise that there was a clear focus and tangible effort to integrate environmental learning into the rest of school curriculum. All four teachers I observed made genuine attempts to include environmental themes and knowledge into their lessons. Whether this was done in order to make an impression on me is beside the point, since whichever way one looks at it, there is evidence of some exposure to environmental learning for the pupils at *Sechaba*. The critical issue for me in the research was the fact that the quality of the teaching about the environment was however not very convincing in terms of the depth of environmental content and learner participation.

The latter two indicators with which I decided to appraise the observed lessons are integral to what makes a quality teacher. Porter (1991), among others, views a quality teacher as someone who is first and foremost properly qualified in the subject he/she teaches. Also, in their definition of OTL, Oakes and Lipton (1990) note that in order to afford all students with equal OTL, all teachers should have teaching qualifications, should be experts in their subject areas and should be able to engage learners in the learning process.

The limiting factor at *Sechaba* Primary was the absence of properly qualified teachers in the field of EE. In fact, there is only one teacher out of a total of 17, who strictly qualifies to teach learners about the environment. *Mr. Lehlabile*, who has a certificate in EE, also coordinates the environmental programmes of the

school, with assistance from the Deputy Principal. *Mr. Paul* also recognised this limitation when he observed that:

> We don't have enough teachers who are qualified to teach Environmental Education. I have interest in Environmental Education but I am not qualified to teach it. Only Mr. Lehlabile has qualification in Environmental Education. We should get Environmental Education teachers. I am saying this because if you look at our environment where we live, especially our community, people don't look after the trees, they chop them. For example, we have 100 pitches around the school premises, and people don't know anything about trees. They take them away, and fruit trees are taken away. If there were enough Environmental Education teachers they were going to teach learners about the importance of trees and plants in general.

However, the emphasis here is not on the presence or absence of a qualification, but rather the observation that qualified teachers are more likely to have the required expertise in their subject areas. Stein (2000) takes the view that there is a connection between teacher qualification, classroom practice and OTL. Teachers who are trained to teach, tend to do better in the classroom in terms of the teaching practice than teachers who are not qualified to teach. All in all, this observation is based on the understanding that qualifications and expertise in the subject areas that teachers offer play a significant role in providing students with OTL about those particular subject areas. With only one teacher at *Sechaba* Primary who possesses a qualification in EE, it can hardly be said that the school has enough capacity in terms of teachers who can teach about the environment. Making a similar point about the quality of teachers, the Department of Education (2000) points out that the quality of education received by the learners is determined by the conditions of the schools and other facilities such as better-trained teachers, and improved methods of teaching and learning.

Other OTL scholars such as Oakes *et al*. (1990) have argued that black students are more likely to be taught by less qualified teachers and eventually their OTL

become less. Sadly, this was the case at *Sechaba*, although it is not clear to what extent this would be the case at other SA primary schools, especially the formerly advantaged schools in the country. The issue of qualified teachers for the subject is a contentious one, even for the Department of Education. At this stage, there are no formal plans to provide enhanced study opportunities for teachers in EE except on a voluntary basis at the initiative of each individual teacher.

In view of this limitation, it was not surprising to find that teacher professional development constitutes the most significant strategy in developing the teachers' capacity to teach about the environment. *Sechaba* Primary has taken the issue of teacher professional development seriously. As demonstrated in the previous chapter, it was clear that teachers at *Sechaba* Primary School have been able to advance their teaching of EE through these professional development workshops as pointed out by *Mr. Lehlabile* in Chapter four:

> We normally attend Environmental Education workshops organized by SANBI, Rhodes University and Walter Sisulu Environmental Center. I attended three National Workshops organised by Rhodes University, one tutorial organised by SANBI and two workshops organised by Walter Sisulu Environmental Center. These three organisations are helping us to integrate Environmental Education into the school curriculum. From the workshops we attended, we have learned quite a number of aspects like composting issue. In eliminating greenhouse gases, which are wasting our oxygen in the atmosphere, SANBI encouraged us to plant indigenous trees because these trees conserve water and we were also motivated to plant them so that they should produce oxygen during the night. We started our school garden with the help from SANBI. At Walter Sisulu Environmental Center, they also taught us about the issue of composting, how to prepare soil for planting, and they also taught learners about different types of animals and how animals should be conserved.

The issue of teacher professional development and how it helps teachers to do better in their teaching practice has also been discussed extensively in the literature. Yoon and Resnick (1998) found that teachers who took part in professional development workshops seemed to have more experience on improvement-oriented classroom activities compared to teachers who did not participate in the program. While in general, most studies find as Herman *et al.* (1996) did in observing that teachers from low socio-economic background tend to receive less in-service training as compared to teachers from high socio-economic background. What seems to have made the case of *Sechaba* to be different from this pattern may be the agency of its leadership in seeking out such professional development opportunities for the school. What was remarkable about their efforts was their attention to the notion of "intellectual resources" that include knowledge and learning about the environment for the teachers at school. The opportunities did not just come on their own, or through the regular departmental structures and processes. The only distinct weakness of the professional development opportunities at *Sechaba* came from the fact that they tended to limit the content of environmental lessons at the school to only those topics that the teachers covered at workshops, such as compost making, gardening, animals, *etc*.

It is important to take note of the fact that these learning opportunities were created through the networks with the NGOs and other external structures and were not limited to the teachers only. Learners were also given opportunities to attend workshops about environmental issues, thereby providing them with some useful knowledge on a variety of environmental issues. Some of the learners, for example, explained what they learned about the environment during their visit at SANBI and WSEC as follows:

> 'We learned about different types of soil like clay soil, sandy soil and loam soil'
> 'We learned about keeping our environment clean'
> 'They were teaching us about making compost'

'We learned about planting'

It was interesting to note that the externally sponsored professional development workshops were not confined to teachers only but extended the OTL to learners. These findings corroborate what Gough (1992) had found in a similar study of external opportunities for learning about the environment. Such opportunities tend to equip learners with abilities and information about the environment and thereby shape their thoughts and feelings towards solving environmental problems that might emerge worldwide. Kola-Olusanya (2005) also emphasised that environmental learning institutions such as museums, zoos, nature centres offer learners with opportunities for direct practice with genuine objects, people or plants. Free-choice environmental learning improves levels of interest and boosts the learners' knowledge through appropriate indications from the outside world.

5.2.1.2 Physical Resources

The evidence in this study suggests that *Sechaba* Primary had managed to build its capacity extensively by seeking out a variety of resources for the teaching and learning about the environment. As discussed in the previous chapter, the data reflect that environmental leaders at the school had taken strong initiatives to identify and mobilise material resources for the school. In terms of preparing the school garden, such tools as hosepipes, cheeters, gardening forks, spades, trees, flowers and compost had been donated. A JoJo water tank for water harvesting, to enable the school to save water was supplied by the local municipality. Similarly, solar panels, retrofitting bulbs, and reflective paint used in the classrooms for provision of alternative energy and energy saving purposes were also donated. My research data reflect that the school had identified a number of priority areas about the environment around which to mobilise resources for teaching and learning, such as plants, water and electricity. The school was using gardening to stimulate learners, educators and the community

to take charge of their environment and its conservation. In addition, the school's EE leaders had taken strong initiatives to search for material resources.

The study found that the school grounds were used as a platform to engage learners in the environmental learning activities. The school developed a garden and used it to teach learners about EE issues, for example compost making and planting. My findings in this respect are not far from what has been suggested by Malone and Tranter (2003, p. 289) who argue that school grounds are places where learners associate with the social, cultural, and ecological areas of childhood. School grounds offer access to real-life natural experiences such as biodiversity, recycling, food webs, *etc*. Supporting this view, Le Roux (2001, p.91) emphasises that school grounds can offer many learning opportunities during local studies of the plant and animal life, gardening, and recycling project. Connell *et al*. (1999) share the same view about school grounds and report that permitting children to explore things for themselves in the natural world encourage the connection between experience and developing environmental knowledge.

Indeed *Sechaba* has managed to organise their school grounds in such a way that they have become a resource for learning about the environment. In the Life Orientation lesson described earlier, *Mr. Lehlabile* created further connections between what he did in the class with some "outdoor activities" where learners participated in the preparation of soil for gardening by changing the composition of soil in the garden. Learners were expected to observe the waste dump around the school and assess activities to deal with an environmental health problem. The aim of this activity was to assist learners in creating a healthy environment and to protect the environment by composting the waste materials to fertilise the soil at the school.

The OTL about the environment were thus enhanced through such outdoor learning activities of the school. In this sense, my findings were in line with the

suggestions by Vaughan *et al*. (2003) who argue that for EE programmes to succeed, outdoor learning activities are necessary to actually observe what has been taught in the classroom. Similarly, Kenny *et al*. (2003) contend that outdoor environmental lessons for schools on their own properties or private properties lead to powerful learning about environmental issues. Field trips stimulate learners primarily because they are able to associate theory and practice; that is, they are able to relate what they have learned in the classroom to what they see in the field (Mandruga & da Silveira, 2003). Accordingly, my findings suggest that *Sechaba* has managed to create better OTL about the environment by mobilising and organising its physical and material resources around the school. The importance of physical or material resources in providing OTL that has been highlighted by many scholars and researchers such as Elmore (1991); Gordon (1987); Schwartz (1995) was thus confirmed in this study.

5.2.1.3 Information and Intellectual resources

Evidence from the literature places emphasise on the fact that OTL are what teachers do in their classrooms when they are teaching students, and whether or not they offer students adequate access to information and resources to allow them to study the curriculum for their age and grade level (Stevens, 1997). Windfield (1993) also contends that OTL is determined by the content coverage. The latter analysis leads to the conclusion that students have OTL only if teachers are able to cover some key subject concepts. In most of the classes studied to explore how environmental learning is integrated in the school curriculum at *Sechaba* primary, data showed that the teaching focused on areas such as pollution, animals, gardening (compost making, energy, *etc*). Some important concepts on the environment were indeed covered during the lessons.

Sechaba has managed to create an intellectual framework for encouraging environmental learning among its learners. The two major problems that tended to limit these OTL as discussed earlier were the fact that the depth of the content

and the participation of the learners were rather insufficient. This further emphasises the point that OTL do not necessarily occur because the teachers may be knowledgeable about EE, but instead are created in the practical situation of teaching and learning in the classroom. Teacher knowledge provides the infrastructure or the intellectual platform upon which such OTL EE can be created but is not by itself a sufficient condition for the creation of OTL. It is important to note that teacher experience is but an integrative resource that stimulates the creation of OTL EE.

Evidence from the present study suggests that teachers at *Sechaba* Primary used different methods of teaching, which in turn afforded learners varied OTL EE at the school. Some teachers used a traditional teacher-centred approach, while others used learner-centred approach which may have offered some learners, within the same school, better OTL about the environment. OTL therefore varied within the same school, once more depending on the specific teachers and the particulars of the classroom interactions.

5.2.2 Institutional systems and frameworks for the implementation of environmental learning at *Sechaba*

Sechaba has managed, through its own networks and initiatives, to create some latent capacity to provide significant OTL about the environment for its learners. This study on the Integration of environmental learning in the primary school curriculum addressed the key concept of leadership as a resource in building environmental learning opportunities. As discussed in the previous chapter, data reveal that *Sechaba* has designated EE coordinators to facilitate and support all other teachers in the school with the integration of environmental learning in other subject areas. It is through the initiatives of such designated coordinators that the school was able to create extensive and meaningful OTL EE in the school.

Although the human competence of the school in terms of its workforce who are qualified to teach in the area of environmental learning appears to be very thin, the leadership and agency of some of these teachers seem to have extended the capacity of the school many times. The environmental coordinators or leaders of the school formed an EE committee with the purpose of enhancing environmental learning at the school. The school also managed to register with the Share-Net to be an eco-school, so that it could attract the attention of stakeholders who could provide teachers with professional development and training about the teaching of EE. Furthermore, the EE committee has drafted an EE policy for the school, which serves as a guide on how the school should run in terms of environmental teaching and learning. The school's EE committee appears to have been a key agent for constructing an agenda and mobilising the resources for environmental learning at the school.

The results of this study suggest that the school has come up with a well focused agenda for addressing environmental issues within the school context. For example, energy saving, water harvesting, school greening, climate protection and waste management were the key issues that the school proposed to tackle. The existence of the institutional systems has enabled the school to mobilize resources and develop effective partnerships that promoted the learning of EE. In fact the existence of formal structures, like committees within the school, has enabled *Sechaba* Primary to link with other organisations and develop partnerships that promote the teaching and learning of EE at the school.

5.2.3 Partnerships between *Sechaba* Primary School and other stakeholders working in the area of EE

Much of the physical and intellectual infrastructure for environmental learning at *Sechaba* is a result of the collaboration between the school and the NGOs working in the area of EE. As indicated in Chapter four, the school has connections with business enterprises such as Pick' n Pay and Nestle Company,

the Metropolis (CTMM), ESKOM, Mondi, SunTank, SANBI, and WSEC. All these stakeholders and NGOs have provided the school with a variety of resources such as trees, compost, financial resources, solar panel, water tank, retrofitting bulbs and capacity building initiative essential for sustaining environmental learning at the school. The joint venture with the available stakeholders itself helped the school to afford better environmental learning opportunities to the learners. The following statement by one teacher makes the point:

> As leaders in Environmental Education we managed to connect our school with stakeholders such as Nestle Company (Growth Wild (PTY) LTD) which donated fifteen indigenous water wise trees to replace the alien trees and also supplied the school with compost and the fertiliser tablet. With the resources that SANBI provides, it conducts workshops for us, thereafter we have to go back and do the practical part, in this instance gardening. SANBI has provided us with plants such as indigenous trees and flowers; they even demonstrated how to plant them. Most of our plants have been contributed by SANBI, and they demonstrate planting. SANBI also gave us a fork, spade, hosepipe and cheeters. Pick' n Pay Company through their "Wish Campaign" donated 46 citrus trees, compost bags, JoJo water tank and R5000 for the implementation of water harvesting project for the indigenous and vegetable garden.

Arising from this quotation, it is evident that the school has become adept at using community resources such as those from the CTMM, ESKOM, SANBI, Pick' n Pay, *etc*., to construct a fairly successful programme for environmental learning at the school. My discussion of the findings suggests that on its own, the Gauteng Department of Education (GDE) seems to have provided minimal intellectual and material resources with which to effectively construct the school's capacity for the integration of environmental learning in the school curriculum.

As illustrated in the data, the professional development workshops attended by teachers from the case study school were mostly organised by NGOs, including business enterprises. Teachers and learners commented about how the NGOs

and business enterprises supplied the school with additional resources and many learning opportunities compared to other neighbouring schools in the Gauteng Province. Making a similar point, Heimlinch (2000) maintains that the interactions between schools, educators, learners and community resources can afford learners with OTL EE.

I further noted that even when the Gauteng Department of Education was involved; it was only when the school looked for such engagement from the Department. I noted that as a result of these stronger partnerships between the school and NGOs around EE, the school has managed to provide better environmental learning opportunities. OTL about the environment appear to be strengthened when there are strong relationships between the schools and NGOs as well as business organisations as illustrated by the case of *Sechaba* Primary. This is partly because NGOs and business organisations bring their own capacity (intellectual, financial, etc) and experience on EE issues to the benefit of the school.

5.3 LIMITATIONS OF THE STUDY

While the case of *Sechaba* Primary has allowed us to learn more about how one primary school had identified and mobilised resources to support the integration of environmental learning into their curricula, there are a few limitations to the present study that warrant some discussion. First, the present study looked at one black urban school in a township within the Gauteng Province of SA called Mamelodi. This makes it difficult to generalise the findings across all primary schools even though it is possible to generate lessons that may be comparable to primary schools across SA and Gauteng in particular.

Second, the study looked at the integration of environmental learning into three learning areas at *Sechaba*. Again, it would be difficult to generalise the findings across all learning areas and across all schools. However, the study begins to

give an indication of what OTL about the environment look like in certain school subjects within the primary school curriculum. More importantly though, the case provides insights into what the challenges of integration are and how teachers may begin to deal with some of them in their day to day teaching.

Finally, another limitation of this study is the fact that it looked at the micro level of education – the classroom level - without any significant focus whatsoever on the macro-level of education. The study also never assessed or made an in-depth assessment of government policies in relation to EE although there was more focus on the environmental policy of the school. This was largely a micro-level study of the dynamics of curriculum (policy) implementation at the school and classroom level and deliberately privileged the voices of the school level players at the expense of the more public and often dominant national voices on policy and its implementation.

The limitations notwithstanding, the study has provided valuable insights into the challenges and opportunities for integrating environmental learning into the primary school curriculum and the potential for schools to overcome the limitations of their own capacity in this field.

5.4 ASPECTS OF FUTURE RESEARCH

Further research is suggested to look deeper into OTL EE not only in one school but across a number of school types in all provinces of SA. This type of research could be conducted also with a focus on rural schools, suburban schools and farm schools to get a varied picture of what OTL EE look like in the different schools.

Furthermore, a more comprehensive research design including surveys could be used to obtain information from different people in diverse ways. In the present study, the investigation was limited only to teachers, teaching, learning and

learners. Future research could also include Curriculum Implementers (CIs) to find out their understanding about the provision of OTL EE in schools. The research questions were restricted to the concerns about resources and their applications during teaching and learning, while another study that could add more questions regarding OTL should be done to capture the diversity of ways by which OTL EE is established in schools.

5.5 RECOMMENDATIONS

Some recommendations arising from the findings in this study include the following:

First, local leadership and agency are required to pursue the various opportunities and resources to build the school's capacity for environmental learning. Schools should be encouraged to designate and support local leaders to take responsibility for driving the integration of environmental learning into their curriculum. Such integration is too important and maybe too demanding to be left to individual teachers independently in their own classrooms.

Second, converting the latent capacity and/or physical and intellectual infrastructure for environmental learning into real OTL about the environment for the students will continue to remain a challenge for some of the teachers while others have managed the integration in some exemplary fashion. Opportunities for teachers to observe each other, plan together and work collaboratively on issues of integration should be created at school and district level.

Third, it is critical that all teachers undergo in service training regarding the implementation of EE, and such training should provide teachers with enough time to learn. One of the major limitations of the Department of Education's programme of implementation of the new environmental learning policy has been

the inability to provide teachers with enough time to learn and implement the new ideas of the revised national curriculum statement.

Finally, it is important to reiterate the importance of providing adequate resources for implementation of environmental learning from the Department of Education. Having said that, however, the case of *Sechaba* has demonstrated how such resources can also be mobilised from elsewhere outside the system. Encouraging beneficial partnerships between schools and NGOs may in itself be a valuable resource to encourage many primary schools in SA for whom government resources in this field continue to remain inadequate.

5.6 CONCLUSION

In proposing this research that sought to examine the OTL about the environment at a school and classroom level, I was interested in knowing specifically about how teachers in primary schools have made sense of the new policy on integrating environmental learning in the various learning areas. I wished to find out how workable the policy was in the various school contexts, and what its consequences were in terms of providing better opportunities for the learners. Indeed the case of *Sechaba* has provided some insights into these questions. We now know about how some schools have taken the new policy and made it work for them. They have developed their own local environmental policy, which served as a basis for mobilising and organising resources for learning and teaching about the environment at the school. It is this localised policy that seemed important in driving the integration of environment into the curriculum at *Sechaba* primary.

Furthermore, the local policy created a platform for mobilising the intellectual and material resources for the integration of environmental learning at the school. For me, the most important lesson coming out of this research therefore is the need for local school actors to take the initiative, and be the agents of change.

Agency and teacher leadership have proved to be cornerstones of the success story of integration at *Sechaba*. There is, however, still a long way to go in terms of reaching the conceptual depths of integration and extended participation of the learners in this environmental learning as the case of *Sechaba* has illustrated. Some gains have been made but a lot remains to be done, to fully realise the OTL about the environment in the many primary schools of SA that look like *Sechaba* Primary.

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UMnyango WezeMfundo
Department of Education

Lefapha la Thuto
Departement van Onderwys

Date:	06 March 2007
Name of Researcher:	Sehlola Mmahlomotse Sekinah
Address of Researcher:	Steve Biko Street
	Mahube Valley
	Mamelodi East
Telephone Number:	0834909341
Fax Number:	N/A
Research Topic:	A classroom study of the opportunities to learn environmental education in two primary schools
Number and type of schools:	2 Primary Schools
District/s/HO	Tshwane South

Re: Approval in Respect of Request to Conduct Research

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

Permission has been granted to proceed with the above study subject to the conditions listed below being met, and may be withdrawn should any of these conditions be flouted:

1. ***The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.***
2. ***The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.***
3. ***A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.***

4. A letter / document that outlines the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.
5. The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.
6. Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Senior Manager (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.
7. Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year.
8. Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.
9. It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.
10. The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.
11. The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.
12. On completion of the study the researcher must supply the Senior Manager: Strategic Policy Development, Management & Research Coordination with one Hard Cover bound and one Ring bound copy of the final, approved research report. The researcher would also provide the said manager with an electronic copy of the research abstract/summary and/or annotation.
13. The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.
14. Should the researcher have been involved with research at a school and/or a district/head office level, the Senior Manager concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

ACTING CHIEF DIRECTOR: QESTED

The contents of this letter has been read and understood by the researcher.	
Signature of Researcher:	
Date:	

16. MAR. 2007 (FRI) 09:26

APPENDIX B

77 Montrouge B2
269 Albertus Street
La Montagne
Pretoria
0184
20/04/07

The Principal
Sechaba Primary School
Mamelodi
0122

Dear Sir/Madam

REQUEST FOR PERMISSION TO CONDUCT A RESEARCH PROJECT AT *SECHABA* PRIMARY SCHOOL

I am a Masters student in Curriculum Studies at the University of Pretoria, involved in research in schools in the Gauteng Province. I hereby request permission to conduct my research on the topic: "**A case study of the integration of environmental learning in the primary school curriculum**" in your school. The aim of my research is to find out how *Sechaba* Primary School integrates environmental learning in its curriculum.

The principal, Head of Department, two teachers and four learners will be expected to participate in a 45 minutes to 1 hour interview which will be tape-recorded. The interviews will be done once before the lesson and once after the lesson with each of the teachers whereas learners will be interviewed as a group. Classroom observations will also be done four times with each teacher. The

teachers will be expected to teach and learners will be expected to learn while the researcher observes to obtain information about how they establish opportunities to learn environmental education and how they involve learners in the environmental learning process. The information collected from the interviews, observation and documents will highly be confidential and will only be used for the purpose of my study.

Your school's participation in this research project is voluntary and confidential and should your school be willing to participate in this study, none of the information obtained will be given to anybody.

I will spend about one week in your school conducting my research so that I can be able to conduct interviews with teachers and learners, and observe lessons with regards to the teaching/learning of environmental education.

Detail in this letter is a document explaining the role of participants in this study, and if your school is willing to participate please sign this letter as a declaration of your consent. This would mean your school participates in this project willingly and that the school may withdraw from the research project at any time.

Principal's signature……. Date…….

Researcher's signature…….. Date…….

Yours faithfully

Miss Sekinah Sehlola
s25365739@tuks.co.za
Cell No: 083 490 9341

APPENDIX C

77 Montrouge B2
269 Albertus street
La Montagne
Pretoria
0184
20/04/07

Dear participant

You are invited to participate in a research project aimed at investigating how environmental learning is integrated in the primary school curriculum. I am conducting this research project because I want to explore the teaching and learning about the environment in order to understand how teachers create environmental learning opportunities in their classrooms. The results from this project will contribute to the understanding of how to design better policies for implementing environmental education in the primary schools in South Africa.

I will spend about one week in your school conducting my research so that I can be able to conduct interviews with teachers and learners, and observe lessons with regards to the teaching/learning of environmental education.

Your participation in this research project is voluntary and confidential. You will not be asked to reveal any information that will allow your identity to be established, unless you are willing to be contacted for individual follow up interviews. Should you declare yourself willing to participate in an individual interview, confidentiality will be guaranteed and you may decide to withdraw at any stage should you wish not to continue with an interview. The duration of the interview will take about 45 minutes to 1 hour.

Accompanying this letter is a document explaining that the participants will be interviewed and also be observed during lesson presentation.

If you are willing to participate in this study, please sign this letter as a declaration of your consent, i.e. that you participate in this project willingly and that you understand that you may withdraw from the research project at any time. Participation in this phase of the project does not obligate you to participate in follow up individual interviews, however, should you decide to participate in follow- up interviews your participation is still voluntary and you may withdraw at any time. Under no circumstances will the identity of interview participants made known to any schools that may be involved in the research process and/or which has some form of power over the participants.

Yours Sincerely,

Ms Sekinah Sehlola
s25365739@tuks.co.za
Cell No: 083 490 9341

Consent

I agree to participate in the research on: "**A case Study of the integration of environmental learning in the primary school curriculum**" as described in the accompanying letter.

Name……..
Signature……..
Date…….

APPENDIX D

77 Montrouge B2
269 Albertus street
La Montagne
Pretoria
0184
20/04/07

Dear Parent/ Guardian

REQUEST FOR PERMISSION TO INVOLVE LEARNERS IN A RESEARCH PROJECT

I am a Masters student in Curriculum Studies at the University of Pretoria, involved in the research in schools in Gauteng Province. The aim of my research is to find out how environmental learning is integrated in the primary school curriculum.

In order to collect valid information I need to interview some learners who attend environmental education lessons integrated into Natural Science, Social Science and Life Orientation. The interview with learners will help find out how primary schools integrate environmental learning in their curriculum.

Through this letter I kindly request you to grant permission for your child to participate in this study. Your child's participation in this study is voluntary and confidential as none of the information obtained will be given to anybody.
Your child will be expected to do the following only:

- Participate in a 45 minutes interview on how they learn EE at school.
- The interview will take place after the school in a classroom.
- The interview will be conducted in English.

- The interview will be tape-recorded.
- Learners will be interviewed as a small group.
- Learners have the right to remain anonymous.
- Learners have the right to withdraw from the interview at any time if they are not comfortable.

If you grant permission for your child to participate in this study please sign a letter as a declaration of your consent. This would mean your child participates in this study with your consent.

Parent's signature…… Date……..

Researcher's signature…… Date……..

Yours faithfully

Miss Sekinah Sehlola
s25365739@tuks.co.za
Cell No: 083 490 9341

APPENDIX E

GENERAL INTERVIEW INSTRUMENT

1. Personal Background and Experiences:

1.1 Tell me about yourself and your own education and work experiences.

- What educational qualifications and number of years teaching what subjects and at which schools].
- In your own education, where and when did you encounter EE?]

1.2 How did you come to work at your present school?

- And also how did you come to teach the subjects/class you are teaching this year].

2. Background of the School

2.1 Tell me about the origins of the school.

- When did this school start operating?
- With how many classrooms?
- With how many teachers?
- With how many learners?
- How many staff members does the school have currently?
- How many learners does the school have currently?
- How many teachers have been trained to teach EE? [how do you know? do they fill a register with this information etc.

2.2 What kinds of leadership does the school have?

2.2.1 Who provides leadership for the teaching of EE at the school – like there is a science leader or HOD?

2.2.2. What does the leader do specifically on EE – listen for 3 or 4 examples of specific activities that they do [collect evidence and samples of these activities] Give examples

3. Tell me about how the teaching of EE is done at the school.

3.1 What is taught? By whom? To whom? And how often? And how is the teaching done?

4. How often do teachers meet?
   4.1 As whole staff at school, [what do they talk about at these meetings?
   4.2 As phase (phase meeting-senior/intermediate phase)
   4.3 As specific subjects [e.g. Science /Life Orientation.

5. Do you [for each staff member you interview, including the principals] have opportunities to attend workshops with regards to the teaching/learning of EE? If yes, how often? [When and what was discussed at each meeting]
5.1. Who organized the meetings? [Agency – GDE or NGOs etc.] And for what purposes?
   5.2 What do you do with the information when you return from the workshops?
   5.3 Provide one or two example (s) to illustrate the process.

6. Do you have opportunities to meet as educators across different phases to discuss EE specifically?
   [How do you know what is being taught in other grades, e.g. below or above yours? Same subjects…]

7. How would you describe the working relationships among teachers in your phase/learning area?
   7.1 Why do you say so? Illustrate with an example.

8. Tell me about the school's participation in the EE programmes:
   8.1 How did it start? Who initiated and why] Over the years,
   8.2 Benefits/problems. [And how are these dealt with at the school?]

9. What is your opinion about the availability of resources (materials) for the teaching/learning of EE? Be more specific. Why do you say so?

9.1 How do you identify the available resources?

9.2 How do you make use of the existing resources for the teaching/learning of EE?

10. How long have you been using the EE curriculum (programme/textbooks/readers that you are using (and why?)

11. Tell me about how much time is allocated for the teaching/learning of EE

12. How did you decide on the allocation of time for EE in the school/class?

13. Is the time sufficient for the teaching/learning of EE? Why?

14. In your opinion, what challenges pertain to the teaching/learning of EE in your school?

14.1 Does the school have an environment policy? [If so, how and why was it drafted? process and motivation]. How does such a policy help you in the teaching of EE at the school?

14.2 Are there any other comments regarding the teaching and learning of EE that you would like to add that we did not cover?

PRE-LESSON OBSERVATION INTERVIEW INSTRUMENT

1. Tell me about what you are planning to do when I observe your class?

2. Can you give me more detail about what the learners will be doing?

3. Why did you decide to do that?

4. What is/are the objective(s) of the lesson?

5. How does today's lesson relate to the rest of your work in EE?

6. Who will be in the classroom? How many learners? Boys? Girls? How many adults? What will the adults be doing?

7. Who are the learners?

8. Are any learners requiring special attention? Why?

10. Is there anything that you want me to pay attention to during the lesson?

APPENDIX F

OBSERVATION GUIDE

1. How many learners in the classroom, boys and girls. (note what the overall number, how many are present, how many are absent)?

2. How do the sitting arrangements of learners look like? If in groups, how are they formed and how many learners in each group?

2.1 What relationship exists between classroom arrangements (number of learners, sitting arrangements) and the teaching/learning of EE?

3. How many teachers in the classroom?

3.1 How are the relationships between teacher(s) and learners and the learner-learner relationship with regards to the teaching/learning of EE (e.g., giving explanations, asking learners for opinion, responding to questions or carrying out classroom tasks)?

3.2 In what context do the interactions occur (e.g., large group or private)?

3.3 Where do the interactions begin (e.g., from the teacher to a group of learners or from an individual learner to the teacher)?

4. How many teaching/learning resources/aids are there in the classroom [pictures, textbooks, etc where are they, what type are they – reference: Author(s), titles and publishers of any text used]?

4.1 What materials did the teacher use and how the materials were used during EE lesson?

5. How does the teacher introduce the EE lesson?

5.1 What are learners expected to be learning about?

5.2 Did the teachers explain the objectives of the lesson?

5.3 Did the objectives of the lesson correspond with the instructional content and how?

6. What kinds of instructional strategies are used for the teaching/learning of EE in the classroom?

6.1 How do teachers present EE lessons in the classroom?

7. What is the nature of activity in place in the classroom (e.g., instructing, recitation or seat work)?

7.1 How are learners engaged in the EE activities?

7.2 What are learners involved in and for how long?

7.3 How do learners participate? What kinds of things do learners say (who says what and to whom) and to what extent do learners participate?

7.4 How are learners' opinions treated? Give example

7.5 What is the role of the teacher in the discussion (e.g., interacting, monitoring or supervising, or uninvolved)?

7.6 What are learners encouraged to do and not to do?

7.7 Are learners given opportunities to interact with the materials and how?

7.8 Are there times during the lesson when a significant number of learners appear to be uninvolved or involved in something else not associated to the classroom task(s)?

- What are they involved in?

8. In what ways are learners exposed to the teaching/learning of EE in the classroom?

8.1 What EE issues emerged from the lesson? Or what content of the lesson is being taught to learners in the classroom?

8.2 Is there any special EE terminology used? What is it and how is it related to the lesson?

8.3 Are learners and teacher familiar with these terms (pollution, soil erosion, water conservation, environmental conservation, etc)?

8.4 In what content and context were these terms used and how were they used?

9. What EE topics are given more emphasis? And why?

10. What impact do you think classroom space has on the teaching/learning of EE?

11. How much time is devoted to the teaching/learning of EE?

12. How does the teacher assess learners' understanding (test preparation or class activities)?

12.1 What kinds of activities or test preparations were they? What is their content and focus? How are they used by learners?

12. 2 How much time is allocated to class activities or tests?

POST-LESSON OBSERVATION INTERVIEW INSTRUMENT

1. How do you feel about the lesson? Why?

(*i*) Have you achieved what you anticipated to?

(*ii*) Did anything go in a different way than what you expected to?

2. Was this lesson typical of what you have been doing in EE? If yes, how? If not, how and why? Give me another example of a lesson you did recently that looked similar or different to the one I just observed.

3. How did you select the activities, explanations and examples that you used in the lesson?

- Where did these activities, explanations and examples come from? *(ii)* Why did you decide to do this?

4. Where did you get the teaching/learning materials (e.g. textbooks, charts, posters) that you were using?

- Why did you choose to employ or use them?

5. How did the materials help you to accomplish what you expected to?

6. Why did you choose to arrange classroom (sitting arrangement, number of learners in each group) the way it was?

7. I noticed that you used terms like……and you seemed to put more emphasis on……where did you get those terminologies and why did you emphasise them?

APPENDIX G

INTERVIEW INSTRUMENT WITH LEARNERS.

1. Did you find the lesson interesting?
   1.1 What did you like most about the class/lesson?
   1.2 What didn't you like about the class/lesson?

2. Is there anything in the lesson you found difficult?
   2.1 What?
   2.2 Why?
3. What have you learned about EE in the lesson?

4. Have you ever been involved in any EE program before?
   4.1 If yes, when and where?
   4.2 For how long were you involved in that program?
   who was teaching? How was it taught?

5. How much time is allocated to EE this year?
   5.1 Would you want more time or less?
   5.2 Why?
   5.3 How would you use the time (if more or less)?

6. In your opinion, is the way EE is taught helping you to understand the subject better? Explain to me how?

7. Let us talk about the way the teacher taught EE during the lessons I observed on Day X, Y and Z.
   7.1 Did the way teachers taught EE help you to understand the content of the subject better? Explain to me how.

8. What materials do the teachers use in other lesson on EE?

8.1 Do you interact with the materials during the lessons?

How, give me some examples of this?

9. Do you think the sitting arrangement in the classroom is all right?

9.1 If yes, why? And if no, why?

10. How do you relate with your teachers during EE lessons?

10.1 How does such relationship help you in the learning of EE?

11. Talk about your interaction with your classmates during the lesson.

11.1 Is the nature of your interaction helpful to you? In what way?

12. Do you have any other thing to say about the teaching/learning of EE in your school?

School Indigenous Greening Project

Workshop 1 Pace the Space

Planning your Garden

13:30	Refreshments
14:00	Welcome and introductions Aim of the project, goals and expectations
14:30	Group 1: Why indigenous? (Eugenie Novellie) • Walk in the garden Group 2: Choosing a site: (Antoinette Eyssell) • Site analysis - checklist • Drawing a site plan
15:10	Group 2: Why indigenous? (Eugenie Novellie) • Walk in the garden Group 1: Choosing a site: (Antoinette Eyssell) • Site analysis - checklist • Drawing a site plan
15:50	Way forward + homework
16:15	Bus departs

Workshop 2
Garden design: "Building" an outdoor classroom

During the garden walk: look out for the following design secrets:

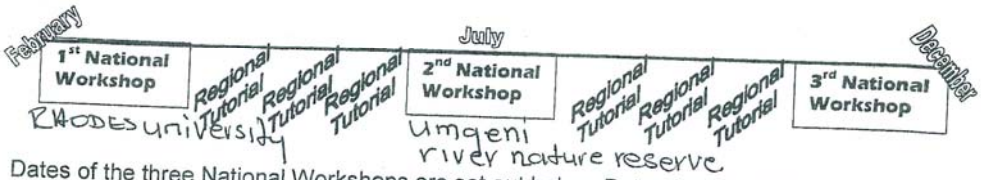
1. Focal plants / structures e.g. benches
2. Use of plants: tall behind small but also note the exceptions to this rule.
3. Beds are curved to create small "rooms". Tree stumps- a cheap way to create seating.
4. Paths around medicinal garden are curved. Some paths lead to something that is "hidden". These paths are "low-budget".
5. The medicinal garden is a Theme garden. The same plants are grouped together.
6. Shrubs used as hedges (*Tecomaria, Plumbago*). Yellow, orange
7. Note the different colors of flowers and plant leaves.
8. Can you identify some of the plants using your color list?
9. Mother hen and children
   asparagus gonona, poly fix

Schools Indigenous Greening
Pretoria National Botanical Garden

Workshop 3: Taking Root

Programme:

13:30	Lunch
14:00	Quick self-evaluation
14:10	How to plant: (demonstration in garden) 1. Trees, 2. Shrubs and 3. Groundcovers
14:50	Making more plants from those that we already have (Propagation) 1. Seeds 2. Cuttings 3. Division 4. Runners
15:10	Practical – divide into groups
15:55	Homework



Dates of the three National Workshops are set out below. Dates for the smaller, regional tutorials which will be held at your local botanical gardens (or similar venue) will be negotiated with your tutor during the 1st National Workshop in Grahamstown, so please bring your 2006 diary with you.

1st National Workshop:	Friday 24th Feb. at 14h00 until Sunday 26th Feb. at 14h00.
2nd National Workshop:	Friday 30th June at 14h00 until Sunday 2nd July at 14h00.
3rd National Workshop:	Friday 8th December at 14h00 until Sunday 10th December at 14h00.

This is a participatory course, which means that your full involvement is required in order to meet the course requirements and qualify for the Rhodes University Certificate in Environmental Education. Full participation means full attendance at all National Workshops and regional tutorials, and evidence that you have contributed to discussions and shared your ideas and experiences with others. The learning that takes place during workshops and tutorials is invaluable and that is why we place so much emphasis on full attendance. If not, we would simply offer a correspondence course and never meet you! But that would do little to strengthen the network of environmental education practitioners in South Africa.

In preparation for the 1st National Workshop in February, **please complete the Pre-course Assignment**, the details of which can be found on the following page.

On behalf of the regional tutors, I would like to welcome you to the 2006 course and look forward to meeting you at the 1st National Workshop.

Regards,

Lausanne Olvitt
EE Short Course Developer
Rhodes University Environmental Education & Sustainability Unit

In partnership with the Murray & Roberts Chair of Environmental Education • In association with the Environmental Education Association of Southern Africa

ANNEXURE D

UNIVERSITY OF PRETORIA

FACULTY OF EDUCATION

RESEARCH ETHICS COMMITTEE

CLEARANCE CERTIFICATE	**CLEARANCE NUMBER : CS06/06/02**
DEGREE AND PROJECT	M.Ed, Curriculum & Instructional Design & Development A classroom study of the opportunities to learn environmental education in two primary schools
INVESTIGATOR(S)	Sekinah Sehlola
DEPARTMENT	Curriculum Studies
DATE CONSIDERED	1 June 2006
DECISION OF THE COMMITTEE	APPROVED

This ethical clearance is valid for 2 years from the date of consideration and may be renewed upon application

CHAIRPERSON OF ETHICS COMMITTEE	Dr C Lubbe
DATE	1 June 2006
CC	Dr LC Jita Mrs Jeannie Beukes

This ethical clearance certificate is issued subject to the following conditions:

1. A signed personal declaration of responsibility
2. If the research question changes significantly so as to alter the nature of the study, a new application for ethical clearance must be submitted
3. It remains the students' responsibility to ensure that all the necessary forms for informed consent are kept for future queries.

Please quote the clearance number in all enquiries.