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Towards a prospectus for Freirean pedagogies in South African Environmental Education classrooms: theoretical observations and curricular reflections.

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DEDICATION

This thesis is dedicated to my precious granddaughter

Ronel

who represents a new generation.

“Education is simply the soul of a society as it passes from one generation to another”

[Gilbert K. Chesterton 1874-1936]

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ABSTRACT

With the transition to a new philosophy of education in post-apartheid South Africa a paradigm shift began from banking education to outcomes-based education. South Afric a looked to other countries for a framework on which to build its curriculum. The first post-apartheid curriculum as well as the subsequent revised curriculum seems to be a contentious matter as outcomes-based education as practised in South Africa is widely criticised by educationists. This study endeavours to interrogate the structure and underlying principles of the current curriculum to gain an understanding of whether and how critical consciousness, learning support materials and environmental education feature in the national curriculum. The purpose of the study is to gain an understanding of what happens in South African environmental education classrooms especially with regard to the construction of meaning and the prospects for Freirean critical education. The research questions elucidate the nature of critical education and its capacity to inform the sociology of learning in environmental education within the South African context. The research purpose is therefore exploratory and descriptive. The research questions emerge from the literature review which informs the study and also conceptualises the key tenets of the inquiry. The literature study reveals that there is adequate mention in policy documents regarding the importance of learning support materials in teaching and learning, but there seems to be a gap in the literature about how learning support materials are currently used in South Africa to develop critical consciousness particularly in environmental education classrooms. This research attempts to address this gap.

The research conducted falls within the conceptual framework of critical pedagogy. It is however the humanist approach asserted by Paulo Freire that premises the study. The research design and philosophy of the study is delineated and the researcher's role in the research process is elucidated. An ethnographic case study positioned within the qualitative approach serves as the methodology by which the research questions are explored. The choice of methodology and the ontological premise of the study are accounted for and issues of quality are discussed with regard to credibility, transferability, dependability and conformability.

The purpose of this study was not to find solutions and no definitive answers were sought or obtained. The findings of the study point to three critical contentions and the following was established: Firstly, that although the National Curriculum Statement pays lip service to some

of the ideals of Freirean pedagogy, it is inherently behaviourist in that it has clearly defined outcomes and assessment standards that learners should attain regardless of learner diversity. Secondly, that the manner in which the educator facilitates the learning support materials is the determining factor in the attainment of the set learning outcomes by the learners. Thirdly, that the manner in which knowledge transmission happens in a lesson influences the development of critical consciousness in learners. The findings only serve as suggestions and the reader is invited to look at the possibilities that Freirean pedagogy has to offer and what might be possible in environmental education classrooms. The findings of the study cannot be generalised and have to be interpreted and applied by the reader within a specific context of teaching and learning.

KEY WORDS

Critical education
Paulo Freire
Freirean pedagogy
Critical consciousness
Curriculum
Learning support materials
Environmental education
Outcomes-based education

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CHAPTER 1
ORIENTATION

1.1 Introduction

This study takes the reader on a journey, starting with conception on how my interest was piqued in the topic, through the literature study and the methodological dilemmas I faced, to the destination where the fruits of this labour are written up. In retrospect, I do not however think that I have reached a destination. I found that persistent reading of the literature and observation of the practice continually led to new questions. The quest continued throughout the study and I have come to the conclusion that this journey does not have a final destination, but is in fact only an extended start for many more journeys of this nature. The destination will probably forever elude me, but the learning and understanding that I have gained came in the act of enquiring and experimenting.

1.2 Background

With the transition to a new philosophy of education in South Africa nearly fifteen years ago a paradigm shift began from banking education to outcomes-based education[1]. South Africa looked to other countries and in particular to Australia for a framework on which to build its curriculum. This study will endeavour to interrogate the structure and underlying pedagogical principles of the current curricula to gain an understanding of whether and how critical consciousness, learning support materials and environmental education feature in the National Curriculum Statement (NCS)[2] for the Intermediate Phase. The research will also look at the conditions for critical education in the environmental education classroom and the strategies that are required to implement it

[1] For the remainder of this thesis outcomes-based education will also be referred to as OBE.

[2] The first post-apartheid curriculum of the RSA was known as C2005. This version of the curriculum was in a revision phase and was known as the Revised National Curriculum Statement (RNCS). Although the revision process has been completed I use the terms national curriculum statement (NCS) and RNCS alternately as the official curriculum documents for grades R-9 are only available under the heading RNCS.

within the South African context. The role of learning support materials in the curriculum and in the classroom will be the specific focus of the inquiry because Curriculum 2005 and the subsequent revisions of the curriculum favour a resource-based approach to learning.

"There is widespread agreement amongst many educationists in South Africa that pedagogy (as teaching and learning) has to become more critical and relevant to the social and historical contexts in which people are situated" (Waghid 2001:1). To enable me to explore the possibilities for critical pedagogies I visited the environmental centre at *The Jewish National Fund Walter Sisulu Environmental Centre* in Mamelodi (Tshwane) to look at the coupling between policy and practice.

1.3 Statement of purpose

The purpose of this study is to gain an understanding of what happens in South African environmental education classrooms especially with regard to the construction of meaning and the prospects for Freirean critical education. The proposed research will look at the nature of critical education and its capacity to inform the sociology of learning in environmental education within the South African context. I am going to explore and describe the extent to which critical consciousness is facilitated by the use of learning support materials in environmental education. My research purpose is therefore exploratory and descriptive.

1.4 Rationale

We are nearly fifteen years into a new democracy and twelve years into a new curriculum and whenever I, in my capacity as a lecturer at a university, visit education students doing their teaching practice at schools the questions I ask myself are, "Has the way in which learners learn in our classrooms really changed?"; "Do learners have a voice in the construction of knowledge or are teachers still gushing forth torrents of knowledge and information, which the learners have to absorb?"; "Are the same methods of teaching and learning as practiced in the pre-1994 education system, in the

idiom of an outcomes-based approach and using the language of outcomes-based education, still used or has some real change taken place?"

Furthermore, research done by Laura Czerniewicz, Sarah Murray and Margie Probyn (2000:78) for the National Centre for Curriculum Research and Development in South Africa, state the following with regard to learning support materials (LSMs), "We need to know more about what actually goes on in classrooms with regard to how teachers currently use LSMs". There seems to be adequate mention in policy documents regarding the importance of LSMs in teaching and learning, but there is a gap in the literature about how LSMs are currently used in South Africa to develop critical consciousness, particularly in environmental education classrooms. It is this gap that I hope to address in this research. Taylor and Vinjevold (1999:160) elucidate this when stating that the new South African curriculum is succeeding well in the ideological domain and while teachers are embracing its intentions, there is a gap between these positive attitudes and the ability to give effect to them in the classroom.

1.5 Contextualising this study

1.5.1 Critical pedagogy and the Freirean approach

In South Africa the National Party governed from 1948 to 1994. The prevailing system of schooling divided English and Afrikaans-speaking learners, as well as white and black learners in separate schools. The predominant educational discourse in South Africa during the apartheid regime was Fundamental Pedagogics which aimed at a "science of teaching", which held that the teacher was the authority and the learner the recipient of knowledge. Taylor and Vinjevold (1999:132) state that Fundamental Pedagogics is an indigenous product which draws on Dutch phenomenological philosophy and is based on the premise that the teacher as knowing adult leads the child to maturity. Fundamental Pedagogics also employed particular strategies to generate particular types of knowledge and prohibited critical thinking, self-directed learning and independent self-study. A set of doctrines called behaviourism, which nuanced the scientific approach to education and led to a didactics of education where

human behaviour could be explained in terms of external stimuli, responses, learned histories and reinforcement, was applied to learning.

Fundamental Pedagogics is contrary to the Freirean view of education. The term "Freirean" is attributed to the renowned Brazilian pedagogue Paulo Freire [1921-1997], who according to Peter McLaren, (as cited in Mayo 2000:262), is widely regarded as one of the leading figures in the area of critical pedagogy. Critical pedagogy is a particular type of pedagogy concerned with issues of respecting the individual's point of view, race and gender differences, and social transformation. Most essentially it challenges received knowledge and makes learners challenge received truths.

Paulo Freire refers to teaching and learning as reflected in Fundamental Pedagogics as "banking education" where learning is viewed as a process of accumulation of bits of knowledge presented as a "gift" from the teacher (Morrow & Torres 2002:121). Only a slice of reality was taught to learners and it was presented as the truth. Learners did not construct knowledge by using critical reflection based on their own expectations or hopes or even their own experiences. In terms of this particular pedagogy, knowledge was constructed according to a set of beliefs and values that the state and the department of education decided on.

In the authoritarian model of education that prevailed in apartheid South Africa, both learners and teachers were forced into submissiveness. Anything or anyone that was perceived as different or anything that presented a political, philosophical, cultural, religious or ethical challenge was seen by the prevailing social order as a threat. Neither the individual teacher nor the learner had a voice and opposing views to that of the governing regime were suppressed. It was against this practice of pedagogy that Freire (1996:150) reacted, describing it as immoral for authorities to impose their voice of command on others and in this way crush their freedom.

In South Africa, critical education emerged out of and was bound up with the country's troubled educational history. Within the context of accelerating resistance to apartheid's Bantu Education, progressive educationists began to explore alternate philosophies of education. The idea of a pedagogy of knowing and participatory

education emerged during the 1970's and 1980's and influenced a new approach to education. Freire's work had a distinct influence on South African activists during this period. The Black Consciousness Movements (BCM) and the People's Education Movement (PEM) applied Freirean pedagogy for the politicisation of the oppressed (Nekhwevha, in Kallaway 2002:136). The Black Consciousness Movements wanted to free blacks from 'mental slavery'. One of Freire's earlier works, published in the 1970's, *Pedagogy of the Oppressed,* was banned by the apartheid regime but was widely read by many educational activists. It is especially the term 'conscientization' that seemed applicable to the South African situation and appealed to influential activists like Steve Biko. In *Pedagogy of the Oppressed* Freire explains 'conscientization' as follows: "…'conscientization' refers to learning to perceive social, political, and economic contradictions, and to take action against the oppressive elements of reality" (Freire 1972:16).

According to Nekhwevha (in Kallaway 2002:140) the concept of People's Education for People's Power is clearly based on Freire's notion of education for liberation. One of the leaders of the People's Education movement, Father Smangaliso Mkhatshwa, said in 1985 that, "those who learn must teach, and those who teach must learn" (Nekhwevha, in Kallaway 2002:140). This was radically different to the prevailing hierarchical sociology of knowledge in South African classrooms where the teacher "knew" and the learners "learned".

There was much optimism among progressive educators that the post-apartheid dispensation for schooling would promote critical education along some of the lines developed by People's Education. This study of the curriculum and classroom practice could give one a better understanding of these ideals and if they were achieved.

1.5.2 Curriculum

The curriculum in port-apartheid South Africa has changed quite substantially and it is a matter that is much debated and contested both politically and educationally. There were several reasons for curriculum change in South Africa. Firstly, globalisation stimulated the need to reform and modernise the curriculum to make it globally

competitive and secondly, the post 1994 government wanted to make a clean break with apartheid (Czerniewicz *et al*. 2000:1). As Freire insists, education is always a political act and the curriculum can either empower or domesticate learners. The curriculum is by nature political because it has to do with what people want, in other words the moment somebody decides on what content to select and what to ignore in a curriculum it becomes political. As Darder (2002:68) writes, knowledge construction is always linked to questions of ideology and education is never a neutral enterprise. If the learner cannot relate to the content that has been selected by the curriculum planners it makes him/her feel inferior and powerless. Lovat and Smith (2003:241) argue that education, its organization and practices, and the beliefs, perceptions and theories on which these are based, are always strongly influenced by the dominant culture and its ideology in a particular society at a particular time. It is this ideology which informs and controls the ideas, skills, beliefs and knowledge which are represented in the curriculum (ibid). Post-apartheid curriculum change in South Africa marked a moment of political hope for many.

Freire bases the curriculum on the needs and interests of the learners and more widely on the needs of society and not on research or the opinion of so called experts. Learners must be able to make the links between their own world and recorded history in order to recreate history. Freire argues that a school curriculum that does not value the knowledge and experience that the learners bring to the learning situation does not allow them to become more human (Hoadley & Jansen 2002:74). Kristi Rennebohm-Franz (1996:265) says the following about the dialogue between learners with one another and with teachers:

> “Listen to what the children are saying and what emerges are dialogues of negotiating identity, loyalties, territory, possessions, and leadership as well as dialogues of conflict, idea exchange, meaning clarification, sharing or exchange of resources, and helping one another. These conversations are not too unlike the global dialogues of regions, nations, and continents”.

The individual and collective voices of the learners in the classroom contribute to the depth of knowledge construction and extend far beyond what the teacher brings to the

classroom. The learners interact on issues of environment as they honestly use their senses to know their habits, notice changes and disturbances and ask, why? (Rennebohm-Franz 1996: 265). The learners are knowers and to raise critical consciousness the learners have to be made aware that they know. The dialogues mentioned and the words of the children become important curricular content.

1.5.3 Learning support materials (LSMs)[3]

The importance of learning support materials in outcomes-based learning and the link to both critical pedagogy and the curriculum are summarised by Czerniewicz *et al*. (2000: viii) as follows, "Curriculum change needs to be viewed and planned holistically, since many factors are involved. LSMs and resource provision extend beyond education to the wider arena of cultural, economic and social development". There can be no doubt regarding the pivotal role of LSMs in teaching and learning in an outcomes-based philosophy of education. The role of resource-based learning in OBE and the nature of LSMs as defined in this study are explored in chapter two of this thesis. As will be mentioned in chapter two, there are many synonyms in the literature for LSMs, e.g. resources and media. For the purpose of this study LSMs is the preferred term when referring to materials used for teaching and learning. LSMs are primary resources, e.g. print, non-print, human, visual or geographical resources that have been shaped to a pedagogical purpose (Czerniewicz *et al*. 2000:20). LSMs can be seen as the bridge between the set learning outcomes and the attainment of the outcomes. Van der Horst and McDonald (1997:160) reiterate the importance of LSMs in outcomes-based education when postulating the following, "The time and attention given to the creation and presentation of various materials and media may often mark the success or failure of a lesson. For learners these resources are often the lens through which they view the subject".

[3] For the remainder of this thesis learning support materials and LSMs will be used alternately.

The role and importance of LSMs in the curriculum can be seen in the numerous references to LSMs as conceptualised in the following South African educational policy documents. The summary is cited from Czerniewicz *et al* (2000:20):

- "Learning support material should be viewed as an integral part of curriculum development and as a means of promoting both good teaching and good learning". in *Generic guidelines for the Development of learning support materials for outcomes-based education and training* (Department of Education 1998).
- "They should 'empower' practitioners to run learning programmes in a flexible, dynamic and learner-centred manner", in *Report of the National Committee on Further Education: A framework for the Transformation of Further Education and Training in South Africa.* (Department of Education 1997).

In the *Revised National Curriculum Statement Grades R-9 (Schools): teacher's guide for the development of Learning Programmes* (Department of Education 2003b, c, d, & e) the role of LSMs are emphasised and clearly defined for each learning area.

The importance of LSMs must however not only be derived from the education policy documents mentioned above but also from the notion that LSMs can be seen as tools of change. Czerniewicz *et al*. (2000:50) argue as follows, "We must recognize that curriculum innovation of the type involved in C2005 involves changes in the very premise of teaching". Change is not always easy for educators who have been teaching in a certain manner for many years. Deeply embedded pedagogies are not changed overnight. The South African curriculum has also been revised since the initial implementation of C2005. However Czerniewicz *et al* (2000: viii) state that international research has shown that carefully designed LSMs can assist teachers in bringing about curriculum change and in changing their practice. It is for this reason that it is important to look at how LSMs are able to facilitate curriculum change in South African classrooms.

1.5.4 Environmental education

I have chosen to make environmental education teaching and learning the focus of this study because of the close link between progressive environmental education and critical education. This link is supported by Greenall Gough and Robottom (1993:301) when they argue that, “Both environmental education and socially constructed critical pedagogy seek to empower students to participate in a democratic transformation of society”. The history of environmental education has according to Loubser (2005:35), been bound up with social, economical, political as well as ecological considerations. Initial definitions of environmental education were rational and linear, while more recent definitions have a strong emphasis on social critique and societal change (ibid).

The understanding of environmental education has evolved over the past few decades from the ‘old’ type of environmentalism which implied that humans were the custodians of nature and only had a responsibility towards conserving nature as stated in the following definition by Brennan (1970:2), “Environmental education is that education which develops in man a recognition of his responsibility to maintain the environment in a manner fit for life and fit for living – an environment of beauty and bounty, in which man lives in harmony. The first part of environmental education involves development of attitudes – a conservation ethic”. This can be seen as behaviour modification and McKernan (1993) argues that attempts to mould learners in this way results in people being treated as machines to be processed by an outside authority. Loubser (2005:2) states that in the early 1980’s environmental education was referred to as ‘outdoor education’; which was partly a deliberate political ploy to sanitise the socio-political connotations of the holistic approach to environmental education that was emerging globally. This approach to environmental education was particularly evident in South Africa during the apartheid years. In chapter three of this thesis the common practice of *veld* schools in South Africa is elucidated.

The current emphasis in environmental education is on sustainability. John Fien, an Australian environmental educationist who holds a professorship in Sustainability, postulates that today the debate is over the meanings of sustainable development and the nature, rate and details of the pathways towards it (Fien 1993a:8). The problem

with which we are faced is 'how can environmental education help effect the transition from present day patterns of unsustainable development to one which are based on principles of social justice and democracy?' (Fien1993a:7). This requires a renewal and refocusing of the goals of environmental education and emphasises the importance of consciousness raising (ibid). The redefinition of environmental education suggests common ground between environmental education and socially critical pedagogy. Although the environmental content of school curricula has increased, most schools are not involved in socially transformative environmental education. They are incorporating environmental content into their existing curricula rather than engaging in the kinds of social action that are being undertaken by other community agencies and activists. Much of what seems to be going on in schools under the guise of environmental education appears as 'nature study' or 'doom and gloom' current affair topics e.g. global warming (Greenall Gough & Robottom 1993:307). This study aims to inquire what the current state of environmental education at a specific site is and what possibilities Freirean pedagogy offer.

1.6 Critical consciousness

In this study the tenets 'critical pedagogy', the 'Freirean approach to education', 'curriculum', 'learning support materials', 'environmental education' and 'critical consciousness' are interrelated and form the premise of the study. Critical consciousness is the organising component of the study and it serves as the unifying factor that ties together all the different tenets in a coherent whole. 'Conscientization' as defined by Freire, can be viewed as critical consciousness and for the purposes of this study I agree with Mahomed (1984:29) that critical consciousness is concerned with what people learn, how they learn and the relationship between these and the quality of human life. The curriculum is being analysed to explore the *what* [what is prescribed & how this is implemented in practice]; the use of LSMs in the learning activities are being observed to explore the *how* and the selection of LSMs in learning activities is observed to explore how the learning relates to the real life experiences of the learner and thus contributes to the quality of his/her life.

Pedagogies of critical education draw heavily on the history, experience and consciousness of learners. An important aspect that I want to explore is how the knowledge that the learner gains in the environmental education classroom is linked to his or her real life experiences beyond the classroom. I intend to pay specific attention to the use of learning support materials, because critical media literacy offers learners the ability to imagine and value points of view different from their own and this leads to an openness to new ideas that can reshape ideas of cultural context (Semali 2000:xii). In other words, I would like to see how the learning support materials used can build links between the classroom and real life. This is important, as environmental education may be one of the major vehicles towards addressing environmental issues and contributing towards social transformation. Education is embedded in meaningful, real life experiences and Rennebohm-Franz (1996:264) argue as follows in this regard,

"It holds the perspective that *the actions we take upon the natural environment are really actions taken upon ourselves and that to destroy the environment is really to alienate and destroy ourselves,* rather than being a way of developing our identity, as we have tended to think in the past.

1.7 Road map to the thesis and outline of chapters

This inquiry takes the reader through five chapters. Chapter one gives the reader an indication of why I want to do the study, i.e. the rationale and purpose of the study, as well as an overview of the key concepts. Chapter two contextualises the study in the literature and culminates in what I want to do, i.e. the research questions that guide this study. Chapter three is about how I am going to conduct the empirical work and how I am going to ensure the validity or goodness of the study. In this chapter the reader gets a glimpse of the trials and tribulations of the study, but also of the small triumphs. In chapter four the reader reflects with me on the empirical work and journeys with me into the classroom to meet the educators and learners. Chapter five concludes the study and the reader and I reflect on what I found to be the current situation and what the future might look like.

1.8 Summary

In chapter one, I have conceptualised and defined the different tenets that are addressed in this study, i.e. 'critical pedagogy', the 'Freirean approach to education', 'critical consciousness', 'curriculum', 'learning support materials' and 'environmental education'. I also rationalised why these concepts are important and gave an indication of their interrelatedness. Furthermore, I have stated my interest in this inquiry and discussed why I find the topic under discussion intriguing and worthwhile**.**

The year 2007 marked the tenth anniversary of Paulo Freire's death in 1997. During the past two years many academic works have seen the light to honour the man, educationist and revolutionary philosopher, Paulo Freire. It is my wish that this thesis will contribute in some small way to the legacy of this remarkable man and that the application of his ideas to teaching and learning in South African classrooms will do him proud. It is however important to bear in mind that we have very unique conditions in our classrooms and that Freirean pedagogy is not a miracle solution for our problems. Paulo Freire's wife, Ana Maria Araujo Freire, argues that Freirean pedagogy is not a method that can be imported or exported and applied in a cookbook way (Freire and Macedo 1998:94). Paulo Freire himself asked that his ideas be re-created and re-written (ibid) and this thesis is a humble attempt to do just that.

CHAPTER 2

How does my research emerge from the literature?

2.1 Introduction

In chapter one, I gave an overview of the key tenets of this study and their inter-relatedness in order to conceptualise my inquiry. In chapter two I give an indication of how my research questions emerge from the literature and how the literature informs this study. The different sections of this chapter serve to elucidate the areas of interest relating to the study. Each concept, for instance critical pedagogy and critical consciousness, curriculum, learning support materials and environmental education is depicted in an interdependent relationship. Certain of these discursive areas, for example critical pedagogy, curriculum and environmental education have been located within a historical context in order to gain a better understanding of present day thinking on these concepts.

2.2 Origins of critical education

2.2.1 Introduction

Teaching and learning as practiced in schools is essentially a set of relations between teachers and learners where the learning begins within the domain of the learner and then extends to the wider world (Ozman & Craver 1999:332-333). The nature of the dialogue between the teacher and the learner gives a clear indication of the type of learning that prevails. When for example a learner acquires knowledge by rote-learning the teacher generates the knowledge and the acquired knowledge is simply reflected back by the learner in the same manner in which it was accumulated. On the other hand when the learner is involved in problem-based learning the teacher only facilitates the learning thus encouraging the learner to apply critical thinking. This way of teaching and learning is inclusive and provides for diversity regarding perspectives and opinions.

2.2.2 Frankfurt School of Social Research

The origins of critical education and the term "critical theory" can be traced to the work of the Frankfurt School of Social Research. In 1923 a group of leftist scholars met at the Institute of Social Research of the University of Frankfurt and developed a "critical theory" based on the work of Kant, Hegel, Nietzsche, Freud and Marx (Ozmon & Craver 1999:327). The work of the scholars of the Frankfurt School was predominantly based on Marx's method of examining ideologies and exposing the power relations that lie behind them. In later years Horkheimer, Adorno and Marcuse expanded on the work they initiated in the Frankfurt School but it is Jurgen Habermas, incidentally the last person at Frankfurt, who was to do progressive work and take their approach to a new understanding of schooling. Habermas (as cited in Ozmon & Craver 1999:327) argues that although societies are dependent on individuals, the symbolic structures of the social world e.g. language and social expectations are also necessary for individuals in order to communicate, organise and resolve conflict.

2.3 The Freirean approach to critical pedagogy

The ideas of critical theory were picked up by Paulo Freire, a Brazilian educator who fled his native Brazil in 1964 after a coup d'état and lived in exile for many years. Freire designed and practiced a pedagogy of critical education, which was distinct from the usual mode of knowledge transmission. Freire moved from social critique to critical pedagogy as a result of his experience of the oppression of the education system in Brazil. Freire did not want his ideas to simply become a recipe for others to follow, he wanted to show children how to think and in this way challenge the banality of ideological and cultural oppression (Palmer 2001:182). Freire insisted that education is always a political act and that educators have to make political choices because it is impossible to remain neutral in education (Palmer 2001:129). Philosophies of critical education have been best applied at times of resistance as Freire experienced in Brazil, and the People's Education Movement in apartheid South Africa.

The premise from which any discussion on critical education should depart is that critical education is essentially a set of relations where the teacher and learner are in a partnership and knowledge is constructed through dialogue. The teacher and learner are involved in a respectful relationship in which they think and reason with each other (Gravett 2001:35). My point of departure is that the dialogic nature of this relationship is the true empowerment of the individual which in turn leads to transformation. Berthoff (as cited in Freire & Macedo 1987:xvii) aptly argues as follows, "Teaching and learning are dialogic in character, and dialogic action depends on the awareness of oneself as knower, an attribute Freire calls conscientization …" Freire's pedagogy of knowing essentially involves individuals naming their world and the renaming of the world appears to the namers as a problem (Sanzerbacher 1991:109). The learning is therefore posed as a problem which the learners and the educators have to solve together. The communication between teacher and student in the paradigm of critical education is in the form of a dialogue or dialogic teaching. The learner is empowered because s/he knows that s/he has a voice and he can exercise his voice. For the learner being conscious means the following, "It pertains to beings that not only know, but they know that they know" (Freire and Macedo 1987:127). This implies that the learners have the ability to become the subjects of their own knowing as opposed to individuals who passively ingest and accept the teacher's ideology (Sanzerbacher 1991:112).

Human values are the pivotal point around which teaching and learning revolve in the critical education paradigm. This emphatically humanist orientation has often been missed by those who have taken up critical education. If every teacher loves the very act of teaching then we are fulfilling Freire's dream of teaching that emphasises human values. Throughout his life Freire believed that every teacher should have a passion for teaching. Freire is quoted in Darder (2002:92) as saying,

"I understand the process of teaching as an act of love. I mean, it is not an act of love in the formal sense, and never in the bureaucratic sense. It is an act of love as an expression of good care, a need to love, first of all, what you do. Can you imagine how painful it is to do anything without passion, to do everything mechanically".

Another influential educationist, Henry Giroux, who was initially greatly influenced by the work of the Frankfurt School, argues that schools should not serve the elite but should be sites of cultural production and transformation rather than reproduction (Palmer 2001: 280). Freire's view of education goes beyond the Frankfurt School's awareness of the cultural productive function of the school and offers a much more humanist approach to education. It is this humanist sort of pedagogy asserted by Paulo Freire that offers a viable alternative to banking education.

According to Freire (1998c:40-42), the progressive teacher needs to have the attributes of humility, lovingness, courage, tolerance, decisiveness, security, patience and the joy of living to successfully facilitate learning. Freire does not rank these indispensable qualities according to importance, as all are necessary. However, I will argue that lovingness, a passion for the learners and the act of teaching and learning are required if the teacher wishes to actively involve learners in the learning. The learning is not only about the content but also foremost about the relationship that is forged between the learner, the teacher and the learning experience.

In the critical education classroom teachers realise that they don't have all the answers. "No one knows it all; no one is ignorant of everything" (Freire 1998c:39). Sanzerbacher (1991:109) interprets Freire's view on knowledge construction as all knowledge being mediated and that no one has the truth. Unlike the version of banking education that dominated in South Africa, knowledge is not delivered from the top down in the Freirean view on education. This is what Freire sees as true humility, which is one of the qualities that he views as indispensable for a progressive and humanist teacher. The learners are not empty vessels into which knowledge is deposited and the teacher is not regarded as the only source of knowledge and transmitter of factual knowledge or gatekeeper of facts. The idea of a deposit rhetorically illustrates the concept of "banking education" which Freire wants to move away from. Together the teacher and learner construct knowledge; together they name the world (Sanzerbacher 1991:109). In other words learners are actively involved in learning and developing their own knowledge with the guidance of the teacher. "Whoever teaches learns in the act of teaching, and whoever learns teaches in the act of learning" (Freire 1998a:31). Learners and teachers mutually reflect on knowledge,

skills and attitudes acquired or developed during the learning experience. “An empowering teacher does not talk knowledge *at* students but talks *with* them” (Shor 1992:85).

Research done by Gloria Ladson-Billings (1995:163), to gain an understanding of what contributes to excellent teaching, found that successful teachers kept the relations between themselves and their students fluid and equitable. These teachers encouraged the students to act as teachers and the teachers in turn often functioned as learners in the classroom (ibid). These fluid relationships were extended beyond the classroom into the community. Furthermore, the teachers that were researched encouraged students to learn collaboratively, to teach each other and be responsible for each other’s learning (Ladson-Billings 1995:163). The relevance of Ladson-Billings’ research to my study is that she found that although the teachers had to adhere to the same state and curriculum guidelines, they were not dependant on state curriculum frameworks or textbooks to decide what and how to teach. This ties in with the Freirean approach to education which recognises the teacher as a resource and could offer a plausible alternative to the current pedagogical practice in South Africa.

Learning should also be relevant to the world of the learner and the teacher, because then all parties will have something to offer and all will benefit. Many teachers have a love of teaching and learning and a passion for their learners but they still stand in front of their classes and practice transmission pedagogies. This may be because learning is results-driven and matriculation results in many South African schools are elevated to such a level of significance that teachers are tied down by the official curriculum and time frames and the assessment does not necessarily fit the philosophy of education practiced. It is assessment that ultimately shapes pedagogy. It could also be that learners are not used to dialogic learning and remain passive in class because they perceive this as acceptable behaviour. The young learner is eager and enthusiastic to learn but often loses this natural love of learning as he or she progresses through school because learners are only expected to perform in very limited ways. The skill of combining the knowledge that the curriculum requires of the learner and the critical engagement of the learner is something that has posed great challenges to many teachers. Ira Shor (1992:84) argues that student experience and understanding are the

foundation in which academic material and structured knowledge are situated. The teacher should pose themes that relate to the academic work but also to the experience of the learners. This should be reflected in the learning support materials that are used in the learning activities.

The inter-personal communication that exists between teachers and learners should be built on respect. Both the teacher and the learner should show respect by being sensitive to diversity of opinion and world view. Teachers should constantly reflect on their words and deeds in the classroom. The teacher has an enormous impact on the learners and the consequence of words and actions in the classroom and beyond should be carefully contemplated (Darder 2002:48).

The learners should be empowered to take responsibility for their own learning by applying critical thought. The learning spans the learner's entire life and it is not limited to the classroom. Semali (2000:5) emphasises that critical pedagogy should not only be practiced in schools, but also in the family and public discourse including the church and the media. Peter McLaren (1998:45) views 'critical pedagogy' as follows, "… critical pedagogy is a way of thinking about, negotiating, and transforming the relationships among classroom teaching, the production of knowledge, the institutional structures of the school, and the social and material relations of the wider community, society and nation state." Freire argues that learners exist in a cultural context and Giroux posits that teachers and their students become 'transformative intellectuals' and in this way critical pedagogy is a cultural politics (Abrahams 2005:12). The critical thinking skills that are developed by the learner become life skills. These skills will be crucial in enabling the learners to transform their world after they have left school. This is why Semali (2000:7) writes that it is a lack of critical pedagogy in schools that creates passive citizens. This implies that the teacher should also have the courage to change and adapt and in this way be a lifelong learner and a participant in an evolving critical pedagogy. The fearless teacher challenges his/her own fears and has the moral courage to serve the interests of democratic action (Darder 2002:48).

According to Freire (1998c:40-42) another quality a progressive teacher should possess is that of decisiveness. This means that the teacher needs to simultaneously

encourage multiple perspectives but still remain a moral person. Irresponsible practices of permissiveness or the inability to take decisions on the teacher's part can be as damaging to learners as an abuse of teacher authority (Freire 1998c:43). The teacher remains an authority figure although the form and content of "authority" is very different to that exercised by the teacher involved in banking education. The teacher has the responsibility to ensure that the classroom does not become a free market of ideas where learners can air views that are in conflict with human values. Freire argues that on the one hand everyone's opinion counts but on the other hand the teacher has the moral authority to ensure that ideas that are in conflict with the rights of others cannot be perceived as valid. This requires that the teacher should have the ability to balance his/her authority with the students' contributions to the dialogue. The teacher who is able to juggle this balance is creative and innovative and does not fear to move away from bureaucratic constraints regarding the curriculum and pre-conceived ideas about teaching and learning. Shor (1992:87) argues that critical discourse differs from the traditional classroom in that it reconciles the teacher's and learner's authority and that dialogue is mutually created, thus questioning existing knowledge and also challenging power relations in the classroom and society.

Although not all advocates of critical education emphasise humanist values, it forms the premise of Freirean pedagogy. Therefore, the next quality ties in with decisiveness is that the teacher should create a learning environment where humanist values are held in high esteem and everyone can make a contribution because they have a sense of security in the learning situation. The teacher's confidence or security should stem from scientific competence, political clarity and ethical integrity (Freire 1998c:43). This implies that the teacher should not only be an expert on the subject knowledge that is used in the classroom but that the teacher and learners should also share each other's knowledge and this in turn shifts power in the classroom. Kanpol (1994:51) develops this point when he argues that the teacher learns about student cultures and students become authorities on their own cultures when critical teaching and learning is practiced in classrooms. In this way relationships are created where teachers and learners strive to understand differences and eradicate gender, race and class stereotypes.

Freire also encourages teachers to maintain the dialectical tension between patience and impatience as this shows growth in the teacher's development (Darder 2002:49). Teachers should respond to difficult situations in schools with thoughtful and reflective strategies and practices and not with blind activism which could cause more harm than good to the promotion of learning (Darder 2002:49).The learners' best interests are to be put first at all times and not the private agenda of the teacher. One only has to look at many contemporary South African schools where teachers arrive late, strike or stay away, to realise that the best interests of the learners are not always paramount. Many teachers get caught up in bureaucratic malpractices and turn a blind eye to a lack of real learning in their classrooms because of time and curriculum constraints. Edmund Burke [1729-1797] remarked that, "All that is necessary for the triumph of evil is that good men do nothing".

Lastly, a joy of living (Freire 1998c:40-42) is an indispensable quality for a teacher to possess. The enthusiasm and passion that a teacher possesses for learning, teaching and above all the learner, is contagious. In every way critical pedagogy can be referred to as a pedagogy of love. As one reads Freire one comes to realise that without love teachers are empty vessels and have nothing to teach and lack the moral and emotional starting point for critical pedagogy. He also implies that the teacher should like the people he or she teaches, otherwise the teacher will not be able to facilitate empowering pedagogy, hence his concept of love.

It becomes very clear that the teacher plays a very important role in the mediating of learning and the selection of content, themes and learning support materials. Giroux (1983) argues that teachers need to be 'transformative intellectuals' that are able to make the pedagogical more political and the political more pedagogical. This ties in with the view of Habermas. According to Fien (1993a:17) this means that the teacher must expose the reproductive role of education and help students to have faith in the struggle to overcome economic, social and political struggle and to educate and humanise themselves as part of the struggle. In order to do this the teacher must give students the opportunity to participate in the learning by making knowledge problematic and making the struggle for a better world a conscious educational goal (Fien 1993a:17).

Giroux's concept of the teacher as a 'transformative intellectual' and Fien's interpretation thereof links closely to Freire's indispensable qualities of the teacher as discussed above. In order to understand the role of the teacher as a 'transformative intellectual' one has to have an understanding of the processes of curriculum planning and teaching (Fien 1993a:17). In other words, one has to understand the constraints and possibilities of the curriculum as well as teacher work to begin to analyse and evaluate the space available for the teacher to be a transformative intellectual. It is for this reason that the national curriculum will be analysed in chapter four of this thesis, to gain an understanding of how it reflects on the teaching and learning of environmental education in South Africa.

2.4 Curriculum

2.4.1 Importance, origins and nature

The importance of curriculum as being the life-blood of education is eloquently framed by Nick Taylor (1993). He says that the reconceptualising the processes and content of curriculum is crucial for re-examination of schooling, which in turn is necessary during the present state of flux that characterises the global political economy (ibid). The literature on 'curriculum' holds that there is no easy definition for this very complex concept (Lovat & Smith 2003; Hoadley & Jansen 2002; Ornstein & Hunkins 2004). Curriculum as a field of study is elusive, fragmentary, and confusing (Ornstein and Hunkins 2004:1). One should however not view this negatively. Ornstein and Hunkins (2004:1) argue as follows, "We think that what many define as confusion is in reality dynamism, the exuberance of the many voices in the field". It is from this premise that I now offer a review of the different viewpoints on the concept 'curriculum'.

Stenhouse (1975) states there are two different views of the curriculum, i.e. the curriculum as intention, plan or prescription, an idea of what one would like to happen in schools and on the other hand there is the existing state of affairs in schools. Hoadley & Jansen (2002:22) agree with this when they distinguish between the curriculum as a prescribed teaching plan and the curriculum as the result or

consequence of teaching. The first notion of curriculum as being a prescribed teaching plan is derived from the Latin word *currere* which means 'to run a course' (Hoadley & Jansen 2002:22). The learner has to run the course (set curriculum) like a racehorse or athlete to obtain the winning post (learning outcomes). One could liken this to the table of contents of a textbook which gives an indication of the plan of learning set out in a systematic way. Taylor (1993) argues that the analogy of the running track for curriculum can be useful in some ways, e.g. just as there are many different running tracks there are many different types of curriculum, but one must also be aware that the metaphor can carry imagery that is not applicable. According to Hoadley & Jansen (2002:26) there are other forms that a prescribed curriculum can take, i.e. an official syllabus document or learning guide; a teacher's teaching plan for one school; a curriculum framework or broad policy statement. A curriculum as syllabus is compiled by a department of education for all schools. The syllabus contains the goal and objectives of the education system and the specific goals for schools. The choice of knowledge to be taught and learnt and how this is arranged into learning areas, as well as which knowledge, skills, and attitudes are included, is determined by the syllabus. The teaching and learning methods as well as the forms of assessment are also determined by the syllabus. Outcomes-based education can therefore be seen as a particular philosophy of education that is practiced in many parts of the world, and the curriculum can be viewed as a model of that philosophy that can differ depending on the context. In post-apartheid South Africa the first curriculum based on the philosophy of outcomes-based education was known as C2005. This version of the curriculum went through a revision phase and was known as the Revised National Curriculum Statement (RNCS). Although the curriculum revision has been completed and the current curriculum is referred to as the National Curriculum Statement (NCS) , many of the policy documents referred to in this thesis do however still bear the title of *Revised National Curriculum Statement.*

The second notion of 'curriculum' is where it is viewed as the result or consequence of learning. Pinar (1975) defines curriculum as an educational journey where the root of such a concept of curriculum lies in the word *currere*, or the infinitive "to be running". In this view of curriculum the focus is not on the track as discussed previously, but on the runner. This concept focuses on the experience of the individual runner or learner

(Lovat and Smith 2003:18). Michael Graham-Jolly, a South African academic, places the concept 'curriculum' on a continuum ranging from very narrow definitions of the curriculum as prescribed plan, to a much broader interpretation of curriculum as something that develops in the process of teaching and learning (Graham-Jolly in Gultig *et al*. 2002). Graham-Jolly draws on the work of Lawrence Stenhouse to make his argument that curriculum is a process and that the two views on curriculum cannot be seen in opposition but must be integrated to complement each other (ibid). Graham-Jolly and others view curriculum as something broader than a plan; it is about what happens to the plan in the context of schools and teaching, in other words it is the learning that results from being at school (Hoadley & Jansen 2002:29). This integrated approach to curriculum is important because what the curriculum prescribes and what happens in the classroom is often far removed. Hoadley & Jansen (2002:33) affirm this when arguing that the prescribed curriculum received by teachers from the department of education does not guarantee that teachers will teach or learners learn what the curriculum planners intended. This leads to the logical conclusion that for analysts and researchers to gain an understanding of the concept 'curriculum', they must not only analyse the intended curriculum, but also investigate how teachers and learners change this curriculum in practice.

This thesis and the research conducted fall within the conceptual framework of critical pedagogy. This implies that the curriculum-in-practice approach is the preferred approach as it contrasts starkly with the curriculum-as-plan approach which reminds one of 'banking education', a concept coined by Paulo Freire. Hoadley & Jansen (2002:35-36) contrast these approaches as follows and this is the lens that I will use in my investigation:

- The curriculum-in-practice approach provides a more complete view of teaching and learning, while the curriculum-as-plan approach only offers a slice of reality.

- The curriculum-in-practice approach validates the teacher's role as curriculum developer, while in the curriculum-as-plan approach the teacher only transmits knowledge to learners who are considered 'empty vessels', in Freire's words.

- By acknowledging the role that teachers & learners play in changing specified content, the curriculum-in-practice approach acknowledges that knowledge changes. According to the curriculum-as-plan approach knowledge is fixed and this knowledge cannot be changed in the classroom. This approach to learning disregards the experience, knowledge and point of view of learners within a certain context.

Although there are many definitions of curriculum, the literature holds that there is a gap between the intended learning and the actual learning that happens in schools. Even if a curriculum is expertly designed and prescribed there are often enormous differences in the results of the learning in different contexts or settings. This may be true because as Ornstein and Hunkins (2004:2) put it, "An individual approach to curriculum reflects that person's view of the world, including what the person perceives as reality, the values he or she deems important, and the amount of knowledge he or she possesses". Giroux (as cited in Abrahams 2005:16) argues that schools are social sites with dual curricula, one overt and formal (the one that is tested), the other hidden and informal (as the extension of hegemony). A better understanding of the explicit and implicit curriculum might help in understanding why this gap exists.

2.4.2 Explicit & implicit curriculum

The curriculum-as-plan approach can also be seen as the explicit or prescribed curriculum and the curriculum-in-practice approach as the implicit or lived curriculum. The explicit curriculum defines the learning which is prescribed and towards which the teacher makes no contribution as curriculum planner, and the implicit curriculum is that which actually happens in a learning situation where the teacher and learner contribute to the curriculum through implementation.

The implicit curriculum is that which is taught and learnt in schools and consists of two components, namely the covert curriculum and the hidden curriculum. Hoadley and Jansen (2002:40) define the covert curriculum as being the learning that is intended but implicit, e.g. respect, punctuality, etc. These intentions are not spelt out but intended because they are central, universal and desired in all teaching and learning.

The learners are not always aware of these intentions but the teacher uses the learning experience to explore these values and model behaviour. The usefulness of the covert curriculum lies in the fact that teachers can give learners more knowledge which can change learners and in turn help them to change society, as well as ensuring that learners learn the attitudes and behaviour that are socially acceptable (Hoadley & Jansen 2002:45). This seems to be contradictory but according to Hoadley & Jansen (2002:45) the teacher has the dual task of ensuring that society not only continues but also changes. On the one hand teachers conserve society but they also mentor learners on how to change that which is unacceptable or has become outdated in society.

In the hidden curriculum things are learnt implicitly and are often not intended. They are invisible to teachers and learners e.g. time allocation to different subjects and learners. More prominence is often accorded to mathematics and therefore more of the school timetable is allocated to the subjects perceived as more important. Learners unconsciously learn about the world in the school environment. They learn that people are not equal in society. Bernstein (1996) remarks that one should look at the way schools select subjects for the curriculum, the way they teach these subjects, and the way they examine them, as these things tell us about the distribution of power in society and about social control. Taylor (as cited in Taylor & Vinjevold 1999) argues that although the unequal distribution of quality teachers and material resources has an influence on student learning, the greatest obstacle to equity in schooling is the differential access that learners from different social classes have to formal knowledge. In the current South African context, outcomes-based education is a resource-based approach to learning, but the problem is that this approach favours learners who have access to technology or sophisticated media and resources. Czerniewicz *et al*. (2000:iv –v) alerts us to the discrepancy in access to LSMs by citing local research that points to a staggering 52% of schools that are inadequately supplied with textbooks and mention that less than a decade ago a computer audit revealed that only 4,9% of South African schools had computers.

Hoadley and Jansen (2002:44) caution that the hidden curriculum can be a far more powerful teacher than the explicit curricula. This was never more prevalent than in the

apartheid era when racism and sexism where modelled to learners as the accepted norm. Although the history of education in South Africa shows that these assumptions were massively and openly challenged from time to time as in the 1976 Soweto uprising, there were also many who did not question the status quo for fear of being labelled, for instance a communist, and ostracized from society. Taylor (in Taylor and Vinjevold 1999) alerts us to the danger of the school becoming an agent that propagates universal truths to the determent of individual differences and the culture of the dominant class is elevated to the status of absolute truth. Even in current South African classrooms outdated ideas about the world and society might still perpetuate, and learners will only be able to question these assumptions once they are more aware of their own voice. This would refer to an earlier quote of Paulo Freire in this thesis where he explains "conscientization" as follows, "…'conscientization' refers to learning to perceive social, political, and economic contradictions and to take action against the oppressive elements of reality" (Freire 1972:16). Many of the issues of the hidden curriculum are becoming more visible and tangible giving learners and parents the opportunity to respond. Hoadley & Jansen (2002:46) argue that we must ensure that the implicit curriculum sends out messages which reinforce the desired learning in the explicit curriculum.

2.4.3 Curriculum models: Tyler, Stenhouse and Freire

Many teachers interpret curriculum instinctively, but the views that they hold on curriculum development can in fact be traced to the theoretical grounding set by three influential educationists, namely Ralph Tyler (whose influence in South Africa is the greatest), Lawrence Stenhouse and Paulo Freire. There are some similarities in their way of thinking but there are also major differences. As this study uses critical theory as the lens through which the research is viewed and is premised on a Freirean point of view, it will be useful to see how the different theoretical stances on curriculum relate to the design and interpretation of curriculum in South Africa. However, before the South African curriculum can be analysed (chapter four of this thesis) one has to gain an understanding of the major thrusts in curriculum theory to determine if critical education can be achieved if we remain within a Tyler-type model of curriculum.

The behaviourist approach to curriculum is the oldest approach to curriculum and is rooted in the University of Chicago school with leading protagonists Bobbitt, Charters, Tyler and Taba (as cited in Ornstein and Hunkins 2004:2). In his book *Basic Principles of Curriculum and Instruction*, Tyler (1949) propagates a technical or objective approach to curriculum development that views curriculum as a product (Hoadley & Jansen 2002:59). He has well defined goals and designs the curriculum to reach these goals or objectives. Tyler's approach is packaged into four neat steps, i.e. determine purpose and set objectives; decide on content to be taught, select how teaching will be organised and determine how the assessment and evaluation will be done (Hoadley & Jansen 2002:59). According to Tyler if you follow the recipe or manual you will achieve the set objectives. Tyler's approach is behavioural and is based on a 'blueprint' which in turn relies on technical and scientific principles, and includes paradigms, models and step-by-step strategies for formulating curriculum (Ornstein and Hunkins 2004:2). This approach to curriculum planning has been popular and dominant in schools for more than ninety years because it ties in with many people's assumptions regarding the function of schools. It also ties into models of industrial planning and management. Scholars of curriculum, such as Michael Apple, Henry Giroux, Ivan Illich, Peter McLaren and William Pinar protest against this approach to curriculum in that they hold that society should not foster a class society that is based on possession of certificates and standarised tests (Ornstein and Hunkins 2004:94).

One of Tyler's sternest critics, Lawrence Stenhouse, views curriculum development as a process. Stenhouse has a much more practical approach to curriculum and does not agree with Tyler's technical approach. Stenhouse views good education as open-ended and experimental thus leading to every classroom being a laboratory (Hoadley & Jansen 2002:61). This links to Freire's idea of learning being a dialogue between teacher and learner and every learning experience being unique as a result of the unique life experience of each teacher and learner. Stenhouse (as cited in Hoadley & Jansen 2002:61) argues that a curriculum plan can at most give recommendations as to the content and processes of working with knowledge and that it can never anticipate the outcomes of learning. Assessment of learning should therefore not be concerned with grading but should rather be developmental.

It seems as if Tyler's approach to curriculum does not leave any room for the voice of the teacher or the learner and this is in direct contrast to the humanist approach to learning preferred by Freire. Both Freire and Stenhouse view education as much more open for discussion and interpretation than Tyler does. Teachers and learners in every situation and context are unique and produce their own brand of learning within that context. Teachers and learners are participatory in the learning and not just players in a game bound by strict rules. This links to the idea of People's Education cited earlier in this thesis when Father Smangaliso Mkhatshwa said that in an education for liberation those who learn must teach and those who teach must also learn (Nekhwevha in Kallaway 2002:140) . This stands in direct contrast to the pre-1994 curriculum that was based on a linear model of curriculum planning where a top-down approach was applied and a prescribed curriculum forced on teachers and learners.

Freire offers an opposing view to the technical approach to curriculum as defined by Tyler, Taba, Wheeler and others. Freire favours an 'emancipatory approach' which entails critical reflection on one's concrete situation by the teacher and learner who are both involved in a dialogue. In contrast to Tyler's technical approach Freire's rationale for curriculum planning would firstly be guided by interaction, empowerment and social change (Hoadley & Jansen 2002:73). Interaction refers to the dialogic nature of the teaching process which would be both interactive and critical. Freire takes issue with other approaches of curriculum primarily in the way that teachers teach. He strongly opposes 'banking education', and the manner by which knowledge is transmitted from teacher to learner. The teacher narrates knowledge which the learners absorb and memorise and in this way no critical thinking is involved. Empowerment requires that the content of the curriculum is experiential in that key themes would come from the learners' lives. In this way the learners have a say in curriculum planning (Hoadley & Jansen 2002:73). The curriculum should aim at social change by encouraging political empowerment so that learners do not only learn at school but also have the insight and skills to carry the learning into their everyday lives. Ivan Illich (as cited in Ornstein and Hunkins 2004:52) agrees with Freire in that they both contend that the larger system is oppressive and that the curriculum should be emancipatory, a so called "grass roots" curriculum that seeks to engage learners, teachers and community members.

2.4.4 Curriculum development in South Africa post-1994

2.4.4.1 Introduction

The political change in South Africa led to a new educational dispensation during the 1990's. 'Curriculum', 'curriculum change' and 'curriculum development' have been buzz words in South African society for the past two decades. The debate is still ongoing as changes to the curriculum are currently in a process of being implemented. I think that this should not necessarily be viewed negatively as curriculum planning and implementation should be dynamic and not static. Lovat and Smith (2003:xi) postulate the following with regard to curriculum being dynamic, "Curriculum is concerned centrally with action. Action implies a unity of theorizing and practice. Any understanding which draws lines of distinction between action in the classroom and the dynamic, ongoing decision-making and reflection which precedes, accompanies and follows it is grossly inadequate and fundamentally misrepresents the essentially unified nature of human action".

2.4.4.2 Conceptual context

Because curriculum is never neutral and is always value laden, it implies that the selection of content will be what is ideologically, morally or socially most desirable by those in power. Over the past fifteen years the power relations in South African curriculum planning and practice have changed dramatically and it is therefore important to look at the curriculum in historical context to see how the past contrasts with the present. Buckland (as cited in Hoadley & Jansen 2002:25) reiterates the important distinction between the notion of curriculum as process rather than as product and states that a curriculum cannot be picked up and examined, but must rather be viewed in historical perspective in its socio-political context.

2.4.4.3 Historical context

Although the major thrust towards political liberation in South Africa resulted from local conditions as a result of apartheid (e.g. the racially divided and unequal education

system), much of South Africa's resistance history was influenced by trends in the international and continental struggle for democracy (e.g. a worldwide radical humanist and often anti-imperialist movement during the sixties and seventies) (Nekhwevha in Kallaway 2002:134).

Firstly, local conditions led to the African National Congress's alternative school movement in the 1950's (ibid). The resistance was aimed against the predominant educational discourse in apartheid South Africa (mentioned in chapter one of this thesis) which was based on Fundamental Pedagogics. Enslin (1990:78) has the following view of Fundamental Pedagogics, "It provides little illumination of the present social and educational order, of possible alternatives to that order or how teachers might contribute to transformation. By excluding the political as a legitimate dimension of theoretical discourse, Fundamental Pedagogics offers neither a language of critique nor a language of possibility". Le Grange (2008:404) argues that the 'fundamental' in the scientific reflection phase of Fundamental Pedagogics is concerned with the bracketing of beliefs and values, which forbids political speech and thus gave no opportunity to critique the apartheid ideology. According to Enslin (1990:78) those who did not have a voice during the apartheid regime were 'teachers not initiated into Fundamental Pedagogics; parents; academics who partook of other discourses; trade unions; the oppositional churches, and the private sector'. These parties were encouraged by the emergence of radical curriculum theory in South Africa in the 1970's and the 1980's and the work of Kallaway, Freire, Giroux, Apple and others inspired those marginalised from the reigning educational discourse (Le Grange 2008:404). Nekhwevha (in Kallaway 2002:135) reminds us that note also has to be taken of the influence of the humanist theories of John Dewey and Ivan Illich on shaping the nature of the debate around alternative education in South Africa. However, for the purposes of this study I will only discuss the influence of Freire's ideas on the liberation struggle, although there are references to the work of Kallaway, Giroux and Apple in this thesis.

Secondly, the international influence of humanist pedagogues like Paulo Freire on South African students, teachers and activists during the 1970's and 1980's in the liberation struggle was profound. Freire's key work *Pedagogy of the Oppressed,* which

banned by the apartheid government, was eagerly studied by young activists and Freirean ideas applied in many projects in urban townships and rural areas (Motala and Vally in Kallaway 2002:178). Internationally and regionally Popular Education was emerging in countries like Brazil, Nicaragua and Mozambique before liberation. Major role players in Popular Education were Paulo Freire and Antonio Gramsci who, according to Walters and Kruss (1988:24), have the following common features within their 'education for liberation' theories:

1. Education and politics are integrated.
2. There is a direct relationship between macro context and the micro educational practices.
3. The development of the ability to think critically is a central difference between 'education for domestication' and 'education for liberation'.
4. Both process and content are an integral part of 'education for liberation'.
5. The importance of the means and the ends of education, which involves the importance of participation in popular or working class organizations in order to learn through the experience of participatory democratic forms of organization.
6. Both emphasise the need for consciousness-raising through the development of a critical understanding of society.

In short, education for liberation is concerned with construction and deconstruction; with process and content; with the development of organic intellectuals of the working class and other oppressed classes (Walters and Kruss 1988:24). These ideas appealed to the oppressed working class in South Africa. The principles of Popular Education resonated in the People's Education Movement which emerged in South Africa in the 1980's. Walters and Kruss (1988:18) postulate that the rise of People's Education was directly linked to the education crisis, which was part of a broader socio-economic and political crisis in South Africa. The year 2009 marks the 33rd anniversary of the 1976 Soweto uprising, where learners protested against the inequalities in education. The Soweto uprising contributed to education reforms being introduced by the apartheid government in the 1980's. Education was however still racially divided and renewed unrest erupted in 1984 when learners boycotted school attendance. Students realised that changes in education would have to be part of a

total societal transformation and "Liberation now, education later" became a common slogan (Walters and Kruss 1988:24). The fact that learners wanted to miss a whole year's school attendance in 1986 to commemorate the 1976 Soweto uprising led to concerned parents and teachers forming the 'Soweto Parent's Crisis Committee' in October 1985 (ibid). By the end of 1985 some parents, teachers, educationists and students expressed the need to find a way to address the needs of the students who were threatening to strike again. On the 28th and 29th of December 1985, a consultative conference was held in South Africa where the idea of People's Education for People's Power originated and the delegates accepted the ideas of Freire as a conceptual framework for a new education curriculum for liberation (Nekhwevha in Kallaway 2002: 140). Freire's influence however extended far beyond education and led to community action and involvement. The supporters of People's Education envisaged their educational ideals as a process that would develop and change but that could only be implemented after the fall of apartheid. These ideals were visionary and it could be valuable to look at the People's Education discourse at this stage of the study.

Walters & Kruss (1988:21) summarise the resolutions of two national conferences of the People's Education Movement (PEM) as follows:

- People's Education for People's Power is simultaneously an educational and a political strategy through which people will be mobilised and organised to work towards the goal of a non-racial democratic South Africa, while at the same time developing an education system for a future dispensation.

- People's Education must instil democratic values such as co-operative work and active participation in opposition to the current authoritarian and individualistic values dominant in schools.

- Based on decades of education resistance, People's Education is a rejection of apartheid education, which is education for domination.

- People's Education has an underlying assumption that education and politics are linked and consequently that the struggle for an alternative education system cannot be separated from the struggle for a non-racial democratic South Africa.

- Central to the success of People's Education is the organisation of all sectors of the population to take control of education and their lives.

- People's Education as an education system must be controlled and advanced by the interests of the masses.

- Arising out of the education crisis, People's Education initially addressed itself to formal, school-based education. People's Education is intended to educate and empower all, not only school students.

- People's Education must stimulate critical thinking to equip students for the future.

These ideals of People's Education for People's Power reflect Freire's notion of education for liberation. According to Coetzee (1995:129) the influence of Freire's pedagogy on People's Education can be traced in the following aspects:

Freire's pedagogy of liberation	People's Education
1. Rejection of 'banking education'	1. Rejection of apartheid education
2. Education is always political and never neutral	2. South African alternative curriculum must produce knowledge useful for liberation
3. Participatory curriculum that cannot be presented in a final form	3. Developed an emancipated school curriculum for People's Power
4. The importance of dialogue in education	4. The community must legitimate the knowledge contained in the curriculum through democratic participation
5. Education is for the benefit of the	5. Education is for the benefit of the

people themselves 6. Provision of universal education that will ensure that everyone, including those outside the schooling system are active participants in the recreation of culture in the form of education for liberation 7. Participatory values in education anchored in 'conscientization' 8. Creativity and critical thinking are core elements of the process of constructing the school curriculum 9. The teacher plays an important role in the 'conscientization' process in the classroom with students as critical co-investigators 10. For education for liberation to be successfully implemented, the oppressed have to acquire the political power to overthrow the status quo	people themselves 6. Provision of universal education that will ensure that everyone, including those outside the schooling system are active participants in the recreation of culture in the form of education for People' Education 7. Participatory values in education 8. Creativity and critical thinking are core elements of the process of constructing the school curriculum 9. The teacher plays an important role in the 'conscientization' process in the classroom with students as critical co-investigators 10. For education for liberation to be successfully implemented, the oppressed have to acquire the political power to overthrow apartheid

Nekhwevha (in Kallaway 2002:141) states that during the 1980's the influence of Freire's pedagogy extended beyond education to other spheres of the community and that radical humanism was practiced in trade unions, women's organisations and by radical Christians within the South African Council of Churches. It is however on the educational sphere that Freire had the greatest influence. Nekhwevha (in Kallaway 2002:141) states that Freire's pedagogy of knowing had a tremendous impact on how South Africans thought about the best way of fashioning education.

Although the People's Education agenda of the 1980's did not constitute a coherent set of policies, it did provide a vision of future policy priorities, which were to a great extent focused on the classrooms (Chisholm and Fuller 1996:695). People's Education contributed towards the laying of a foundation for education in a post-apartheid South Africa. This was because People's Education represented a shift from reactive responses to a more serious questioning about the nature of education itself (Walters & Kruss 1988:21). The education activists and radical educationists of the 1980's expected that some form of People's Education would shape future education policy. I will now proceed to offer an overview of the post-1994 education transformation to see if these ideals were met.

2.4.4.4 The transformation of educational policy and the emergence of outcomes-based education (OBE)[4]

A renowned South African curriculum specialist, Jonathan Jansen (in Jansen & Christie1999:4), views 1990 as a significant year in curriculum reform in South Africa and indicates the following factors as contributing towards the educational landscape: Firstly, changes in the domestic political scene resulted in the release of political prisoners including Nelson Mandela. Secondly, changes in the international and regional political scene with the end of the Cold War resulted in the change in the ideological and political alignment of e.g. Angola and Namibia which facilitated the emergence of a post-apartheid capitalist state. The demise of the apartheid state was evident and the African National Congress (ANC) was referred to as the 'government in waiting'. This led to competing social movements and political actors preparing themselves to propagate their views on curriculum and this has caused fierce and controversial debates since the mid-1990's (Jansen in Jansen & Christie1999:4).

According to Jansen (in Jansen & Christie 1999:4) OBE did not emerge as a coherent and comprehensive reform in South Africa, but emerged as a result of a number of

[4] Outcomes-based education and OBE will be used alternately in this thesis.

disparate influences: on the internal (e.g. the competency debates in labour) and external (e.g. the Spady version of OBE in the United States) front; on the historical (the apartheid legacy) and contemporary (managing the contradictory claims of reconstruction, redistribution and reconciliation) front and lastly on the educational (performance-based learning) and economic (globalisation pressures to participate meaningfully in competitive economies) front. These influences supply the context within which the following section on the conception and implementation of OBE in South Africa should be viewed. Jansen (in Jansen and Christie 1999:4) argues that these different formative influences help to explain the conceptual confusion and contradictions underlying the meanings and relationships of the OBE jargon in the South African curriculum.

With the birth of democracy in South Africa the new government opted for a school curriculum based on the principles of outcomes-based education. A new curriculum appropriate to the needs of the changing milieu of South Africans as global citizens had to be developed. One of the tendencies of globalisation is that of increasing homogenization that comes from policy borrowing (Christie 1996:409). South Africa looked to other countries, Australia in particular, for the framework on which to base its new post-apartheid curriculum. Chisholm and Fuller (1996:697) state that it can be expected that new states and societies will borrow and adapt ideas from different contexts, especially states with strong union ties links like South Africa and Australia. In common with curricular development in other parts of the world, South Africa's new curricula adopted transnational policy discourses e.g. "life-long learning", "problem-solving education" and "quality assurance". A supposed policy shift was thus made from positivism to outcomes-based education, which is premised on constructivism and a concomitant change of teaching strategies. It seems however as if Jansen, Christie and others suggest that the trajectories of OBE in South Africa retain strong strands of positivism, despite rhetorical commitment to constructivism.

After the first democratic elections in South Africa in 1994, the newly elected Government of National Unity entered into consultation with officials from the Netherlands, Australia and Canada. As stated before in this thesis, is to be expected that new states and societies will borrow and adapt ideas from different contexts.

However, what is crucial is how these ideas and policies are mediated by local conditions and social relations (Chisholm and Fuller 1996:697).

There are two aspects that are pivotal in the understanding of the post-1994 educational policy in South Africa. Firstly, the educational policy must be understood within the context of the broader educational policy of the new government. Sisulu (as cited in Chisholm and Fuller 1996:701) postulates the following in this regard, “The education struggle is a political struggle in South Africa. We are fighting for the right to self-determination in the educational sphere as in all other spheres”. Historically, symbolically and imaginatively education was and is one of the major areas of contention in the struggle for liberation in South Africa. With this in mind the new Government of National Unity embarked on reforming education policy, starting in 1994. Secondly, it has to be understood in terms of the gap between policy and the reality on the ground. According to Chisholm and Fuller (1996:701) the People’s Education agenda was principally linked to mobilisation rather than to the daily reality in the townships during the struggle years, where people were essentially caught up in a civil war. The aims of People’s Education was to mobilise a collective struggle against the oppressive education system and the apartheid system and this led to politics and education becoming so intertwined that the schools were not a neutral space to return to once the struggle was over (ibid). After liberation the ANC entered into a Government of National Unity with the National Party and this led to a compromise on the ideals of People’s Education. The very people who were used to opposing the government were now in the position where they had to deliver on the promises to their voters and come up with the reform of the education system. “The sun dawned on a post-apartheid South Africa with rising popular demand for material signs of change” (Chisholm and Fuller 1996:707). There was much pressure on the fragile new government to deliver immediate and visible change. Chisholm and Fuller (1996:707) postulate that although curriculum reform was an important issue, the important questions currently are how to energise stultifying classrooms, encourage pedagogical innovation and impart critical thinking skills. Jansen (in Jansen & Christie 1999:147) argues that OBE will fail in South Africa, not because politicians and bureaucrats are misinformed about conditions of South African schooling, but because

the curriculum initiative is in the first instance driven by political initiatives which have little to do with the realities of classroom life.

The transformation of the education system by the newly elected ANC government started in earnest in 1994 with the publication of *A Policy Framework for Education and Training* (African National Congress 1994:3) which stated among others, the following goals:

- "All individuals should have access to lifelong education and training irrespective of race, class, gender, creed or age".
- "The pursuit of national reconstruction and development, transforming the institutions of society in the interest of all, and enabling the social, cultural, economic and political empowerment of all citizens".

One of the ways by which these goals could be attained in education was by replacing the curriculum and revising the national education policy. "The reconstruction of the curriculum for schooling and for other contexts will be essential in order to rid the education and training system of the legacy of racism, dogmatism and outmoded teaching practices" (ANC 1994:10). In March 1995 the government announced their plans to implement an outcomes-based education and training system and the Departments of Education and Labour announced a new qualifications structure that would in future regulate all education and training in South Africa. McKernan (1993:343) argues that schools take on the responsibility for planning the learning of children through the curriculum and that research has shown that schools do not do this very successfully. In the South African context the introduction of outcomes-based education was seen by the government as the miracle worker for all educational problems. McKernan (1993:343) argues that OBE serves as a limited model for curriculum and that education is a social-reflexive process that must be negotiated in classrooms on a daily basis.

Nekhwevha (in Kallaway 2002:142) postulates that a lack of understanding regarding the principles on which the education for liberation was grounded led to the relative exclusion of Freirean educational insights in C2005. The rigid outcomes and exit levels

lack the progressiveness that local educational movements would have liked to see in the curriculum. Kraak (1999:46) highlights three fundamental flaws in the OBE curriculum, i.e. its grounding in the discipline of behavioural psychology, its false claims regarding knowledge transferability, its diminution of teachers' contributions in the curriculum and its privileging of assessment technologies. It seems as if the current OBE discourse uses Freirean terminology but in fact the content is far removed from the principles of People's Education. Kraak (1999:38) argues as follows when referring to OBE as practiced in South Africa, "... a learning methodology which is simultaneously radical in discursive practice but behaviouralist in assessment technology".

The legacy of apartheid impacts on the implementation of the new curriculum in South African schools with regard to several inequalities that are experienced in schools, e.g. qualifications of teachers and the availability of resources. Le Grange & Reddy (2000:23) report on the findings of a study on curriculum implementation that supports the fact that curriculum development and research cannot ignore the socio-cultural context from which it springs and in which it occurs. It is important to understand that although we currently have a national curriculum for all learners, the intention of the curriculum and the reality are far removed. Even if the prescribed curriculum is the same the consequences may be different. Stenhouse (1975) commented on this discrepancy between the dimensions of the curriculum as follows:

"We appear to be confronted by two different views of the curriculum. On the one hand the curriculum is seen as an intention, plan or prescription, an idea of what one would like to happen in schools. On the other it is seen as the existing state of affairs in school, what does in fact, happen."

Graham-Jolly (in Gultig *et al.* 2002:23) reminds us that what has changed in the South African curriculum is *how* things are prescribed. In the curriculum of the old educational dispensation the teacher input was limited to content knowledge, while in the new dispensation the emphasis is on the learner who has to reach certain outcomes in the form of performance or assessment criteria. The new curriculum is supposed to be non-prescriptive but it does prescribe. It is for this reason that I would like to analyse

the curriculum to gain an understanding of how environmental education for the Intermediate Phase is reflected in the national curriculum, while observing learning activities at the *Jewish National Fund Walter Sisulu Environmental Centre*.[5] I hope that this will give me an understanding of the coupling between policy and practice. In chapter four, the national curriculum will be analysed to trace the presence or absence of the ideas supported by the People's Education Movement.

2.5 Outcomes-based education and resource-based learning

One of the ways in which one can determine the nature of the learning taking place in the classroom is by observing the nature and utilisation of learning support materials by the teacher and the learner. In the traditional teacher-centred curriculum that prevailed pre-1994 in South Africa the predominant learning support materials used were textbooks. Anecdotally one only has to look at the content and layout of text books of the apartheid era to realise that pedagogical decisions were made and text books and other learning support material were selected according to explicit ideological and cultural assumptions about the nature of South African society and the sociology of knowledge. Masokoane (as cited in Kromberg 2000:63) postulates the following, "These practices and policies of marginalizing, under-and mis-educating and entrenching black people's inferior status, were the backbone of the emerging apartheid education system. In these efforts books were used as a means of propagating and distributing apartheid in a mass way." Furthermore Masokoane (ibid) states that the textbook was used as a tool to transfer and entrench apartheid. Teachers and learners accepted the pre-selected knowledge as the 'truth' and did not add to, question or interpret the knowledge presented. Freiburg & Driscoll (1996) mention that this one-sided knowledge acquired by the learner was then regurgitated verbatim in a test or examination. Apple and Christian-Smith (1991:37) support this by arguing that textbooks, "…signify – through their content *and* form – particular

[5] The Jewish National Fund Walter Sisulu Environmental Centre and the JNFWS Environmental Centre are used alternately.

constructions of reality, particularly ways of selecting and organizing that vast universe of possible knowledge". The content and illustrations of the apartheid era textbooks reflected hierarchies of gender and race e.g. science teachers were depicted as white males, the underlying assumption being that people of colour and women were not smart enough to teach science. Learning support materials such as textbooks can give one an understanding of the prevalent hidden curriculum and the power relations of the society within which the schooling is situated. By raising the critical consciousness of learners the intention is to empower learners to become more critical and to enable them to detect the hidden curriculum and the power relations reflected in the texts or other LSMs used in the classroom.

Outcomes-based education involves more than a progressive learner-centred approach to teaching and learning (Czerniewicz *et al*. 2000:75). It also involves the use of a resource-based approach to learning, a commitment to the development of information literacy skills and the provision of a learning culture that promotes life-long learning (ibid). In resource-based learning the educator is regarded as a source of information but not the only source of information. The educator is not intended to be the supplier or giver of information but facilitates the learning activities to attain the set outcomes. In order to realise the outcomes the learner must develop the skill to find and process information for application in all learning areas. Learners must be equipped to be able to think critically, solve problems and become life-long users of information. In resource-based learning the LSMs are used to achieve the afore-mentioned. Czerniewicz *et al*. (2000:9) claims that because LSMs are central to a resource-based curriculum such as the NCS, a basic minimum provision of LSMs is an essential pre-condition for effective teaching and learning. To facilitate the understanding of resource-based learning as implied in this thesis, I refer to the model representing resource-based learning as adapted by Czerniewicz *et al*. (2000:9). The original model was developed by Manitoba Education and Training (1994)[6]. For the purpose of this study I will only be paying attention to the nature and use of learning

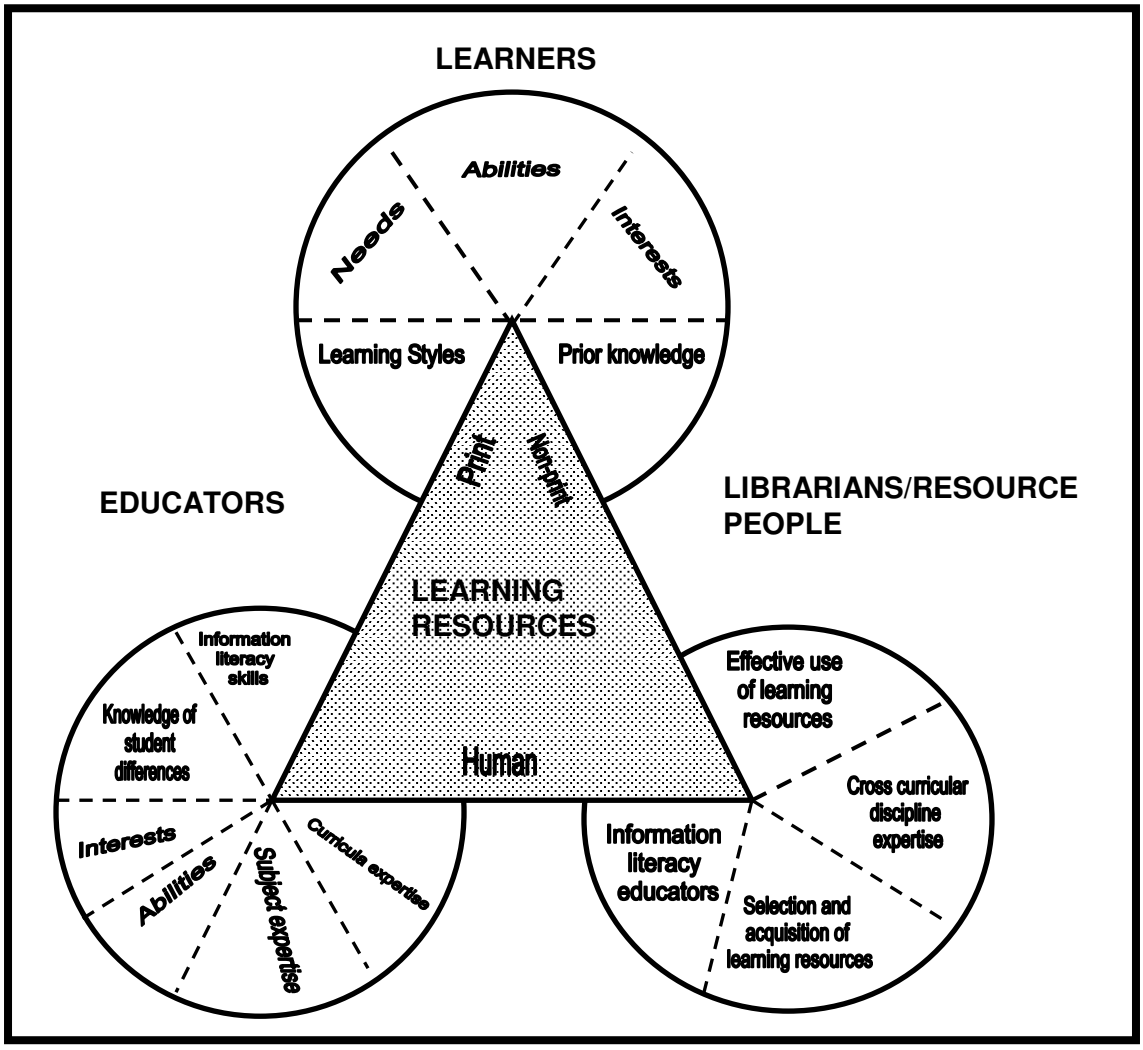
[6] The model was available on the following website: http://www.resd.mb.ca/programmes/curriculum/libraries/Resource.Based.Learning/RB/index.html. Currently, i.e. July 2008 the website was no longer in existence.

support materials by educators. Reference to learners will only be in how the educators analysed their audience or target group when selecting and designing LSMs and how the LSMs were utilised in the learning activities. The learning styles, needs, abilities, interests and prior knowledge of the learners as described in the model constitute the analysis of the target group according to the ASSURE model (Heinich *et al.* 1996:34) which is applied to the analysis of data (Chapter 4 of this thesis). Beside my observation of how the LSMs are utilised by learners during the learning activities, the actual perception of the LSMs by learners, as well as the influence that the LSMs have on the learners individually, falls outside the scope of this study. Likewise, the role of the librarians and resource people as mentioned in the model are not addressed in this study.

Resource-based learning is described as follows in the original model, “an educational model, which by design, actively involves students, teachers and teacher librarians in the meaningful use of a wide range of appropriate print, non-print and human resources” Manitoba Education and Training 1994 (as cited in Czerniewicz *et al*. 2000:9-10).

Diagram 1

Diagram representing resource-based learning (Czerniewicz *et al*. 2000:9)



The literature does however warn that resource-based learning (RBL) may not be as efficient as propagated if it is not understood and implemented correctly. Czerniewicz *et al*. (2000:12) warns that, “RBL requires carefully planned activities progressively linked in well-structured teaching programmes, without which learning may be arbitrary and superficial”. With this in mind and the fact that the problem of time may be exacerbated when learners are learning in a second language or multi-

language classroom I observed the learning activities at the JNFWS Environmental Centre.

2.5.1 The nature of learning support materials (LSMs)

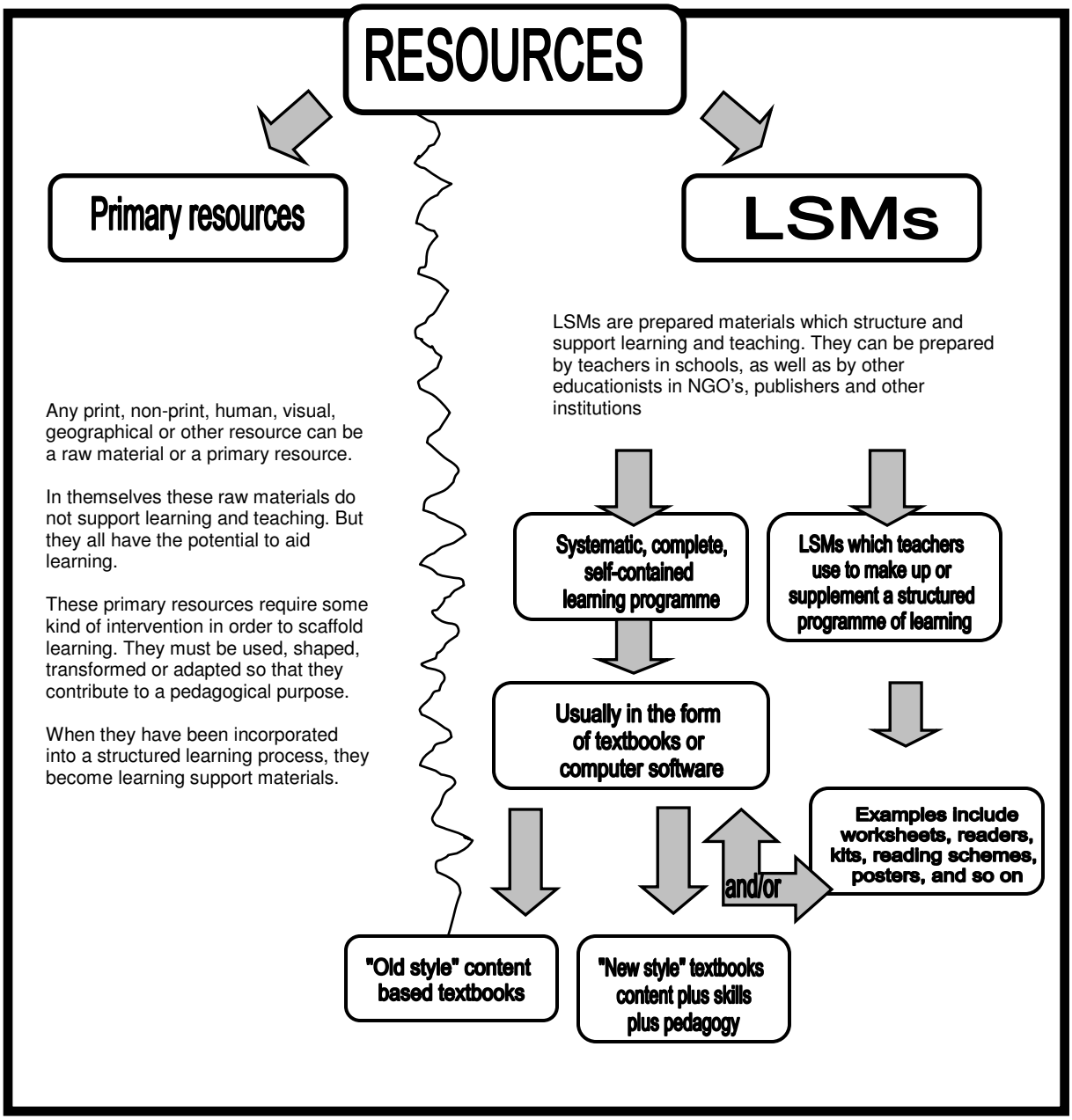
There are a wide range of definitions for LSMs in the literature. Definitions range from very narrow, for instance textbooks (where the predominant learning support material or teaching media is based on the conventional teacher based approach to learning) to all encompassing definitions that include absolutely everything from the school and the teacher to the air and the soil. Vinjevold (1999) includes print-based, electronic, physical, combinative, human and organisational materials in the scope of learning support materials. Claassen (in Pretorius 1998:75) states that LSMs are not limited to what can be fitted into the classroom but real-life situations should be allowed to permeate the learning environment. This links to the notion of learners also bringing their real-life experiences to the classroom which is the premise of Freirean pedagogy. Claassen (in Pretorius 1998:75) describes learning support materials in outcomes-based education as materials which support real learning by contributing to a dialogue between learners, teacher and materials. The key word here being 'dialogue' which also corresponds with Freire's concept of pedagogy. In outcomes-based education learning support materials enable learners to synthesise and integrate facts and ultimately construct their own knowledge Claassen (in Pretorius 1998:75).

Many synonyms are used for LSMs in the literature. LSMs are among others referred to as media, resources, materials, or technology. In the pre-1994 curriculum LSMs were referred to as teaching aids, which incidentally gives one an indication that the emphasis was on the dominant role of the educator. In the C2005 documents, materials used in learning activities were referred to as learning support materials with the emphasis on the learners. In the Revised National Curriculum, LSMs are referred to as learning and teaching support materials (LTSMs). As discussed in chapter one of this thesis the term 'learning support materials" (LSMs) is the most common term found in the literature pertaining to outcomes-based education and is the term of choice for this study. Recent literature on LSMs is directed at computer-based materials and the emphasis is on the role of technology for example the role of the Internet in teaching

and learning. It is interesting to note that in the research done by Czerniewicz *et al*. (2000:19) the chalkboard, computers, the Internet and software packages were not listed as LSMs in the policy documents of the South African Department of Education. At the site of this research (the JNFWS Environmental Centre) the emphasis is on real objects and hands-on experiences and therefore this study excludes computer based LSMs. In the hazy and often confusing terminology maze regarding the nature of LSMs I deemed it wise to use a model that elucidates the concept. The model was developed by Czerniewicz *et al*. (2000:20) and it differentiates between primary resources for example any print, non-print, human, visual or geographical source and LSMs which are any of these sources shaped to a pedagogical purpose. It is this understanding of LSMs that informs my study.

Diagram 2

The nature of learning resource materials (Czerniewicz *et al*. 2000:20)



2.5.2 The role of LSMs in teaching and learning

The purpose of this study is not to debate the influence that learning support materials might or might not have on learning. I will however briefly summarise the debate on what the effect of media on learning is, in order to conceptualise the framework within which learning support materials are viewed in this study. The main protagonists in the debate are R.E. Clark and R.B. Kozma. Clark (1982; 1983; 1985; 1991; 1994) holds that educational technologies and media deliver content but have no influence on learning (as cited in Carter 1996: 30-31). Kozma (1994:18) responds to Clark and postulates that the question should not be asked 'do media influence learning?' but rather 'in what ways can we use the capabilities of media to influence learning for particular students, tasks, and situations?' It is within this context that the use of learning support materials in a specific subject area (environmental education) for particular learners (Intermediate Phase) in a particular situation (the JNFWS Environmental Centre) contributing towards a particular task (learning activities) is being studied. Jonassen *et al.*(as cited in Carter 1996:32) regards media as tools which enable cognitive resources and argue that appropriate selection and inclusion of educational technology media nurtures and ameliorates cognitive processing. This emphasises the role of the educator to select and utilise the best possible learning support materials for the particular situation at hand.

The motivation to learn and to complete tasks is directly related to the learner's perception of the relevance of the learning (Tileston 2004:6). Educators must emphasise the importance of the learning to learners but also motivate them as to why the learning is important to them personally. The learning is thus made applicable to their everyday lives. Marzano, Pickering and Pollock (as cited in Tileston 2004:6) postulate the following, "What an individual considers to be important is probably a function of the extent to which it meets one of two conditions: it is perceived as instrumental in satisfying a basic need, or it is perceived as instrumental in the attainment of a personal goal".

Many of the learners at the JNFWS Environmental Centre where the study was conducted are from poor backgrounds and the motivation for learning was directly linked to their real-life experiences. They could go home and apply the learning, for example how to cultivate a vegetable garden, which would satisfy a basic need, that of providing food.

There is a wealth of information and resources available to the educator for use in teaching and learning. The problem is not necessarily finding resources but selecting the ones that are appropriate for the needs and abilities of the learners and are able to attain the learning outcomes. In outcomes-based learning students are no longer limited by the walls of a classroom or the knowledge of a single textbook or the limited knowledge of the educator. Educators and learners can bring the real world into their classrooms by touching, tasting, smelling, hearing and seeing. Another important advantage of using LSMs in learning is that it evens the playing field for learners that are from different socio-economic backgrounds and thus provides equal opportunities for everybody to learn (Tileston 2004:2).

2.5.3 The role of LSMs in the curriculum

The importance of LSMs in the National Curriculum Statement (NCS) is supported by the fact that the NCS is resource-based and aims to provide life-long learning. Czerniewicz *et al*. (2000: x) views the role of LSMs in such a curriculum as central and argues that a basic minimum provision of LSMs is an essential pre-condition for effective teaching and learning. LSMs were envisaged by the curriculum planners as driving curriculum change (ibid). Outcomes-based education changes the role of learning support materials from fulfilling a peripheral role to that of a tool of change.

The key role of LSMs in the NCS is further expressed in the *Norms and Standards* Document of the National Department of Education (2000). This document defines the seven roles of the educator. Role number two is defined as *The interpreter and designer of learning programmes and materials*. The *Norms and Standards* document (2000) describes the educator in this role as being able to interpret, adapt and design learning programmes. The educator must be equipped to design original learning

programmes and select appropriate textual and visual learning resources. Furthermore the educator should also be able to make original learning resources. To be able to do this the educator must be competent enough to write clearly and be computer literate. The educator must also be competent in selecting, sequencing and pacing the learning in a manner sensitive to the differing needs of the subject or learning area and the learners. The educator should also be able to evaluate learning programmes through learner assessment.

There are several other policy documents of the Department of Education that emphasise the importance of LSMs, for instance the *Generic Guidelines for the Development of Learning Support Materials for Outcomes-Based Education and Training* (Department of Education: 1998).The *Generic Guidelines* states that learning support materials should be viewed as an integral part of curriculum development and as a means of promoting both good teaching and good learning (Department of Education: 1998) I will however not be analysing all the documents as this falls outside the scope of my study. In chapter four I will pay attention to the role of LSMs for the Intermediate Phase as portrayed in the NCS.

2.5.4 LSMs in the classroom

I will now offer an overview of the use of LSMs in the classroom and their value for critical education, as this was one of the recommendations for future inquiry that resulted from the research done by Czerniewicz *et al.* (2000:78) and this is also the focus of my study. I will focus on three important aspects of LSMs in the classroom, i.e. how LSMs link to constructivist learning, how LSMs influence literacy and how educators interpret and use LSMs. The purpose of this study is not to engage in an extended discussion on learning theory. I will however briefly link the type of learning implied in the curriculum to the use of LSMs in the classroom.

Firstly, the NCS is based on a constructivist approach to learning and a progressive, learner-centred pedagogy (Czerniewicz *et al*. 2000:i). The pre-1994 pedagogy was based on the assumption that knowledge could be transferred from the mind of the teacher to the mind of the learner, or that learning was a process of absorbing

knowledge (Driver and Bell 1986). This links to Freire's concept of 'banking education'. Contemporary constructivist philosophy holds that knowledge cannot be transmitted to passive recipients (Tobin *&* Tippins 1993). This is acknowledged throughout the NCS, with outcomes-based education premising a pedagogy that is learner-centred. The emphasis being on learners' participation and the interactive nature of learning activities. Anderson and Mitchener (1994) postulate that learning outcomes depend not only on what is taught but on what the learner already knows. This supports Freire's idea that the educator must engage with the knowledge that the learners bring to class. Educators need to be aware that learning involves the construction of meaning as learners make links between what they already know and the new knowledge with which they are confronted (Anderson and Mitchener 1994). This implies that the intended learning is not always received by different learners in the same manner and that the achievement of outcomes might differ from those intended by the curriculum and the educator. Anderson and Mitchener (1994) argue that the construction of meaning is a continuous and active process and as learners continually change their ideas as they interact with new knowledge, their thinking changes and evolves to accommodate new experiences. If a learner's prior knowledge, life experience and beliefs influence the meaning they make of a situation it stands to reason that it would also influence the way they interact with learning materials.

Secondly, the constructivist pedagogy which characterises the NCS, values the notion of information literacy. Through a constructivist lens, information itself is reconceptualised and it is no longer data but a process that involves and necessitates problem-solving, decision-making and critical thinking (Czerniewicz *et al*. 2000:13). Information literacy expresses the move away from repeating, copying and getting the 'right answer', to processing, understanding and reshaping information in order to solve problems (ibid). The information explosion has led to new definitions of literacy. Where literacy traditionally meant the ability to read and write, this definition has now been expanded to include media literacy, print literacy, school literacy, computer literacy and so on (Semali 2000:19). These levels of literacy are reflected in the NCS and all contribute to critical thinking. Czerniewicz *et al*. (2000:53) however warn that before learners can develop the deeper cognitive skills that are necessary for the sophisticated levels of literacy required by the curriculum, learners must be able to

read and write. Taylor and Vinjevold (1999:233) postulate the necessity of reading and writing as follows, “Learning materials are essential because without books to read and write in, schooling as cognitive development cannot take place. All subsequent learning depends on the development of progressively higher and differentiated forms of literacy”. In 1999 the then Minister of Education said, “The dismally low reading skills of South African pupils is a major cause of overall school failure and dropout” (Professor Kader Asmal, MP 5 August 1999). The *Progress in International Reading Literacy Study 2006* found that the majority of South African children cannot read (Rademeyer 2007).

Thirdly, the premise of outcomes-based education is that the educator is the most important resource in the classroom (Van der Horst and McDonald 2005:61). The educator mediates the learning and as mentioned previously creates a dialogue between educator, learner and LSMs. In order to utilise resource-based learning in the classroom a very skilled educator is required. The educator has to be able to develop the cognitive outcomes specified in the curriculum and to play a facilitating role quite different from the traditional teaching role (Czerniewicz *et al*. 2000: 12). Furthermore, Wickham and Versfeld (as cited in Taylor and Vinjevold 1999:171) observe that, “The individual teacher rather than the materials used is the significant determinant in the materials/practice relationship”. As discussed in the preceding paragraphs it is one of the professional roles of the educator to design and interpret appropriate LSMs to attain the learning outcomes set for a learning activity. In the traditional curriculum no creativity, originality and resourcefulness was expected of the educator when devising LSMs (Claassen in Pretorius 1998:77). In the traditional curriculum the textbook was centre stage and teachers all over a province worked from the same textbook at the same pace. In outcomes-based education the educator has far more freedom in selecting and using LSMs. The LSMs should however be accurate; well laid out and readable; interesting and varied; linked to the content, objectives and intended learning outcomes of the lesson and used constructively (Van der Horst and McDonald 2005:61). Claassen (in Pretorius 1998:77-78) names several other principles that underpin the development and use of LSMs, i.e. LSMs should be user-friendly and teacher-friendly, affordable, integrated, holistic and cross-curricular. As mentioned in the preceding part of this chapter the pre-1994 educational dispensation utilised

learning materials that were prejudiced and biased. According to the NCS, LSMs should not contain bias as the Constitution and the Schools Act forbids discrimination on various grounds, such as race and gender Claassen (in Pretorius 1998:78).

The LSMs used in a learning activity can often give an indication of the interaction between educator, learner and learning materials. In a 1999 study Vinjevold (1999:13) found that without learning materials learners could only talk about what they already know. There was little or no advice provided during the group work and pre-group work activity to ensure that the group interaction would be productive and lead to conceptual or knowledge development. It is this interaction between educator, learner and learning support materials that are of interest to me in this study as this could illuminate how knowledge is transmitted in the classroom.

I will now offer a discussion of the next tenet of this study, i.e. environmental education as the purpose of the inquiry is to gain an understanding of the way in which LSMs are utilised in environmental education.

2.6 'Environment' and 'environmental education'

2.6.1 Contextualising the concepts

Callie Loubser (2005:35) a South African academic and environmental educationist, states that the history of environmental education is inextricably bound up with social, economic, political and ecological considerations. Loubser (2005:35) postulates the following, "The concept has evolved, both internationally and in South Africa, from a relatively simple understanding of people-environment relationships to a sophisticated interpretation of humanity's interaction with all aspects of the environment, global and local, biophysical and social" (ibid). According to Wagiet (2002:28), environment is a composite of interacting and interdependent facets. The environment is a social construct where the biophysical world forms the basis for economic and social development, with numerous interactions between political, economical, social and biophysical dimensions (Wagiet 2002:28; O'Donoghue & Janse van Rensburg 1995:18). People are the most important role players in this understanding of

'environment'. In the past the emphasis was on environmental conservation and concern for the environment while the current understanding of environmentalism is much more complex. O'Donoghue & Janse van Rensburg (1995:18) argue that environmental issues can now be understood as social problems, problems of people which relate to their history, living conditions and their relation to the world. Environmental issues currently take on a very personal note as we are all affected in one way or another every day. While earlier definitions of environmental education were linear, later definitions had a strong emphasis on social critique and societal change (Loubser 2005:37), which ties in with critical education and the broad political commitment common to all critical education projects.

Irwin (1984) suggests that traces of 'environmental education' can be found in the works of the ancient Greeks. However the more current understanding of environmental education had its origin in Europe as a counter reaction to the Industrial Revolution (Loubser 1996:11-12). Environmental education is a complex concept and the integration of environmental issues into mainstream education is a result of increasing environmental problems for which solutions are continually being sought. The environmental crisis is on a global scale and includes issues such as biophysical destruction, global warming and the depletion of the ozone layer. Not only have human life styles contributed to the crisis but the accompanying social, economic and political dimensions have aggravated the situation (Le Grange & Reddy 1997:12).

Loubser (1996:8) states that environmental education has rapidly developed over the past twenty five (now thirty seven years) as a result of the following events:

- The *Stockholm conference* (1972) that led to the *Declaration on the Human Environment.* An appeal was made that environmental education had to become an international concern.
- The *Belgrado charter* (1977) determined the guidelines that would be applicable across the world for future environmental education.
- The *Tbilisi-declaration* (1977) where twelve principles applicable to environmental education were decided on.
- The *Moscow conference* (1987) where a strategy for the decade 1990-2000 was determined.

- *Agenda 21* of the Rio Earth Summit (1992) where it was decided that education is the key to sustainable development.

Although Loubser (1996:8) refers to the importance of all five the above-mentioned events in the development of environmental education, I will only briefly discuss the latter three international conferences mentioned, i.e. the Tbilisi conference (1977), the Moscow conference (1987) and the Rio Earth Summit (1992). This is solely because these conferences are the most recent of the mentioned events and the scope of this study does not require more comprehensive coverage.

2.6.2 The Tbilisi conference (1977), the Moscow conference (1987) and The Rio Earth Summit (1992)

The Tbilisi and Moscow conferences contributed in a major way towards the development of principles that should be applied to the teaching and learning of environmental education. In 1988 UNESCO published a document titled, *International strategy for action in the field of environmental education and training for the 1990's,* in which the following statement was made, "Recommendations of the Tbilisi Conference (1977) on environmental education goals, objectives and guiding principles are to be considered as providing the basic framework for environmental education at all levels, inside or outside of the school system" (UNESCO 1988). In the same document the twelve guiding principles for environmental education were defined (ibid.). A summary of these principles indicates that environmental education should: be considerate to the environment in its totality; have an interdisciplinary approach; be a continuous lifelong process; examine major environmental issues; focus on current and potential environmental situations; promote the value and necessity for local, national and international prevention and solution of environmental problems; explicitly consider environmental aspects in plans for development and growth; enable learners to have a role in planning their learning; relate environmental sensitivity, knowledge, problem-solving skills appropriate to the age of the learners; help learners to discover the symptoms and causes of environmental problems as well as the complexity of these problems and to enable this a wide range of educational approaches should be used.

On a global scale the quest for finding ways to address environmental issues did not start in 1992, but the Earth Summit held in that year in Rio de Janeiro, did give impetus to the important influence of education in promoting sustainable development. The "Principles for Equitable and Sustainable Societies" adopted at the summit resonated strongly with the critical, democratic and transformatory values and ideas that were under discussion in South Africa at a time when the apartheid era was drawing to a close and a new dispensation was emerging. Anecdotally, Paulo Freire also attended the Rio Earth Summit and the principles echo his ideas on critical education as discussed earlier in this thesis. According to Le Grange & Reddy (1997:12) the principles of the NGO's International Forum include that, "Environmental education, whether formal, non-formal or informal, should be grounded in critical and innovative thinking in any place or time, promoting the transformation and construction of society. Environmental education is not neutral but is value-based. It is an act for social transformation."

2.6.3 Environmental education for 'sustainability'

Le Grange & Reddy (1997:12) affirm the importance of the transformative function of environmental education when stating that, "Environmental education is intended to be transformative in nature and can serve as an important catalyst for social transformation and reconstruction". These are important issues in South Africa where redress and equity are priorities in a new democracy. The World Summit on Sustainable Development that was held in South Africa in 2002 has once again brought sustainable development to the fore and highlighted it as a theme for deliberation in education (Loubser 2005:115).

At present poverty and inequity are major contributors to environmental degradation and it is globally accepted that the reduction of these influences will best be attained through education. For decades the international environmental community has been looking for ways by which poverty can be reduced so that sustainable development can be achieved. Wagiet (2002:27) confirms that there is international consensus regarding the importance of education at all levels to give impetus to sustainable development. Loubser (2005:114) defines sustainable development as follows, "In

theory, sustainable development means development that takes place in such a way that it does not compromise the needs of future generations." The literature however holds that this might be too simplistic a view as demonstrated by Wagiet (2002:28), who is of the opinion that sustainable development can be understood as a complex medley involving economic, social, political, cultural and ecological dimensions that are interacting and that are interdependent. There is no quick fix to promote or attain sustainable development but the use of education as a vehicle by which the pressing issues mentioned can be addressed seems to be the only viable option.

Loubser (2005:116) asserts that although there are different viewpoints regarding the relationship between environmental education and sustainable development (sustainability), the most commonly accepted term is 'education for sustainability'. The late Canadian environmentalist Bob Jickling (1999:63) takes issue with the debate on 'education for sustainability' in that he believes many have been conditioned to believe that this term carries unconditional or positive values. He argues that critical thought depends on transcending elements in ordinary language, the words and ideas that reveal assumptions and worldviews, and the tools to mediate differences between contesting value systems (ibid). Jickling (1999) holds that our understanding of the aim of environmental education should not be limited to sustainability as an organising concept for environmental education, but that it should be seen as a stepping stone in an ongoing evolution of environmental thought. As with the OBE curriculum currently practiced in South Africa the concept 'education for sustainability' reveals the deterministic nature of this approach and also reveals very much about the ideology behind the curriculum. Adherents to this approach are determining outcomes and are saying that they know best and that their value system is the best. Weston (as cited in Jickling 1999:62) remarks that environmental ethics is in its formative stage and for this reason it should be a creative, open-ended process that resists the temptation to reflect fashionable normative stances. The consensus amongst critics of the 'education for sustainability' approach is that concepts such as 'education for sustainability' should be allowed to grow and evolve and mean different things to different people.

John Fien argues that although the 'sustainability debate' has been ongoing for many years, there is no longer a need to focus arguments on the need for change, as that is

a given. The debate is currently on the meanings of sustainable development and the nature, rate and details of the pathways towards it and this requires renewal and refocusing of the consciousness raising effort, and poses new challenges for environmental education (ibid). According to Fien (1993a) the concept 'sustainable development' originated in the 1980 *"World Conservation Strategy"* document and in the second document of this nature, titled *"Caring for the Earth"* the term 'sustainable living' was coined. The proposal was put to governments, industry and families to live by a new world ethic of sustainability. The core values of the new world ethic of sustainability are summarised by Fien (1993a) in a diagram which I will represent as follows: under the heading 'Ecological Sustainability' the following elements are listed, i.e. interdependence, biodiversity, living lightly on the earth and interspecies equity, while under the heading 'Social Justice' the following elements are listed, i.e. basic human needs, human rights, participation and intergenerational equity. The implications of the cores values mentioned, impact substantially on the rules of the 'old' environmental education, i.e. environmental education is a part of progressive child-centred education; environmental educators should be objective on matters of values and the goal of environmental education is to create environmentally responsible behaviour (Fien 1993a:13).

Fien's critique of certain aspects of the 'old' environmental education seems to resonate with current OBE terminology in that the approach of both is learner-centred. Fien (1993a:13) offers the following suggestion, i.e. more socially-critical approaches to environmental education are necessary to address the weakness in liberal child-centred educational ideology. He lodges three criticisms against the 'old environmental education': First, the problem is that personal transformation often happens at the expense of the interdependence of personal and broader structural transformation, which is necessary for sustained social change (Fien 1993a:13). The second criticism is lodged at the very idea of educators that are objective on matters of value. This is a fundamental contradiction as no person can ever be totally objective. "If all values are equally valuable, then all values are also equally valueless" (Fien 1993a:15). Educators should rather be truthful and honest and declare their inability to be neutral. Kelly (1986: 130) coined the term "committed impartiality" and remarked as follows, "First teachers should state rather than conceal their own views on controversial

issues. Second they should foster the pursuit of truth by insuring that competing perspectives receive a fair hearing through critical discourse". As previously discussed in this chapter, this view supports the Freirean approach that holds that education is never neutral. Giroux (1983: 359) affirms this when he says that, "...students must learn not only how to clarify values, they must learn why certain values are indispensable to the reproduction of human life". The third criticism that Fien has against the principles of 'old' environmentalism is that it suggests that the sole goal of environmental education is to create environmentally responsible behaviour. He feels that education for responsible environmental behaviour fits the old, narrow view of environmental education and fails to address the imperatives of sustainable living (Fien 1993a:16).

Furthermore, the teaching methods used in environmental education are behaviouristic and attempt to address learning in a linear way. The assumption is made that 'right knowledge" and "right attitudes" leads to "right behaviour" (Fien 1993a:17). One of the primary problems with behaviouristic approaches to learning is that learners are not always offered the opportunity to develop critical thinking skills. The learners are submitted to "banking education" and are perceived as empty vessels to be filled with knowledge, as the Freirean view holds. Loubser (2005:69-70) says that in contrast critical educationists see learners as fires to kindle and the teacher helps to empower people in order to improve the quality of their own lives. Huckle (1983) argues that committed teachers will need skills to reveal the political nature of so-called "neutral" or "balanced" approaches to values education, while Giroux (1988) argues that teachers must adopt the role of "transformative intellectuals" who practice a pedagogy that encourages learners to be active critical citizens. This subscribes to the critical education approach which endorses the fact that environmental education should question the underlying assumptions and ideologies of schooling. According to Fien (1993a:9) environmental education challenges the role of schools as agencies of cultural and economic reproduction. Those involved in environmental education need to be critical and promote approaches to curriculum planning and pedagogy that can help integrate social justice and economic sustainability into a new vision of personal and social change (Fien 1996:xxiii).

Furthermore, environmental education should be an integral and formal facet of education and not a separate, external, informal or added component to the curriculum if it is to have a lifelong effect on learners (Wagiet 2002:28). Trainer (as cited in Le Grange & Reddy 1997:12) argues that the curricula of schools play a major role in reproducing the unsustainable values of modern society. If however environmental education cannot only expose learners to the problems faced with regard to the environment and sustainable development but also enable them to be part of the solution it might influence their future decision-making with regard to sustainable development in a positive way (Wagiet 2002:27).

2.6.4 Environmental education and South African society

2.6.4.1 Background

Although epistemologically and historically problematic, nature conservation has been practised in South Africa by people indigenous to Africa since the dawn of time. Hugo (1993:43-45) indicates that the indigenous people of Africa utilised nature by selectively gathering plants for medicinal purposes, producing vegetables by rotating their crops and by selectively harvesting grass to thatch roofs. Wagiet (2002:29) mentions the importance of African roots in the publication *The long walk to sustainability: a Southern African perspective,* and argues as follows, “Education in South Africa has the challenge to affirm our African values in order to balance our Western influences and to rekindle some of those values associated with cooperation and communalism inherent to African civilization, from which there is much to be learnt”.

Environmental education has however only gained impetus in South Africa over the last thirty odd years. The first international environmental education conference in South Africa was held in 1982 at Mooi River in the then Natal (Loubser 1996:9). The Wild Life Society was one of the first organisations to actively promote environmental education programmes in South Africa and in 1973 the Wild Life Society did ground breaking work by designing teaching materials for environmental education (ibid). Educationists and environmentalists alike have lobbied for recognition of the important

role of education in addressing environmental issues over the past decades. The recognition of the paramount importance of environmental education is recognised in the following documents (Wagiet 2002:28):

- On an international level in Agenda 21, and the Millennium declaration
- On a regional level in the NEPAD SADC Treaty.
  On a national level the White Paper on Education and Training 1995 and the National Environmental Management Act (1999).

2.6.4.2 Environmental education and the formal curriculum

2.6.4.2.1 Environmental Education Association of Southern Africa [EEASA]

Even before significant political and educational change in South Africa was brought about there was great concern regarding the escalating environmental problems in Southern Africa. In early 1982 the non-racial Environmental Education Association of Southern Africa (EEASA) was established by concerned educators and environmentalists in South Africa and in neighbouring countries in Southern Africa. All these countries and their environmental issues were linked to the economic, social and political effect of colonialism and apartheid as practiced in South Africa. Masuku-van Damme and O'Donoghue (2002:32) argue that it is for this reason that a brand of environmental education encompassing the political, social, economical and bio-physical issues as interacting dimensions of the environment has developed in South Africa and some of its neighbouring countries. It seems as if a radical and progressive approach to environmental education had begun to emerge.

In the late 1980's the first attempt was made to include environmental education in the formal curriculum with the inclusion of the guidelines of the international conferences held in Belgrade (1975) and Tbilisi (1977) in the 1989 *White Paper on Environmental Education* (Le Grange & Reddy 1997:13). Environmental education was now formalised in education but little was done by way of implementation in the classroom.

2.6.4.2.2 Environmental Education Policy Initiative [EEPI]

As previously mentioned, political and social change in South Africa since the 1990's led to a new approach to teaching and learning. Le Grange & Reddy (2002:21) state that a new space was created for open and inclusive discourse and this led to the *Environmental Education Policy Initiative* (EEPI), which is a civil society and state partnership that aims to develop an inclusive process of gathering and developing environmental education policy for formal education in South Africa. In 1992 the EEPI was launched and the outcome was the inclusion of environmental education across the curriculum as a principle. This was significant as environmental education had up to this time been marginalised from mainstream education in South Africa. Environmental education is reflected in the White Paper (1995) on education and training as a principle. The White Paper (Department of Education 1995), Principle no.20:22, states that the aim of environmental education is to create environmentally literate and active citizens; to ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources. Environmental education must also form a vital element of all levels and programmes of the education and training system.

2.6.4.2.3 Environmental Education Curriculum Initiative [EECI]

The Environmental Education Curriculum Initiative (EECI) was established in 1996 to take the initiatives of the EEPI from policy to curriculum development and to ensure that environmental concerns form part of the new outcomes-based approach to learning in South Africa (Le Grange & Reddy 1997:12). Four key projects were identified for the EECI, i.e. learning programme development; materials development; teacher education and research (Le Grange & Reddy 2000: 21).The EECI was a joint state/civil society partnership project with a focus on formal education and curriculum policy development. The EECI gave environmental educators working in the EECI the opportunity to contribute significantly towards the new curriculum. In the first curriculum post-1994 (C2005), environmental education was defined as a cross-curricular phase organiser which was seen as a triumph for environmental educationists, but in the revised national curriculum statement all phase organisers were omitted (Loubser

2005:52). There was concern from both the environmental education lobby and the government that environmental education would not feature in the revised curriculum and this led to the establishment of the National Environmental Education Programme for General Education and Training, which will be discussed in the next section of this chapter.

2.6.4.2.4 National Environmental Education Programme for General Education and Training [NEEP-GET]

The NEEP-GET was established by a previous Minister of Education, Kader Asmal, when the revision of C2005 was underway, to facilitate environmental education processes as an important educational priority within the curriculum of the different learning areas. The vision of the NEEP-GET was to provide an integrated educational framework for environmental enhancement and sustainable development which was to be achieved by co-operative governance (Wagiet 2002:29). Razeena Wagiet, the Environmental Adviser to the National Minister of Education and coordinator of NEEP-GET said the following, “The aim is to mobilize the power and relevance of environmental education in the South African context, as one of the means of achieving our Tirisano: ‘Call to Action’, and to contribute to building a South African education and training system – in its broadest sense – for the 21st century” (Wagiet 2002:29).

The NEEP-GET project’s strategy was to impact on curriculum design and revision; resourced-based learning; professional development of district staff and teachers; and the improvement of environmental learning in schools. The development objective of the project was to enhance the capacity of South African teachers and to enable them to implement environmental learning across the OBE curriculum as a compulsory principle (Wagiet 2002:29). Tilbury (1995) notes the following parallels between OBE and environmental education: both focus on the relevance of the learning to learners present and future needs; both take a holistic approach to curriculum and emphasise the importance of integration and cross-curricular approaches; both value the development of the whole person; both are values-orientated and are concerned with the integration of knowledge, skills and attitudes; both are learner-centred and

encourage active learning on the part of learners who are involved in real and simulated action; both emphasise the importance of life-long learning and critical thinking is a central part of both approaches to education.

To attain the learning outcomes of the curriculum, a resource-based approach is used. The results of the pilot research projects done by NEEP-GET regarding the use of materials or resources are of special importance to this study as this could give me an understanding of previous research before I do the empirical work at the JNFWS Environmental Centre. Wagiet (2002:30) states that adequate access to appropriate learning support materials (LSM) is problematic in all learning areas in the South African context and the same applies for environmental education and that it is learners from the poorest families that do not have access to materials and are disadvantaged. Participants in the pilot research were supplied with LSMs and equipped with insights on how to use the materials in the classrooms.

The NEEP-GET research rendered three important findings (Wagiet 2002:30-31):

- In order to develop environmentally literate learners who are able to address environmental problems, knowledge, values and skills are required and are best developed through active learning, critical thinking and active involvement in issues and encounters in the learners' immediate environment.

- The establishment of an environmental ethos in schools by means of clubs etc. should be encouraged because this made the integration of environmental education into the learning areas much easier.

- The open-ended active learning framework implemented was useful in terms of facilitating and assessing environmental learning in OBE.

The main objective of the NEEP-GET project was to ensure that environmental learning is integrated throughout the curriculum for the General Education and Training (GET) band. The project's activities ended in December 2003 and the objective was

obtained as environmental education is now a principle applied in the curriculum for all learning areas.

2.7 Summary

The literature thus informs how teaching and learning should look in critical education classrooms. Paulo Freire's ideas and ideals regarding pedagogy represent a major shift from that which prevailed and might still prevail in South African education. However the literature on teacher development and change holds that teaching is a deeply embedded social practice and that the process of change is demanding and difficult and may challenge deeply held ideas and views of the world. Hoadley & Jansen (2002:191) supports this when stating that there is always resistance to change. The change to a new philosophy of education premised on outcomes-based education and the implementation of C2005 and later the Revised National Curriculum Statement could thus not happen overnight.

Thus far in my study of radical curriculum change I have concluded that the educator plays an important role in the teaching and learning of environmental education. The nature and importance of learning support materials was also addressed. The indispensable qualities that the progressive teacher should possess in a Freirean approach to education were revealed. Freire (1998c:39) emphasises that these qualities are not natural talents but skills that are only acquired through practice in concurrence with a political decision that the role of the teacher is crucial. The teacher should also realise the importance of this role on a personal level. Wagiet (2002:29) reiterates this when she argues that it is the competence and confidence of environmental education practitioners that is crucial for successful learning and the attainment of critical praxis (theoretically informed practice).

Furthermore, it must be understood that in a learning situation learners and educators act within a context that has complex interacting historical, political, economic, cultural and social dimensions (Le Grange & Reddy 1997:12). The South African environmental education context is unique as a result of several factors, not least the political and educational past of the country. Wagiet (2002:28) argues that learners

need a framework to unpack and critically investigate environmental issues in order to understand the concept 'environment'. Perhaps environmental education and critical education need to be located dialectically. I believe that this framework can be found within the parameters of critical education. The problem however emerges that though this makes sense theoretically the evidence in practice may prove difficult to clarify. To enable me to gain an understanding of the practice, I have formulated the following critical questions:

2.8 Critical questions that emerged from the literature review

I would like to understand whether critical pedagogy may be applied in environmental education to promote critical consciousness. In order to do this I will explore and describe the extent to which critical consciousness is facilitated by the use of learning support materials in environmental education.

Before the research was undertaken I analysed the national curriculum in order to gain an understanding of how the curriculum accommodates Freirean ideals. I will ask the following question to facilitate the understanding:

- "How does critical consciousness manifest itself in the curriculum document with specific reference to the role of learning support materials?"

The empirical work for this case study was done at the *Jewish National Fund Walter Sisulu Environmental Centre* in Mamelodi (Tshwane). At the mentioned Centre I observed how learning support materials were used in learning activities so that I could investigate the following questions:

- "How do educators interpret and apply the curriculum with regard to learning support materials?"

- "To what extent does learning support materials used in a specific environmental education setting have the potential to develop critical consciousness?"

Furthermore I will conclude with observations on the various traditions of critical practice and how they could contribute to debates about critical education in South Africa. I am not promoting an utopian view of critical education but in the words of Henry Giroux, I believe that we need to be visionaries planning the future with great wisdom, “Radical pedagogy needs a vision – one that celebrates not what is but what could be, that looks beyond the immediate to the future and links struggle to a new set of human possibilities” (Giroux cited in Palmer 2001:280). Sparkes (1991:7) argues that, “Once the dominant and stable practices of teaching are understood then the possibilities of change can be considered by the very people involved in the practices”.

CHAPTER 3
Research design and methodology

3.1 Introduction

This chapter addresses the research design and philosophy of the study and serves to elucidate my role as researcher in the research process. I give an overview of my epistemological stance as well as the methodological nature of the study. Furthermore I attempt to justify and account for my data collection and give an overview of the formal aspects of the research. In short, the purpose of this chapter is to facilitate means by which the research questions that were posed at the end of chapter two can be explored. I have used the following definition of the purpose of methodology to guide me in the writing of this chapter,

"… methodology is our justification of why we use certain tools in preference to others and why we have decided upon particular combinations of methods and approaches to examine the particular phenomenon in question" Kearney (in Conteh *et al*. 2005:108).

I now proceed to give an indication of the responsibilities, triumphs and defeats, of this very personal journey towards understanding.

3.2 My role in the research process

3.2.1 Choice of methodology and ontological premise

Many scholars would attest to the fact that the methodology chapter is the most difficult chapter of the thesis to write. I had written a preliminary methodology chapter for my research proposal and felt this to be quite sufficient. It was only after I started collecting the data that I realised that the proposed methodology did not suit the data that I had collected. The methodology I had designed was not tailor-made for the particular site and the specific participants. I had tried to follow prescribed layouts and academic procedures to no avail. I once again started reading everything that I could lay my

hands on regarding methodology. I re-read the trusted and renowned academic volumes on methodology, but also ventured further to work that I had not read before e.g. Jean Conteh and Eve Gregory (2005); Fraenkl and Wallen (2006); Freeman *et al*. (2007). I realised that in qualitative research I would have to follow the role of "bricoleur", which Levi-Strauss (1963:17), defines as a "Jack of all trades or a kind of professional do-it-yourself person". Implementing this approach, I had to select the tools for this particular job and I had to make the decisions. This was shaped by the research questions, the setting and the context. Although this was an extremely daunting task it was also a very fulfilling one. In this chapter I attempt to support the methodological choices I made.

My reading re-affirmed the positioning of the study within the qualitative approach. I did however begin doubting the applicability of conventional criteria for qualitative research. Only after I considered the viability of an ethnographic case study did I discover that criteria for academic rigour are handled differently in research of this nature. Jean Conteh (in Conteh *et al*. 2005:101) illuminates these issues as follows, "…in ethnographic research the conventional criteria of objectivity, validity, reliability and generalisability need to be transformed into judgements about subjectivity, authenticity and trustworthiness". I was intrigued to discover that an ethnographic study places much emphasis on the role of *the self* in the research process. Issues such as the subjectivity and bias of the researcher are explicitly explained in the methodology of this type of study. Gregory (in Conteh *et al*. 2005:101) states that ethnography recognises the role of the researcher both in changing events and changing oneself.

Social anthropologist John Comaroff argues that methodologies are really only a function of the questions we ask and that 'methodologies' are determined by prior theoretical considerations and not by the intrinsic nature of academic 'disciplines' (Comaroff 1982:143). Furthermore, John and Jean Comaroff argue that in the social sciences we don't set out to 'prove' anything but we use our empirical findings to make arguments about how society works (Comaroff & Comaroff 1992). In this study I do not intend to fetishise methodology or follow a mindless recipe. I recognise that I am unable to write the absolute truth. I cannot describe the "way things really are" or "really work" or the "true state of affairs", I can only "make sense" of the situations in

which I find myself (Guba and Lincoln 1989:8). In qualitative research, which is defined later in this chapter, the researcher can never be totally objective. I therefore declare my subjectivity and realise that I cannot eliminate this subjectivity. I refer to Freeman *et al*. (2007:30) in this regard who state that, “Rather than focusing on eliminating the subjectivity of the researcher in a fruitless effort to attain objective knowledge, qualitative researchers pursue how best to work with the fruitful positionings that each researcher brings to a project”. It is necessary for the researcher in a qualitative study to acknowledge subjectivity and bias because it is necessary to convince the readers of this study that I am giving them a reliable picture of the phenomenon that I observed. Ely *et al*. (1991:32) recommend that the aim of qualitative research is not to eradicate any biases, but to reveal them and to acknowledge their effects in the research. Although my aim was to produce trustworthy evidence, I realise that the reader and I share a joint responsibility in interpreting events (Conteh *et al*. 2005:xxi). This thesis is therefore my point of view and my story. It is essentially a descriptive, interpretative narrative on what policy and practice look like and how policy and practice relate within the context in which I worked and conducted the research.

3.2.2 The research site

This study was considerably delayed as a result of complications that arose with regard to access to the initial research site. In May 2006 I contacted an environmental education centre in Tshwane to make an appointment to meet the principal and staff of the centre and to negotiate access to the facilities. I was welcomed by the principal of the centre, introduced to the staff and offered unlimited access to facilities and resources. I started observing learning activities, attending meetings and analysing learning support materials. From the start the principal gave me the assurance that there would be no problem gaining informed consent from the participants in the research. Before handing in my application for ethical clearance at the University of Pretoria I was however informed that one of the directors of the South African National Botanical Institute insisted that she must personally authorise the research. This was an unexpected move as this type of authorisation had never been required in the past. It took me weeks to reach the mentioned director and after several attempts to obtain a personal or telephonic interview with her, I was unable to gain the necessary consent. I

discussed the ethical dilemma in which I found myself with the then dean of the Faculty of Education of the University of Pretoria, my supervisors and the chairperson of the Ethical committee. The general feeling was one of dismay, especially as no reasons were ever given for the refusal of final consent. I did however bear in mind that the letter of approval and informed consent that were addressed to the principal and director did state that participation in the research was voluntary and that participants could withdraw at any stage. This led to the decision that although it was at a great personal cost, the research would have to be delayed in order to find a new research site.

In 2007 I contacted an environmental education centre in Mpumalanga and after my initial contact with the principal of the centre I felt hopeful that this would be a suitable site. However when I paid a visit to the centre I realised that this was a former *veldskool,* [literally translated as a veld or outdoor school]. This type of activity was part of schooling and the curriculum in the pre-1994 South African education dispensation. The principal of the then *veldskool* is also the current principal of the environmental education centre and he was able to give me the following valuable insight into the activities of the Centre pre- and post-1994[7]. Firstly, the concept of the *veldskool* was established in 1976 by the Department of Education of the apartheid government. The existence of the *veldskool* continued until 1996. There were several *veldskole* [plural of *veldskool*] across the rural areas of the then Transvaal. The *veldskole* were financed by the Department of Education and the teachers were employed by the Department. Secondly, the *veldskool* was seen as an extension of the curriculum and learners were transported to the facilities in school time and spent several days on site. The transport to the facilities was subsidised by the then Department of Education. The aim of the *veldskool* was to prepare the learners for the spiritual, moral and socio-economic threat that was lodged against the youth of South Africa as perceived by the government of the day.

[7] This was a personal communication on 17 November 2007. I choose to keep the identity of the Principal and the Environmental Education Centre anonymous.

When the above-mentioned concept of the *veldskool* was abandoned by the ANC government in 1996, the facilities that I visited were used for an environmental education centre. The current centre is however more of an adventure and recreational centre than an environmental education centre. Attendance by schools is voluntary and the programme is not linked to the school curriculum. Learners also stay for a much shorter period of time e.g. one or two days, in comparison with the extended and compulsory visits by schools in the past. The centre does offer workshops for educators and the activities are also focused on the community at large. There is a link to environmental education in that themes are incorporated in the activities that relate to environmental events e.g. "Wetlands day", "Water week", but the emphasis is on adventure and recreation. In the light of this I found it unsuitable for the research I was conducting and had to renew my endeavours in finding a new site.

Towards the end of 2007 I made contact with the principal of the Jewish National Fund Walter Sisulu Environmental Centre[8] in Mamelodi. In a relatively short space of time I obtained permission from the Centre to research this study at their facility and successfully submitted my application for ethical clearance to the Ethics Committee of the University of Pretoria. The mentioned facility suited the study well as activities are directly linked to the curriculum, the environment and the local community. According to the website[9] of the Centre their aim is to develop community conservation champions for the environment through learning activities that are linked to the national curriculum**.** The interactive educational programmes ensure that this is achieved in an entertaining and stimulating way. The wide variety of resources and learning support materials used at the JNFWS Environmental Centre ranges from theme rooms, a sensory trail through the garden which allows learners to see, hear, touch, smell and taste, to an underground cave where learners can meet the animals living underground. This aspect of the learning at the Centre intrigued me as the focus of this study is on learning support materials. The wealth of learning resources used varies from the extraordinary as described above, to the mundane, for example worksheets.

[8] For the remainder of this study the Jewish National Fund Walter Sisulu Environmental Centre will be referred to as the JNFWS Environmental Centre.

[9] http://www.wsec.co.za

The exceptional potential for data collection, the application of the curriculum and the ready access to the facilities made this the preferred site for the research. The research site is discussed more comprehensively in chapter four of this thesis.

As a result of the extended pre-amble to identifying and confirming the actual site of the research I did not do a pilot study. As mentioned earlier in this chapter, I learnt by trial and error and explored different options of doing the research as the study progressed. At first, I found this process of going back and forth frustrating, but after much reflection I realised that these events had contributed to the maturity of the questions I intended to ask. I continually refined my research questions, interview questions and the methodology guiding the research as is preferable in the qualitative approach to research. I conclude this section with the following:

"Time ripens all things, no man is born wise" [Miguel de Cervantes]

3.3 Research philosophy and epistemology

The approach used in this research study is of a qualitative nature. I endeavoured to see the world through the eyes of the participants and as revealed in the literature review, I did this in order to gain some understanding of the construction of meaning in environmental education classrooms and the prospects for Freirean critical education. This ties in with what the literature on qualitative research (Silverman 2000; Hammersley 1995; Fraenkl and Wallen 2006) holds regarding the preference of qualitative researchers to make sense of the lives of the people being studied and to attempt to see the world from their point of view. According to Fraenkl and Wallen (2006:429) qualitative research is concerned with researchers taking an in-depth look at a specific situation and a particular set of instructional materials. I therefore deemed it wise to situate this research within the qualitative approach, as the research questions relate to the curriculum, teaching and learning in a defined setting, and the use of learning support materials to develop critical consciousness.

After observing the setting and participants involved in this research, I realised that as a result of the nature of this particular study I would have to move beyond mere

"science" and "just getting the facts", to include the human, political, social, cultural and contextual elements that are involved (Guba and Lincoln 1989:8). I therefore situated my understanding of methodology within the premise that Guba and Lincoln (1989:7) hold, which is that evaluation should not be treated as a technical process of inquiry and a scientific process, because "…to approach evaluation scientifically is to miss completely its fundamentally social, political, and value-orientated character". Freeman *et al*. (2007:25) argue along the same lines when they state that the quick fix for today's educational problems seems to be the assumption that rigorous scientific research will help educationists to re-engineer schools in order to function better. I do not attempt to advocate qualitative research as being better that quantitative research, where more 'scientific' methods are used. I acknowledge the worth of quantitative research, but this study cannot identify with the quantitative inquiry's preoccupation with measuring and quantifying data and claiming to work within a value-free framework. The quantitative researcher's main concern is with product. In contrast the qualitative researcher stresses the value-laden nature of their inquiry and how social experience is created and given meaning (Denzin and Lincoln 2000:8). I argue that for the purpose of this study I am concerned with process as well as product. I am describing how things work and acknowledge that no amount of quantified data or statistical analysis would contribute significantly to the understanding of how learners learn and teachers teach. A narrative with thick rich description of how the participants make sense of their lives is better suited to this particular study.

Denzin and Lincoln (2000:3) warn that when defining qualitative research one cannot ignore the complex historical field from which it developed, as it meant different things at different moments in time. There are however certain generic elements or characteristics of qualitative research with which this study can identify and which serve as motivation for choosing the qualitative approach to research. According to Denzin and Lincoln (2000:3) the following is true of qualitative research:

- it is a situated activity that locates the observer in the world;
- it consists of a set of interpretive, material practices that make the world visible;
- these practices transform the world;
- the practices turn the world into a set of representations;

- it involves an interpretive, naturalistic approach to the world.

These characteristics of qualitative research intrigued me as they suited this study well. Firstly, the JNFWS Environmental Centre which I visited can be regarded as the situated activity that located me as observer and researcher in the world. In this particular setting I was able to observe participants in their daily routine. By listening to and telling their stories I was able to make visible the world of the educators and learners and the learning support materials that they use.

Secondly, if the practices that the researcher makes visible may transform the world, then the use of critical theory, which is the lens through which I as researcher observe the practice, is relevant. As observed later in this chapter the intention of critical theory is to transform the world and the intention of critical pedagogy is to develop the critical consciousness of learners and to empower them to transform their world. Darder (2002: 47-51) argues that if pedagogy is concerned with what happens in classrooms, then critical pedagogy is what happens in classrooms where learners are not only the recipients of knowledge but are active participants.

Thirdly, the interpretive, naturalistic approach can be regarded as the epistemology of this study as it focuses on human beings and their interaction in their actual social settings. Denzin and Lincoln (2000:8) hold that qualitative research is two-fold, i.e. a commitment to some version of the naturalistic, interpretative approach and also an ongoing critique of post-positivism. Positivism or post-positivism is situated within the framework of scientific, objective research. In contrast, the interpretative, natural approach holds that the role of the researcher is never totally objective. I engaged in a critique on post-positivism in the preceding part of this chapter when I declared my subjectivity and continue to give supporting arguments why this study does not engage in so called scientific methods. According to Ely *et al*. (1991:46) naturalistic research allows one to explore those things that arise naturally in social situations. I tried to be involved in the daily routine of the participants by attending meetings and having corridor discussions with educators, learners and visitors to the JNFWS Environmental Centre. I browsed through the Centre, asked questions beyond the research focus and discussed general educational concerns with staff and visitors. I attempted to immerse

myself in the setting and mainly observed, but sometimes also participated in the very mundane tasks of preparing materials or discussing the reasons for buses being late as a result of the bus drivers' strike. This gave me an understanding of the context within which the teaching and learning happened and how unexpected events such as the strike influenced the programme for the day.

Bogdan and Bilken (2006) feel that human behaviour is vastly influenced by particular settings and this is why there was no other way for me to obtain rich data than by paying extended visits to the setting and interacting with participants on a regular basis. This also led me to pay attention to the smallest detail, for instance how learners reacted to different educators presenting the same content, for example their style of presentation, manner and gestures. Because I was interested in how teaching and learning happen at the JNFWS Environmental Centre I tried to find out how the participants think and reason. The interviews and informal conversations with participants gave me the opportunity to place observations within context. I observed that learners and educators not only interact in English, which is the language of instruction at school, but also in their mother-tongue. At times I observed the learners playing games, laughing, singing and dancing. One of the activities involved the learners composing a song and using garden implements as instruments. Within a few minutes we were all, the learners and I, dancing and singing in the Centre's garden. Lincoln and Guba (1985) argue that qualitative methods are invaluable in the naturalistic paradigm, not because researchers within this approach are anti-quantitative but because qualitative methods come more easily to the human-as-instrument. Data was collected in the form of words and not in the form of numbers or statistics. There was no other way for me to capture the joy and exuberance of learners while they danced and sang than with words. No amount of statistics, charts or numbers could adequately portray the experience. I observed, described, explained and interpreted the experiences of the educators and learners within a specific context. McKernan (1993) argues that it is best for the researcher to observe human behaviour in the field, as human behaviour is strongly influenced by aspects of its context, such as social and economic factors.

Furthermore, I chose to position this study within the qualitative approach because this gives me the liberty to work within an approach that is supple and allows for the incorporation of diverse philosophies, theories, research designs and methods (Freeman *et al*. 2007:25). This suited the choice of critical theory as the lens through which I looked at the world. Cohen, Manion & Morrison (2000:180) state that although the use of critical theory in case study research is in an embryonic stage it offers rich potential. Creswell (2000:126) describes the role of the researcher within this approach as one of uncovering the hidden assumptions about how narrative accounts are constructed, read and interpreted. Cohen, Manion & Morrison (2000:28) go further and argue that the purpose of critical theory is not only to try to understand situations and phenomena but to change them; it therefore intends to transform. Adopting to work within the critical theory framework ties in with my research focus which was aimed at understanding how learners can become more critical in environmental education learning.

According to Habermas (as cited in Cohen, Manion & Morrison 2000:30-31) critical theory has its own research methodologies, i.e. ideology critique and action research. Ideology critique can be addressed in four stages through reflective practice and Smythe (as cited in Cohen, Manion & Morrison 2000:30-31) define this process as: description (what am I doing?); information (what does it mean?); confrontation (how did I come to be like this?); and reconstruction (how might I do things differently?). My epistemology was therefore directed towards exposing ideologies as reflected in theory (the curriculum-in-plan) and how the theory is applied (the curriculum-in-practice). The role of the researcher within the qualitative approach is that of reflective practitioner and the above-mentioned stages of reflection were applied in the analysis of the data [see chapter four]. I have however also endeavoured to continually rethink and revise my own practice throughout the research process.

Denzin and Lincoln (2000:2) name case studies as one of the many methods or approaches that fall under the category of qualitative research. Hammersley (1990:209) identifies a case study as follows, “It is concerned, almost exclusively, with displaying as doubtful or puzzling what we previously took for granted, and with the generation of plausible explanations for these puzzling phenomena”. According to

Stake (as cited in Denzin and Lincoln 2000), a case study is not a methodological choice but a choice of what is to be studied. A case study was the most viable option for this research as it is concerned with how learning support materials are used in the environmental education classroom to develop critical consciousness. The extended time span and the nature of the data therefore determined the use of a case study. The data was collected over an extended period of time primarily through observation and interviewing. This ties in well with the choice of an ethnographic case study. Gregory (in Conteh *et al*. 2005) claims that ethnography describes the following: the context of the environment; the group membership (participant or non-participant); the specific social interactions and the product of those interactions – the learning. Yin (1984) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real life context. He also emphasizes that this type of study enables the researcher to ask "how" or 'why" questions, but offers the researcher little control over the actual behavioural events (ibid). The contemporary phenomenon investigated in this study was the teaching and learning of environmental education and the context was situated at the JNFWS Environmental Centre, as discussed earlier in this chapter. The multiple sources of evidence included interview transcripts, observation protocols, learning support materials, descriptions of setting for example the perma- culture garden, description of participants, anecdotes, gestures and more. These were recorded to give a depth to the research which could not be obtained in a quick way.

McKernan (1996:74) adds to the body of knowledge on case study methodology by defining it as follows, "… a case study is a formal collection of evidence presented as an interpretative position of a unique case, and includes discussion of the data collected during fieldwork and written up at the culmination of action, or involvement in the research". The focus of a case study is therefore very narrow and investigates one particular person, site or situation. Once again I argue that the choice to frame this research within an ethnographic case study was appropriate as the criteria set in the above definitions are met in this study.

There are however those who caution against the pitfalls that can occur in case study research. Case studies have been criticised for having certain weaknesses for

example, lacking in rigor and not allowing for generalisation. Yin (1988) has refuted the allegation of lack of rigor by arguing that case studies may even be considered more rigorous than other forms of research because of the multiple data sources used. The case study research inquiry does not make use of a single source of data for example a survey, but works toward a saturation of data by using multiple sources. The claim regarding lack of rigor is not necessarily a weakness as the use of multiple sources of data gave much more depth to the findings of this particular study than a single source of quantitative data would. Cohen, Manion & Morrison (2000:181) support this when they state that, “Case studies can penetrate situations in ways that are not always susceptible to numerical analysis”. A chain of evidence is however necessary to ensure rigor in a qualitative study and evidence of this will be supplied later in this chapter.

The second criticism, that of not allowing for generalisation does not seem a barrier in the ethnographic case study and in this research I did not experience it as such as I was not trying to prove anything. I did not start this study with a hypothesis that I tried to prove true, as is sound practice in quantitative research. I rather posed questions that I sought to gain an understanding of. Freeman *et al*. (2007:29) argue along the same lines when they state that the goal of interpretive research is not to generalise, predict or control, but rather to describe what people do and say within local contexts. It is only as a qualitative study progresses that hypotheses are formulated, dropped, reconsidered and modified (Fraenkl and Wallen 2006:434). If several cases are involved in a study it might be possible to generalise to a certain extent, but I did not find this necessary as I was only studying one case. Generalisation is further discussed in a later section of this chapter.

In preceding sections of this chapter I have at some length discussed the choice of an ethnographic case study situated within the qualitative research approach. I have emphasised that within this approach I cannot eliminate my subjectivity and bias. Furthermore, in light of my epistemological approach and the questions it elicits, I did not measure anything. My purpose was *to gain an understanding of how the teacher and learner negotiate learning in the classroom* and why it is done in this manner. I built my theory on the understanding and experience that I gained and I will now endeavour to supply a chain of evidence of how I got to this understanding.

3.4 Issues of Quality

As mentioned earlier in this study I did not employ the conventional criteria for judging the rigor of the inquiry. Guba and Lincoln (1989:235-236) argue that the conventional criteria of internal validity, external validity and objectivity are only applicable for inquiries within the positivist paradigm and are not suitable for constructivist, responsive approaches. It was important to consider different measures to check for quality in this study, as I was not trying to prove scientific facts as is the case in the positivist approach. I wrote a narrative of a set of arguments that I tried to elucidate. I used parallel criteria, i.e. authenticity criteria offered by Guba and Lincoln (1989) to build the quality of this study and I now proceed to discuss these criteria:

3.4.1 Credibility

Cohen, Manion and Morrison (2000:107) describe internal validity simply by saying that the findings of the study must accurately describe the phenomena being researched. Several scholars, LeCompte and Preissle (1993); Lincoln and Guba (1995) and Denzin and Lincoln (2000) give alternative options for accommodating internal validity in an ethnographic case study. According to Guba & Lincoln (1989:236-237) the credibility criterion is parallel to internal validity in that, "… the idea of isomorphism[10] between findings and an objective reality is replaced by isomorphism between constructed realities of respondents and the reconstructions attributed to them". In other words credibility is the assessment of the degree of isomorphism between a study's findings and the real world. Within the ontological approach that I am working, reality only exists in a mentally constructed form. Reality exists in different forms in different minds; therefore reality differs according to how people perceive circumstances, which in turns influences their life history (Guba & Lincoln 1989:237). In addition to this, people come from different value systems which influence their perceptions (ibid).

[10] Isomorphism is a one-to-one correspondence between the elements of two or more sets (Hofstadter, D.R. 1979. *Gödel, Escher, Bach: an eternal golden braid.* Sussex: The Harvester Press p.49).

When working towards building the credibility of a research inquiry the focus is upon establishing the match between constructed realities of the participants and those realities as represented by the researcher and attributed to the participants (Guba & Lincoln 1989:237). LeCompte and Preissle (1993); Lincoln and Guba (1995); Denzin and Lincoln (2000) as well as Guba & Lincoln (1989) offer wide ranging techniques to address credibility. For this study I have chosen the following techniques from the combined literature mentioned above:

Firstly, prolonged engagement in the field is necessary for the researcher and the participants to build rapport. Hours were spent observing and just being present on the site. In this way rapport was built with participants and they started acting more naturally as they came to understand that I was there to make meaning of their activities and not to pass judgement. Oakley (as cited in Lincoln and Denzin 2003) defines “rapport” in this context as the participants in the research accepting the research goals and working with the researcher to supply the information needed to reach these goals. I did however guard against getting overly sympathetic and involved in the lives of the participants.

Secondly, persistent observation was done of learning activities. I observed four different educators present the same learning activity to four different groups of Intermediate Phase classes over a period of four consecutive days. I then observed another six hours of several educators presenting different learning activities for grade six learners. All the learning activities were within the theme *Biodiversity*. I did this to add depth to the scope that the prolonged engagement offered.

Thirdly, peer debriefing involved the extended and extensive discussions of my findings, research instruments, data analysis and writing of the report with my supervisors, other researchers and impartial colleagues on a continual basis to ensure that my interpretation of the data was trustworthy. The role of a peer reviewer is not only to provide support but also to challenge assumptions and interpretations made by the researcher and to play devil’s advocate (Lincoln & Guba as cited in Creswell & Miller 2000:129).

Fourthly, as discussed in a prior section of this chapter, no inquirer engages in an inquiry with a blank mind. I started this study with ideas in mind. I had hunches and pre-conceptions. I did not start working with a hypothesis, but I did expect to find certain tendencies. As explained in chapter one of this thesis, I suspected that educators might still be teaching in much the same way as they did in the previous educational dispensation. Denzin (1994:249) holds that even if the researcher's participation is limited to listening and taking notes, the role of the researcher is never neutral. The pre-knowledge of the researcher can act as a screen from seeing reality. With this in mind I found myself continually reviewing my role as researcher. Ely *et al*. (1991) state that there are varying degrees of participation, ranging from full participation to mute observation. My role was situated between active participant observer and that of passive or limited observer. I never presented learning activities or interfered in the progress of the activities. If asked to assist with something I gladly helped, otherwise I sat unobtrusively observing the events. If learners asked me for answers or assistance with their work I referred them to the educators. At other times I would join in the singing and dancing with learners as mentioned earlier in this chapter. In a meeting I would consult with the chairperson before offering a view.

My identity, which includes my being a white, middle class female, shaped the way in which I did research, for example how I selected questions. In this instance subjectivity is not a bias because I cannot step out of race, gender or socio-economic stance. All I need do is to think about how I influenced the research process and declare that, as I have done in chapter four of this thesis.

I also made use of member checking to ensure that I reflected the participant's view as accurately as possible. Member checking is described by Lincoln and Guba (as cited in Creswell & Miller 2000:127) as "the most crucial technique for establishing credibility". I took the data and interpretations back to the participants so that they could check on the credibility of the information. In this phase I was however particularly alert to the possibility that members might censor their own testimony. Feedback could be incorporated into the final narrative but no changes to the original testimony were accommodated.

I further established credibility of the study by describing the setting, the participants and the themes in great detail in this chapter and in chapter four of this thesis.

3.4.2 Transferability

Guba and Lincoln (1989:241) use transferability as a parallel to external validity or generalisability and go further by saying that while proof of generalisability is on the inquirer, proof for claimed transferability is on the receiver. The major technique for establishing transferability is thick rich description. Gregory (in Conteh *et al*. 2005) and Guba & Lincoln (1989) attribute the term 'thick description' to anthropologist Gilbert Ryle and its elaboration to Clifford Geertz (1973). Thick rich description reflects the depth of the description of the phenomena being observed. Denzin and Lincoln (2000:439) refer to thick description as the case's own issues, contexts and interpretations. As a researcher I can take the experiences of the participants in my study and elucidate their more general meanings, but I need not generalise these experiences. Levi-Strauss (1963:16-17) remarks as follows in this regard, "all that the historian or ethnographer can do, and all that we can expect of them, is to enlarge a specific experience to the dimensions of a more general one". The findings of this case study cannot be generalised to the larger population of South Africa. However generalisation can be an unconscious process for both researcher and reader (Denzin and Lincoln 2000:442). I therefore leave it to my reader to decide what can be applied to individual situations.

3.4.3 Dependability

Guba and Lincoln (1989:242) offer dependability as a parallel to reliability, in that it is concerned with the stability of the data over time. If reliability is concerned with consistency, then the same test or measurement should lead to the same result in similar conditions or by another researcher. In an ethnographic case study where there is no testing or measurement, instability of data can occur because researchers are tired, bored or under considerable psychological stress from the intensity of the process (Guba and Lincoln 1989:242).

As mentioned at the beginning of this chapter, the nature of the data and the research site determined my shift from conventional criteria for ensuring the merit of the study to the use of parallel criteria instead. Guba and Lincoln (1989:242) argue that whereas methodological changes are undesirable in positivist studies, it can be viewed as a sign of maturity in a study of this nature. It is however essential to document the logic of process and method decision, which is the dependability audit.

3.4.4 Conformability

Guba and Lincoln (1989:242-243) rate conformability as parallel to the conventional criterion of objectivity and state that conformability is similar to objectivity in that it shows that the data, interpretations and outcomes of the inquiry are not figments of the researcher's imagination. Freeman *et al*. (2007:26) refer to the account of practice, which is the systematic and careful documentation of all procedures to provide a record for the researcher's ongoing reflection and for peer review. This means that both the raw products, and the processes used to compress them are available and that data can be traced to original sources (Guba and Lincoln 1989:243). It is for this reason that the interview transcripts, worksheets and planning of learning activity as well as excerpts from the NCS documents are included in the Addendum of this thesis.

Freeman *et al*. (2007:27) argue that in qualitative research, data such as mentioned in the foregoing paragraph are produced from social interactions and is therefore constructions of interactions (Freeman *et al*. 2007:27). "Data analysis leads to a *reconstruction* of those constructions" (Lincoln and Guba 1985:132). Qualitative data has therefore already been interpreted by the participants when they answer questions. Lincoln and Guba (1985:132) advocate that a researcher should follow a hermeneutic, dialectic process of data collection and evaluation to ensure the authenticity of the study. My understanding of this process is that hermeneutic refers to the fact that the researcher should bear in mind that he/she is interpreting an interpretation and that the dialectic refers to the dialogue between the researcher and the respondent which goes both ways. The authenticity of the study can further be advanced by the researcher acknowledging that in the qualitative research approach it is impossible to eliminate bias and subjectivity. In ethnographic study it is recognised that the researcher can

never be divorced from the world that is studied. Gregory (in Conteh 2005: xxi) reiterates this by saying that in ethnographic research the researcher both changes the situation that is being studied and is changed by it. At times I felt an outsider while collecting data in the sense that I could not interfere in the learning activities. In some learning activities, for instance, I realised that the educator was making mistakes but I could only observe and record it, I could not intervene in any way. At other times I felt much the insider when I participated in the singing and dancing with learners**.** I was, however, observing and reflecting at all times. Denzin (1994:249) remarks that we cannot study the social world without being part of it, even if such participation involves only listening and taking notes.

3.5 Data collection methods

3.5.1 Reflection on documents

The National Curriculum Statement for the Intermediate Phase was analysed for mention of 'environmental education', the 'Environment', 'critical consciousness' and the learning support materials.

The worksheets, the planning of the learning activity and other learning support materials used in the learning activities that were observed were analysed to ascertain if these materials contributed to the promotion of critical consciousness in the learning activity.

3.5.2 Personal interviews and tape recordings

A semi-structured interview was used to interview the principal of the JNFWS Environmental Centre. This was done in order to gain rich primary data from the Principal who is a curriculum specialist. The principal of the mentioned environmental centre plans and designs the learning outcomes according to the NCS. She trains volunteers from the community who work at the centre on a regular basis, and are paid for their services, to present the learning activities. The principal is a qualified educator and is in the service of the Department of Education. She attends meetings at the

Department of Education but works full time at the mentioned Centre. She is a specialist on curriculum development and implementation. Secondly a focus group interview was held with the educators after they presented the learning activities (lessons) that I observed. The interviews have all been transcribed and are included in an addendum to this study. The questions that I asked served to elucidate my research questions.

3.5.3 Site visits, observations and field notes

I observed approximately twenty-two hours of learning activities (lessons). My focus was on Intermediate Phase learners for two reasons, firstly, the characteristics of Intermediate Phase learners suited the purpose of the study and secondly these were the learners that were visiting the JNFWS Environmental Centre during the weeks that I was doing my fieldwork. According to Loubser (1996:60-62) learners in the age group nine to twelve years enjoy games; they learn best in an interactive manner; they are keen to participate and enjoy taking decisions; they understand the concept of working in a group and they start to understand the nature of societal requirements and responsibilities. I continued observing learners' activities for several days after I had obtained the primary data. I continued until I felt that I had obtained saturation of data that would illuminate the use of learning support materials in environmental education learning activities for Intermediate Phase learners.

3.5.4 Discussion meetings

At this stage in the data collection process I attended one discussion meeting with the principal, educators, volunteers and other staff of the JNFWS Environmental Centre. I was invited to participate in the meeting and found it gave me insight into the context within which the research was done.

3.6 Analysis of data

After the field study I started off by reading through all the raw data that I collected by means of interviews and observation protocols. In particular, inconsistencies were

interrogated for the hidden assumptions and ideologies that they reveal. The interviews that were recorded were transcribed. The transcriptions include everything said by the interviewer and the interviewees.

I also made field notes during the recording of the interviews to make the study more ethnographic. The data that have been obtained from the interviews and the observations were critically re-read so that leading words could be identified and marked in order to obtain codes. This enabled me to identify emerging patterns or trends. The data were integrated into an in-depth analytic coherent narrative.

3.7 Ethical issues

Guba and Lincoln (1989:10-11) insist that it is incumbent for the researcher to interact with the participants in the research in a manner which respects their dignity, integrity and privacy. The following measures were therefore taken to protect the respondents in the research:

3.7.1 Informed consent

Informed consent was obtained from the participants involved. The mentioned respondents have democratic rights to freedom and self determination and were therefore made aware of these rights and knew that their participation was voluntary and could be ended by them at any time during the research process. I agree with Conteh *et al*. (2005:101) that it was not possible or desirable in this specific study to guarantee the anonymity of participants as would be the case in a quantitative study. The JNFWS Environmental Centre by mouth of its principal did not desire to be anonymous, but I undertook to refer to the educators by using pseudonyms e.g. Mary, Jo, Sibu and Neo thus protecting their identity.

3.7.2 Access and acceptance

Researchers cannot assume access to facilities as a right. They have to demonstrate their good intentions, trustworthiness and present their credentials to the facility. The

initial meeting with the principal of the JNFWS Environmental Centre was followed up by written confirmation. It was important that the staff at the Centre perceived me, as the researcher, as being competent, trustworthy and accommodating. To this end I was well prepared regarding the presentation of my proposed research and took study leave while gathering the data so that I could accommodate the Centre whenever it suited them to receive me.

3.7.3 Personal code of ethical practice

Creswell (2003:63-64) mentions that the researcher should anticipate ethical issues with regard to: research problem statement, purpose statement, research questions, data collection, data analysis and interpretation, as well as writing and disseminating the research. Although I took the necessary precautions to avoid compromising myself or the respondents in any of the above aspects of my research, I soon realised that ethical issues that I have not foreseen emerged at the initial stages of the research. When these unforeseen ethical dilemmas arose at the previous research site, as discussed in paragraph 3.2.2 of this chapter, I consulted the then Dean of the Faculty of Education and my supervisors. Bearing in mind that I had stated in the letter of approval presented to the participants that they could withdraw from the research at any time, I felt morally obligated to abandon the site.

The University of Pretoria has a stringent ethical policy and researchers have to submit a set of prescribed documents to the Ethical Committee before embarking on any research project. I obtained the ethical clearance certificate in January 2008 and negotiations were initiated with the participants in the research.

3.8 Constraints of the study

When I started the study I anticipated that participants might not be willing to co-operate because they might feel vulnerable in exposing their practice. I continually assured them that the purpose of my study was not to expose practice but to learn and understand practice. As revealed in chapter four of this study, only one educator, who incidentally was not coping with the facilitation of the learning activity, queried my

presence. I was however able to motivate my presence in the class and she agreed to and accepted my reasons. When lessons are observed or educators are interviewed it may be perceived as artificial circumstances. Because teaching and learning imply a set of relations, someone else in the class may change these relations. People under observation or study do not behave naturally and this may affect the data. Conteh (2005: xi) postulates that the very presence of researcher makes participants act unnaturally. Window dressing can therefore also be regarded as a limitation of this study. I countered these interferences by building rapport with the educators, ensuring them that they should not see me or the research results as a threat but an attempt to give a credible account of how critical education informs the sociology of learning in environmental education in the South African context. During the observation of the learning activities one of the educators walked over to me and the teacher from the school and asked us why we were in her class and why we did not go to one of the other classes. The teacher explained that she must remain with her class as she had to complete the assessment form with regard to the learning activity (lesson). She also mentioned that I was doing research and that I had already observed the other three educators so I could not leave either. In learning activities (lessons) one, two and three the educators did not seem self conscious with regard to my presence at all. The learners in all four learning activities (lessons) also seemed to accept my presence. Learners often looked up and smiled at me or showed me the thumbs- up sign. One girl put her hand to my face when they walked out of class and smiled. The learners were very friendly. They would often ask me to assist them and I would refer them to the educator or their teacher from school who was always present in the class.

I did not implement any explicit interventions in the learning situations whilst conducting the research. It is not possible and certainly not desirable to force Freirean ideals regarding pedagogy on educators or learners. I can only hope that the study will raise the critical consciousness of all involved in the research and beyond.

3.9 Summary

The preceding narrative revealed that the purpose of this chapter was to facilitate means by which the research questions of this study could be explored. I described my role in the research as being that of a “bricoleur” or “Jack of all trades” which according to Levi-Strauss (1963:17) is a kind of professional do-it-yourself person. I motivated my methodological choices and gave an indication of the worth of a qualitative approach to this research. The merits and suitability of ethnographic research, where the conventional criteria of objectivity, validity, reliability and generalisability need to be transformed into judgements about subjectivity, authenticity and trustworthiness were revealed.

I elucidated my role in the research process and revealed that I did not engage in this inquiry with a blank mind. I started this study with ideas in mind. I had hunches and pre-conceptions. I did not start working with a hypothesis, but I did expect to find certain tendencies. As explained in chapter one of this thesis, I suspected that educators might still be teaching in much the same way as they did in the previous educational dispensation. The focus of a case study is therefore very narrow and investigated one particular site and situation.

I also described my ethical dilemmas and the realisation that research is not a linear progression of events or activities. It was by trial and error that I discovered that research is a rather ‘messy’ process that requires continuous reflection and adaptation.

CHAPTER 4
REFLECTIONS

4.1 Introduction

In the preceding chapters of this thesis I introduced and contextualised key tenets of the inquiry and gave an indication of the methodology and epistemology of the study. In this chapter, titled *Reflections*, I will reflect on the curriculum and the data that I gathered. I am reflecting on these aspects so that I can gain an understanding of how the teacher and learners negotiate learning in the environmental education classroom. As stated in chapter one of this study the purpose of my research is to enrich my understanding of what happens in South African environmental education classrooms especially with regard to the construction of meaning and the prospects for Freirean critical education. I furthermore set myself the goal of exploring and describing the extent to which critical consciousness is facilitated by the use of learning support materials in environmental education.

The premise of this study is not to measure anything or to find solutions for problems. I did not set out to prove anything. In this chapter I narrate the world through the eyes of the participants in this research. I am the narrator of a story and I describe, explain and interpret the experiences of the educators and learners at the JNFWS Environmental Centre. I reiterate my stance as stated in chapter three of this study, i.e. this thesis is essentially a descriptive, interpretive narrative on what policy and practice look like and how policy and practice relate within the context in which I worked and conducted the research.

The first section of this chapter concerns curricular reflections. After I analysed the curriculum I gave an indication of how this served to elucidate the first critical question that I posed at the end of the literature review. I then proceeded to discuss the findings pertaining to critical question one. In the second section of chapter four (4.3 Empirical reflections) I turned my attention to empirical reflections. In the methodology chapter of this study I proposed to collect data at the JNFWS Environmental Centre site by means

of observations, interviews and field notes. I used this data to elucidate critical question two and three of my study. In each instance (question two and question three) I analysed the data and then discussed the findings pertaining to each question. In the analysis of the data I read and re-read the transcriptions of the interviews and observation protocols in order to obtain codes or indicators. This enabled me to identify emerging patterns or trends. I used my research questions to guide me in determining these indicators. I also gave an indication of how I would know if the data reflected these indicators. Each section starts by stating the critical question and related indicators and then the data used, i.e. the curriculum, the observation protocols, the transcriptions and/ or field notes to gain an understanding of how theory and practice relate. The language used in much of the discussion on the curriculum is within the lexicon of OBE as this is the predominant discourse within which the curriculum is situated.

4.2 Curricular reflections

I used the NCS as a data source to gain an understanding of critical question one. I analysed the NCS for the Intermediate Phase, as all the learners that I observed were in grade five.

4.2.1 Critical question 1

- "Does critical consciousness manifest itself in the curriculum document with specific reference to the role of learning support materials and environmental education?"

One indicator was used to elucidate question one. I used the indicator to guide my understanding of the influence that a curriculum can have on the transmission of knowledge in the classroom. Hoadley & Jansen (2002:27) postulate that a national curriculum outlines a nation's educational priorities and it shapes the boundaries of teaching, i.e. it determines what is possible in a classroom. A curriculum does not only outline a nation's educational priorities but also outlines the ideologies of education that underlie it.

Indicator 1: the way in which the curriculum prescribes learning can influence the way in which the transmission of knowledge happens in classrooms.

I analysed the curriculum to gain an understanding of how learning is prescribed in the curriculum and if any room is allowed for teachers and learners to negotiate learning in the classroom to suit their particular needs. I also did the analysis of the curriculum to gain an understanding of the context within which the planning and presentation of the learning activities (lessons) that I observed at the JNFWS Environmental Centre are situated.

4.2.2 Analysis of the NCS

I briefly analysed the broad curriculum statement and other foundational documents to ascertain how 'curriculum' is defined in the NCS and if the environment features in the mentioned documents.

4.2.2.1 How is 'curriculum' defined in the NCS and what relevance is afforded to the environment

'Curriculum' is defined as follows in the Preface to the *Revised National Curriculum Statement Grades R-9 (Schools)*[11] (DOE 2003a:1):

"At its broadest level, our education system and its curriculum express our idea of ourselves as a society and our vision as to how we see the new form of society being realised through our children and learners. Through its selection of what is to be in the curriculum, it represents our priorities and assumptions of what constitutes a 'good education' at its deepest level. This curriculum is written by South Africans for South Africans who hold dear the principles and practices of democracy. It encapsulates our vision of teachers and learners who are knowledgeable and multi-faceted, sensitive to

[11] The National Curriculum Statement has been in a process of revision since 2001 and although the revision has ended the policy documents for grades R-9 are still referred to as the RNCS, i.e. the Revised National Curriculum Statement.

environmental issues and able to respond to and act upon the many challenges that will still confront South Africa in this twenty first century."

In the overview to the NCS it is stated that the Constitution of the Republic of South Africa (Republic of South Africa1996) provides the basis for curriculum development and transformation in South Africa (DOE 1993a:6). One of the principles of the NCS reads as follows, "The curriculum can play a vital role in creating awareness of the relationship between human rights, a healthy **environment**[12], social justice and inclusivity. The *Revised National Curriculum Statement* has tried to ensure that all Learning Area Statements reflect the principles and practices of social justice, respect for the **environment**[13] and human rights as defined in the Constitution" (Department of Education 2003a:10).

Reference to the environment is also made in other foundational documents pertaining to South African education, for example in the *Manifesto on Values, Education and Democracy* (Department of Education: 2001), ten fundamental values of the Constitution and 16 strategies for familiarising young South Africans with the values of the Constitution are defined. One of these strategies refers specifically to the environment, i.e. ***promoting ethics and the environment.***

4.2.2.2 'Critical consciousness, 'environmental education' and 'learning support materials' in the NCS

In the preceding section I have indicated how 'curriculum' is defined in the NCS as well as the relevance afforded to the environment in the broad curriculum statement and other foundational documents. I have also outlined how the broad curriculum documents and other foundational documents refer to the importance of environmental matters in education. In the following section I will give an indication of how or if the

[12] Emphasis my own.

[13] Emphasis my own.

learning area statements and learning outcomes as defined for the Intermediate Phase in the NCS refer to the key concepts of this study, i.e. 'critical consciousness', 'environmental education' or 'environment' and 'learning support materials'. I only indicate explicit reference to the mentioned concepts. Environmental educationists might feel that I have missed embedded reference to environmental matters, but these implicit references fall outside the scope of this study.

Learning area statements and learning outcomes

The critical and developmental outcomes apply to all learning areas in the NCS and describe the kind of learners and citizens that the education system envisages. In the critical outcomes one of the principles is to envisage learners who will be able to, "use Science and Technology effectively and critically showing responsibility towards the **environment**[14] and the health of others" (Department of Education 2003a:11).

The learning outcomes which are derived from the critical and developmental outcomes describe the knowledge, skills and attitudes that learners should know, demonstrate and be able to do at the end of the General Education and Training band (Department of Education 2003a:14).

I found mention of 'critical consciousness', 'environmental education' and 'learning support materials' in the following learning areas statements and learning outcomes:

Natural Sciences

In the learning area, *Natural Sciences*, learning outcome 3 (Science, Society and the Environment) states that, "Learners are able to demonstrate an understanding of the interrelationships between Science and Technology, society and the **environment**"[15] (Department of Education 2003a:23).

[14] Emphasis my own.

[15] Emphasis my own.

Social Sciences

In the learning area, *Social Sciences*, the following learning outcomes are listed under *Geography* (Department of Education2003a:23): Learning outcome 1 (Geographical Enquiry), "The learner is able to use enquiry skills to investigate geographical and **environmental**[16] concepts and processes"; learning outcome 2 (Geographical Knowledge and Understanding), "The learner is able to demonstrate geographical and **environmental**[17] knowledge and understanding" and learning outcome 3 (Exploring issues), "The learner is able to make informed decisions about social and **environmental**[18] issues and problems".

Life Orientation

In the learning area, *Life Orientation*, learning outcome 1 (Health Promotion) states that, "the learner is able to make informed decisions regarding personal, community and **environmental**[19] health" (Department of Education 2003a:26).

Technology

In the learning area, *Technology,* learning outcome 3 (Technology, Society and Environment) states that, "The learner is able to demonstrate an understanding of the interrelationships between Science, Technology, Society and the **environment** [20]over time" (Department of Education 2003a: 28).

[16] Emphasis my own.

[17] Emphasis my own.

[18] Emphasis my own.

[19] Emphasis my own.

[20] Emphasis my own.

After analysing the learning areas and learning are statements I realised that there was no mention of LSMs. I turned my attention to the teacher's guide for each learning area included in the curriculum statement and found the following:

Teacher's guide for the Development of Learning Programmes

I found no explicit mention of LSMs in the above mentioned documents. I did however find extensive reference to LSMs in the *Revised National Curriculum Statement Grades R-9 (Schools): Teacher's Guide for the Development of Learning Programmes* (Department of Education 2003e). Each learning area in the RNCS (R-9) has a section that gives a detailed account of the LSMs to be used in that particular learning area. In the *Teacher's Guide for the Development of Learning Programmes,* LSMs are referred to as LTSMs (learning and teaching support materials). The section for LSTMs is not the same for each learning area but there are generic principles that are applicable to all learning areas. I will briefly mention the aspects that are relevant to this study. The importance of LSMs are emphasised in the learning area *Technology* as follows[21], "Learning and Teaching Support materials have a very important role to play in the learning of Technology. They provide the medium through which teaching and learning happens at school. Without any form of Learning and Teaching Support Materials in the classroom, not much learning can take place" (Department of Education 2003e:51). Furthermore, I found mention in the same section of the above-mentioned document of learners having to work with tools to solve identified problems and developing knowledge, skills and attitudes (ibid). The following statement also relates to this study, "LSMs provide opportunities for learners to relate what is learned in the classroom with the outside world" (ibid). In the section pertaining to the learning area *Life Orientation*, mention is also made of the role of the teacher in developing LSMs for specific activity outcomes, thus ensuring that the direct needs of a particular learner or group of learners are taken into consideration (Department of Education 2003e:43).

[21] The *Revised National Curriculum Statement Grades R-0 ((Schools): Teacher's guide for the development of learning programmes* for the learning areas, Technology, Social Sciences, Natural Sciences and Life Orientation are included in the addendum for the reader's perusal.

4.2.3 Critical question one: findings

In the preamble to question one I referred to Hoadley & Jansen who argue that the curriculum shapes the boundaries of teaching and determines what is possible in classrooms. It is for this purpose that I analysed the curriculum and found the following:

One, the NCS declares that the vision of South African society is that our children and learners need to be agents of change to transform society. This is consistent with critical education.

Two, the NCS envisages educators who contribute to the transformation of education at all levels and are qualified, dedicated and caring and who will fulfil the various roles as set out in the *Norms and Standards for Educators* (Department of Education: 2000).

Three, I found that the NCS envisages teachers and learners that are sensitive to environmental issues.

Four, one of the sixteen strategies for familiarising the youth with the Constitution of South Africa is, *Promoting ethics and the environment*.

Five, in the critical outcomes of the NCS learners are envisaged that are able to 'effectively and critically show responsibility towards the environment'.

Six, in four of the eight learning areas for the Intermediate Phase, i.e. Natural Sciences, Social Sciences, Life Orientation and Technology, explicit reference is made to the environment. In the other learning areas the environment is implied but not mentioned explicitly.

Seven, I found no explicit reference to 'critical consciousness' in the NCS, but the attainment of knowledge, skills and attitudes by learners was emphasised. If the attainment of knowledge, skills and especially attitudes are facilitated by a skilled educator and are premised on critical education the learners can be empowered. This does however depend on the educator.

Eight, the Department of Education (ibid) further states that the educator is allowed space to select knowledge and concepts that are relevant to the treatment of local issues, problems and interest of learners in that 30% of the knowledge and concepts prescribed is unspecified.

Nine, the NCS does give the educator some freedom in the choice of topics and issues that are relevant to the world of the learner.

Ten, the Department of Education (2003:41) further suggests that educators look through all the statements of core knowledge and concepts and that they select those that fit together and come up with a topic that embraces all the selected statements, e.g. the context "energy flow" might include food production by plants, food consumption by animals (Life and Living), energy sources and energy transfers (Energy and Change) etc.

I will proceed to investigate if this freedom was used in the application of the curriculum in practice at the JNFWS Environmental Centre.

4.3 Empirical reflections

The empirical work for this case study was done at the JNFWS Environmental Centre in Mamelodi, Tshwane. At the Centre I observed how learning support materials were used in lessons[22] to enable me to gain an understanding of the following question:

4.3.1 Critical question 2

"How do educators interpret and apply the curriculum with regard to learning support materials?"

Two indicators were used to elucidate question two. Firstly, I looked at the lesson planning as well as the nature of the LSMs, to determine the appropriateness for Intermediate Phase learners. Secondly, I analysed how the presentation skills, subject knowledge and facilitation of the LSMs by individual educators influenced the attainment of the learning outcomes as specified in the lesson planning.

[22] In the narrative that describes the learning activities that I observed I have chosen to use the term "lesson" so that the reader is able to distinguish between individual learning activities e.g. games and worksheets that formed part of the comprehensive learning activity (lesson).

Indicator 1: The way in which educators interpret and apply the curriculum with regard to learning support materials can influence the learning in a positive or negative way.

Indicator one implies that if the learning support materials selected for a lesson are appropriate and relevant for the target group they should facilitate the attainment of the learning outcomes. Heinich *et al*. (1996:36) state the following, "If instructional media are to be used effectively, there must be a match between the characteristics of the learner and the content of the lesson's methods, media, and materials". In terms of my understanding of learning support materials (LSM's), as described in chapter two of this thesis, the media and materials used in the above statement are synonyms for LSMs. Firstly, I took the developmental characteristics of Intermediate Phase learners into consideration to enable me to infer if the selected LSMs were appropriate. Secondly, I analysed the lesson planning to see how the curriculum was applied in the planning and if the LSMs were used to promote the learners' knowledge, skills and attitudes toward critical education.

Appropriateness of LSMs for the target group

The Intermediate Phase learners (grades 4, 5 and 6), selected for this study fall within the age group 8-14. The learning activities that I observed were planned and presented to grade fives. This would include an age range of 11-12 year olds. Learners in the Intermediate Phase are generally energetic, curious to learn, often self conscious and are prone to be reliant on peer pressure. Learners in this phase love to share ideas with the educator and peers. They enjoy active learning and prefer to contribute to the learning in an interactive manner (Loubser 1996:61). Educators should also refer to tangible objects to facilitate learning and learning should progress systematically towards abstract thinking. Learners in this phase are good at using written and spoken language to express ideas. With reference to the role of the learner as defined in the NCS and discussed in a previous section of this chapter, the learners are expected to develop respect for the environment in this learning activity.

In section three of the *Teacher's Guide for the Development of Learning Programmes,* the Department of Education envisages the Intermediate Phase learner[23] as follows (Department of Education 2003e:43),

The learners are:

- Becoming more sensitive to how their actions affect others;
- Beginning to consider the needs, desires and points of view of others;
- Able to function co-operatively in the completion of group tasks with increasing ease;
- Enjoying the challenge of tackling independent tasks;
- Beginning to reveal the desire to take control of their own learning;
- Attempting to satisfy their curiosity about the world around them through active participation and critical enquiry in the learning process;
- Beginning to seek more order, while manifesting spontaneity and creativity;
- Becoming more deliberate and methodical in their approach;
- Increasingly able to apply acquired methods in new contexts;
- Increasingly able to access, record and manipulate information and
- Increasingly able to investigate, compare and assess information critically.

The LSM's for the lessons at the JNFWS Environmental Centre included two worksheets (refer to addendum); a white board and pens; six sets of tins; four cards with pictures of the sun, plants, a cow and humans; fifteen cards with grass, grasshoppers, frogs and an eagle; a video as well as all the materials to make a cardboard flower. The perma culture garden was also used and several games were played outside enabling learners to observe nature. The different classrooms were decorated according to different themes, e.g. *the Biodiversity Room; Waste Room* and the *Water Wise Room.* These rooms and the garden can also be regarded as LSMs, but will not be included in the discussion as this falls outside the scope of this study.

I will now analyse the planning of the learning activity to see how the curriculum was applied in the planning and if the LSMs were used to promote knowledge, skills and

[23] In the section on the findings of critical question two, later in this chapter, I will reflect on the wisdom of using set criteria for all Intermediate Phase learners.

attitudes towards critical education. The indicator used to elucidate critical question two of this study stated that the planning of the learning outcomes and the interpretation of the curriculum in the planning can influence the learning.

The lesson planning

I received the lesson planning from the Principal of the Centre where the research was done.[24] The target group for the lessons were grade five learners and the topic was *Interrelatedness.* The learning area *Natural Science* and learning outcome 2, i.e. "The learner will be able to know and interpret and apply scientific, technological and environmental knowledge", are appropriate for grade fives according to the curriculum. The learning area *Natural Science* was also integrated with the learning area *Arts and Culture* in that the learners created a flower and grew a seed. The assessment standards are: "Learner will be able to categorise animals according to their feeding habits: carnivores, herbivores, omnivores" and "Learners will be able to demonstrate understanding of how flowers are pollinated". These are refined learning outcomes and are likewise appropriate.

The critical and developmental outcomes for the lesson were more generic, and related to environmental education, i.e. "Use science and technology effectively and critically, showing responsibility towards the environment and health of others" and "To participate as responsible citizens in the life of local, national and global communities". The lesson planning was detailed and the teaching strategy was direct instruction and was indicated as *Tuning in* (the introduction to the lesson), while the learner activities give a clear indication of LSMs to be used.

The planning of the learning activity stated that the core knowledge that learners must gain relates to the theme "Life and Living" within the context "Healthy Environment". With regard to interactions in environments the learners were expected to gain the following knowledge:

[24] Consult the Addendum to view the lesson planning.

Firstly, “Animals cannot make their own food, and so some animals eat plants for food while some animals eat other animals. All animals ultimately depend on green plants for food” and secondly, “Ecosystems are self contained areas where a wide variety of plant and animal species live and reproduce. They depend on each other and the non-living environment. The life and reproduction of all the organisms in an ecosystem depend on the continuing growth and reproduction of plants”.

The knowledge activities included the “tuning in” (introductory) sessions where the educators facilitated the learning of, “What is Biodiversity”, “Flow of energy from the sun” and “Why flowers are important?” Worksheet two had one section that involved the recall of rote learning. The application of knowledge, i.e. the skills section of the learning required learners to apply knowledge by playing the “Food pyramid game” (tin game), the “Herbivore and carnivore” game, the “Pollination game” and worksheets one and two.[25] The third level of outcomes, namely the forming of attitudes was addressed in the critical and developmental outcomes that stated the following, “Use science and technology effectively and critically, showing responsibility towards the environment and health of others” and “To participate as responsible citizens in the life of local, national and global communities”.

In my field notes I made a note at one of the meetings that I attended that the Principal of the Centre continually reminded educators that they should apply Bloom’s taxonomy in their teaching. Although I juxtapose Bloom’s taxonomy and critical education in the findings for critical question two in section 4.3.1.1 of this chapter, I will now proceed to analyse the worksheets used in the lessons according to Bloom’s taxonomy because this is the way in which cognitive development is graded in outcomes-based education. I am therefore using Bloom’s taxonomy to analyse the worksheets because this is the approach that is favoured by the NCS and therefore applied at the JNFWS Environmental Centre. The Principal of the Centre emphasised that learners must gain knowledge, apply knowledge and develop a positive attitude towards the environment as prescribed in the curriculum. The preceding section indicated how these three levels, i.e. Head (knowledge), Hands (skills) and Hear (attitudes) were all present in

[25] A detailed discussion of the various games is offered in the next section of this chapter.

the planning. According to Van der Horst & McDonald (1997:37-38), Bloom's taxonomy has the following six levels of cognition:

Level one (Knowledge) involves recall of facts and rote learning.
Level two (Comprehension) requires the learner to understand the knowledge acquired on level one.
Level three (Application) refers to the ability to use information in new situations.
Level four (Analysis) refers to the ability to break down a whole into its component parts. On this level there is only one correct answer, although learners may use different methods to get to the answer.
Level 5 (Synthesis) refers to the ability that learners should have to create or compose something by putting together elements to form a new whole.
Level 6 (Evaluation) requires the learner to make a value judgement based on universal and personal values and beliefs.

I will now analyse the planned worksheets to see if they were developed on the levels of cognition according to Bloom's taxonomy:

Worksheet 1

The food chain had to be completed using pictures from the garden. The activity was on level two of Bloom's taxonomy as learners had to understand the food chain to be able to complete the activity. The learners were not expected to apply critical thinking and this activity can therefore not be rated as higher order cognitive thinking. The last link in the chain indicated on worksheet one, does however ask learners for their own contribution and this activity can therefore be classified as application.

Worksheet 2

In this worksheet the learners were instructed to look at flowers and then answer the following questions: "How does it attract insects?"; "How many colours do you count?"; "Which colour do you see the most?"; "Which product sells[26] the flowers?" These questions are all on level one, i.e. the knowledge level of Bloom's taxonomy. The

[26] This is a direct quote from the worksheet hence the unfamiliar language usage.

learners need only use their senses to observe flowers in the garden to answer the questions.

Level two: Comprehension
“Can flowers use any pollen to make a seed?”

Level three: Application
“What plants are you going to grow in your own garden?”

Level four: Analysis
“How does pollination help to ensure food?”

Level five: Synthesis
Section 2 of worksheet: “Make your own flower”.

Level six: Evaluation
Plant a seed. This activity is supposed to be on the highest level of cognition because the individual learner has to apply knowledge gained in the previous levels and then make a value judgement, e.g. “Do I need flowers to enhance my garden” or “Do I need food to eat?” If the activity is facilitated by a skilled educator the learners could be required to reflect on their actions and evaluate their own learning. If this is however not done the action of planting a seed alone cannot be on the highest level of cognition.

As stated in the planning, learners had to know that animals cannot make their own food and that they rely on plants and other animals for food and also that all animals ultimately depend on green plants for food. The “Food chain game” (tin game) was used to attain these outcomes.

Indicator 2: The way in which educators present the planned learning and utilise learning support materials can influence the attainment of the learning outcomes.

Indicator two implies that if the educator is competent and skilled when interacting with learners and is able to utilise the LSMs effectively the planned learning outcomes can be attained. Indicator two serves to further elucidate critical question two and interrogates the role of the educator in the classroom. Firstly, the subject knowledge and presentation skills of the educators were analysed as well as the teaching strategies or methods applied to facilitate the learning. Secondly, the manner in which individual educators used and applied the same LSMs to achieve the learning outcomes were analysed. I now proceed to offer an analysis of the presentation of the lesson. I have written a very comprehensive narrative describing the four lessons that I observed. This supports the claim that I made in chapter three of this thesis, i.e. to use thick, rich description to narrate the data. It is for this reason that I have not included my observation and field notes in the addendum of my thesis. The other sources of data, i.e. the transcriptions of the interviews, the worksheets and the lesson planning have however been included in the addendum.

Presentation of four lessons by four different educators

As stated in chapter three of this study, I analysed four lessons with the same planning but presented on four consecutive days by four different educators for Intermediate Phase learners from different schools in the Mamelodi vicinity. The learning activities started at 9h00 in the morning and ended at 13h00. There was a thirty minute break each day at 10h30. I will now offer a table (TABLE 2) depicting the different educators who were responsible for the lessons:

TABLE 2

DAY	EDUCATOR[27]	LESSON	LESSON PLANNING & LEARNING SUPPORT MATERIALS	LEARNERS (Each day learners came from a different school)
Monday	Mary	One	The same for all four lessons	Group 1 (Grade 5)
Tuesday	Jo	Two	The same for all four lessons	Group 2 (Grade 5)
Wednesday	Sibu	Three	The same for all four lessons	Group 2 (Grade 5)
Thursday	Neo	Four	The same for all four lessons	Group 4 (Grade 5)

In all four lessons the educators greeted their learners in Sotho, which is the mother tongue of the majority of learners. The educators did however often code switch between Sotho and English which made it easy for me as the observer to follow and understand. Terminology, e.g. “pollen”, “environment”, etc. were repeated in English and all terminology was written on the board in English. All worksheets were also in English. In all four lessons, the educator wrote the word *Biodiversity* on the white board and asked learners to name plants or animals that started with the letters portrayed in the word *Biodiversity*, e.g. *B*. This led to learner involvement. Up to now the learning

[27] [27] To protect the identity of individual educators I did not use their real names.

activity (lesson) had proceeded as intended in the lesson planning. There was however one deviation and that was that the story about the tree was not read or referred to in any of the lessons. Nobody gave any indication to why this was not done and I can only presume that it was decided on beforehand. This deviation from the planning did not influence the progression of the lessons. Although the introduction progressed as planned, there was a difference in approach in the four lessons.

The next section of the planning related to the tin game and the topic was *Energy transfer.* Learners sat at round tables in groups of five or six. There were five tins on each table representing air, water, plants, animals and humans. Mary and Sibu explained what each tin represents; Jo adhered to the planning and started the activity by asking learners what they cannot live without; Sibu deviated slightly from the planning and started with an explanation on pyramids while E4 started the activity by asking learners what they like to eat. Neo offered no explanation as to what the cans represented or what a pyramid is. Sibu was the only educator to explain to learners what the concept “pyramid” meant and what the shape of a pyramid is. Although this was not specified in the planning, it worked very well and learners seemed to grasp the concept and purpose of building the pyramids much better than the learners in the other lessons.

Learners now proceeded to build the pyramids with the six tins. In the lessons facilitated by Mary, Jo and Sibu the learners made mistakes but coped well. In all four lessons the educators moved between the groups to assist learners. In the lesson facilitated by Neo the learners were however confused. Neither Neo nor the learners seemed to know what a pyramid was and the learners did not know what the cans represent. My field notes revealed that the teacher from the school who attended Neo’s lesson and completed an assessment form on the educator’s performance was very upset. She approached me and said that she intended to complain to the Principal of the Centre because the learners were not briefed on the activity and did not know what to do. They also did not know what a pyramid is. The confusion spread and Neo moved between the groups and built the learners’ pyramids for them. Chaos prevailed as Neo built the pyramids incorrectly. Neo now demonstrated the building of the pyramid in front of the class but did not link the pyramid to the food chain. It was impossible for the

grade five learners to make this link themselves. They seemed to be unsure why they had built the pyramids and this was confirmed by the answers that the learners gave, which were mostly wrong. This is significant as the learners felt powerless and this is exactly what critical education is not. The learners were listless and sat and played with the tins while Neo was talking in front of the class. Jo also incorrectly demonstrated the building of the pyramid in front of the class but Mary and Sibu built the pyramids correctly and adhered to the planned learning and teaching.

The planning required that the educators discuss with learners which one of the tins they could pull out of the pyramid without causing the pyramid to collapse. Mary and Jo required learners to substantiate their answers and explain why they built their pyramids in the way that they did. Mary spent considerably less time on the tin game and deviated slightly from the lesson plan. The concept of energy transfer and the food chain was not made clear. Sibu, however, explained at length why the order of the cans was important and asked the following question with regard to each can, “Can plants live without air?” and “Can people live without air?”. Sibu demonstrated very effectively that if the top can (people) is removed the pyramid does not collapse, but that the top can falls off if the middle layer of cans are removed and that the whole pyramid collapses if the bottom cans are removed. Sibu used the can representing the sun and once again asked learners what they cannot live without. Sibu added the sun tin to the bottom layer of the pyramid and linked this with what people cannot live without. Sibu adhered to the planning and the learners were able to link the different stages of knowledge acquisition knowledge in order to understand energy transfer and the food chain. There was a remarkable difference in the clarity of thought and the progression of knowledge as presented by the four educators. Sibu succeeded in facilitating the learning more successfully than the other three educators because he explained more extensively and used appropriate examples Sibu was the only educator to adhere to the planning and place the tin representing the sun at the bottom of the pyramid. Neo did not obtain the desired answers from the learners when asking them what they cannot live without. The learners did not understand, they seemed confused and they could not link the LSMs that were used to the questions asked. The learners were therefore unable to apply critical thinking. The teacher from the visiting school confirmed this. None of the educators followed the planning and explained to

learners that Biodiversity is the natural wealth of the earth that supplies all our food and much of our shelter.

Sibu did however tell learners that people must conserve nature and also that they must not litter. *"People must conserve our nature".*[28]

The learners now proceeded to do the activity on the flow of energy. The planning indicated that four learners should come to the front. Each one should get a card, one with a picture of meat, one with a picture of a cow, one with a picture of grass and lastly, one with a picture of the sun. Learners were required to place the cards in the correct sequence. Mary, Jo and Neo called four learners to the front and the class had to guide the learners to place the cards in hierarchical order to demonstrate energy transfer. Mary, Jo and Neo did not follow the planning and did not link the learning in class to the world of the learners by asking them what they ate the previous night and then linking this with things that humans cannot live without. Mary, Jo and Neo seemed to have left the learning dangling in the air. No connections were made between the different sections of the lesson and no logical conclusions were drawn. Sibu handed out a set of cards to each group and they had to sequence the cards. Sibu was the only educator who did not call the learners to the front. Sibu went to each group and asked them to explain to the class why they sequenced the tins in a particular manner. He linked the sequence of the tins to the sequence of the cards and wrote the words "energy transfer" on the board and indicated the percentage of energy obtained from the sun, plants, animals, etc. Sibu also asked learners what they liked to eat and made statements like, *"You have a full plate of pap and meat and it gives you energy".* He followed the planning meticulously but also interpreted the planning by using unique examples that were applicable to the learners. This is significant for critical education because Sibu linked the new knowledge with the real life experiences of the learners.

[28] All quotes from the transcriptions of the observation protocol and the interviews are indicated in italics and quotation marks.

Activity two required learners to know that all organisms can be divided into different trophic levels, according to the food they eat. The four new concepts that learners were required to know and understand were *producers, consumers, reducers and decomposers.* Mary handed out the cards to learners and informally discussed the new concepts, but did not use the board to write down the concepts. Mary let the learners build the pyramid with their bodies according to the cards that they had. The learners then played the carnivore game. Mary asked a lot of questions and learners responded well.

Jo wrote the key words on the board and discussed the answers with the learners. Learners did not go outside to build the food pyramid with their bodies or play the carnivore game which was the follow-up activity. Learners remained in their groups at the tables and pasted the cards on worksheet 1. Jo moved around the class and assisted learners but no critical thinking was required of the learners. Jo deviated from the planning because there was no time to go outside and play the two games. Sibu continually reminded learners with regard to the knowledge that was required to play the carnivore game, but did not require learners to build a pyramid with their bodies. The carnivore game was not specified in the planning but all three educators used this activity instead of the alternative offered in the planning, i.e. *The Bush school video.* Sibu and the learners moved outside to play the carnivore game. While the game was on Sibu continually reflected with learners on the knowledge gained in the preceding activity. The reflection was important and Sibu realised that the learners had to acquire knowledge before they could make a value judgement. In class he would for example tell the learners not to litter. He also asked the learners what would happen if the frogs ate the litter. He then linked this to the fact that the frog would die and the animals that ate the frog would also die. Sibu continually explained the food chain while the learners played the game. Sibu said to learners, *"We must take care of our nature"*, at the end of the game. He was therefore linking the knowledge that the learners were acquiring to their everyday lives.

Neo moved outside with her class without preparing them for the activity. The learners did not play the pyramid or the carnivore game. They played a game for a few seconds where all the learners stood in a circle holding the cards that they had received in

class. The learners then linked to each other by means of a rope. The learners seemed confused and the teacher from their school was very upset. The teacher said that the learners should have been briefed and that skills were being applied before knowledge was gained. In contrast to Sibu's lesson the learners in Neo's class felt stupid and disempowered. They felt that they had nothing of value to add to the learning experience. Neo deviated from the planning and the assessment standard for this activity, i.e. "Learner will be able to categorise animals according to their feeding habits: carnivores, herbivores, omnivores". In comparison with the other three lessons where learners were exuberant while playing the games, the learners observed in lesson four were quiet and subdued. Learners were not able to link theory and practice. Neo and the learners returned to the classroom. Neo kept busy with the resources (finding cards etc.) for long periods of time. The learners were quiet but were sitting at their tables not doing any work. The handing out of cards for the worksheet (which other learners received before they went out to play the games) took exceptionally long. The learners become restless, there was a lot of feet shuffling, but the class was not out of control. Neo seemed to be out of her depth; not only with regard to subject knowledge, but also with regard to classroom management and utilisation of the LSMs. Neo held up worksheet 1 and in a few seconds told the learners what to do. Learners in this class were uncertain as to what was expected of them. They asked their own teacher for assistance as they were unable to do the worksheet. There was no knowledge base for the learners to build on and the carnivore game was not played with the cards that they now had to arrange in a hierarchal order on the worksheet. Furthermore, they were unable to link the worksheet with the work that they did in the preceding part of the lesson. The learners were unable to make the link between energy transfer, the food chain and the game that they played outside. There were also not enough picture cards for all the learners. Neo left the class to fetch more cards and wasted time by cutting out cards for the learners. Neo quickly explained the food chain on the board, but did not write down keywords on the board. Learners were not asked questions related to knowledge that they had acquired. They were only asked, "*Do you follow?"* Learners answered in the affirmative but Neo had no way of knowing this because no knowledge was offered or shared. I felt that these shallow types of questions were used by the educator to maintain order in the class and also to create an illusion that learning was taking place. Neo then moved to the different groups to

assist them with their worksheets, but the learners' answers on the worksheets were wrong. The one group nearest to where I was seated had no glue to paste the pictures on the worksheet and the learners were sitting at their tables doing no work. Even though Neo came to the group in question and showed them exactly where to paste the pictures the learners were still unable to do the activity. The learners were also not asked to substantiate their answers. No questions were asked for approximately ten minutes and another thirty minutes passed with very little interaction. Neo only made one or two comments to individual learners but no comments were directed at the class. As the lesson progressed the learners, sitting close to me, still did not have glue and all the pictures. Although the learners had no idea what they were doing, they seemed very keen on getting the answers right. They continually asked their teacher for the right answers. The lesson ended abruptly and there was no feedback given on the worksheet or the learning.

I will now proceed to an analysis of how the educators executed the second part of the lesson planning as the lesson planning was divided into two sections. The second section consisted of five activities. The introduction to this section started with a "*Tuning in*" activity where the educator had to explain to learners that plants make their own food and also produce food for humans and animals. In the first lesson that I observed, Mary explained the term "pollination" and the learners were briefed with regard to worksheet one. Mary and the learners moved outside to the perma culture garden to identify different kinds of flowers. The learning went according to the lesson planning and the learners used their senses to observe the flowers and answer the set questions. Learners went back to the class and commenced with worksheet two. Mary helped learners to answer the questions in the first section of the worksheet. Materials were handed out and learners worked quietly while making their own flowers. The five minutes that Mary initially gave for the activity was extended to thirty minutes. There was no specific time allocation indicated in the planning. According to the planning learners were required to apply what they had learnt, i.e. "What is needed for successful pollination?" Jo brought the real flowers that were picked in the garden to class to demonstrate to learners how the flowers attract pollinators. In lesson two the Principal visited the class and noticed that Jo did not discuss the criteria for making their own flower, i.e. question two of worksheet two as well as the questions posed in

the planning with the learners before they made their own flowers. This was a deviation from the planning and this could have influenced the intended learning. The Principal requested educators to communicate to learners that as long as the learners applied the criteria there were no right or wrong answers. Jo did ask learners to motivate their choice of certain colours and he reinforced new knowledge before learners went out to play the pollination game. In lesson three Sibu's approach differed slightly when he took the learners out to the garden to observe the flowers before starting with the worksheet. In lesson three Sibu and his class paid a very quick visit to the garden and Sibu explained to learners to look out of for the colour of the flowers' petals.

Back in the class, Sibu drew a flower on the board and indicated which part of the flower consists of the petals. He asked learners what attracted insects to flowers and wrote the answer, i.e. "bright colours" on the board. Sibu did not mention that the shape of the flowers also attracts pollinators, as other educators did. Sibu was the only educator who discussed the criteria with the learners before they made their own flowers. Neo did not explain the criteria with the learners at all. She discussed with learners which part of the flower attract pollinators and told learners to start making their flowers. The teacher from the school intervened quite often to help learners or correct the educator. This intervention led to the learners losing confidence in the educator and the educator felt unsure. Neo seemed a little unsure and consulted her planning from time to time. She told learners to make their flowers a bright colour but did not say why. She mostly left learners to their own devices and they worked in dead silence while she continually left the class. The learners seemed very bored while they waited for the last learners to complete their worksheets. Neo discussed question two of the worksheet and asked learners questions but she received no response. Neo told learners to choose one answer and underline or circle it. She did not supply model answers and learners had to choose their own answers. Although the learners chose an answer the answer that they selected did not relate to the flower that they made. For all the remaining questions on the worksheet, Neo did not elicit appropriate answers from the learners and she resorted to supplying all the answers and writing them on the board for learners to copy. Sibu on the other hand, encouraged learners to help their friends and corrected them when they made mistakes. Although the Principal emphasised that learners should be made aware that their flowers must be unique and

that they must apply the criteria it did not happen in any of the four lessons. Even Sibu discussed model answers which he wrote on the board. The learners copied the correct answers from the board. This could mean that rote-learning was taking place if learners are not asked to motivate their answers. Freire argues that there are no right or wrong answers. This is true for higher levels of cognition but when Bloom's lower levels of cognition (levels 1-5) are applied there are definite correct or incorrect answers.

The learning now proceeded to activity three and the planning indicated that learners must be able to understand the role of the pollinator, as well as nature's mechanism to ensure that pollination between species does not occur. In all four lessons the learners received cards from the educator that depicted flowers. Each card had a different shape and colour. In each lesson the learners and educator moved to the lawn in front of the Centre. In this game, the educators put on a ladybird or bee costume and all the "flowers" (learners) stood in a circle around the pollinator (ladybird or bee). The flowers had to try their best to attract the pollinator. The planning stated the rules of the game.

In lesson one, two and three the educators explained the game before learners went out to play. In lessons one, two and three the learners enjoyed the game immensely. In lesson three the learners did the worksheet first and then went out to play the pollination game. The learners were exuberant and they laughed and played. In lesson one and two, the learners went out to play the pollination game after doing questions one and two of the worksheet. Neo did not take the learners outside to play the game and she was the only one to deviate from the lesson planning. In lesson one the learners returned to class to complete worksheet one. Mary generated knowledge but involved learners through questioning, enabling them to apply the knowledge gained in the game to the worksheet. Jo used the knowledge that the learners had gained as a result of the game to discuss pollination. The questions stated in the planning were used to guide the discussion. Jo kept the bee costume on while leading the discussion and this seemed to be very effective. Sibu showed the ladybird costume to learners while discussing pollination. Sibu was the only educator to link new knowledge to biodiversity and explain companion gardening, where different types of plants live together. Sibu also explained to learners that plants are planted together because

certain plants repel insects. All educators deviated from the planning with regard to activity four. Although Sibu discussed the questions posed in learning activity four, none of the educators took their learners back to the garden.

All the educators deviated from the planning with regard to activity five. This could have been due to time constraints but none of the educators returned to the garden to allow learners to catch pollinators with a net. The concluding activity for the lesson on pollination was not done by any of the educators where learners had to place their cards in the appropriate pocket supplied against the wall of the class.

The second part of the concluding activity was not done as prescribed in the planning. In all learners four lessons the learners returned to the *Biodiversity Room* for the conclusion phase of the lesson. In the first and second lessons the following questions were asked: “What did you learn today?” and “What is pollination?” These types of questions do not require of the learner to reflect on knowledge. There was no reflection on skills acquired or attitudes formed. In lesson one the learners did not do the pledge for a better environment. In lessons two, three and four the learners did the pledge as prescribed in the planning. In lesson three, Sibu did the reflection well and it was by far the best of all the learning activities that I observed. I will motivate this statement in the findings. Sibu asked learners what they had learnt on the specific day and they replied, “About plants and animals”. He used this answer and linked it to the tin game and the food pyramid, energy and energy transfer. Sibu also linked the learning to littering and how this affects plants and insects. He explained the pledge and requested learners to read it out loud before they completed their individual forms. In none of the concluding activities seed was handed out to learners to plant at home as specified in the planning.

4.3.1.1 Critical question two: findings

The data revealed that Bloom’s taxonomy was favoured by the Principal of the Centre and was used in the lesson planning. Bloom’s taxonomy is directly related to the belief in the primacy of cognitive development as the aim of schooling (Eisner in Gultig *et al.*:112). This orientation to schooling is in direct opposition to critical education. In

critical education schooling is aimed at developing levels of critical consciousness among learners to empower them to transform their world. In Freirean pedagogy the learners see themselves and the world as being in a dialectical relationship and the learners can exert some influence on surrounding conditions and this empowers them (Ozman1999:332). Although taxonomies like Bloom's is juxtaposed to critical education it is in keeping with behaviourist philosophies of education such as OBE.

The above-mentioned data further suggests that although the planning, facilities, resources and LSMs were the same for all four learning activities the facilitation of the learning by individual educators influenced the attainment of the learning outcomes by the learners. The data illuminated the above finding as follows:

Firstly, the learning outcomes as stated in the curriculum were applied in the lesson planning. Within the critical approach to education there are no set learning outcomes that have to be achieved. In fact critical education contests the fact that learners have to achieve outcomes. In critical education the end product is not a learning outcomes but critical reflection and action upon reality (Posner in Gultig *et al.* 2002:57). To reduce critical education to a set of intended learning outcomes would be to miss its point of political activism (ibid).

Secondly, the LSMs were appropriate for Intermediate Phase learners in that it suited the characteristics of learners as described in the NCS. Earlier in this chapter I questioned the wisdom of prescriptive criteria which are behaviourist in their approach. Eisner (in Gultig *et al.* 2002:117), remarks as follows with regard to diversity, "For a meaningful form of education experience to occur it is critical that teachers regard children as individuals and not as mere members of a class or group". It should not be assumed that all children of the same age would have to study the same content at the same rate, for the same aims, for a uniformed period of time (ibid: 120). It can then be assumed that learners cannot not be expected to have the same developmental maturity or prior knowledge. Although the learners were therefore not homogenous, although they were all in grade five, the LSMs used in the lessons did meet the criteria set in the NCS as follows: First, the LSMs involved tangible objects that could lead learners systematically towards abstract thinking. Second, the games allowed learners

to be spontaneous and energetic. Third, the designing of flowers by learners allowed for creativity. Fourth, the group work gave an opportunity for learners to converse with their peers. Fifth, if applied effectively the LSMs enabled learners to apply critical thinking. Sixth, the learning enabled learners to develop respect for the community.

Thirdly, the interpretation of the lesson planning by individual educators influenced the learning as follows: Mary adhered to the lesson plan and had sufficient subject knowledge and skills to facilitate the learning adequately. In lesson one, the learners did make mistakes, but Mary guided and prompted learners to give the correct answers without supplying the answers herself. Learners had sufficient prior knowledge to offer solutions when confronted with a problem that required higher levels of cognitive thinking. Mary facilitated the learning and use of LSMs effectively and this led to learners being able to achieve the set outcomes. Jo was very enthusiastic and had good presentation skills but insufficient subject knowledge, which led to learners not being able to achieve all the outcomes. Jo her assisted learners but no critical thinking was required of the learners. Sibu facilitated the lesson extremely well and the learners were able to participate constructively in all the activities and attain the outcomes as specified in the lesson planning. Sibu reinforced acquired knowledge throughout the carnivore game. He was the only educator to explain what a pyramid is and this made a big difference to the learners' understanding of the activity. Sibu explained to learners why it is important for them not to litter, thus using their acquired knowledge to form positive attitudes. Sibu was the only educator to discuss the criteria for making the flower with learners and this resulted in this activity being on the synthesis level of Bloom's taxonomy. Neo had insufficient subject knowledge and facilitated learning poorly, which led to learners being unable to attain the outcomes. Insufficient knowledge on the learners' part meant that they were not able to achieve the skills on the more advanced levels of Bloom's taxonomy that were required in many of the activities. Learners were not able to link theory and practice because of Neo's inadequate facilitation. She did not have the LSMs prepared and wasted valuable time doing this in class, while learners were idle.

The data therefore further suggested that the utilisation of LSMs by the educator influenced the attainment of the learning outcomes by learners in the four lessons in a

positive or negative way. I found that this happened irrespective of the developmental level of the learners. My field notes revealed that the learners in lesson three came from a very disadvantaged background. Their teacher from school told me that they lived in an informal settlement, called Mandela Village. The teacher said that the learning did not extend beyond the classroom and that there was no support for learners at home. Learners had varying degrees of prior knowledge which required a lot of patience from the educator. Maybe this is why Sibu spent more time explaining and preparing learners for the worksheet than the educators in lessons one, two and four. Although the learners in lesson two came from a so called eco-school, where great emphasis is put on environmental education, the learners in lesson three still fared better in the attainment of the learning outcomes as a result of Sibu's capable facilitation.

4.3.2 Critical question 3

"To what extent does learning support materials used in a specific environmental education setting have the potential to develop the critical consciousness of learners?"

Three indicators were used to elucidate critical question three. Firstly, I looked at the nature of the transmission of knowledge and considered if the educator and learners were involved in a dialogue or not. Secondly, I analysed the four lessons to see if the educators linked the learning to the world of the learner and to real life experiences. Thirdly, I analysed the data to see if the learners were given the opportunity to reflect on the learning.

Indicator 1: Learning support materials can contribute to the development of the critical consciousness of learners in environmental education.

Indicator one implies that learning support materials contribute to the development of the critical consciousness of learners if the educator and learners are involved in a dialogue and the learning support materials are interactive and require the learners to apply critical thinking skills. Secondly, I used the observations of the four learning activities to compare how and when educators posed questions; learners posed and

answered questions; and how the learners conversed with each other to exchange ideas and construct knowledge.

In the introduction to the lesson the four educators engaged learners as follows: Mary frequently asked questions and learners responded. The learners were however quite reluctant and very quiet. When Mary could not elicit anymore answers from the learners, she supplied the answers. Although the learners responded by saying “Yes Ma’am” all the time they were only partially interacting. Learners did ask questions but it was organisational questions and had nothing to do with knowledge construction. Jo gave the learners five minutes to think about possible answers. The extension of the response time seemed to lead to better answers than those received in lesson one. Jo was very energetic and motivated learners to give answers while he supplied prompts and clues. Jo engaged with learners and handled the questioning very well. Sibu continually gave prompts and clues and demonstrated with his body, e.g. he imitated an impala, when learners had to come up with a word starting with the letter *i.* Learners enjoyed this tremendously and participated actively. In learning activity three, Sibu gave the learners much more time to think than in any of the educators did in the other learning activities. The response to questions was good and learners conferred with each other before answering. The lengthy response time allowed learners to confer with each other. Learners in this class also read the answers aloud from the board. Sibu was the only educator to do this and this seemed to reinforce the new concepts for learners.

During lesson one, learners responded well to questioning while visiting the perma garden. Learners used their senses to observe and identify flowers. The learners worked quietly on the worksheet and there was no interaction between the educator and learners for a considerable length of time. Although Mary generated the knowledge, learners were actively involved through questioning. Spontaneous dialogue was limited but Mary frequently posed questions and learners responded well. Conversation between learners with regard to the worksheet was, however, very limited.

While playing the pollination game the learners contributed significantly to the answering of questions and they enjoyed the game. They were exuberant and encouraged each other to participate. After break the learners played the tin game. There was a remarkable difference in the learners' attitude. They were much more exuberant while playing the game than they were while doing the worksheets. Learners helped and encouraged each other and clapped hands when the pyramid was completed. Mary required that learners motivate the way in which they built their pyramids. Learning was interactive and learners were getting involved in a discussion with Mary and offering their opinions. In preparation of the carnivore game Mary handed each learner a card. While Mary was handing out the cards the learners informally conversed with each other about the cards. They compared cards with their group members and engaged in spontaneous discussion. The learners were able to answer the questions that Mary posed correctly. Learning was interactive and the learners conversed with the educator and with each other. Mary did not supply answers. Learners were required to think while she only gave clues or prompts.

In lesson two, the learners responded well to Jo's questions while visiting the perma culture garden. While using their senses to observe and identify flowers they conversed with each other and the educator. Jo was very keen and enthusiastic and this seemed to motivate the learners. Learners in lesson two interacted more with the educator than the learners in lesson one. In lesson two learners asked the Jo questions and interacted informally with each other. After the game, Jo continually asked learners to motivate their answers. Learners enjoyed the pollination game tremendously and were exuberant. Back in class, Jo kept the bee costume on for the discussion on pollination and learners enjoyed this. Jo and the learners were continually engaged in a dialogue and the construction of knowledge. After break, Jo started the activity by asking learners what they could not live without. The learners all had their own opinions and got involved in an active discussion about the necessity of electricity in their lives. Jo continually asked learners to motivate their answers and did not supply the answers. The pyramid game did not go very well. Jo was not able to build the pyramid correctly and he and the learners were confused. One learner in each group built the pyramid and the rest of the group shouted at him or her. There was no positive interaction between the learners and this contributed negatively

towards the completion of the task. Jo did ask learners to motivate why they built the pyramid in the way that they did but the discussion was futile as Jo did not know the answer himself. Jo assisted learners with worksheet 1, by showing learners where to paste the cards. No critical thinking was required of the learners and there was limited dialogue.

In lesson three, Sibu first explained the concept of a pyramid before the learners were required to build pyramids with the tins. Sibu asked questions all the time and the learning was very interactive. He had better classroom management than the other educators and this contributed to the success of the questioning. Sibu asked learners to raise their hands when answering questions and not to shout out answers. He ensured that various learners were given an opportunity to answer questions. The learners were interactive in their groups. They changed their pyramids back and forth all the time after conferring with each other. Each group member contributed to the learning. Sibu encouraged learners all the time without supplying the answers. At one stage the class got a bit rowdy and Sibu said, *"I do the talking you do the listening".* Later in the lesson Sibu qualified this statement by saying, "*We are not perfect. We are all learning. I am learning from you. We are learning together".* Sibu was very energetic and enthusiastic and he continually used non verbal communication to illustrate the meaning of concepts. While the learners were playing the carnivore game outside Sibu continually asked learners questions and engaged in a discussion with them. In the perma culture garden Sibu continually asked learners questions while they were observing the flowers. While doing worksheet 2, Sibu encouraged learners to help each other and correct their friends if they made mistakes. The learning was interactive and the learners conversed with each other with regard to knowledge construction. Although the learners responded well when asked questions they did not pose questions. During the pollination game the learners enjoyed the outdoors and were exuberant. During the conclusion phase learners were a bit reluctant to answer questions, but Sibu encouraged them and continually linked learners' answers to newly acquired knowledge.

In lesson four, Neo asked learners what they like to eat and the learners responded enthusiastically, naming their favourite food. Neo did however not link the learners'

answers to the construction of new knowledge and simply proceeded with the building of the food pyramid. Learners were unable to contribute meaningfully to the tin game as they did not know what a pyramid was. Once again the learners felt stupid and disempowered. Learning was not interactive as Neo went to each group and built their pyramids for them. Learners promptly responded to all questions with “Yes ma’am” but did not really show any signs of understanding the work. Learners’ answers were mostly wrong and Neo did not receive the desired answers. Learners were confused and asked their teacher from school for assistance. The answers on their worksheets were also wrong. For extended periods of time (up to 30 minutes) there was no talking in class. It was dead quiet and there was no dialogue. When Neo asked learners, “Why flowers are important”, before they commenced with worksheet 2, she obtained no answers from the learners and supplied the answer. Learners did not interact with each other or the educator for long periods of time. Neo offered no help or encouragement to the class as a whole. She did however go to individuals and correct their work. For all sections of worksheet 2 Neo either did not obtain the correct answers from learners or obtained no response at all. Neo immediately supplied the correct answers and wrote it on the board when learners did not respond to the questions. This indicates that the learners were not able to attain the planned learning outcomes.

In all the lessons the learners were very keen to get the right answers. The teachers from the schools that were accompanying the learners also tended to get very uncomfortable if their learners could not get the answers right and they tended to partake in the lesson and assist learners.

The Principal of the Centre emphasised the fact that learning activities must be interactive. In my field notes I recorded the Principal as saying to the educators that the learning activities must be interactive and that educators should “*pull”* information from learners if they were not responsive. The Principal said that the level of interactivity depended on the level of the children. She did not specify the level but in the context of the discussion I understood this as the knowledge level and the developmental level of learners. In the personal interview, the Principal reiterated the importance of the LSMs in the learning of environmental education and said that the programme at the Centre could not run without the resources. “*I mean that [LSMs] is actually the most important*

thing and they are designed in such a way that they are interactive". The motto at the Centre is the 3 T's: talk, touch and think. The Principal said in the interview, "*So there must always be something that you can touch and there must always be a dialogue …*" The focus group interviews revealed that the educators value learner participation, "*I want to refer to the water programme that we run. It is here that you see that kids love to be in charge, they like to be involved. They like participation a lot. We would for example give them an experiment of purifying water. We look for volunteers, we choose volunteers, the learners would for example volunteer to participate as time keeper, one person who is going to read the instructions and one person who is going to pick up the stuff and one person who is going to help others to clarify the instructions and explain to other kids. It is here that you see that the critical thinking is playing a big role, a big role because you will see learners having a serious conversation with each other and coming up with clever ideas, wise ideas*"**.** Both the Principal and the educators made it very clear that learning at the Centre must be fun. "*I think they enjoy it. We also try and make it fun as well. Otherwise the children, you know, come here the whole morning. It is a long stretch and you have to put in some fun as well and to get their limbs loosened up and a little bit of running here and there or something else so that it doesn't feel like a real class situation. You know something that they enjoy. Usually the things that they enjoy, especially the games, it makes them excited*". The Principal also remarked as follows, "*We teach them while using games. …they learn while playing*". The emphasis is, therefore, on the learners' learning while they are playing and this makes the learning applicable for the Intermediate Phase learner. The focus group interview showed much the same tendency as educators emphasised the value of learning being practical and learners being involved in the learning.

Indicator 2: To raise critical consciousness in environmental education teaching and learning, educators choose themes that relate to the world of the learner and their real life experiences.

Indicator two implies that learners are required to link the learning to their real life experiences and are able to apply the knowledge gained in class in their everyday lives. I used the transcriptions of the interviews as main source and then supported this by using the observations of the four lessons.

The interview with the Principal of the Centre revealed that LSMs are viewed in a broad perspective. She said the following, "*For me the resources can be living and non-living, because we regard us as a living laboratory. So I am not just sticking to written material*". This links to the model of LSMs depicted in chapter two of this thesis which indicated that any primary resource that is shaped for a pedagogical purpose can be considered a learning support material. When asked if real life objects have a bigger impact on learning than text based LSMs, the Principal replied that the educators have to give information to the learners and that they don't always want to just talk, so they give learners text based information in the form of worksheets. Then the educators let the learners feel and touch objects. The Principal emphasised the importance of the LSMs as follows, "*Look, for every learning activity we have learning support material, it might not be a book or a textbook but it is always something that is … part of education. It might be in the Waste Room, it might be the wall about the waste, or in the Energy Room it might be the sun stove…*" When asked if the learners can actually apply the knowledge that they gain at the Centre at home, the Principal said that this was what they encouraged but that it was not always easy. The observations for this research were mainly done in the *Biodiversity Room* and the Principal mentioned that their aim was to get learners to experience the "*magic*" of learning. The Principal mentioned that the learners must see the soil and the compost so that they can understand that this is real magic happening and that they need to care for the soil. The important principle that the Centre applies to learning is that learners must first have an appreciation for soil and respect for water before they can be expected to save water or conserve soil. The Principal mentioned that when learners have the necessary knowledge they will understand why they should not litter. She further said that learners must know where for instance water comes from and why they must look after it before learners can be expected to apply the knowledge in their own lives. She said that although the programme at the Centre was designed to deal with appreciation of the environment first and then motivate learners to act on this in their everyday lives, she felt that there was still much work to be done in this regard. She mentioned that one of the biggest problems in the streets and suburbs of Mamelodi, directly adjacent to the Centre, are waste and the polluting of the river running through the Centre, "*The river is full of pollution and how do we stop people from polluting the river? So the*

children go there and they do a little study at the river and see the magic in the water and realise that there is more going on in this river than what they ever thought of. And then we tell them to pick up the papers and clean the place. Whether that happens, I don't know". The Principal mentioned that the Centre did however not ignore the situation, and that they had follow-up action by means of action projects and community workshops. This ties in with the broad 'social' part of critical education. Giroux (2006) confirms this when he argues that schools need to be incubators for the production of democracy. To attain this ideal learners must be enabled to practice in the community what they have learnt in school. In the focus group interviews the educators also mentioned the problem of waste in the everyday lives of the learners, "…*locally we have a problem of waste on the streets and then when the rain falls it washes the waste into the river. And then that is a problem to the aquatic animals. So having these children coming here and giving them an idea of how to solve the waste problem. I think it is important to the real world, because those illegally dumping on the streets are often their parents. So having this knowledge of how to deal with waste will benefit the aquatic animals in the river*". One of the educators in the focus group interview also referred to the waste problem in Mamelodi. He related a story of one of the learners being very fond of dragonflies and while doing a water study at the river running though the Centre, she realised that dragonflies grew up in water and are dependent on water to survive. The learners were surprised to learn this and realised that by polluting the river the dragonflies were being endangered.

The interviewees reiterated the importance of the learning at the Centre being applicable to the real lives of the learners by saying that the learning would not have the same effect on the learners if it was just book knowledge. The effectiveness of the learning was a result of the learners using learning support materials that were familiar e.g. soil, water and waste but at the same time learners were being challenged to look at these materials from a new perspective. As one of the educators remarked in the focus group interview, "*Some of the knowledge that they are acquiring at school is theoretical, but here in the Centre it is practical. They see these things, they see the kinds of animals, they see the plants living together, all kinds of things, all sorts of things – we have them here". Another educator remarked as follows, "...by using real objects it makes the learning more practical. It is realistically based; it is there in life...*"

The focus group interviews supported the Principal's view of the importance of linking learning in the classroom to the learners' real life experiences. The educators linked the themes used in the learning e.g. waste and soil erosion to the world of the learners. The interviewees said that the learners had waste and soil at home and that the knowledge gained at the Centre should enable learners to deal with waste management and soil conservation in their everyday lives. When asked how the learning support materials used in learning activities linked to the everyday lives of the learners the one educator answered as follows, "... *they have for example waste, they have it at their homes. It is where they must think how to separate the waste, what to do with the waste rather than taking it into the streets. Soil erosion can happen everywhere in their streets, to their houses or the space around their homes*". The focus group interviews also revealed the value of using real objects, e.g. earthworms. Taking the learners outside to the perma culture garden and showing them the earthworm farm and how the earthworms make the soil fertile and how this can aid in growing plants and vegetables. This is knowledge that the learner can apply by cultivating a vegetable garden at home.

Indicator 3: The learners are given the opportunity to reflect on the learning

I used the observations of the lessons to evaluate if learners were given the opportunity to reflect on the learning during and/or at the end of each lesson. I also referred to the focus group interviews and the interview with the Principal. During the focus group interviews I asked the educators how they knew if the learning was successful and if the set learning outcomes were achieved. The educators replied that they firstly used questioning to determine if the learning outcomes were realised. Secondly, the educators used the conclusion phase of the lesson to reflect on the learning. The educators felt that the solutions that learners came up with when faced with a problem in the course of the lesson also gave learners the opportunity to reflect on the learning and apply critical thinking skills. The Principal of the Centre also emphasised the importance of reflection with the learners as well as reflection sessions with the other educators at the Centre after the lessons.

In the planning of the lesson, provision was made for a concluding activity where learners had to write a pledge for a better environment. The conclusion also involved the planting of a seed. At the end of the first lesson the learners gathered and the educator asked knowledge questions such as, “What did you learn today?” and “What is pollination?” The reflection was only done on the knowledge level of Bloom’s taxonomy. At the end of the second lesson the same conclusion with the same questions was done, but this time the learners were required to complete a written pledge for a better environment. At the end of lesson three the learners also reflected on the knowledge but Sibu made links between the questions posed and the knowledge acquired in the lesson. Sibu used the learners’ answers to remind them that plants and animals are part of the food chain and that littering would affect the plants and the animals and in this was affect the food we eat. Sibu explained the pledge to learners and let them read it out aloud before writing their pledge. At the end of lesson four, learners concluded the day with a session on the knowledge that they had gained but no pledge was done.

4.3.2.1 Critical question three: Findings

The data that were analysed to elucidate critical question three, revealed that the manner in which knowledge transmission happens in a lesson influences the development of critical consciousness in learners. Firstly, the way in which meaning was negotiated in the four lessons depended on the nature of the relationship between educator and learner. In lesson one I found that although learners continually replied “Yes Ma’am” it was not indicative of a dialogue between educator and learner. In lesson one the learners conversed with each other about the work, but the dialogue was limited. When Mary did not receive the appropriate answer, she immediately supplied the answer. Jo continually asked questions and when the appropriate response was not attained he motivated learners to think. He did not supply answers but used follow-up and prompt questions. During the tin game Jo’s questioning did not contribute towards the attainment of the learning outcomes as he did not know the right answers himself. Initially, I got the impression that Sibu might be in an authoritarian model of knowledge transmission when he made the following statement, “*I do the talking you do the listening”.* He did however qualify the statement later by referring to

learning being a process that is constructed by educator and learners. He remarked as follows with regard to knowledge construction, "*We are not perfect. We are all learning. I am learning from you. We are learning together".* The dialogue was however restricted in that learners never asked questions with regard to knowledge construction. The only questions posed by learners pertained to organisational matters e.g. how to do something.

Secondly, while observing the learning activities I saw how three of the educators continually linked the new learning to concepts that were familiar to learners in their everyday life. The flowers used to demonstrate how colour and shape attract pollinators, as well as the games played were appropriate for learners in the Intermediate Phase. The worksheets were not always as popular with learners and the ease with which the learners completed the worksheet depended on how well the educator explained the new concepts. The introduction to the learning activity that had "Energy" as topic worked well when the educator asked questions relating to what learners could not live without. Learners could give examples from their own lives and had to motivate their answers. When asked what they like to eat the most popular answers were from their daily diet, e.g. pap and meat, cabbage and meat, rice and chicken. Sibu continually used examples from the learners' daily lives to explain, e.g. "*We get our food from farms and the crops need soil, sun and water to grow and this is why we have to conserve nature*". The learners were able to make the link between their favourite food and the importance of conservation. The Principal and educators continually referred to the importance of linking learning to the learners' real lives. Educators said that earthworms, dragonflies, waste management, as well as soil and water conservation were topics that learners related to.

Thirdly, the development of critical consciousness in learners was influenced by the opportunities that learners were given to reflect on the higher levels of cognition. The learners acquired and applied knowledge, but were not always given the opportunity to make value judgements based on their individual perception of the acquired knowledge. The pledge that learners had to write at the end of the lesson contributed to the development of critical consciousness, but this was only done in lessons two and three. In lesson three, learners were given ample opportunity to reflect on the learning

as the lesson progressed. This was conducive to critical thinking. Learners realised that their opinion mattered and that they had a voice in the construction of knowledge. In lessons one and three learners conversed with each other and the educator about the work. Jo also continually asked learners to motivate their answers, but there was limited dialogue. In lesson four there was extended periods of time (up to thirty minutes) when there was no talking in class. The learners continually chanted “Yes Ma’am” but this was not indicative of learners really understanding the concepts. When Neo did not obtain the required answers she immediately supplied the answers. This seemed to leave learners feeling powerless. The aim of developing the critical consciousness of learners is in fact to empower them and make them realise that they can transform their world. In this context the particular learning should have made the learners aware of how they live and exist and how they can apply the knowledge with regard to Biodiversity in their everyday lives.

4.4 Summary

In this inquiry I set out to gain an understanding of how educators and learners negotiate meaning in the environmental education classroom. I uncovered a wealth of data during my visits to the JNFWS Environmental Centre. In order to make sense of the data, the research questions were posed and indicators were used to elucidate the findings. In this penultimate chapter of the thesis, the story unfolded and the reader journeyed with me through four classrooms to meet the educators and learners. We saw how the different educators facilitated the learning and utilised the learning support materials. The curriculum was the point of departure for the discussion and attention was paid to the effect of the prescribed curriculum on the lesson planning. The data revealed that learning support materials (LSMs) had a profound influence on learning but that the effect, either positive or negative, depended on the teacher’s facilitation of the learning. The way in which meaning was negotiated either empowered learners and engaged them in the construction of knowledge, or left them feeling bereft.

The findings will be summarised in three critical contentions in chapter five. I will use the synthesis of the findings and the body of literature that informs this study to create

a scenario depicting the prospects for Freirean education in the environmental education classroom.

CHAPTER 5
Synthesis

5.1 Introduction

As discussed in chapter three of this thesis critical theory has its own research methodologies and pedagogies, i.e. ideology critique and action research. Ideology critique can be addressed in four stages through reflective practice and Smythe (as cited in Cohen, Manion & Morrison 2000:30-31) defines this process as: description (what am I doing?); information (what does it mean?); confrontation (how did I come to be like this?); and reconstruction (how might I do things differently?). In chapter one I gave a description of what I intended doing. In chapter two I revised the literature and addressed the second phase of the reflective process. i.e. 'what does it mean' by contextualising and defining the key concepts of the study. At the end of chapter two I also revealed my research questions, i.e. "How does critical consciousness manifest itself in the curriculum document with specific reference to the role of learning support materials?"; "How do educators interpret and apply the curriculum with regard to learning support materials?" and "To what extent does learning support materials used in a specific environmental education setting have the potential to develop critical consciousness?". In chapter three I described the methodology of the study and revealed that my epistemology was directed towards exposing ideologies and that my particular point of entry was the supposed gap between the planned curriculum and the curriculum-in-practice. I also stated that I would endeavour to continually rethink and revise my own practice throughout the research process. These reflections were written up in chapters three and four of my study. In chapter four I furthermore attempted to make sense of the data that I gained at the JNFWS Environmental Centre by reflecting on the focus group interview, the individual interview, my observations of learning activities (lessons) and my field notes. This brings me to chapter five which focuses on the last two stages in the reflective process, i.e. information and confrontation. In the last chapter of this thesis I will synthesise and make sense of the knowledge that this study has generated and reflect on how things came to be as they

are and how things might be done differently. I will now attempt to synthesise the findings of my study with the literature that served as the theoretical premise of the study.

5.2 Synthesis of the findings and the literature

The findings of this study can summarised in the following three critical contentions:

Firstly, the study has established that although the NCS pays lip service to some of the ideals of the People's Education Movement and Freirean pedagogy, it is inherently behaviourist in that it has clearly defined outcomes and assessment standards that learners should attain regardless of learner diversity. The jargon used in the NCS does link to the ideas of critical pedagogy in that it envisages that "our children and learners need to be agents of change to transform society" and that educators should contribute to the transformation of education at all levels (Department of Education 2003a). The study also found that the NCS envisages teachers and learners that are sensitive to environmental issues. The NCS also allows space for teachers to choose topics and issues that are relevant to the learner. Chisholm & Fuller (1996:712) hold that although the curriculum uses the language of critical pedagogy, old labels persist but mean different things. Jickling (1999:65) also questions the behaviourist approach to learning when he asks the following, "Is it educational to prescribe the values, concepts and normative frameworks that ought to define educational outcomes?" Behaviourism holds that only *observable* and *measurable* behaviour counts as learning and that people's reports of their thoughts and feelings have no scientific validity (Gultig *et al.* 2002:160). Kraak 2002) also takes issue with the behaviourist approach in the NCS and alerts us to the danger of a schema that has no place for imagination, creativity and innovation. McKernan (1993:346) states that the most fundamental criticism against OBE is that it reduces education, teaching and learning to forms of human engineering and quasi-scientific planning procedures – procedures that view education as an instrumental means to specified ends. Outcomes-based education amounts to moulding students through behaviour modification. This is in direct contrast to Freirean pedagogy and philosophy which premises the notion of 'conscientization' which according to McLaren

(1989:195), is "a process that invites learners to engage the world and others critically".

As disclosed in chapter two of this thesis curricular transformation began before the 1994 election in South Africa but it only gained momentum after the government of National Unity came to power. Jonathan Jansen (in Jansen & Christie 1999:4) views 1990 as a significant year in curriculum reform in South Africa and he argues that the different formative influences on the curriculum are the reason for the confusion and contradictions underlying the meanings and relationships of the OBE jargon in the South African curriculum. The curriculum reform had the major aim of transforming not only the curriculum but also South African society. The downside was the failure to translate the vision into practice (Chisholm & Fuller 1996:702). This was probably too ambitious and too heavy a set of expectations to invest in a curriculum, especially such a young curriculum in a young democracy. The curriculum today remains rigidly tied to centrally determined syllabi, and little attention is paid to reforming teaching methods that might advance the adjusted curriculum, or to further participatory social relations inside classrooms (Chisholm & Fuller 1996: 706). This was confirmed by the Principal[29] of the of the JNFWS Environmental Centre, where the research was done, when she said that she thinks there is a gap between the planned curriculum and what is practiced in classrooms. She referred to teachers that were still using the old syllabi as the content to work from and just window dressing their teaching methods. "*I think there is a gap, because there are lots of reports that the people are still doing the old education and they just apply it with the outcomes. They don't transform everything, but they are still using that old syllabi as the content to work from and changing their teaching methods".* The Principal also mentioned that she is continually reminding educators to be mediators of learning. "*Many of them still fall back into the thing of, 'I am giving the information' and not being the mediator".* This confirms the hunch that I had when I embarked on this study, i.e. that although much window dressing has been done, the very nature of the pedagogy in our classrooms has not necessarily changed. Chisholm & Fuller (1996:707) argue that the radical concept of education as promoting

[29] Quotes are from the interview transcriptions that are attached in the Addendum of this study for perusal

critical thinking and cooperative local action was not realised in the curriculum but in its place came a concept of rationalised curriculum that links to centrally prescribed 'learning outcomes' within the NQF. Even old labels for core problems have become bureaucratised. For example the *Reconstruction and Development Plan's* 'culture of learning' initiative, became aimed at building classrooms, totally detached from altering the school's social relations and pedagogy (Chisholm & Fuller 1996:707). This phenomenon is not only characteristic of education, but is evident in the rest of South African society. Patrick Bond (2004:1) remarks as follows in this regard: "There were widespread expectations and hopes for working people and the poor in South Africa that the end of the racist system would open the way to radical social change". Bond (ibid) claims that the hopes for liberation in South Africa have given way to free-market 'neoliberal' policies that have left the vast majority of South Africans in the grip of poverty, unemployment and social crisis.

As discussed earlier in this thesis, OBE is the philosophy of education practised in South Africa, and the national curriculum is one model of this philosophy. The practice of OBE in South Africa has many critics for example, Jansen (1999,2001); McKernan (1993); Chisholm & Fuller (1996); Kraak (1999, 2001);Le Grange & Reddy (1997, 2000); De Clerq (1997) and Christie (1996), as referred to in chapter two of this study. What is however remarkable is that the so called 'father of OBE', William Spady, has now added his voice to the growing number of critics against this philosophy of education as practiced in South Africa. Spady (2008) regrets that the principles of OBE were not fully integrated into the South African curriculum. He claims that OBE has failed in South Africa because although the principles of OBE are evident in the national curriculum, the government stifled the application of the curriculum by limiting curriculum discourse to traditional ways of thinking about learning, curriculum, assessment and qualifications (ibid). I find it necessary that before I offer an alternative to OBE, I should comment briefly on why OBE is not working successfully in South African education. McKernan (1993:343) states that schools take on the responsibility for planning the learning of children through the curriculum and that schools tend not to do this very successfully. In 1999 Jansen (in Jansen & Christie:145) wrote a text titled, *"Why Outcomes-based Education will fail: an elaboration"* and here he argues that the

new curriculum was a political response to apartheid schooling rather than one which is concerned with the modalities of change at the classroom level.

However, Chisholm & Fuller (1996:693) remark that school quality was being addressed but with much less emphasis on changing the character of classrooms than was anticipated during the late 1980s and early 1990s. One of the features of People's Education, whose origin is discussed earlier in this thesis, was to instil democratic values such as co-operative work and active participation in opposition to the then current authoritarian and individualistic values dominant in schools (Walters & Kruss 1988:17). It appears as if all attention was focused on the planning of the formal aspects of the curriculum and the actual transformation of teaching and learning fell behind. This may be as a result of the fact that education is never neutral but that it reflects the ideological stance of those in power. It seems as if the vision of the People's Education Movement has virtually disappeared at grass root levels and that it is only in the jargon of educational policy that these ideals can still be traced. Chisholm & Fuller (1996:693) reiterate this when arguing that, "Earlier talk of people's education and robust civil participation is giving way to a technocratic discourse: a policy talk that emphasises centrally-defined 'outcomes-based education', pupil: teacher ratios and a unified education 'system'."

There are several factors that contributed to the narrowing of the education agenda which includes scaling down on the ideals of People's Education as mentioned above. Chisholm & Fuller (1996:694) offer two reasons for the narrowing of policy in South African education, i.e. changes in the international and local political economy with the accompanying institutional processes; and education-based struggles that are characteristic of the way in which fragile governments must act to gain wider legitimacy. It seems as if fledgling governments tend to mimic Western ways of defining policy problems and organising technocratic remedies and thus succumbing to a common institutional process (Chisholm & Fuller 1996:694). The new government has been under enormous pressure to deliver visible change and improvements on every level, e.g. housing, education and job creation. " The rise of policy technicians and mechanical, state-guided reforms signal that this is indeed a modern government,

creating visible signs of change, centred on individual opportunity and economic growth, for which the state can claim success" (Chisholm & Fuller 1996:694).

De Clerq (1997:127) and Reddy & Le Grange (1996:20) argue that the narrowing of educational policy in South Africa will hamper the development of equity, redress and participation and this will result in the favouring of the interests of privileged sections of society. This is what Patrick Bond calls the 'elite transition'. In his book titled, *The Elite Transition: from apartheid to neoliberalism in South Africa*, he analyses the compromises that were made and continue to be made between the past and present powers in South Africa. Because concerns such as development, equity and participation are central to environmental education, the narrowing of educational policy and the institutionalisation of environmental education will compromise these pivotal issues. Furthermore current educational policy development largely excludes the expertise and knowledge of teachers and learners at grass-root level. Supporting this view, De Clerq (1997:140) argues that curriculum research throughout the world has shown the importance of building the professional capacity of teachers and involving them as key agents in the design and implementation of new curricula. The teachers are involved in the everyday learning that happens in classrooms and they are the real experts, not a select few that determine policy. Christie (1996:413) adds to this by reiterating that policies are best understood in terms of practices on the ground. This is why it was important for me to go into the classrooms where environmental education is being taught and learnt to gain an understanding of how teachers interpret and apply policy. It is futile to use the term 'reconstruction & development' in policy documents and as buzz words in educational jargon if reconstruction is not started in the classroom so that development can follow (Le Grange & Reddy 1997:14). Fullan (1991) furthermore argues that change will only take place if the cultures of classrooms, schools and universities are transformed and not by the implementation of new policies alone. The success or failure of South Africa's new educational policy will ultimately be determined by what happens in the classrooms.

I also found that environmental education was only a principle integrated in certain learning areas and not a learning area. As discussed earlier in this thesis environmental education has evolved into a new approach. The old approach treated

environmental education as applied science. The rationality of environmental education became of the technocratic kind and qualities of science such as objectivity, rationality and truth dominated the approach to problems (Robottom 1997:20). “One of the outcomes of technocratic rationality in education is an emphasis on the didactic teaching of pre-existing knowledge – knowledge that is systematically selected and organised before the classroom activities are defined which ‘transmit’ the knowledge to students” (Robottom 1997:21). For example, ‘ecology’ is often treated as a means of perceiving the environment as it ‘really exists out there’ in a purportedly objective sense, in a way that separates ‘the ecology’ from personal, political and social values (ibid). Another outcome of technocratic rationality in environmental education is a belief in the authority of scientific knowledge which is expressed in a division of labour between those who are supposed to produce knowledge and those who are supposed to use or implement the knowledge (ibid). The technocratic interest that justifies and preserves a division of labour between the science academy and teachers creates the conditions for the academy to enact a role of legitimate pre-ordinate, objectivist ecological knowledge as proper curriculum content (ibid).

Secondly, the study has established that the manner in which the educator facilitates the learning support materials is the determining factor in the attainment of the set learning outcomes by learners. It was also found that the curriculum as practiced is not always the same as the prescribed curriculum. This was revealed when I observed four lessons with the same planning and LSMs presented by four different educators. The way in which individual educators interpret and apply the curriculum with regard to learning support materials influenced the learning in a positive or negative way. This leads me to believe that LSMs on their own cannot improve teaching and that LSMs must be accompanied by teacher development. Darder (2002:99) reminds us of the teacher’s responsibility towards exposing students to a wide range of LSMs when she remarks as follows, “Teachers committed to a revolutionary practice must often search for and bring in alternative materials, articles, and textbooks to juxtapose with those required by their districts”. The data that were analysed in chapter four of this thesis illuminated the fact that the correct lesson planning and appropriate LSMs cannot magically transform learning in the classroom. According to the seven roles of the educator as defined in the *Norms and Standards* document of the Department of

Education, educators have to be able to create LSMs and learning programmes in resource-poor environments and to be able to do this teachers need to be information literate. People acquire these levels of literacy in communities and through interaction with resources. Walker (as cited in Carter 1996:36) feels that curriculum and education were always and necessarily mediated and educators themselves were located inside the media. It has been established earlier in this study that carefully designed LSMs can support teachers in bringing about curriculum change but it is not an automatic process."Teachers tend to be active, excited and convinced of the value of the new resource, but on their return to the stark reality of the chalkface there may be very little carry-over" (Moodie as cited in O'Donoghue & Taylor 1988:3).

> "The interactive experiences through which we perpetually redefine our worlds tend to resist change. Thus, for example, the world of the workshop, where teachers are exposed to new resources, may not have a profound influence on the world of the classroom. This is because the social reality of the classroom tends to be a 'crowded self perpetuating world' that resists outside forces of change. Changes occur when the maxims of the classroom 'fail to produce the goods' and/or outside propositions are reprocessed to become part of that world" (O'Donoghue & Taylor 1988:4).

O'Donoghue & Taylor (1988:5) emphasise the important role of the educator in the facilitation of LSMs as follows, "The important issues are not who developed the resources, what they are like of how they are printed, but *what teachers make of them.* We seem to have been so concerned about the materials that we have been unaware that teachers must make meaning of new resources by adaptively redeveloping them to their own needs and context." Within the premise of critical pedagogy meaning is negotiated in the class and each class and each learner is unique. This is why centrally determined curricula and learning support materials are bound to fall short in practice. Rather than confining teachers to the role of technical implementers of the curricula designed by others, teachers should be encouraged to participate in research of their own, conducted in their own classrooms and addressing environmental education issues of interest and concern to themselves (Robottom 1997:21).

Thirdly, the data that was used to elucidate critical question three revealed that the manner in which knowledge transmission happens in a lesson influences the development of critical consciousness in learners. 'Conscientization' as defined by Freire, can be viewed as critical consciousness and for the purposes of this study I have already stated that I agree with Mahomed (1984:29) in that critical consciousness is concerned with what people learn, how they learn and the relationship between these and the quality of human life. The curriculum was analysed to explore the *what* [what is prescribed & how this is implemented in practice]; the use of LSMs in the learning activities were being observed to explore the *how* and the selection of LSMs in learning activities was observed to explore how the learning relates to the real life experiences of the learner and thus contributes to the quality of his/her life.

Sparkes (1991:6) argues that progressive 'child-centred' teachers tend to see the world very differently from traditional 'subject-centred' teachers and both organise their behaviour accordingly. "Our culture structures the way we think; for teachers it structures how they think about children, the nature of learning, the appropriate forms of teaching, and school life in general" (ibid). Learning support materials can raise critical consciousness in learners if the educator and learners are involved in a dialogue; the LSMs are interactive and the learners are required to apply critical thinking. It is also crucial that the educators choose themes that relate to the world of the learner and his/her real life experiences so that the learner is able to use his/her prior knowledge in the construction of new knowledge. "We expect the educated person to have some understanding of the relationships between those bits of information that enable a person to make some sense of the world; the educated person should have some understanding about why a relationship exists" (Jickling 1992:6).

The literature that I read for this study revealed that critical consciousness in learners pertains to beings that not only know, but they know that they know (Freire & Macedo1987:127). Simone Weil [1901-1934] remarks as follows in this regard, "The most important part of teaching is to teach what it is to know". In one of the lessons that I observed I experienced how learners felt disempowered when they felt that they had

no voice and that they could not contribute to the construction of meaning (refer to lesson four in chapter four of this thesis). Dialogue is nourished by love, humility, hope, faith and trust. When the two "poles" of the dialogue are thus linked by love, hope, and mutual trust, they can join in a critical search for something. Only dialogue truly communicates (Freire & Macedo 1987: 84).Critical pedagogy cannot be done from the top down, but only from the inside out as learners have to be able to "identify learning *content* with the *learning* process" (ibid: 84). The learner will only be empowered to exercise his/her voice if the learning is related to meaningful, real life experiences which enable the learner to transform his/her world. This links to my earlier discussion on LSMs and emphasises the importance of the teacher using LSMs that link to the real world in which the learner is situated.

Rennebohm-Franz (1996:265) suggests four philosophical/pedagogical principles for involving learners and their voices in the learning:

1. Listening to children's voices will lead to dialogue and from these dialogues the words of the children become important curricular content.
2. Multiple ways of knowing will result in peaceful and positive learning with multiple versions of human experiences that develop understanding of diversity.
3. Focus on collaboration rather than on competition will lead children to know that they are knowers and that everyone has an equal opportunity to contribute to the learning.
4. Generative teaching and learning imply that the understanding of what our world constitutes is continually evolving and that nobody can claim to "say what the world is" (Rennebohm-Franz 1996:269).

5.3 The prospects for Freirean education in South African environmental classrooms

At the beginning of this study I emphasised that I am not looking for solutions and that Freirean pedagogy is not a recipe to be applied. You cannot liberate someone. Liberation has to come from within. A personal conviction that each one has a voice and that the transformation of society starts with the individual exercising his/her right to make that voice heard sparks liberation. In chapter three I stated that the findings of this study cannot be generalised. The idea of a true, correct or perfect statement about how pedagogy should be practiced in our classrooms is implausible. I am therefore not

asserting that what is suggested here is the solution. I have not reached any definitive answers at the end of this study and certainly no solutions, only suggestions that the reader might interpret within his/her world. I invite my reader to look at the possibilities that Freirean pedagogy has offered throughout this study and share with me what may be possible in our classrooms.

The reading for this study made me realise that critical pedagogy is not without its critics. Among them are C.A. Bower (1982, 1987) and Kenneth Strike (1989) who accuse Apple, Giroux and McLaren of being idealist and liberal and Freire of practising "revisionist liberalism" (as cited in Abrahams 2005:16). There are however many staunch supporters of critical pedagogy whom I have quoted in this study, for example Freire, Shor and Giroux.

Despite criticism lodged by Bower, Strike and others, there is a strong case for critical pedagogy in environmental education. Although the relevance of critical pedagogy in environmental education has been argued earlier in this thesis, I suffice with a final argument. One of the foundational environmental education documents, *Agenda 21* (UNESCO 1992), states that one of the challenges for environmental education in the future is to prepare students effectively to be socially critical and engage them as agents of environmental protection and change. In the past it has been assumed that sufficient knowledge about the dire state of the environment would motivate learners to act upon this knowledge. However, Tilbury (1995:201) argues that the decision to participate in environmental improvement is not stimulated by the cognitive realm, but is dependent on personal motivation and a sense of responsibility which results from a personal environmental ethic. This orientation reinforced earlier claims (Huckle 1990, 1992; Robottom 1987 & Abraham *et al.* 1990) that only critical education will improve the capacity of people to address environment and development issues (Tilbury 1995:204). This ties in with the Freirean view on education which holds that teaching is not only a cognitive act. Darder (2002:99) defines learning in the critical classroom as "... very exciting, painful, frustrating, and joyful" – all affective and physical responses. Freire often referred to these very human responses when he considered the process of studying (ibid). In South Africa the classrooms are immensely diverse and it would therefore be impossible to impose a suit-one-suit-all approach. It is the teacher's

responsibility to make the learner aware of his/her voice and the right to exercise this voice. In Freire's pedagogy the teacher requires lovingness and humility to engage the learner in the learning. Jickling (1992:8) reminds us of the importance of engaging our learners in the learning as follows, "In a rapidly changing world, we must enable students to debate, evaluate, and judge for themselves the relative merits of contesting positions".

I have come to the conclusion that we as teachers and teacher educators should meet the challenge to reflect critically on our own practice. If we are honest we might admit that the status quo is not working and that no harm can be done in putting critical pedagogy to the test. We must however realise that critical pedagogy cannot be applied in a cookbook way and that it cannot guarantee automatic success.

Maybe we should not start off by asking, 'How *should* teachers teach'?, but rather inquire initially into, 'Why they teach as they do?' (Sparkes 1991:7). Any attempt to initiate curriculum change must take into account the culture within which teachers operate and the conditions which reinforce their sacred norms. Hargreaves (1989: 57) emphasises that anyone seeking to bring about radical curriculum reform must face the formidable challenge of fundamentally reshaping this culture of teaching, and therefore of interrupting its reproductive processes.

I want to challenge teachers to confront their own pedagogy and take up the role of 'transformative intellectual' rather than being the victim of the current educational dispensation. I re-iterate Giroux's (1988) argument that teachers should adopt the role of 'transformative intellectuals' who subscribe to a view of pedagogy based upon educating students to be active, critical citizens, thus making the pedagogical more political and the political more pedagogical. Taking up the role of 'transformative intellectual' may challenge the very premise of our identity as educators. Jickling & Spork (1998: 324) remark on a more humorous note that the great danger in teaching people to think is that they may actually do it. If we lack confidence in education we may, on the surface, encourage students to be socially critical, yet feel the need to steer them towards a 'best' direction (ibid). To be able to teach as a transformative intellectual, attention has to be paid to the processes of curriculum planning and

teaching. Approaches to teaching in the critical classroom need to be very different from those of the traditional classroom. One might reflect on one's own pedagogy by measuring them to the following ideals or guiding principles for critical teaching in environmental education as outlined in Fien (1993a:17-18):

1. To what extent do I maintain a clear vision of what a just, peaceful and ecologically sustainable world would be like and how does it influence the education I provided to my students?
2. To what extent do I maintain a balance between knowledge, skill and values objectives, especially so that the development of important skills and values are not subsumed by an over-emphasis on content?
3. To what extent do I follow democratic procedures which enable students to participate in curriculum decision-making and negotiation and to have power and responsibility over their own learning?
4. To what extent do I respect students' understanding, ideas and opinions and create a supportive classroom environment which encourages students to explore new ideas and voice opinions in a spirit of tentativeness but without fear of criticism or failure?
5. To what extent does my dominant teaching style respect the varying learning needs, abilities and learning styles of students, and focus on the development of inquiry, values analysis, decision-making and social actions skills?
6. To what extent do I utilise the resources and experiences of other teachers, students, parents and members of the wider community in order to draw upon and illuminate the experience of living in a particular community with a particular social, political and economic structure, and particular links to global trends and processes?
7. To what extent are the criteria I use to critically evaluate the appropriateness of teaching materials consistent with the principles of Education for Sustainable Living?
8. To what extent do I ensure a match between the content I am teaching and the styles of learning experiences and assessment to be employed so that my style of pedagogy becomes the message it is teaching?
9. To what extent do I focus on political literacy in my teaching in order to develop appropriate understandings, attitudes and skills for encouraging participation in formal and informal channels to resolve global problems, but with particular focus on 'thinking globally and acting locally'?

10. To what extent is my teaching characterised by an action orientation that enables students to participate in some form of educative or direct action in the local community in order to practice the skills of political literacy they have developed, to see the social relevance of their school learning, and to experience the joys of success and the pains of frustration that come from collective action in working for a fair and more peaceful world?

The ideas suggested by John Fien should not be seen as prescriptive or as a checklist to be adhered to as this would be the sort of didactic that critical education is not. It only serves as a map to guide us and to de-mystify critical education. No two persons will have the same approach to critical pedagogy in their classrooms. I once again emphasise that Freire would not want us to work with recipes or checklists as this would defy the educator's freedom as 'transformative intellectual'. What I have however found useful is the suggestions that educators have to offer that have reflected on their own practice and have applied critical pedagogy in their classrooms. One such a reflective practitioner is Frank Abrahams (2005:18) a music educator who uses the following steps to facilitate critical pedagogy in his classroom:

Step 1: Honouring their world: teacher engages the students in problem solving by creating an experience that presents a need to know.
Step 2: Sharing the experience: students and their teacher process the experience. They share feelings and they reflect.
Step 3: Connecting their world to the classroom: teacher connects the experience using comparable concepts from the other arts, culture, (learning areas)[30], or student out-of-school experiences.
Step 4: Dialoguing together: teacher presents the lesson content. Students gather the evidence they need to solve the problem.
Step 5: Practicing the content: teacher provides students with an opportunity to practice the content. A homework assignment or quiz might be included at this step.

[30] My addition.

Step 6: Connecting word to world: teacher invites students to find alternative solutions and new ways to use the information presented. Students have the opportunity to create something new.

Step 7: Assessing the transformation: students and their teacher reflect and evaluate work completed. An assessment rubric may be applied at this step.

Step 8: Acknowledging transformation: students and their teacher celebrate the new learning through presentation, exhibition, or some other form of demonstration.

5.4 Conclusion

I started this study with the following questions in mind, “Has the way in which learners learn in our classrooms really changed?”; “Do learners have a voice in the construction of knowledge or are teachers still gushing forth torrents of knowledge and information, which the learners have to absorb?”; “Are the same methods of teaching and learning as practiced in the pre-1994 education system, in the idiom of an outcomes-based approach and using the language of outcomes-based education, still used or has some real change taken place?” My study progressed through three chapters before I got a glimpse of the realities of the classroom. I found that although the planning for the lessons was done in an expert way, the knowledge and presentation style of each educator had a profound influence on the learning. Learners were either empowered or disempowered depending on the manner in which the educator involved the learners in the construction of meaning. In the penultimate chapter of this thesis I gave an in depth discussion of my findings and how this related to my research questions. In this the last chapter, I have motivated why I find the national curriculum to be behaviourist and offered possible reasons for the relative exclusion of the ideals of People’s Education in the post-1994 South African curriculum. I argued that the evaporation of the ideals of the People’s Education Movement which were grounded on Freire’s pedagogy might be as a result of the current emphasis on training and not on education. This might be the result of the high unemployment rate in South Africa and the pressure experienced by politicians to deliver visible change and improvement to the lives of millions of severely impoverished people. Patrick Bond refers to these manifestations of material grievances as one of the many tragedies of South Africa’s elite transition and argues

that South Africa has witnessed the replacement of racial apartheid for what can be accurately described as 'class apartheid' (Bond 2004:7-8).

I furthermore offered suggestions from the work of scholars that made an impression on me while I was reading the literature. In the last chapter of this thesis I want to challenge teachers to confront their own pedagogy. O'Donoghue & McNaught (1991:401) rightly argue that, "One of the weaknesses of prevailing curriculum theory is its assumption that the curriculum can be orientated to manage greater levels of critical consciousness and social change". Furthermore "...change occurs through complex processes of critical reflection and dialogue in contexts of everyday action and social interaction" (ibid). Freire (1985:87) himself reminds us that, "Critical consciousness is brought about, not through an intellectual effort alone, but through praxis – through authentic union of action and reflection". The school and the curriculum should not be the tool for the management of environmental change but rather the teacher involved in engaging in a dialogue with the learners every day. The teacher is the curriculum expert because he/she is intimately involved in the lives of the learners and knows which themes are relevant to the world of each learner. Ladson-Billings' (1995:163) research revealed that the teachers who were successful in their teaching practiced a curriculum that was always open to critical analysis. The teacher is the learning support materials expert because it is s/he that must make meaning of new resources by adapting and redeveloping these resources to suit a specific pedagogical purpose. The teacher is the motivating force in bringing about environmental change, by not using didactic teaching of pre-existing knowledge. The passion that the teacher has for teaching and learning and the love for the learner are according to Freire indispensable qualities. If Kemmis (1986:19) states that, "Socially critical schooling is intended to provide students with a map of the existing culture and society and a map of what a better society might be like" , then we as educators are the guides, we give students the key that will unlock the map but they have to find their own way.

In conclusion I believe that it is not blind activism that will save South African education, it is love grounded in humanism. The enthusiasm that the educator possesses for teaching, learning and the learner is contagious and this is fulfilling Freire's ideal. According to Ladson-Billings' (1995:163) research successful critical

educators exhibited a passion about what they were teaching – showing enthusiasm and vitality about what was being taught and learned. Educators could love their learners by having a profound respect for each learner and the knowledge that s/he brings to our class. The educator also respects the learner when knowledge creation is mutual and the educator is working with learners in a dialogic relationship, where learning centres around problems that begin within the domain of the student and then spread outward to the wider world (Ozman 1999:332). This will enable the learners to see themselves and the world as being in a dialectical relationship. When the learner realises that s/he can exert influence on surrounding conditions they are truly empowered (ibid). Freire urges the educator to reflect and act upon the world in order to change it. Bell Hooks (as cited in Steiner *et al.* 2000:185) reminds us that, “And how could I forget that fundamentally damentally the purpose of my knowing was so I could serve those who did not know, so that I could learn and teach my own-education as the practice of freedom”.

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ADDENDUM

Lesson Planning

LESSON PLANNING

Activity one

Activity	**Needs**	**Time**
Tuning in: Bio diversity is the whole variety of living organisms, the genetic difference between them and the communities and ecosystems in which they occur. It is the natural wealth of the earth that supplies all our food and much of our shelter. B I O D I V E R S I TY Think of an animal or plant that begin with one of the above letters: A story about the tree: The heaviest burdenP93 from the Green Umbrella The pyramid **Tuning in:** Divide groups into six groups of five; Ask learners to name something they cannot live without and write on the board Each group gets six tins that represent air, water, soil, plants, animals and humans. The learners have to arrange these tins into pyramids. Air, water and soil at the bottom, then plants and animals then humans at the top. Discuss which of the tins they can pull out without breaking up the pyramid/ Add a sixth tin representing the sun. Let learners discuss where the sun should fit in. Provide them with a plank on which the pyramid will be balanced with the sun underneath. Explain that all energy comes from the sun and is captured by plants. Which of these elements can we eat? *Plants and animals* Which of these elements provide their own food? *Plants make their own food by using the sun, air, water and minerals.* Now relate back to what learners said they could not live without. Which of the tins would they be able to live without?	6 Sets of tins	**10 mins**

Learners create their own flower. Apply what you have learned what is needed for successful pollination. Where does the flower grow? Veldt or Wood? Wet or dry places? How will it attract pollinators? Does it need a special pollinator? How is it going to ensure that the correct pollinator visits it? Is the flower adapted especially to ensure pollination? What would happen if the pollinator were killed? **Activity three:** To understand the role of the pollinator as well as the natural mechanism to ensure that pollination between species does not occur. Flowers stand in a circle around the educator. The educator will be the pollinator and the flowers will try their best to attract the pollinator. When the pollinator visits the flower there are three rules: The flower must stick his pollen onto the pollinator. If there is already a coordinating speck of pollen on the pollinator then the flower may go and sit, as it is pollinated. If there is no coordinating pollen on the pollinator then the flower is not pollinated and must still stand. The flower must still place its pollen on the pollinator. At the end of the activity some flowers will still stand and will be the dead flowers. The flowers that sit are pollinated will have become seeds. **Discussion:** Why did the pollinator choose the flowers that were pollinated first? What is the function of the pollen? Can flowers use any pollen to make a seed? How does a flower distinguish the right pollen from all the different kinds on a pollinator?		

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Activity three Play the carnivore game. Or play the carnivore game: **Activity four** Show bush School Video Show learners the skulls of herbivores, carnivores and omnivores. Look at their teeth and the position of their eyes.	Bush school video	

Group 2 **Tuning in:** Plants make their own food and produces food. How do plants grow and make new plants so that we can have food? **Looking at flowers:** Why are flowers important? *Flowers attract pollinators. When a flower is pollinated it makes a seed or a fruit. When a seed germinates it makes a new plant.* Which product sells the flower *Nectar is food for many insects, birds and bats* Look in the garden at different colours and shapes of flowers: How many colours do you count? Which colour do you see the most? *Yellow attracts most insects* Which colour do you not see often? Which feature do you think sells the flower? Nectar is food for many insects, birds and bats. **Activity two:**	Learners make their own flower	

What was the function of the dead flowers? How many different pollinators can you identify in the garden? **Activity Four** How does pollination help food security? Take a walk through the garden and see if you can identify a monoculture garden and a diversity culture garden. Which garden is the most attractive? Why? Which garden is more sustainable and why? What would be the benefits of a garden with many different species as opposed to a garden with only one type of plant? *It attracts more insects* *It provides yields for other plants* **Activity Five** See how many pollinators you can find. Give children a net to catch insects with. How many different pollinators can you find? Insects: bees, butterflies Bats: Birds: sunbirds **Concluding activity** Give learners cards with sentences. Learners have to decide whether the card is good or bad for the environment and then place their card in the appropriate pocket. Each child will get a piece of paper in the form of a seed. Each learners will write what he is going to do as a pledge for a better environment. Go back and plant your seed.		

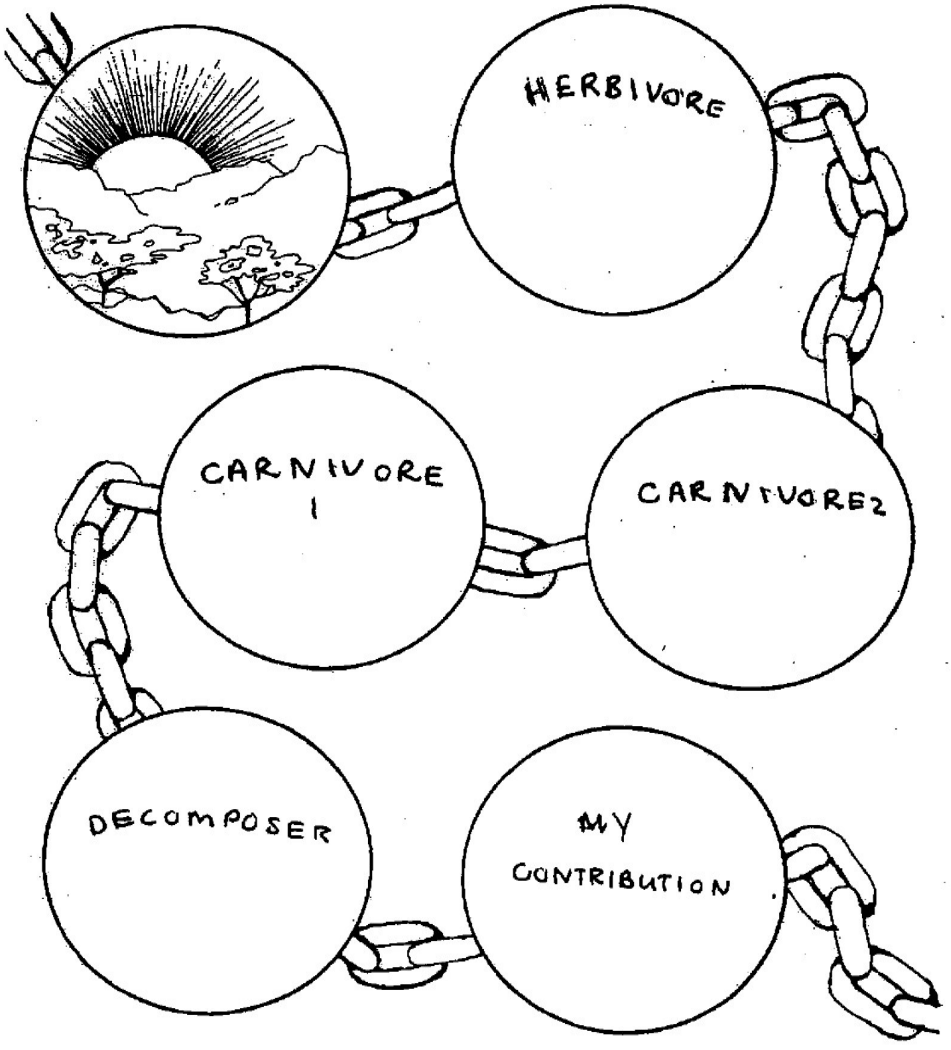
Resources:Energy: UNISA
Biodiversity: SANBI

WORKSHEET 1

200

Complete the food chain using pictures from the school garden

Name: _____



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

WORKSHEET 2

Name: _____

Look at flowers:

How does it attract insects?

_____

How many colours do you count?

_____

Which colour do you see the most?

_____

Which product sells the flower?

_____

2. Make your own flower

Where does your flower grow?
Shade, sun, wet, dry place
How will it attract pollinators?
Colour_____
Shape_____
Nectar _____
How is it going to ensure that the Correct pollinator pollinates the flower

_____

_____

3. Can flowers use any pollen to make a seed?

_____

_____

4. How does pollination help to ensure food?

What are the benefits of a garden with many different species as opposed to a garden with only one plant?

_____

_____

What plants are you going to grow in your garden?

_____

Interview with principal

Thank you for having me. It has been a privilege and a pleasure to work at your centre. I have enjoyed it and the reception has been so kind and you have been so hospitable, I really appreciate that. I think as you know from the letter of approval and other discussions that we had, that I am looking at what happened in South African classrooms before 1994 and what happens now, and also to get an understanding of the nature of critical education and its capacity to inform learning in environmental education in classrooms in South Africa. I want to see how the use of learning support materials can actually raise the levels of critical consciousness of learners, that they know that we are in a dialogue in our classrooms, it is not a monologue and that they have a voice and that they can exercise that voice so that the dialogue between the educator and the learner is of such a nature that they are also able to bring the knowledge that they have to the classrooms. And that we construct the knowledge together, so that both teachers and learners benefit from the learning and that it is not a top-down approach. And in the light of this I would just like to ask you a few questions.

What is your understanding of the concept curriculum?
Ok, that is defined by the National Department of Education and the National Curriculum Statements and the Assessment Standards. I think that is what the curriculum basically is in South Africa. That is my understanding of what we have to follow.

Do you think that there is a gap between the planned and the practiced curriculum and why do you think as you do?
You mean the planned curriculum?

Yes, and how it is practiced in our classrooms?
I think there is a gap, because there are lots of reports that the people are still doing the old education and they just apply it with the outcomes. They don't transform everything,

but they are still using that old syllabi as the content to work from and changing their teaching methods.

So they are actually using their old content, but just applying OBE methods?
Yes, that is what I understand and you know, aligning it with the outcomes.

And what is your understanding regarding the methods of OBE? If you say that some people are using the old knowledge but new methods, what do you perceive as new methods?
Well, it is basically that they have to follow the curriculum statements and the assessment standards and the assessment standards describe exactly what the children should be able to do and usually also says that there is knowledge, skills and values, that has to be learnt in each lesson. So there are certain prescriptions that they have to follow to be able to attain those outcomes.

Do you see the methodology in the class changing? Do you think it is still a top-down approach, or do you find that the learners are participating?
Yes, I am not so sure of what is going on in all classrooms, so I cannot really say how it happens. I have seen some reports that the department is working with, where they are still struggling with getting it right.

And at your Centre here, how has the methodology in your classroom changed?
Look, here we really work differently. We don't do a normal lesson. But what we do is that all the activities are interactive. The children can interact. When we train our volunteers, we train them that they are just mediators of the education. Whether that happens I don't know, but I can still see people fall back into the old thinking, some of them. Many of them still fall back into the thing of, "I am giving the information" and not being the mediator.

But that is actually what you are trying to achieve?
We are trying and I think that some have witnessed that they are really doing it in the right way.

I have looked at your lesson planning, and observed your lessons. Do you work according to the curriculum, in the sense that you plan according to the outcomes that are set?
Yes, we are trying to actually be like an outdoor classroom for the schools. They can bring their kids here. What we do here is what they should do in the morning classroom, but we are just going to do it in the environment as a context and at the same time teach those values and skills… We use the environment as the context, I think what OBE ascribes is that there must be a context. It must be relevant to everyday life. So, we are taking those concepts of the waste and the energy and all that, bringing it into those learning outcomes where appropriate, and we are really trying to work according to the levels that the department has set now for each grade. So we try to make it grade specific. The teachers must come here and find that it is worth their while to come here in the morning and then the children get a little sheet that they can complete, which they can be used in their portfolios. So it is doing their curriculum work here.

So do you link to specific learning areas, or do the teachers go back and link it to whatever they are doing?
Our lesson plan is there and it is specifically linked to a learning area and a learning outcome and an assessment standard, so that they can actually see that we are doing that work.

And do you find that they actually build on what you are doing when they go back to the classrooms?
That is what I don't know, because most of the time we are using the natural science area or the social science one. Then the idea is that they should actually come here when they are busy with a certain topic, because the natural science learning area covers life and living. It's 4 strands, but they are all doing the same strand the one term. Life and living

is what we are doing in the biodiversity room and they do it actually in the third term. But, you know, teachers, I don't know. In the beginning I had a little bit of feedback when I taught the classes myself, and I interacted with the teachers. I asked them if it works for them in the classes. Do they take it back? And they would say that they would do soil and we show the children these things and we build on it a little bit at school. I don't know how many times, because I don't know how often that happens. I tried in the beginning that it should happen.

But it is difficult for you to monitor?

Yes, it is difficult to monitor because I am not in the classes all the time. I have trained the volunteers to do that and the teachers must give feedback, a questionnaire that they must complete after each session, that they must say whether they find it relevant or is the knowledge relevant and so on. And usually they give a positive feedback, most of the time.

So you trust that they are applying what they have learnt here in the classrooms at school?

Yes, many times they would say things like, it is good for the kids. But I am not sure…

In other words that they apply it when they go back to their classrooms? But they seem very keen and interested when they are here.

Yes, they are very interested when they are here, but I am not so sure what happen in the classroom. I have not done any follow up work on that.

So that might be a new area for research?

That can be a very interesting area for research, yes.

In other words how they actually apply what they have learnt here.

I just want to show you some of the feedback forms.

It might be a good idea if I could have a few of these feedback forms to maybe add to the study.
Yes, you are welcome.

It will give us an idea of the perceptions of the teachers from school.
The first one is an evaluation on the facilitator and the second one is on the program. So you can see that we have 87% average that they give us.

[Which is excellent. And I found the same when I spoke to some of the educators while I was observing the learning activities. They were really positive and really very keen]
And then, how do you apply the curriculum and do you deviate from the prescribed curriculum to accommodate the needs of your learners?
The curriculum is not so prescribed; the curriculum is actually so flexible that it can accommodate all… OBE should accommodate the needs of the learners. So when they do the assessment they are supposed to look at all those 7 multiple intelligences and then accommodate learners in that way when they assess them. So, yes with us we are doing… I can't say I do it consciously, but we have games, we have things that they must draw, we have things where they do drama, we have things where they play a game.

To accommodate the 7 forms of intelligence you are actually making sure that there is a little bit of each in the learning activities, to accommodate everybody?
Yes, we wanted to be interactive… it is active learning here. We are doing active learning.

I actually perceived this when we were out in the garden and they had to make music and do a little song, you used the garden implements as instruments. And they just loved it. It was actually so creative, and I actually thought that it is a very good idea for the music intelligence ones. You could see the learners that are strong in music sort of coming forward and leading and help composing the song.
Yes.

[Interruption]
We let them feel and touch. We always say the 3 T's: talk, touch and think, those 3 T's. So there must always be something that you can touch and there must be a dialogue and there must be the thinking component. So we are trying that always. Sometimes they have to read something, and then you find that the children struggle to read…

…because it is not in their mother tongue, the worksheets?
So that is why in those cases the teachers might read the things for them or they might interpret for them what they are reading.

Could you tell me more a little bit about the idea of code switching were the educators present both in their mother tongue and in English? What is your thinking in this regard, why do you do it that way?
Here with us, I find that the volunteers do it in their mother tongue. Especially the younger ones [learners] and even the older ones they themselves are not that capable of talking in English. So they always switch over, even if it is grade 8's and the grade 8's is very much fluent in English. The code switching might happen when they read something and the teacher explains to them in their mother tongue.

How do you feel about the knowledge that they have gained? Do the educators reflect with the learners on the knowledge at the end of the learning activities?
Yes, that is what we encourage them to do at the end. We always have a conclusion.

Why do you think the conclusion is important?
Because you have to bring all the ties together, tie everything together, and you have to see what the children have learnt. You have to assess what the children have learnt. We usually ask the children what is the one thing that they can remember of today. And then we just reflect on the whole morning's activities and sometimes we give them a little assignment that they must take home, like for the grade 7's they must go and make a poster, with the grade 8's they must write a magazine article, but we haven't seen much of that happening. It is very difficult to monitor.

It is very difficult to follow up, because you don't see them…
We wanted to have a competition doing an article but it hasn't realised.

They are not keen on that?
Yes, we have lost touch.

After your reflections, do you find that you actually adapt follow up lessons? Do you find sometimes that the lesson is too difficult or too easy and that you adapt the follow up activities or not?
Look we can also do the reflection with the children and then also with the volunteers, usually when we do a new program we would reflect… we would ask them how did this work, how did that work and so on. And then they would give input and say this didn't work for us and we must change it this way or that way.

I think you have answered this in a certain sense, but I want to know how important are learning resources and specifically learning support materials (LSM's) in your teaching and learning at the EE centre? What role does it play in a learning activity?
Look, for every learning activity we have learning support material, it might not be a book or a textbook but it is always something that is like a thing that is part of the education. It might be, in the waste room, it might be the wall about the waste, or in the energy room it might be the sun stove or different things. In the Biodiversity Room the resources would be the things the children use to go and do their studies outside, the nets that they go and catch insects and there are worksheets that they must answer. So yes, everything is supported. The programme cannot run without the resources. I mean that is actually the most important thing and they are designed in such a way that they are interactive.

And do you think that the learners can actually apply some of the knowledge that they have learnt here? You have mentioned the sun stove, are these the kind of

things that they can apply in their everyday life and in the community in which they live?

That is what I encourage, but it is not always that easy. Because you were doing the Biodiversity Room, and the Biodiversity Room you really want them to understand the magic. They must come and see the soil, the compost and actually understand that this is real magic happening here, so that they can appreciate it and value it, that it is really something that they can care for. And then after that, then that is when we hope that people will start to appreciate the soil and do something. Because now we don't waste in the street, why don't we waste in the street? You must first know why and that is why we deal with the appreciation first. So to get the message across that you must save water, you must first give them the respect for water. Where is it coming from? Why must we look after it? And if they get that, they understand better why they must look after it. But if it really happens after this… it is a long way to go. Especially the waste, one thing that we are looking at here is the river. The river is full of pollution and how do we stop people from polluting the river? So the children go there and they do a little study at the river and see the magic in the water and realise that there is more going on in this river than what they ever thought of. And then we tell them to go pick up the papers and clean the place. Whether that happens, I don't know.

Yes, I am sure it is difficult to determine, because it is not the same as in a school were you see them over a long period of time. You might see them once or twice a year?

Yes, but we do action projects as well. We don't just leave it here, we do projects where they have to go and clean the river physically or where they have to go and plant something. Those are the types of things that we try.

[Yes, to keep everybody involved] Do you get other members of the community involved as well or only the learners?

Yes, we do. We can't address the waste problem if you don't address the community as well. So we have community workshops also.

Then lastly I would like to ask you, how are learning support materials selected for activities and how do you select the themes? How do you decide what you are going to do for example with the grade 5's in Biodiversity?

We are really going according to the curriculum, what is prescribed. Because I mean you have it now. That is really difficult, because we have grade 4-6 and you have the curriculum for grade 4-6. I actually went and looked what teachers do and now the Department has actually come up with some kind of structure, that this is what must be done in grade 4, this is what must be done in grade 5. So this helps a lot. But still things overlap and so on. Say for instance I want to teach about herbivores, carnivores and omnivores, they are supposed to start in grade 6 now. But I teach it to the grade 5's anyway.

So it just prepares learners?

Yes, so I don't think it matters too much. Like soil, they are doing it in grade 5, but I only do it in grade 6 because I find the children have to read a lot of things and a lot of technical things that they must understand. There I find that I work better with the grade 6's.

So it is by trial and error as well, to see what works?

Yes

So you work according to the curriculum but you also see what works in your classes?

Then I have a sensory trail. You haven't done that, you haven't observed that…sensory? I did consult a teacher and asked the teacher what she thinks.

Do you find that the learners are keen when they come here? Do they enjoy the learning? What is your general perception? Is it a good way for them to learn, using real life objects?

I think they enjoy it. We also try and make it fun as well. Otherwise the children, you know, come here the whole morning. It is a long stretch and you have to put in some fun as well and to get their limbs loosened up and a little bit of running here and there or something else so that it doesn't feel like a real class situation. You know something that

they enjoy. They usually enjoy the activities here, especially the games, it makes them excited. We teach them while using games. One of the things that we do is "how does waste get taken to the landfill?" It is a whole animated thing that we do with them and they play this little game and they learn while playing.

Thank you so much and for the input that you have given me.

Interview with educators

I just want to say thank you for having me and for always being so friendly and accommodating me. It was an enormous privilege being here with you at the Centre. I admire the work that you do; I'm just so impressed and thrilled. I would just like to talk to you about the lessons that I observed.

You were the people that presented the lessons and I would like in the first instance to ask you:
How important do you think learning support materials are in the learning activities that you present?

We think it is important because it is practical. They use resources and materials that are available to them. It makes it easy for us to teach and it makes it easy for students to understand. It is not like you tell them something that they cannot see. It is possible for them to forget that, but using their hands it is easy for them to remember, so using those materials is important.

Would you like to add anything? Why do you think it is important to use these learning support materials?

It is making the job simpler for them, and they will understand clearly. And having those things at hand it makes your job much, much simpler. And you can give more examples, especially the examples of those things that we are using at home and we are still using them again here, so it is knowledge that will not forget easily because you making use of it everywhere. Everywhere you go you find these materials. And it is then that you recall, oh I have done this, I fix this, I am doing this, so it makes it simpler for us to work with these matrials.

So do you think that the learning support materials that you use here, links to the learners everyday lives, when they go home in the afternoon, and that they can link what they have learnt here to what they when they are at home?

Yes, because they have…for example waste, they have it at their homes. It is where they must think where to take that waste and it where they must think how to separate the waste, what to do with the waste rather than taking it into the streets. So it is important that they can link it, even like

soil erosion. Soil erosion can happen everywhere in their streets, to their houses or the space around their homes. So they must think what to do with those erosions in their homes and into their streets.

Yes, to add to that, the learning support material, I think, yes it is very important. It encourages and it motivates the learners to participate.

So if I can ask you, why do you use the learning support materials during your learning activities? I think you have answered that to an extent, but do you think it is to the advantage of both the educator and the learner?

Yes, it is because when you give them the material you don't just teach them; they must think what to do with the material. It is easy for us as facilitators to use these materials and for the learners they are more active, they participate more, because they have something to do, rather than sitting and looking at you talking for the whole hour. So it is important.

The learning materials must … also be so that learners must be able to relate to certain things, because the material is provided for them. So it is simpler for them to relate. Hence the teachers and the educators, it is easy for them to adapt these materials and use the same methods the learners use in schools.

It also minimises the efforts that you as facilitator go to. You do not have to go through the whole program as it is. Lets say you are given the instructions and the resources, maybe to experiment whatever experiment it is, it becomes quite easy and you can see that the learner can integrate the theory and the practice. Does the learner understand? You only monitor, you no longer do the full facilitation.

We always say the learners must acquire knowledge and skills and develop attitudes. What is your opinion on the attitude forming? Do you think you are actually changing attitudes in these learning activities?

Yes, I can say that in a way we are creating critical thinking. The learners get it from the materials they are working with. These materials are playing an important part. The learners are no longer thinking the way that they were thinking before. It is changing. So the learners are thinking critically. It [the learning] becomes more effective for them. And then again they are gaining a lot,

because then you get challenges from then, and they come with all sorts of different things, all sorts of questions through these things and it is by these things that you realise it is working. Because look at the children, I am no longer spoon feeding them. They are telling me what to do, they are telling me which way can I still use the materials. So those opportunities they are there. And you don't have to say to them you do this with this. No, you just ask them, what can you do with this? One thing about waste, just ask them what you can do with this. Someone will say I am going to make a wheel for my car. Then the other will say no I am going to make a helicopter. You see, the learners are thinking, critical thinking is increasing. So it is much simpler for you. Your work is no longer that much. That is how you relate with those things that you are making use of. So it is very nice.

Do you think that it makes the learning more interactive, that you are not talking all the time and that you are getting the children involved?

Exactly.

We are more involved with the children with things, with the materials, that is when you are having fun. You have to have fun with those things, with the kids. Because when you have a long face with the kids you have a problem. You have to like smile with them, cooperate with them, understand them before you can come to yourself. You have to understand the kids, you are working with kids. You have to understand that. So it much nicer, it is beautiful.

You have to mould them, because when they want to buy snacks, they just eat them and they just throw away the plastic, but if they know that someone can earn a living out of the plastic that day, they know that they can take it to him and save as much plastic and then certain Wednesdays, Thursdays of Fridays when the recycler passes by they can give it to him.

And again they know that they are doing great and their attitude has been changed for life. Let's say that today they come for waste programme and tomorrow when they come for water programme, they bring along the waste from their homes so attitudes are changing.

So you can see the results?

Yes finally, you can see the results. Like sometimes it amazes me, like asking them with the plastic thing. Like asking them what can you do with the plastic bottle, instead of throwing it away? It is whereby you see that the kids start to think more, they start to think critically. Like, one would said I am going to make wheels for cars and one can say I can do a plane and one can say I can do this and do that, and it's so surprising to me. Some kids they didn't notice that before, but usually they are doing it at home, but they never thought that they are re-using or recycling. But automatically as we go through the program, especially waste programs, then they start to change their attitude, realising that if I'm doing this now, by re-using the container, I am re-using, you see.

Again on attitude, last week we were having a group of students here. They even left their containers on the grounds, because no one told them not to waste. And then today I told them to clean up and now it is clean, they were eating but left our grounds clean. So their attitude is growing.

It is wonderful, that is what we are trying to achieve. The learning outcomes that are set in the curriculum and that are interpreted for your learning activities here. When you plan these activities, you have certain things in mind that you want to attain. Do you think that the support material contribute significantly toward these learning outcomes? Would you be able to obtain the learning outcomes without these learning support materials in the activities that you present?

Yes, but it is going to be tough. By using learning material it is easy the things that we are going to attain.

Yes I can say by using those things it is making the work much simpler and easier and you are saving time. By using these learning materials you are saving at the same time. If you don't use it still you can attain what you want, you can still get the same results, but with different attitudes, different ways of thinking. So you need to use the materials to make the lesson more interesting more fun. That is why we need to work together as groups, get them to do things together, to know how to do things for themselves, to know how to make them think with these materials. So again the materials are playing an important part. In a way you can say, there is no way that you can work without them. But with them it is making your work simpler.

I recall on of you mentioning earthworm, that some of the children have not seen an earthworm, and what are you thinking of using the real objects?

Yes, by using real objects it makes the learning practical. Why it is practical it is realistic. It is based on life. It is that in future he or she might educate her kids. It is really realistically based, it is there in life, you know.

And again using those materials, for example, I will give the example of biodiversity. Biodiversity is about the different species living together. But they don't know what are the different species living together. So they need something practical to see and interact with. Because having those material and thinking of using those materials…I don't know how to put it. But having the material in your hands is easier. Ok, for example again, of the earthworm, we said to them everyone can make the soil fertile. And then we must show them an earthworm and how earthworms work in the soil and going in the garden and showing them the earthworms and showing them what the droplets are doing, and because the soil is fertile we are planting there. So they can say, oh ok the result of the droplets from the earthworms is for growing the plants and vegetables. So it is making the learning to become more interactive and we are achieving a lot because of using those materials and it is working.

It is nice when theory can be applied in practice. The more you get the kids to be active, automatically you achieve more learning. And you could see by the way they reflect and it makes the kids to learn more easily. It makes it easier for learners to recall and apply knowledge.

On the learning support materials, I think the learning support materials it also helps the children a lot, because if you are going to put white paper here, a red paper, a black paper and then ask the children which paper requires the most chemicals to clean, or which paper requires lots of energy to clean. But the method that we are using here to teach them, using those same papers, in a way it becomes simpler to change their behaviour and attitude towards paper and towards the environment as a whole.

Then I think we have spoken about this as well, but do you think that the learning support materials promote the learner's critical thinking skills and why?

I think it is promoting critical thinking as he was giving the example here of the different kinds of paper. When they can see the dark colour and the light colour and maybe take a pen and then write on the white paper and then write on the black paper. Then they can tell you, the writing on the

black paper isn't even visible. It is better, it is cheaper to clean the black paper than the white paper. In a practical way they are looking at the different learning materials at the centre. And then again having the material on the table, even if you don't tell them what to do with the material they can think, ok because I am having the soil here, and I am having 2 stones, it is soil study that we are going to do. Having the 2 stones and a spoon, what can I do with those things? They can easily think, ok I can rub these and then I can see what is the result. And then I have the other activity here for waste and then we put the bean on the scale and the waste, and then I tell them how many kg's do the objects weigh? How many kg's does the bean weigh? They must think, ok I am doing something wrong because thee scale is not working because I cannot see the number. Ok I can take the scale and put it outside, it is faulty. [learners then realise that the bean is so light that it does not even register in kilograms] So they must think, they must use these materials to think for themselves.

So they must make a plan, you are not spoon feeding them?

They come up with the ideas, their own ideas to find out whatever the required answer is.

As I said at the beginning it's developing their critical thinking, to think big. They are no longer thinking small, because of these learning materials that they have in front of them and at hand. Then by having these materials it is easier for the learners to think more. So they can know from the beginning, they can think about certain things, they can think of many things they can do with one thing. They can think of reducing and recycling material and take these cans to the people who are buying them. But because of the knowledge they gain learners think about recycling those things and they come up with solutions to problems. That is why we don't spoon feed them with the information. The learning materials help them to come up with their own solutions, things that they didn't know. The use of learning materials increases the learners' thinking skills and they start to think big.

I want to refer to the water program that we run. It is here that you see that kids love to be in charge, they like to be involved. They like participation a lot. We would for example give them an experiment of purifying water. We look for volunteers, we choose volunteers, the learners would for example volunteer to participate as time keeper, one person who is going to read the instructions and one person who is going to pick up the stuff and one person who is going to help others to clarify the instructions and explain to other kids. It is here that you see that the critical thinking is

playing a big role, a big role because you will see learners having a serious conversation with each other and coming up with clever ideas, wise ideas.

And again in the water programme, we have a problem with water quality and the amount of water that we flush away everyday in the toilet. So we ask the learners, let's say that you maybe go to the toilet 5 times per day, that means that you are flushing 9 litres 5 times. So we tell them what the problem is… we want to reduce the amount of litres that you flush everyday, how can we reduce the waste, the use of water in the toilet? The think, they think very well, they will say I won't flush it again, I will just use a bucket of 2 litres, or ok, I will just close the tap there and pour the water inside the cistern. They think, even if they don't come with the right answers, but they are thinking of solutions.

Critical thinking.

Do you also find that you are also learning from the learners?
We are learning a lot. It is fun and at the same time you are experiencing various ideas from various kids.

Are the learners bringing knowledge from home to the classroom?

Yes. It is quite relevant to their everyday lives.

Do you know the program that she was speaking about? I remember asking one of my groups, in this learning activity how we can save water in the system. One said, I can flush and stop. I said no, you are going to break cistern. Then the other said I can pour a certain amount of water in the cistern. No, how are you going to do that? The cistern is ceramic you are going to break it. Come up with another solution. The other one said you can put a brick inside there. Then I said that when you put a brick in the cistern it is going to get wet and then it is automatically going to dissolve, it is going to become sand inside there. Then the other kid said, no if you put this thing like this in here it is going to block the system. You start interacting with each other. The other one said no we can put a plastic around the brick. Then I said that is the solution. Take the plastic and wrap the brick and put sellotape around it and put it in the cistern. You are still saving water. We had another example where the learners put less litres of water inside, and they come up with another solution. And we learned something from them. You always interacting with them, you

are always learning from them because they come up with different ideas. We are not all living in the same way; we are not living in the same environment and the same place. So by having a word with the students we learn a lot from them. Others they come with questions you didn't know. But then you go and find out about this and get the answer.

You find yourself challenged.

And then learning becomes exciting?

Yes, ja.

You have answered this to a certain extent, but maybe we can just reflect…I know you have spoken about the river or the stream that passes through the garden of the Centre. Do you think it is important for learning activities and learning support materials to link to the real life experiences of the learners and why do you think so?

Yes, we think it is important because for example locally we have a problem of waste on the streets and then when the rain falls it washes the waste into the river. And then that is a problem for the aquatic animals. So having these children coming here and then giving them an idea of how to solve the waste problem. I think it is important to the real world, because those illegally dumping on the streets are often their parents. So having this knowledge of how to deal with waste will benefit the aquatic animals in the river.

I remember saying to you last time, that having a Centre like this as a privilege for these students because by having a Centre like this they have different learning support materials available inside the Centre. I can say all of the things we are talking about in Biodiversity are available here. Here we have birds, we have people, we have animals, we have all sorts of things living together and you learn from them. Unlike having a book telling them about something that they don't see, which is a bit difficult for them. Sometimes they don't believe you, it is just information. But because they see it now they become more challenged and say no this thing is helping us. So by taking care of these trees I am saving my air. By not burning stuff in the street I am not polluting my air. So these things become more relevant to them. So we really need these kinds of centres for the students to

have this kind of information because here they have it practically. Some of the knowledge that they are acquiring at school, is theoretical, but here in the centre it is practical. They see these things, they see the kinds of animals, they see the plants living together, all kinds of things, all sorts of things - we have them here. We show them these things and they are challenged. And that is whereby they gain knowledge and then when you show them again you are going to learn something from them because they are going to come up with something, always.

Again, we make compost here that is used as manure to grow plants. The learners need the vegetables for their health and for the home. Most of the schools have gardens and it for those children; it is the children who build the gardens for their schools. But again they can even take this information home to plant vegetables. Instead of buying vegetables they can take from their gardens. So they can apply the knowledge at home, even though we don't go to their homes to check if ever they are doing it.
In a way as she said it is the kids that are growing the plants in their schools. So they get like she said the compost, we give them the alternatives instead of using pesticides, we ask them what can you use? Instead of using spray and poisoning the plants and the soil, there is life in the soil. We give them things that are real to their world.

Again to add to the problem we spoke about of having waste on the streets, we tell them you cause a lot of problems because it was raining during winter time, it was not like that before, because we were experiencing rain during summer and cold during winter. So we tell them, many of those waste materials have chemicals and when it burns it ends up polluting the environment and we end up explaining about global warming. So we tell them the example of seasonal changes and they become afraid, but they know and think that what we are doing is wrong to the environment, it is wrong to our health too. So they can link this knowledge to their real life.

Excellent, yes if I check what she said. I am referring to what she said. Locally it is locally based, this problem of waste it is a very huge problem in Mamelodi. You know, with the stream and the waste. Maybe you find that kids do not know that is there is life in water, for example plants and aquatic animals and certain plants that depend on water. So we usually have a cleanup week. We don't just get the kids to clean the rivers and the dumping sites. We also give them the information about what is living in the water, so that they reason for themselves that what they are doing is harming the environment and that it is not friendly to the environment. So we are just giving them information to see the environment from a different perspective.

They test the quality of water beforehand and we have material like fishing rods and buckets so they can fish out the animals and then they can see we have different animals in the water, and then afterwards we tell them ok imagine if this animal swallowed the paper, what will happen to this animal? Oh it will die. So we want to save this animal, what can we do to save this animal. So they say, oh remove the papers from the water. So they are thinking and sometimes they see there is dead fish in the water. Then having these activities to think and relate to the real world because they want these species in the water and they enjoy seeing them and sometimes they are surprised to see them. Then the learners realise that having these species is a privilege.

I also once had a learner who liked the dragonflies. She never knew that these flies grow up in water and that they depend on water. They can live in water, but they can also live outside of water. She didn't know that, she was surprised that at this age, at this young age that the dragonfly looks like this and then it develops and then it changes and it becomes a fully grownup dragonfly. It starts as fly. She was so surprised and that also changed her attitude you know. Next time when she sees a paper or she throws it, she will think twice before doing it knowing very well that it will end up in the river.

And then lastly I just want to ask you if you find that children from different schools, I know you have an eco school here as well in the vicinity, have different needs? Do you adapt your material to suit the different needs of these learners or do you find that you can use it as is, and that everybody understands? In other words are they on the same level or do you adapt the learning to suit different learners?

We adapt the learning, but not for learners from the eco school. Some of the learners are a bit slow into the program. Some are fast and it is depends where they are coming from and the different school situations. So here, when we do the introduction it is here that we see that these learners are more active or less active and if they are less active they need much more information and if they are motivated I will just give them the introduction to each of the activities. So we try and adapt and then the children from the Eco School are better equipped because they have the learning support materials in their gardens and in their school yards. Like for instance waste, they have the recycling bins at their school. So it is not a big job for us to tell them, ok into the plastic bin what can we put in? They already know about that. And then with the different species and the biodiversity, they know because they have the various species and the different plants, and the

different flowers. It is easy for them to understand our activities. But for those who are not from the Eco School we try to help them, to give them more information that they can take with them.

Especially for those coming from the Eco School, I can say that you have to add something that they don't know yet. You challenge them to come up with a solution to a problem. You must give them something new. You come up with something different that is going to challenge them, then by so doing you are winning. Every day you have to win, you have to tell them…so that when they come out of here they have new information. Some information comes from them from their critical thinking. So you don't spoon feed them. And the other ones that are not from the Eco Schools you give them information; you let them think on the information that you give them. So by so doing you put them on the same level as those ones because you give them information that those ones are having and the ones that they not having, you combine them and come up with something. At the end of the day, that is why you have a conclusion. You summarise everything that you did. In the class I always say that I want one kid from the group that can come and summarise everything that we did. You will see what they have learnt. If one kid has learnt this much, ask yourself about the other ones. So you know that you are doing a great job. I cannot say that I haven't made use of this, I did it now. So we are winning with the learners and I feel I have done a great job. I have also learnt something from them. You see from the situation that you have a relationship with the students because they are coming from different families, different environments.

So you are saying that you are winning, do you see that as pertaining to the learning outcomes that was set at the end of the lesson? Do you think that it was a successful lesson, how do you measure it?

Yes, by asking questions and giving them things to do. You come up with different strategies of making sure what we have achieved with them. If you ask them questions automatically at the end of the lesson they are going to give you answers. You can see, ok they've got what I wanted them to learn. If you ask them to do something for you themselves at the end of the day, even if I give them a paper one is going to this and that, and in the end of the day they are going to reach what I wanted them to do. You can recycle or you can re-use the paper; build something out of this paper or you can put something on top of this paper instead of wetting the box. So the learners apply critical thinking.

Yes, by having a conclusion it is actually whereby we see that they have learnt. They have something that they can go home with. Sometimes we have a small competition after the program where we can to see that indeed they learnt something, that they have gained something. And I think they gain a lot, because at the conclusion, even if they cannot answer exactly what you wanted, not because they were not listening, they did gain knowledge. You can see others coming with this solution, ok I have learnt this, I have learnt that. And by so doing it is where we can see that they have learnt much. And you know, teaching a child you are teaching the nation because they will grow with this knowledge in mind. But this is the environment where they are learning.

I have experienced that the kids with the background of Eco Schools and the kids who don't have that background of an the eco school - it is quite interesting when they are together, because of the kid who doesn't have more information he feels excluded or she feels excluded and less engaged. Kids they like to know more. So when we do have the kids who have more knowledge it helps them to engage with the kids who don't have the same knowledge and everybody learns.

I really want to thank you, that was the last question and it was a wonderful discussion as always. Thank you so much for having me and all the success in the world with the wonderful work that you are doing here. It was really a privilege being here, thank you very much.