

**CURRICULUM RESPONSES TO
COMMUNITY-BASED AIR POLLUTION:
AN ETHNOGRAPHIC STUDY**

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AIR POLLUTION: AN ETHNOGRAPHIC STUDY**

by

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(i)

DECLARATION OF ORIGINALITY

I, Parvathy Naidoo, declare that this thesis is my own work and has not been previously submitted for any other degree at any other University.



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The "Naidoo sisters", for their support during the write up of the thesis.

DEDICATION

This study is dedicated to all those learners and educators in the South Durban Basin who are victims of community-based air pollution and have been part of the struggle for environmental justice.

ABSTRACT

The study aimed at exploring curriculum responses to community-based air pollution. This was done through an analysis of educator and learner perceptions of community-based air pollution and an examination of how the curriculum (teaching and learning content) responds to local air pollution. The key forms of the study – (what are the perceptions of educators and learners to community-based air pollution and how do educators and learners respond to community-based air pollution within the formal curriculum).

Ethnography as a qualitative methodology was adopted in the study. This methodological tool created spaces to understand curriculum responsiveness in the context of wider social and political power relations in the South Durban Basin. Ethnography suited the study since it was a unique example of educators and learners in real situations and lived experiences, and enabled a clearer understanding of the theory and praxis of curriculum. The primary research methodology used in order to gather data to answer the research questions was observation, participant observation and interviewing of educators and learners. This study was conducted with educators and learners in the Further Education and Training phase (Grade 10), within the Human and Social Sciences in the year 2006. Curriculum responses to community-based air pollution in Geography and Life Orientation were investigated. Learners were traced from previous primary schools in the area and who were in Grade 10.

It was found that all participants in the study were knowledgeable and well informed about air pollution through consistent exposure to local air pollution. Collectively, they presented a sense of enduring struggle against community-based air pollution. They have been part of the struggle for clean air for many years and reside in the South Durban Basin. Participants display perspicuity in respect of how air pollution infects and affects them. Attempts at including community-based air pollution into the curriculum have been sporadic and at times incidental from learners' point of view. On the other hand, educators' responses were very constructive and established. Furthermore with reference

to curriculum response to the subjects Geography and Life Orientation, both educators and learners responses were similar in that they displayed sophisticated accounts of knowledge of community-based air pollution. There was a deep sense of understanding of content and related to lived experiences.

It was also found that educators and learners choose to live optimistically amidst the air pollution at Valley Secondary. Issues of class, poverty and powerlessness emerge from the data – these govern the lives of educators and learners. Participants in the study provided several motivations for Environmental Education to be included as a separate subject for future curriculum initiatives by the Department of Education.

The recommendations included a strong need for responsive teaching to community-based air pollution. Learners should also be guided on how they should handle air pollution incidents. Recommendations in respect of re-organising the existent Environmental Club at Valley Secondary School also emerged. There is a clear sense that schools in the area should mobilise against the cooperate giants. Recommendations were provided for Curriculum Planners, Policy, and Policy Makers at the level of the Department of Education for the inclusion of Environmental Education as a separate subject rather than a devolved input.

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

AS	Assessment Standards
C2005	Curriculum 2005
CAER	Community Awareness and Emergency Response
CCS	Center for Civil Society
DEAT	Department of Environmental Affairs and Tourism
DMA	Durban Metropolitan Areas
DoE	Department of Education
EECI	Environmental Education Policy Initiative
EPI	Environmental Policy Initiative
FET	Further Education and Training
GET	General Education and Training
HSS	Human and Social Sciences
LO	Learning Outcomes
NCS	National Curriculum Statement
NGO	Non Governmental Organization
OBE	Outcomes based Education
SDCEA	South Durban Community Environmental Alliance
SO	Specific Outcomes
RNCS	Revised National Curriculum Statement
USEPA	United States Environmental Protection Agency
WHO	World Health Organization

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CHAPTER ONE

CONTEXTUALISING THE RESEARCH

“When we breathe the air of freedom
we do not wish to choke on hidden
fumes “ (Judge Albie Sachs, 1994)

1.1 Introduction

The above quote is metaphorical within the context of post apartheid South Africa. After the first democratic election Judge Albie Sachs was appointed by President Nelson Mandela to serve on the newly established Constitutional Court. In his opening inauguration of the first Constitutional Court (1994), he swore the oath to uphold the new non-racial, non-sexist, democratic Constitution of South Africa, without fear, favour or prejudice. In his opening presentation he referred to the relationship between the struggles for freedom, the struggle to improve the lives of everybody, especially to improve the lives of the most disadvantaged, and the most marginalized. He wanted to ensure dignity of every human being whoever they were, whomever their parents were and wherever their ancestors come from, in conditions of equality.

After 1994, the South African citizens yearned for freedom, in more ways than one. They wanted to be removed from the shackles of apartheid and to experience complete political freedom at last. Gaining South African citizenship meant that the government dismantle all apartheid-based structures both visible and hidden. Similarly, since the advent of democracy, several local communities (in particular South Durban Basin)¹ have been mobilizing around environmental issues, in particular community-based air pollution. In response to ongoing air pollution incidents and transgressions by South African industries, an appeal was made by Judge Albie Sachs to industries to be accountable for

¹ Within the South Durban Basin are several residential communities, namely Bluff, Clairwood, Isipingo, Merebank, Umlazi and Wentworth.

their air pollution.² The new democratic South African government had and still has a critical responsibility in ensuring that no community is exposed to health problems or an unclean environment. Judge Albie Sachs therefore appealed to the industries in the South Durban Basin to take responsibility for their actions. He wanted the citizens to be able to taste freedom politically as well as environmentally. However in the South Durban Basin the struggle for clean air continues. It is important that environmental justice activists continue telling stories of real people fighting environmental, social and economic injustices throughout the world. As “we breathe the air of freedom let us hope that we do not choke on hidden fumes? Sometimes, these fumes are not hidden **but** clear and present danger. It is distressing to learn that, in post-apartheid South Africa, low-income (black) communities continue to inhale the deadly fumes of environmental injustice.³

Furthermore, the South African Bill of Rights⁴ (Section 24 of the New Constitution) is supposed to guarantee every person the right to an environment that is not “harmful” or “detrimental” to health. Ironically at the time of South Africa’s democratic transition and to date, “hidden fumes” are still prevalent. Thirteen years since the birth of the new democracy in South Africa, “South Durban” citizens are still faced with community-based air pollution. It is therefore a challenge for communities and schools, in particular the South Durban Basin to ensure the proper implementation and enforcement of this constitutional right. According to a leading South African NGO called GroundWork (2003), one of the key objectives of working on industrial air pollution is to make the public aware that environmental rights are an integral part of human rights.⁵ GroundWork (2003) claims that by the time of South Africa’s democratic transition, there was widespread concern about air pollution and the failure to hold industries accountable for it. To date (2007) South Durban Basin communities and schools continue to face the harmful effects of community-based air pollution.

² See *Inauguration of First Constitutional Court. Address by Honour. Judge Albie Sachs.* 1994

³ See South Durban Community Environmental Alliance: Personal Reflections:Kalan H.

The deadly fumes of environmental injustice in South Africa.*South Durban Toxic Hub of South Africa.*
<http://www.afsc.org/pwork/0599/0514.htm>

⁴ See Section 4 of the New Constitution: *List of Rights of all South Africa Citizens in New South Africa.*

⁵ See GroundWork: Community Air Monitoring Report, 2003

In chapter one, I conceptualise the study and present the rationale for the study. I provide a brief review of South African curriculum policy changes, followed by the problem statement of the study. Thereafter I trace the history of the location of industries in the South Durban Basin. The aims, objectives and critical questions are explored. Finally the limitations of the study are presented and the chapter concludes with an overview of the chapters to follow.

1.2 Rationale for the Study

My rationale for engaging in this study is three fold, personal, contextual and policy reasons. Firstly, it is important to point out that I am a classroom educator who, like my participants, have been part of the struggle of teaching within the context of community-based air pollution. Since I began teaching at this school (2000) I have developed a respiratory condition “wheezing”.⁶ This has imbued in me a search for “responsive teaching” in dealing with community- based problem air pollution and schooling.

Secondly, my contextual reasons are based on the following. My subject (Geography) involves many aspects of air pollution, environmental issues and environmental education. I also have a great interest in the activities of the South Durban Community Environmental Alliance,⁷ a non-governmental organisation that actively challenges environmental issues in the South Durban. I see the need to sensitise and initiate processes towards understanding community-based air pollution within the context of curriculum and schooling.

Thirdly, policy reasons (with reference to the Constitution and the Bill of Rights) meant that I wish to understand how these rights have influenced curriculum responses to community-based air pollution. Furthermore, this study will examine the idea of the institutionalisation of Environmental Education within the context of future curriculum

⁶ Wheezing is a respiratory condition, which is breathing with audible whistling sound.

⁷ SDCEA is an environmental justice organization based in South Durban and it has been active since its formation in 1996. It has been successful for vocal and vigilant groupings in terms of lobbying, reporting and researching incidents and accidents in South Durban communities.

policy. The establishment of EECI⁸ in a post 1994 period is significant. Since EECI's establishment in 1996, it has been proactive in efforts to support Environmental Education in the proposed South African Curriculum. Currently Environmental Education is taken as an extension to the NCS⁹. Environmental issues are integrated in various subjects in the NCS. This is evident in that human rights, environmental and social justice are addressed extensively in Learning Outcome 2 in both Geography and Life Orientation. In a transforming and democratic South Africa, the NCS places emphasis on values and principles espoused in the Constitution. The focus lies in responsible citizenship and social justice. According to Le Grange and Reddy (1997), taking Environmental Education as an extension to the NCS, may result in Environmental Education becoming merely a peripheral concern or diluted amid a sea of confusion and uncertainty around the proposed NCS.

1.3 South Africa's Curriculum Policy Changes

According to Grundy (1987) curriculum may be viewed, as a product in which there was control and manipulation in the learning environment, with predetermined outcomes, a characteristic feature of curriculum in apartheid South Africa. Apartheid curriculum¹⁰ was authoritarian, racially exclusive and context blind. Thus we find that education, which ideally should serve to equalize society, has been a process that actually entrenched inequalities in the curriculum. On the other hand post-apartheid curriculum (NCS) emphasizes learning by doing, problem solving and skills development. In more ways than one, we can see the shift in the interest of equity and the empowerment of learners, which reflects the ideology of the new government. This participatory pedagogy¹¹ is strongly based on flexible outcomes, student paced learning and the development of critical thinking skills. The NCS makes this pedagogic objective explicit in the following way. It maintains that learners are trained to think logically and

⁸ Refers to Environmental Curriculum Initiative, which was established in 1996.

⁹ Refers to the National Curriculum Statement. The review of Curriculum 2005 provides the basis for the development of the RNCS, in which the NCS refers to Grades 10-12. This represents a flagship of South African education.

¹⁰ Refers to curriculum that prevailed in schools before 1994.

¹¹ The adoption of the Constitution of the Republic of South Africa (Act 108 of 1996) provided the basis for curriculum transformation and development in South Africa. Found in NCS grades 10-12, General.

analytically, as well as holistically and laterally. There is a need to balance independent, individualized thinking with social responsibility and the ability to function as part of a group, a community, or society (DoE, 1997). However, it must be noted that curriculum thinking and practice will vary from school to school as the process becomes flexible and responsive to diverse community needs. According to Chisholm (2002), the NCS in the Social Science learning area statement has been designed to give space to the silent voices of history and to the marginalized communities to develop a sense of agency in learners.¹²The NCS places strong focus in the relationship between curriculum, community and schooling.

1.4 Location of the Study:

Durban is the largest city of the Kwa-Zulu Natal¹³ province with a population of approximately 2.3 million and black communities comprise an overwhelming majority of this population. The school under study is a public school located within the Merebank¹⁴ community in the South Durban Basin. The South Durban Basin is located approximately south east of the Durban harbour. The South Durban Basin is made up of many industrial belts, within which are several low income residential communities namely Bluff, Clairwood, Isipingo, Merebank, Wentworth and Umlazi¹⁵. South Durban has the largest concentration of petrochemical industries, which disproportionately overburdens low-income communities with environmental stress and public health costs. In the South Durban Basin the residential communities and heavy industries are in close proximity and has a geographical relationship to the refineries. This valley industrial belt, nicknamed “Cancer Valley”¹⁶ is occupied by Engen and Sapref refineries. According to Peek (1997) the South Durban industrial basin is also home to waste water treatment works, numerous toxic waste landfill sites, an airport, a paper manufacturing plant and a multitude of chemical process industries¹⁷. In total, the South Durban area contains over 120

¹² See Reflections on Curriculum Revision: The Making of the RNCS Statement, Kenton, 2002

¹³ Refers to one of the nine provinces located in South Africa. South Durban Basin is located in Durban.

¹⁴ This is a community, located within the South Durban Basin with 8 schools in total.

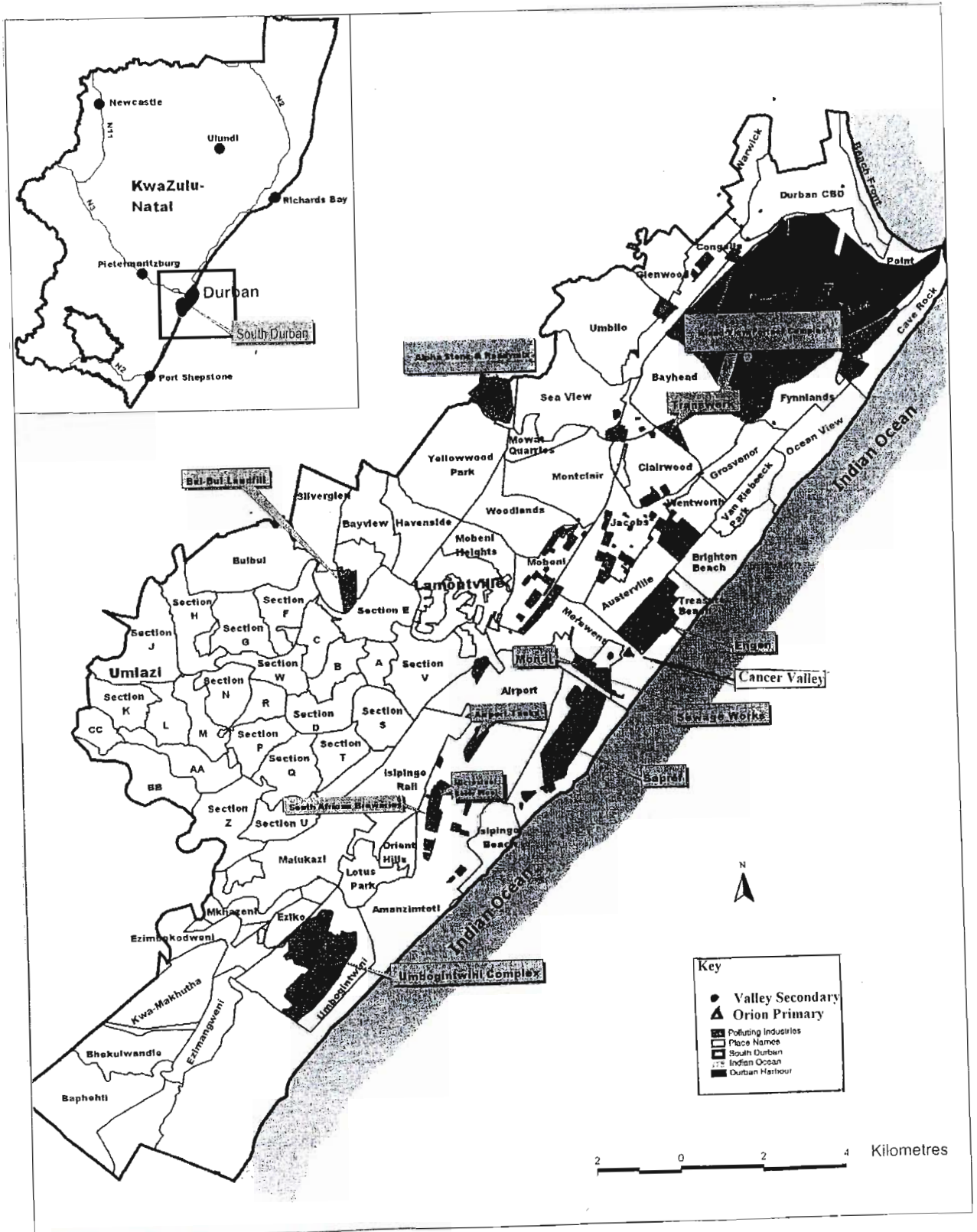
¹⁵ See ‘Community Air Monitoring Report, 2003.Groundwork’.

¹⁶ It is situated in a valley and has been nicknamed after Cancer Alley in California.

¹⁷ .See ” [<http://www.katu-network.fi/Artikkelit/kirja2/teksti/Peek.htm>].

industries, including the two oil refineries. According to Peek (2001), corporations in the South Durban Basin have used their power and influence to ensure that the lens used to view environment and development is clouded with strategies that benefit polluting multinational industries.

FIGURE 1.1: The Map of Kwa-Zulu Natal Province with an enlarged portion of the South Durban Area showing some polluting industries mapped by SDCEA.



1.5 Problem Statement

Against the background of curriculum theory, the National Curriculum Statement (NCS) and a selected demographic context, I propose to examine curriculum responses to the local problem of air pollution in the South Durban Basin. Curriculum change in South Africa must be understood against the following background. Since the late 1990's OBE¹⁸ as triggered the single most important curriculum controversy in the history of South African education. The historical account further suggests that politics remained a primary force in shaping the focus and content of curriculum policy in South Africa. A great challenge for post apartheid S.A. was to transform and modernize apartheid educational policies. Resistance to apartheid was matched with a degree of reconstruction in education and curriculum change. Curriculum 2005 has been described in policy documents as a "paradigm shift" because it represents a radical departure from the previous curriculum in terms of theoretical underpinnings, structure, teaching and learning (Department of Education, 1997:1).

Furthermore, Wilmont (2003) asserts that C2005 and the NCS advocates a shift from a system-based, largely on the tenets of positivist epistemology and behaviourist learning theory to one located within the ambit of constructionist epistemology and learner-centred education. Learning is therefore viewed in the new curriculum as an active and ongoing process of knowledge construction and meaning making. While curriculum policy mandates change, the interpretation and implementation of change is a process, which must be context specific. The process of curriculum change is an intimate affair that will play out differently in each and every school. We therefore need to understand in greater depth, how the official curriculum (teaching and learning) responds to community-based environmental context. Each school will have their own particular set of problems and challenges in teaching and learning within the context of community-

¹⁸ See the following articles; Jansen, J. (1997) on '*Why Outcomes-based Education will Fail?*'
Harley, K. and Wedekind, V. (1997) on '*Vision and Constraint in Curriculum Change: A Case Study of South African Secondary School Principals*'.
Chislomn, L. (1997) on '*Restructuring of South African education and Training in Comparative Context*'.

based environmental problems. The NCS integrates environmental issues such as local air pollution issues in both GET¹⁹ and FET²⁰ with specific reference to the subject Geography and Life Orientation. In this study I will bring together contextual and historical data, and match this with curriculum theorising.

1.6 History of Location of Industries in South Durban

It was apartheid planning that created the South Durban Basin's mix of heavy industry and residential land uses. Most part of the South Durban was deliberately zoned for industrial development and at the same time residential areas for black people was located close to these dirty industries in order to facilitate easy access to cheap labour. Durning (1990) states that apartheid was not only an example of political injustice, but it was also the most glaring example of environmental injustice. Bullard (2001) claims that environmental racism has shifted the cost of the industries to the people. According to the SDCEA²¹ (1996), these local communities have raised several concerns over health, education and quality of life while industries continue to seek sanction for a number of industrial developments in the South Durban Basin. Whitaker (2001) asserts that generally these black townships are located within the close proximity of toxic dumps, sewage treatment plants and polluting industries.

Communities must therefore not relent in their struggle against environmental injustices and racism and they should not let obstacles of industrial and state power foil their quest for the ideal environment. Percival and Homer-Dixon (1995) assert that environmental legacy of apartheid is grim, and will surely influence socio-political, economic and educational conditions of post-apartheid South Africa for decades. Peek (2001) an environmental justice activist claims that the winds of change driven by the 1994 democratic elections required Engen doing business differently, i.e. consulting with local affected communities. Since South Durban Basin schools are also affected by local air

¹⁹ Refers to General Education and Training i.e. Grades 8 and 9. The first version of the new curriculum for the GET, known as Curriculum 2005 was introduced in 1997. This was followed by a review of the curriculum in 1999. The review of C2005 provides the basis for the development of the RNCS for the GET, grades (R -9).

²⁰ Refers to Further Education and Training i.e. Grades 10-12.

²¹ Refers to the South Durban Community Environmental Alliance.

pollution, there should be consultation with affected schools, the Department of Education and Government in Kwa-Zulu Natal.

1.7 Aims and Objectives of the Study

Arising out of the rationale and the following aims and objectives were formulated;

- To examine the perceptions of educators and learners with particular reference to community- based air pollution.
- To examine how the educators and learners respond to community-based air pollution within the school's formal curriculum.
- To gain insight into educators and learners daily lives and lived experiences of community- based air pollution within the context of schooling.
- To ascertain what challenges educators face in curriculum delivery and implementation in respect of community-based air pollution at school.

1.8 Critical Questions

The following critical questions emerge from the above objectives.

- What are the perceptions of educators and learners exposed to community-based air pollution?
- How do educators and learners respond to community-based air pollution within the official school curriculum?

1.9 Limitations

This study is a case study reflecting how educators and learners of a selected school respond to community-based air pollution. This sample may therefore not be representative of all the secondary schools in the South Durban Basin. The sample size is small due to firstly, the nature of the study, an ethnographic study and the limited number of educators and learners in FET phase within the Human Social Sciences. Given the nature and scope of the study, a greater number of educators and learners could not be selected in the sample.

1.10 Overview of Chapters

This thesis is divided into five chapters. The first chapter is an overview of the study. This chapter conceptualises the study and focuses on the rationale of the study. A cursory review of South African curriculum policy changes is provided. Providing the location and problem statement of the study follows this. I then trace the history of the location of industries in the South Durban Basin. The aims, objectives and critical questions are laid out. The chapter is concluded with limitation of the study. Chapter Two is divided into two aspects namely, the literature review and the theoretical framework for the study. Firstly, within the literature review, I examine the background to air pollution, the regional and international literature within the field of local air pollution. Local community-based air pollution is reviewed. I examine specific research conducted in the South Durban Basin. I focus on the South Durban communities' responsiveness to community-based air pollution. Secondly, within the theoretical framework, I define curriculum, provide a background to critical theory to education and schooling. Critical theory is examined. A motivation for the use of critical theory in curriculum is provided. The theoretical orientations to curriculum are presented. Chapter three is the research design and the methodology of the research and examines responses to the two critical questions. It outlines the sample of participants in the study, specifies the research approach adopted, the methods used, and the instruments of data collection. Chapter four is the analysis and the interpretation of the data gathered. This chapter gives a detailed

analysis of the data and presents the four emerging themes. Theme one which is educator and learner perceptions of community-based air pollution, theme two which reflects on how teaching and learning respond to community-based air pollution, theme three highlights curriculum challenges in learning and teaching within the context of community-based air pollution and lastly theme four which focuses on critical thinking and empowerment within the context of curriculum implementation and delivery. The discussion of the findings of this study is a part of this chapter. Chapter five is the final chapter. It is exclusively a conclusion of the research, where a summary of the findings is provided, some implications for further research is given and some recommendations are made for curriculum and schooling.

1.11 Conclusion

Chapter 1 sets the scenario for the research by providing the rationale for the study. A cursory review of curriculum policy changes, the location of the study and the history of the location of the industries, which forms the basis for the research, follow this. The problem statement is set out, followed by the aims and objectives. The critical questions are addressed and concluded with limitations to the study.

In chapter 2, the literature review and theoretical framework is presented.

CHAPTER TWO

LITERATURE REVIEW

THEORETICAL FRAMEWORK

2.1 Introduction

I commence this chapter by providing a background to air pollution as an environmental issue in communities, regions and internationally. This is followed by an examination of regional and international research in the field of community-based air pollution and schooling. The discussion moves into a review of specific research conducted in the South Durban Basin with reference to community-based air pollution. Theoretical orientations of curriculum are then presented with a view to contextualise curriculum responses to community-based air pollution and exploring curriculum as process and praxis. I argue for the use of critical theory in curriculum, interrogating which is seen as process and as praxis (empowerment and emancipation). The chapter is concluded with a review of status of Environmental Education in the NCS.

2.2 Background to Air Pollution

Air pollution includes dust, gases, and heavy metals and smokes generated mainly by human activities. When inhaled, many air pollutants directly affect the lungs and respiratory tract. They also settle on the land, water and crops and are swallowed with food and drink. Finally when they come in contact with the skin and eyes, a number of pollutants cause irritation and allergic reactions. In all cases pollutants are absorbed by the blood and distributed throughout the body.¹ International Researchers in the field of local air pollution and health effects are Maynard and Coster (1999), Cairncross & John (2000), Brunekreef & Holgate (2002) and McMichael & Haines et al (1996). Some of the international organisations engaging in research on air pollution and health effects are World Health Organisation (2000), Environmental News Service (2006), AIRNOW

¹ See Air Pollution: An Ethical Perspective, Based on the statement from the International Environment Forum for the 14th Commission on Sustainable Development, May 2006.

(2006), United States Environment Agency (2003) and Friends of the Earth (2003). Air pollution has historically been caused by industrialisation and the consequent proliferation in the use of 'fossil fuels' (and therefore sulphur dioxide emissions) in the industrial process. The European Environment Agency (2002),² defines air pollution as the presence of contaminant or pollutant substances in the air at a concentration that interferes with human health or welfare, or produces other harmful environmental effects. There are a vast range of air pollutants, which cause a variety of effects on the environment and health. Air quality is key to the health of humans. Air pollution can lead to a variety of respiratory diseases, tuberculosis, bronchitis, heart and chest diseases, stomach disorders, and cancers. This study is particularly concerned with the impact of petrochemical and chemical industries (community-based air pollution) on teaching and learning, since they are serious sources of toxic pollutants. Air pollution crosses local, regional and international boundaries and action, which is not always forthcoming, is required to address it.

2.3 Regional Research in Community-based Air Pollution

South Africa's main oil refineries are located in Sasolburg, Secunda, Cape Town and South Durban. A variety of associated chemical industries are located particularly in Sasolburg and the South Durban. In the following discussion the regional chemical hot spots in South Africa are described.

Sasolburg is a major center for the chemical industry. Many of Sasolburg's workers are located in communities such as Zamdela, which following the apartheid planning, became known as the 'black township'. Zamdela is located downwind of heavy industry zone and residents live here with the constant smell of a many chemical pollutants from industries. Health statistics recorded at clinics in and around Sasolburg show a high rate of asthma and other lung conditions. According to GroundWork (2003)³ an analysis of clinic reports revealed that during some months respiratory illnesses account for up to 40 % of illnesses treated at clinics. Democratic government together with public pressure

² EAA refers to an environment agency that handles environmental issues in Europe.

³ See Community Air Monitoring Report, 2003- GroundWork

has produced greater openness and some industries are publishing annual environmental reports. According to USEPA (2002), air samples taken at Sasolburg identified 20 different chemicals. Of these, 15 are listed as toxic or hazardous air pollutants by USEPA.⁴

The second region is Table View, which is located 20 minutes away from Cape Town and shares a similar air pollution problem. Local health regulations requiring an 800-metre buffer between residents and the refinery have already been transgressed. This settlement has 400 houses within the boundary and more planned. Local residents have expressed concerns about air pollution for several decades. According to Global Community Monitor (2002) blood samples from community people living in and around Visserhoek revealed presence of mercury in the blood. This came from exposure of mercury-contaminated dust blowing off the landfill site. Residents in these communities complain of respiratory health problems (especially asthma), chest related illness and headaches.

The third site is Secunda, which is, located 150 km South East of Johannesburg. Adjacent to eMbalenhle, an apartheid created township with mainly poor African people. This settlement is surrounded by mines and is adjacent to the local dump. The dump is not maintained and children in these communities have access to it. The Occupational Health and Safety Act (1993) claim that the local municipality has used environmental health workshops to assess the health status of young people. According to GroundWork⁵ (2003), a large percentage of the population in Secunda suffer from respiratory illnesses such as asthma, sinuses, burning eyes and skin irritations.

Upon a cursory review of the location of the variety of chemical industries within the region of South Africa, it becomes clear that environmental air pollution does not strictly respect geographical boundaries. An apartheid-era of industrial planning makes black workers, communities and schools bear the brunt of community-based air pollution. Many workers get a double dose because they live near polluting factories as well as

⁴ Refers to the United States Environmental Protection Agency. It regulates the Criteria Pollutants.

⁵ See Community Air Monitoring Report, 2003. GroundWork is leading NGO working on industrial air pollution.

working in them. Furthermore, GroundWork (2003) claims that the above communities who are living on the fence line of chemical and petrochemical industries are exposed to cocktail emissions and their health and quality of life is seriously comprised. Several communities, regionally, internationally and locally have become victims of community-based air pollution. In the next section an overview of the international literature in the field of local air pollution is undertaken.

2.4 International Literature in the Field of Air pollution

According to the Johannesburg Sustainable Development (2002), environmental concerns have only become mainstream in the developed world's political systems in the last 20 years, but many still claim that economic objectives are routinely given precedence over the environment. In the developing world, which is increasingly industrialising, the problem is becoming even more pressing. At an international level, air pollution in the UK is cited as a contributing factor in a range of environmental and health problems, such as rising rates of childhood asthma, respiratory conditions and allergies, although its precise role is frequently vaguely defined.⁶ Like South Africa, poorer communities in international countries such as United States, United Kingdom, Europe, Asia and California share the brunt of local air pollution. According to Friends of the Earth (2003) 66 % of all carcinogenic chemicals emitted into the air come from factories in the most deprived 10 per cent of communities in England. Sulphur dioxide (SO₂) used to be a significant contributor to air pollution. Between 1985 and 1994, sulphur di oxide emissions in Western, Central and Eastern Europe fell by 50 per cent in line with the Convention on Long Range Transboundary Air Pollution protocols.⁷ However, emissions in other regions, especially in parts of Asia, are a major and growing problem.

Pollution emissions are governed by the National Air Quality Standards and part of the 'National Air Quality Strategy' adopted by the UK Government in January 2000. These

⁶ See Guidelines on environment sustainability, principally the Rio Declaration 1992.

⁷ Source - DEFRA 'Air quality headline indicator for sustainable development', 2002); Statistic 3: (Source: Friends of the Earth, 2003); Statistic 4: (Source: United Nations Environment Agency, 2003).

Standards aim to meet the requirements of the EU Air Quality Framework Directive, which set binding limits, to be met between 2001 and 2010. There are also international guidelines on environmental sustainability, principally the Rio Declaration 1992, resulting from the 'Earth Summit', and the 2002 declaration from the Johannesburg Sustainable Development Summit. Air pollution is worst in Latin America and Asia. In cities such as Seoul and Mexico City, the air quality is so bad that some people wear facemasks to filter the air.⁸ The Bay Area in San Francisco is a major site of chemical production and the location of four refineries. It provides an appropriate comparison with South Durban Basin industries under review. Screening and minimum risks levels are not legally enforceable in the United States industries.

The WHO⁹ (2000) estimates that three million people die each year because of air pollution. Millions suffer serious health problems. Around 30 – 40 % cases of asthma and 20-30 % of all respiratory diseases are linked to air pollution in some populations. USEPA¹⁰ (2002) has identified 188 toxic or hazardous air pollutants. These are dangerous to the environment because they are poisonous. Many of the pollutants found by community monitors in South Africa are on USEPA's list. WHO first created air quality guidelines in 1987, but they were originally developed just to address pollution in Europe. The guidelines were originally created to address only Europe but were expanded to focus on all regions and provide standardized targets for air quality. The WHO (2000) assert that the increasing evidence of the health impacts of air pollution prompted the organization to expand its guidelines to address all regions of the world and provide uniform targets for air quality. The new guidelines for air quality standards are established after consultation with more than 80 leading scientists and are based on review of thousands of recent studies from all regions of the world.

According to Bertollini (2000), the WHO's special program from health and environment guidelines reflect the most widely agreed and up-to-date assessment of health effects of air pollution. It also recommends targets for air quality at which the health risks are

⁸ See US Environment Agency.2003

⁹ See World Health Organisation (WHO) 2000. Section 112 Hazardous Air Pollutants online:www.epa.gov/ttn/atw/188polls.html.

¹⁰ Refers to the United States Protection Agency (2003).

significantly reduced. Furthermore Bertollini claimed that the WHO (1987) is looking forward to working with all countries to ensure these guidelines become part of national law. Air pollution from industrial sources is a significant problem in most communities, regions and countries. The industry must weigh the cost of these measures, reflected directly in its balance sheet, against the benefits to the public for which it receives no return apart from the temporary good will that comes when a nuisance has been abated. According to Environment News Service (2006)¹¹, while a responsible business will implement all reasonable measures to avoid harm to others, unscrupulous operators will simply hope that their emissions are unnoticed or untraceable. In implementing air pollution prevention or reduction, it is important that government, industries and NGOs agree on requirements with support and advice from technical and health experts. Where the government is honest and efficient, the businesses trustworthy, and the NGOs altruistic in their representation of the public interest, this works well. Reinforcing ethical behaviour and strengthening corporate responsibility can help strengthen action to reduce air pollution.

Air pollution, whether the debilitating smog of urban areas, the "brown cloud" over Asia that is blocking so much sunlight as to affect agriculture, or the smoke people are obliged to breathe in their own homes, communities or schools, symbolizes the general failure of the major actors in society to take responsibility for the environmental and human health effects.¹² Any action strategy for air pollution control should therefore include an education component at both the level of school and public. The freedom to breathe clean air should be seen as an inalienable human right and be defended accordingly.

2.5 Introduction to Local Community-based Air Pollution

The South African Constitution stipulates that everyone has the right to an environment that is not harmful to his or her health and well-being. Local air quality affects how we live and what we breathe. Like the weather, it can change from day to day – sometimes from hour to hour. The known and recognized health effects of air pollution include the

¹¹ See ENS Environment News Service. www.wes@ENS.Com.

¹² See International Environment Forum for the 14th Commission on Sustainable Development, May 2006.

increased risk of the exacerbation of respiratory symptoms such as increased asthma attacks and reduced lung function, increased hospital admissions for respiratory and cardio-vascular diseases, and increased mortality. The challenge for curriculum, schooling and communities in the South Durban Basin, is to ensure the proper implementation and enforcement of this constitutional right.

2.6 Specific Research Conducted in the South Durban Basin:

Residential communities in the South Durban have for decades and continue to face environmental health and socio economic costs of community-based air pollution. These communities are faced with air pollution resulting from either the deliberate or accidental release of harmful substances from the adjacent industries release of toxic chemicals, which alters the atmosphere's composition and poses a threat to human health. According to Clark (2004), the South Durban has been a pollution hot spot generating some bitter debates and encounters between industries and the adjacent communities. The following research studies have been conducted in the South Durban with reference to community-based air pollution.

Firstly, investigative studies by a local journalist (Carnie, 2004), suggested that the incidence of leukaemia in the South Durban is as much as 24 times higher than other parts of South Africa. One of the known causes of cancer is exposure to benzene, an organic gas emitted from, amongst other sources, oil refineries. Secondly, a study conducted by the University of Natal Medical School¹³, found that children in the suburbs south of Durban “are up to four times likely to suffer from chest complaints than children from other areas of the city”(Kistnasamy, 1994). School children bear a major part of the public health cost associated with community- based air pollution in the South Durban Basin. Furthermore, according to reports by environmental consultants, Ecoserv, the sulphur dioxide pollution in Merebank exceeded World Health Organisation¹⁴ guidelines on 124 occasions from 1 November 2000 to 31 October 2001(SDCEA¹⁵, 2000). Another

¹³ Known as Nelson Mandela School of Medicine.

¹⁴ . See World Health Organisation. (WHO). (2000). Fact Sheet No.187 on Air Pollution Guidelines.

¹⁵ . Refers to a NGO environmental organization called South Durban Community Environmental Alliance.

study (North, South Comparative Health Study) by the University of Michigan along with the Nelson Mandela School of Medicine and the Durban Institute of Technology conducted an extensive health study at Settlers Primary School. The results revealed that the prevalence of both asthma among participants were strikingly high. Research revealed that an abnormally high 52 % of students and teachers at a primary school bordering the Engen plant suffered from asthma (Robbins et al, 2002). According to the Environmental Officer¹⁶ of Orion ¹⁷Primary School (2004), attendance figures are perceived to go down when the wind blows toxic emissions into the classrooms. Staff members report that there are constant unpleasant odours in the classrooms affecting both pupils and learners. Pupils complain of burning sensations in their eyes and noses, sore throats, nausea and severe headaches.¹⁸

In addition the air pollution the South Durban Basin was singled out at the African Asthma Congress in Durban in 2003, as being at unacceptable levels. According to the Merebank Residents Association, statistics reveal that Merebank has more than three times the international norm of asthma cases in a residential area (SDCEA, 2004). Environmental World standards for the location of industries require a buffer zone of 200m from residential communities. However, according to Carnie (2004)¹⁹, the Engen refinery is just 20m away from the residential communities and schools. According to (Naidoo, 2004), the children and educators at Settlers Primary School bear the brunt of the emission releases with daily complaints of stomach cramps, coughing, wheezing and headaches (Robbins et al, 2002). In the South Durban Basin there has been an on-going struggle for clean air in communities and schools. Media reported (21 March 2004, Noelene Barbeau, *Living under a cloud*, Sunday Tribune) that, toxic emissions from Engen refinery resulted in a number of local residents and school children requiring medical treatment. The valley industrial belt, is nicknamed “Cancer Valley”²⁰ is occupied by Engen and Sapref refineries. This information just adds to the existing body

¹⁶ Orion Primary has appointed an educator as an Environmental Officer to handle air pollution complaints.

¹⁷ Pseudonym: used for ethical reasons

¹⁸ See Community Air Monitoring Report, 2003 – GroundWork 31.

¹⁹ See Press Release in The Mercury by Carnie (2004) on ‘Refinery fumes gas pupils and teachers at Merebank’.

²⁰ Named after Cancer Alley in California.

evidence that the health of people living, working and schooling in South Durban is being affected by emissions from industries in the area.

SDCEA demanded that further proper studies be done in South Durban to determine exactly what chemicals are contained in the range of toxic emissions that residents breathe each day. According to a Mercury survey, 18 September 2000), analysed by public health specialist Duane Blaauw,²¹ of the University of Natal's Nelson Mandela Medical School the results of the research were startling. There was an association between air pollution and cancer. After comparing cases with national statistics over the past 10 years he calculated that the rate of leukaemia in Merebank children under the age of 10 was at least 24 times higher than the national average. Furthermore Stevens and Kelly (2000) assert that, one of the ills of modern city living is pollution with industries and factories belching fumes into the atmosphere. While one may be able to avoid some of the pollution, how do you limit it when it is in the air that you breathe at school and at home? People in the heavily industrialised South Durban Basin have been suffering a higher proportion of respiratory illnesses than similar communities living elsewhere.

Interestingly, as recent as February 2007, Juggie Naran, The Sunday Tribune reported *"Merebank's toxic woes "mismanaged" by authorities* that Alipore Primary School (located within the South Durban Basin) was shut down as scores of learners and educators were rushed to hospital for chemical contamination during excavations at school. According to Environmental attorney Jeremy Ridle, this case was another example of the authorities not having the community's and school interests at heart. Parents and education MEC Ina Cronje have expressed concerns that some of the learners may have been exposed to hazardous chemicals at school.

2.7 South Durban Communities' Responsiveness to Local Air Pollution

One of the ways in which South Durban communities and schools fight their battles of environmental injustices is through an NGO called SDCEA. SDCEA was formed in February 1997 after the various differing community-based representatives in South

²¹ Ex worker for the National Cancer Registry in Johannesburg.

Durban liaised under a common agreed-up mandate. It has 14 affiliate organizations, and to date, there are over 8 community-based organizations and 2 non-government organizations under the banner of the South Durban Community Environmental Alliance. Up until 1997, various differing communities of Wentworth, Merebank and Bluff waged environmental struggles against the petrochemical industries, primarily focusing on the Engen Refinery. SDCEA has been successful and contributes to the struggle against Environmental racism for Environmental Justice and Environmental health. According to D'Sa (2006), the chairperson of SDCEA, advocacy and lobbying are extensively used to fight for better air quality in the locale, and this tool has led to many successes.

In the next section a review of how curriculum and schools have responded to community-based problems is presented.

2.8 Curriculum and Schooling Responding to Community-based Problems

Educators in many parts of the world have been dealing with questions of curricula and teaching in the contexts of ongoing strife and trauma which include community-based problems, HIV-AIDS epidemic, poverty, race, gender within existing educational systems. In South Africa several serious contexts for the new curriculum (NCS), education and schooling are based on the move to a democratic nation. This study sees the need to examine how teaching and learning responds to a community-based problem of air pollution and the implications this has for curriculum and schooling at Valley Secondary School.²² Teaching, learning and schooling are inextricably linked to the curriculum. Curriculum for South African schools in post 1994, meant revision for new values and principles, especially those espoused in the Constitution. The NCS can be understood within the social meliorist theory, where schools are critiqued from a “reproductive theory” perspective. This theory claims that schools reproduce social inequalities of society and schools reproduce the status quo. Schools should transform society. If we have democratic, egalitarian society, schools must promote these principles and practices. According to Counts (1932), in his book “*Dare the schools build a new*

²² Valley Secondary : a pseudonym used for ethical reasons.

social order?” he claims that schools are the primary social institution for transforming society and for building a new social order. In opposition to this was John Dewey (1933), as cited in Pinar et al (2002), who believed that schools alone cannot transform society; all social institutions need to support democracy, community and equality.

This has implications for curriculum, in that schools need to be democratic institutions and promote community and effective citizen participation. The NCS focuses on citizenship education. Citizenship contributes to the school curriculum by giving learners the knowledge, understanding and skills to enable them to participate in society as active citizens of our democracy. Interestingly, Dewey (1933), as cited in Pinar et al (2002) made three recommendations. Firstly, he claimed that teachers had an obligation to search for the solutions of social problems (e.g. community-based air pollution). Secondly, a study of social problems should focus on social problems teachers know best, their local community and then broaden the study to nation & international realm. Finally, he claimed that social objectives, which might support educators in social reform efforts, ought to be formulated in curriculum.

In the following section, the conceptual framework for the study is presented

2.9 Conceptual Framework For the Study

In this section curriculum is defined and a relationship with critical theory and curriculum is established.

2.9.1 Curriculum Defined

In arguing for a context of curriculum, Schubert (1986: 289) supports the idea of the curriculum responding to local community-based issues. According to Marsh (1997), curriculum can be defined as all visible and invisible, the explicit and implicit activities in a school and all the activities that contribute to learning. The school curriculum is also a political document which reflects the struggles of opposing groups to have their interests, values, histories and politics of the dominate groups included in the formal

curriculum. Therefore curricular ideologies are defined as beliefs about what schools should teach, to what ends and for what reasons. Furthermore from a critical theorists perspective (Apple, 1990; McLaren; 1989 McLaren, 1995) assert that the curriculum represents more than a programme of study, a classroom text or a course syllabus. It represents the introduction of a particular form of life; it serves in part to prepare students for dominant or subordinate positions in society. The curriculum favours certain forms of knowledge over others and is often discriminatory on the basis of race and class.

According to Goodson (1994), curriculum is a multifaceted concept, constructed, negotiated and renegotiated at a variety of levels and arenas. The most significant of these arenas is schooling, i.e. curriculum responses to teaching and learning. Furthermore, Tanner (1982), asserts that the curriculum field is no different from other professional occupational; its history is inextricably tied to its professional knowledge. This follows that when we look at “history”, we ask substantive educational problems that arise in the process of schooling. Thus we find that foundational principles of critical theory and critical pedagogy namely, (politics, culture, economics and theories of interest and experience) links curriculum to community and schooling. Jackson (1992), advocates that there are definitional shifts of curriculum over the decades going from “fixed course of study” terminology to broader terms such as “learner opportunities and “learner experiences”. Tanner and Tanner (1980) argue that shifts in definition over the decades represent “conceptual progress in curriculum”. Part of this conceptual shift is related to a shift in thinking to Critical Theory.

2.9.2 Critical Theory and Curriculum

I propose to use critical theory as a lens to examine curriculum responsiveness to community-based air pollution. Some of the writers who have been advocates of critical theory as cited in McLaren (1989), are Kozol (1968), Friere (1972), Dewey (1960), Apple (1979), Giroux (1986), McLaren (1948). Firstly, Jonathan Kozol has been for many educators, the first step toward entering the domain of radical schooling and the world of educational outlawry. Secondly, Paula Friere, a Brazilian educator has been cited by educators throughout the world, for fighting behind the banner of liberation to

fight for social justice and educational reform. Paulo Freire produced numerous works, most notably is the *Pedagogy of the Oppressed* (1972). He made an important contribution to critical pedagogy and his success in putting theory into practice. He also believed that poverty and illiteracy are directly associated to oppressive social structures and unequal exercise of power in society. Thirdly, Apple (1990), the centre of his analysis of schooling and the wider society are the relationships of class, gender, race and cultural forms of resistance. His focus was also on “lived experiences” and “everyday patterns of interaction” of educators and learners, including and other cultural forms. Apple’s contribution to critical pedagogy was in his ability to articulate how curricular form, the transmission of various knowledges and teaching as a labour practice are linked to capital and capital accumulation. Fourthly, Henry Giroux (1986), who advocated that schools must be seen not merely as educational sites, but as complex dominant and subordinate cultures.

Teachers must therefore understand how the dominant culture at all levels of schooling function. Giroux, along with Apple and others argues that schooling does more than just reproduce inequality. Giroux’s work to date can be described as both politically courageous and theoretically path finding within the context of education and schooling. In providing the basic principles of critical theory, I now motivate for its use in curriculum responses to community-based air pollution.

2.9.3 Motivation for the Use of Critical Theory

Taking into consideration that the participants in the study are experiencing a new democratic curriculum, critical theory is the ideal lens to examine curriculum responses to community-based air pollution, since it entails a view of what behaviour in a democracy should include. The apartheid curriculum was controlled, pre-determined, uniform, predictable and largely behaviourist in outcome. Critical theory seeks to emancipate the disempowered, to redress inequality and to promote individual freedom within a democratic society. Critical theory is concerned with raising the consciousness of learners and educators to the subtle ways in which an unequal and unjust social order reproduces itself through schools. The study will examine the extent of empowerment

and emancipation in curriculum responses to local air pollution. Critical theory also identifies the notion of false consciousness that has brought a social group to relative powerlessness and it questions the legitimacy of this (Gibson, 1986). Critical Theory gives great impetus for the study envisaged, since it will examine how the official curriculum responds to the powerless state of a particular social group (non whites within the South Durban Basin) to a community-based problem such as air pollution.

This theory will also provide the basis to examine the relationship between the school curriculum and society, how schools perpetuate or reduce inequality, the social construction of knowledge and curricula, who defines worthwhile knowledge, what ideological interests this serves, how power is produced and reproduced through the official curriculum, whose interests are served by the curriculum and how legitimate these are, Kozol (1968), Friere (1972), Dewey (1960), Apple (1979), Giroux (1986) as cited in McLaren (1989).

Thus, this study aims to examine how the NCS in addresses community-based air pollution with reference to the subject Geography and Life Orientation. To this effect the study will also critically examine the NCS responses to community-based air pollution with specific reference to environmental issues and Environmental Education. Critical theorists of education and schooling have three things in common. Firstly, they begin with the concern to map inequalities and injustices in education. Secondly, they trace the inequalities to their source, showing educational processes and structures by which they are maintained. Thirdly, they seek to propose remedies to these injustices.

According to McLaren (1989), applied to education, critical theory helps learners and educators understand the school, classroom practices and the political, social and economic issues underlying their social world. Critical theory attempts to explain the origins of everyday practices and problems in education. It is not simply explanatory, but is committed to enabling change towards better relationships, towards a more just and rational society. Critical theory therefore criticizes social inequalities and injustices and is committed to their transformation. This theory goes on further to argue that in human affairs all “facts” are socially constructed. It also claims to provide enlightenment as to

the actual conditions of social life. This enlightenment consists in the disclosure of true interests of individuals and groups. Interest will therefore refer to the needs and concerns of a particular group, especially to the advantage i.e. “vested interests”(Gibson, 1986). Critical theory focuses on common sense assumptions and everyday language of those familiar settings, showing how common sense interest is served at the expense of others. Ideology is a form of consciousness, which pervade common- sense assumptions and everyday practices. Critical theory shows how common sense distorts and conceals true interests, thereby fostering injustice by preventing certain groups from gaining control over their lives (McLaren, 1995). Critical theory attempts to reveal those factors which prevent groups and individuals taking control of, or even influencing, those decisions, which crucially affect their lives. In the exploration of the nature and limits of power, authority and freedom, critical theory claims to afford insight into how greater degrees of autonomy could be reversed. Thus this study will examine the power relations between learners and those parents who work for the nearby industries.

This characteristic marks out critical theory’s true distinctiveness: its claim to be emancipatory. Apple (1990) advocates that emancipation as a theme; freedom comprises the intellectual and imaginative insight. Not only does it provide enlightenment (deeper awareness of the true interests); more than that it can set you free. Critical theory acknowledges the sense of frustration and powerlessness as they see personal destinies out of their own control, and in the hands of others (often unknown). My endeavor is to expand critical theory even further in order to show its relevance to the study and the needs of linking curriculum to community issues and schooling. Critical theory also insists that art is understood and experienced socially (Gibson, 1986). It seeks to locate artistic work in a social context. Art is also prominent because critical theory holds that art reveals society. Further, utterly characteristic of its enterprise, critical theory hold that great arts hold within itself images of liberation, and visions of emancipation (Giroux, 2003). Significantly, critical theory reads in words like “life”, “experience” and “freedom”. Thus it is claimed that inward, private feelings accept and do not challenge inequalities that literature reveals. They hear the voices of affirmation and reconciliation, not protest. Critical theory’s view of emancipation is concerned with structural constraints upon the freedom of the individual. Critical theory asserts not only that

individuals should have maximum control over their own lives. According to Giroux (1983), critical theory is specific in locating the sources of unfreedom, oppression, class and social justice, which is often in their communities and society at large.

This brings the discussion to the tradition of critical pedagogy, which represents an approach to schooling that is committed to the imperatives of empowering learners and transforming the larger social order in terms of interests of justice and equality. Critical pedagogy examines schools both in their historical context and as part of the existing social and political fabric that characterizes the dominant society. Critical theory has begun to provide a radical theory and analysis of schooling. Critical educational theorists argue that teachers must understand the role that schooling plays in joining knowledge and power, in order to develop active citizens. Furthermore critical pedagogy focuses on class relations, culture, hegemony, and ideology and power knowledge relations.

According to McLaren (1989), class refers to the economic, social and political relationships that govern life in a given social order. Class relationships reflect the constraints and limitations individuals and groups experience in the areas of income level, occupation, place of residence, and other indicators of social and rank status. Relations of class are those associated with surplus labour, who produces it and who is recipient of it. The concept of class is relevant to the study; in the way power plays itself out between the giant industries and the people who work with them. McLaren (1989) asserts that when teachers in their acceptance of the role of technicians, fail to challenge the ways in which educational curricula correspond to the demands of industry or the means by which schooling reproduces existing class, race relations in our society, they run the risk transmitting to the disadvantaged students that their subordinate roles in the social order are justified.

2.9.4 Exploring Curriculum Perspectives

In this section perspectives about the curriculum are examined through an analysis of Giroux, Schubert, Schwab, Apple and Grundy and Tyler. Curriculum is seen as an ideological selection from a range of possible knowledge. This resonates from the principle of Habermas (1972) that knowledge and its selection is neither neutral nor

innocent. Thus, this study examines how selected educators respond to community-based air pollution within their learning areas and subject specialisation. Educators in implementing and delivery the official school curriculum will need to reflect on how they address the community based air pollution in their everyday teaching and learning in the formal curriculum. Critical pedagogy regards the curriculum as a form of cultural politics in which participants (rather than recipients) of curricula, question the curricula dominating messages contained in curricula and replace them with language of possibility and empowerment, often community-related curricula. In this way curricula serve the socially critical rather than the culturally and ideologically passive school. It represents the introduction of a particular form of life; it serves in part to prepare students for dominant or subordinate positions in society. The curriculum favours certain forms of knowledge over others and is often discriminatory on the basis of race and class. The impact of the dominant society and culture is inscribed in a whole range of school practices, for example, the official language, school rules, classroom social relations, the selection and presentation of school knowledge and the exclusion of certain cultural capital (Giroux, 1983:66).

Schubert (1986:170) sums up the usefulness of an understanding of paradigm of curriculum. Paradigms, he asserts, are the conceptual lenses through which curriculum problems are perceived. In a similar light, paradigms that guide our work as educators govern the kinds of questions we ask and the ways we view the consequences of our efforts. Therefore, paradigms of curriculum inquiry are distinguished on the basis of differences in their assumptions about; the nature of reality (ontology), the nature of knowledge (epistemology), the nature of inquiry methods used in understanding reality and constructing of knowledge (methodology).

Schwab (1969) notes that the curriculum should be understood as involving what he referred to as the four commonplaces of curriculum – teachers, learners, subject matter and milieu. Yet the practical curriculum goes beyond this description by claiming that curriculum should be understood in its broader social, political and economic context. It is obvious that there are many resonances between the values promoted in the practical paradigm and those espoused in the NCS. Grundy (1987) notes that, the critique and

promotion of critical consciousness, is the central disposition of the emancipatory and transformative interest in curriculum delivery. Community-based air pollution problems have oppressed the South Durban communities for many years. It is environmental injustice in contemporary South Africa that has their foundation in struggles against the legacy of apartheid and spatial planning. Curriculum requires framing issues within a historical context. One therefore needs to take into account the painful history that left deep social, economic, political and environmental scars for the South Durban communities. Critical Theory deals with careful reflection on the taking for granted socio-economic class structure and the ways in which educators unwittingly perpetuate such structures.

With particular reference to LO 2²³ educators are challenged in the National Curriculum Statement (NCS) to be innovative on how the curriculum should respond to community-based problems. All newly developed Subject Statements in the NCS have been infused with the principles and practices of social, human and environmental justice as defined by the Constitution of the Republic of South Africa. Educators and learners are encouraged to have direction and a plan of action for responding to community-based problems. Educators and learners can both engage in curriculum deliberation. There is growing focus on meaningful action, using the new knowledge and insights gained in learning experience to address not only the physical manifestations of environmental problems but the underlying causes as well. This theory is significant for participants in the study, in addressing curriculum responses (i.e. teaching and learning) within the context of air pollution in the South Durban Basin. According to Apple (1990), a democratic curriculum should strive to invite young learners to shed their passive roles of knowledge consumers and now assume the active roles of meaning makers in addressing the air pollution crisis of which they are innocent victims.

For the purpose of the study, the theoretical underpinnings of curriculum are indispensable. Tyler (1949) postulates that the curriculum is controlled (and controllable), ordered, pre-determined, uniform, predictable and largely behaviourist in outcome. It is

²³ Refers to Learning Outcome No.2 that focuses on citizenship education with specific reference to the environment.

Critical theory that avoids all of the above elements of a positivistic mentality. According to Grundy to (1987), Tylers's rationale resonates with a modernistic, scientific, mentality of society and education that regards ideology and power as unproblematic. Doll (1993) argues that this represents a closed system of planning and practice. In a postmodern society, education is viewed as an opening process, which is open and diverse, multidimensional, fluid, and with power less monolithic and more problematic. Therefore, not all knowledge can be included in the curriculum. The school's official curriculum is a selection of what is deemed to be worthwhile knowledge. The justification of this knowledge reveals the ideologies of power in decision-making in society and through the curriculum. To this effect the study will critically examine post-apartheid curriculum responses to community- based air pollution. Curriculum is seen as an ideological selection from a range of possible knowledge. This resonates from the principle from Habermas (1972) that knowledge and its selection is neither neutral nor innocent. This will provide meaning, understanding and greater depth as to how and why the official curriculum responds to community- based air pollution in the study.

2.9.5 Praxis and Curriculum Responses to Community-based Air Pollution

Curriculum as praxis will be relevant for the study, since it implies a conscious recognition of the relationship that exist between practice the real world, not an imaginary world. Grundy (1987) notes another constitute element of praxis is, the recognition that learning takes place when it is grounded in real experiences. The emancipatory interest is an interest to free persons from control and coercion of the technical interest and also from the possible "deceit" of the practical interest. Paulo Friere (1972) views praxis as reflection and action upon the world in order to transform it. Praxis is therefore concerned with relevance to the lived experience and interests of those involved. It is argued that, in terms of the practical interest, ones interpretation of a situation could be based on pre-understanding based on tradition. Such knowledge can be bias (deceitful) in that it is based on a particular conception of reality. Fundamental to the curriculum informed by the emanicipatory interest is the concept of "praxis". "Praxis" is defined as a "form of action which is the expression of the emanicipatory interest" (Grundy: 1987:104). When applied to the subject of curriculum, the constitutive elements

of “praxis” have specific meanings. Praxis entails a reflexive relationship between theory and practice in which each builds upon the other: The curriculum is not simply a set of plans to be implemented. It is an active process in which planning; acting and evaluating are all reciprocally related and integrated.

Praxis takes place in the real world. The programme content of education must take into account the concrete, present world, which reflects the aspirations of the people. It must be constructed with hypothetical learning situations in mind. Praxis means acting with others, not upon others. According to Freire (1972), teaching and learning are to be seen as a dialogical relationship between teacher and learner, rather than as an authoritative one. The critical paradigm of curriculum inquiry is informed by an emancipatory mode of rationality linked to principles of critique and action. Its knowledge constitutive interests lies in “emancipation and empowerment (of people) to engage in autonomous action arising out of critical insights into the social construction of human society” (Grundy, 1987: 19).

Proponents drawing from the critical theorists claim that the search for consensual meaning and understanding, the central concern of hermeneutic rationality, would be impossible if it were not located in a social order that empowers human beings to transcend constraints imposed by race, gender and socio-economic class. Arising out of the above general principle are a number of specific, interrelated principles. The implications for these in terms of curriculum responses to community-based air pollution may be spelt out through an analysis of teaching and learning in Geography and Life Orientation within the context of ongoing community-based air pollution. An emancipatory curriculum operates in the context of interaction, which implies that the learning process requires the creation of a dynamic social environment.

2.9.6 Curriculum Responsiveness

The idea of “curriculum response” invokes the ideas of how teaching and learning takes place within the context of ongoing community- based air pollution. According to Elblaz (1993:190) “response” should invoke interconnections among individuals, but among

cultures; between language and culture, between culture and schooling. It is the entire complex of interconnected issues that responsive teaching should be alive to". Environmental issues are complex, particular and diverse and arise in a range of different context. According to Usher (1997) learning must also take place in diverse contexts. The implications for Environmental Education seems that educators need to deliberate curricula, which respond to environmental issues as they arise in diverse community context. Similarly, Eisner & Vallance (1974) as cited in Pinar et al (2002), claims that the Social Reconstructionist see schooling as an agency of social change, and they demand that education be relevant both to the learners' interest and to society' needs. Curriculum is conceived to be an active force having direct impact on the whole fabric of its human and social context. Once the sole province of anthropologists, ethnography has emerged as a major mode of research in the reconceptualized field of curriculum and schooling since ethnography deals with "lived" and "inside" experiences of learners and educators. Similarly, in this study, curriculum responses to community-based air pollution reflects on the "lived" and "inside" experiences of both learners and educators in the subjects Geography and Life Orientation.

2.9.7 Chapter Summary

This chapter was divided into two aspects namely: the literature review and the theoretical framework. In the literature review I present the background of air pollution. Literature was examined, exploring the chemical hotspots regionally and internationally. Local community-based air pollution was reviewed. Specific research conducted in the South Durban Basin was examined. I focus on the South Durban's communities' responsiveness to community-based air pollution. Within the theoretical framework I defined curriculum and provided a background to critical theory in education and schooling. Critical theory was introduced as an approach to theorise the study and gave its ideology of empowerment. Curriculum perspectives was presented using critical theory lens.

This chapter provided the backdrop for locating the research design and methodology, which is presented in the next chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

As stated in the introductory chapter, the purpose of this study was to investigate curriculum responses to community-based air pollution. In particular the following critical questions and objectives guided the study: (a) learner and educator perceptions of local air pollution, (b) curriculum responses to community-based air pollution, (c) curriculum challenges in handling community-based air pollution and (d) learner and educator empowerment in curriculum implementation and delivery.

In order to respond to the critical questions on these themes it was felt that an ethnographic study would be best suited. As illustrated very succinctly by Hammersley (1990), ethnography refers to social research in which people's behaviour is studied in everyday contexts, rather than under experimental conditions created by the researcher. Furthermore, Denscombe (2003) asserts that ethnography involves a thick description of people's culture and emphasises understanding things from the point of view of those involved. This is most appropriate for the current study where this community's experiences of local air pollution can well understood by those involved in the struggle for clean air and environmental justice within the context of schooling.

This chapter is presented into five foci namely; firstly the research design in which I present my approach used in the study. Secondly, I present the sampling method used and provide a brief description of the nature of the sample. Thirdly the data collection methods are outlined, in which I focus on the participant observation and interviewing. Fourthly, I provide reasons why I used methodological triangulation. Fifthly, I explain the methods used to analyse the data collected. In the next sections, detailed discussions of these foci are presented. Table 3.1 guides the following sections.

TABLE 3.1 RESEARCH DESIGN

Critical Questions	Sample data source	Frequency Interview	Research Instrument	Data Analysis	Purpose
Two critical questions. What are the perceptions of learners and educators to communit-based air pollution ?	Purposive sampling 2 educators per subject and traced learners - Settlers Prim selected all available sources	spread over 3 months duration traced over a period. traced over 10 months	Qualitative research method. Ethnographic Studies Observation in the Classrooms Non-Participant observation in the the classrooms and staff meetings in the staffroom, staff briefings, and staff meetings	Search for patterns, categories, themes & regularities in the data - Using Methodical Triangulation Obtain objective data as a starting point. Passive & unobstrusive ie as participant observer. Transcriptions of fieldnotes and memory notes, Analysis of transcripts & pattern analysis	Involves study in natural setting. Provides in depth description of of people- insider perspective. Variety of methods to gather data. Can use fieldnotes, journal entries, etc. Allows for making sense of data. Involves accounting for and explaining the data collected. Allows for funnelling from wide to narrow. Analysis can start early. Exposure to broader perspective of the issue under investigation.- community based air pollution.
How do educators and learners respond to community-based air pollution within the formal school curriculum?	educators & learners	2 sessions 4 educators 4 learners approx. 40 minutes per educator 40minutes per learner 4 educators 4 learners	2 types of Interviews-using . Semi-structured interviews One to one Interviews - In-depth Interviews Focus Group Interviews &	Transcription of interviews into themes and categories Will entail coding and defining categories My unit of analysis will be to examine how data are similar to and different from each other. Domain Analysis will look at any symbolic category that include other categories. Establish linkages & relationship between domains Making speculative differences Summarize data Seeking negative & discrepant cases Search for patterns, categories, themes and regularities in the data.	Each unit should be discrete, yet integrative as a whole. Ascribe codes to data, keep as units. This helps to define categories. Creates order and structure. detects frequency. helps create clusters of data. Helps maintain richness of data. Discover reallionships between symbol. Moves research from description to inference Helps to identify key factors, key issues. Weigh significance of disconfirming cases. Helps to compare data gathered.

3.2 The Research Design

According to Cohen, Manion and Morrison (2000), the purposes of the research determine the methodology and the design of the research. Furthermore, Kane and O' Reilly-de-Brun (2001), argue that a problem or an issue studied by a researcher determines not only the research design but also more importantly the research techniques used. Creswell (2003) also states that certain types of social research problems call for specific approaches. In this study an ethnographic approach to research was consistent with the purpose of the research. This ethnographic study, which is based on qualitative methods, will include pure description of the experiences of people in the research environment. In this regard Hammersley (1990) asserts that an ethnographic study has three methodological principles naturalism, understanding and discovery, which are used to provide the rationale for the specific features of the ethnographic method.

It is the opinion of the researcher that this study fits these characteristics and can be classified as an ethnographic study. There are many reasons why this suited my study of curriculum responses community-based air pollution. Firstly, Cohen and Manion (2003: 181) supports the ethnographic approach by arguing that ethnography is a unique example of people in real situations, enabling readers to understand ideas more clearly than simply representing them with abstract theories or principles. Secondly, he claims that the ethnographic approach was employed because scientific research is a human activity. Conducting any research project is thus a fundamentally social and cultural act. The push towards ethnography in the professional discipline of education (curriculum) is propelled by the recognition that all research is generated, made possible, constrained and helped by the same historical (cultural and political) conditions which generate, make possible, constrain and help any other social activity. Thirdly, ethnography focus on a specific situation and the epistemology of ethnography is developed over the recognition that scientific knowledge is not advanced through attempts at abolishing the conditions of the research, but rather in using these conditions as a lever to gain a more critical understanding than is available through common sense participation. Spradley (1979)

advocates that one of the unique strengths of this approach is the rigor in ethnography, which consists in clarifying the position of the ethnographer within the process of which he is a part. Thus, it is evident that all these aspects seem to match with the issues being investigated in this study. In order to obtain the qualitative data required participant observation, one to one interviews with both learners and educators within a selected school. This was followed by focus group interviews with learners and educators respectively.

In response to the critical questions asked, Table 3.1 illustrates very comprehensively the research design. An ethnographic research stance was used, since it is qualitative in nature and provides an in-depth description of participants' experiences in the study. Van Maanen (1996) asserts that ethnography typically refers to fieldwork conducted by a single investigator who 'lives with and lives like' those who are studied, usually for a year or more. Ethnography literally means a portrait of a people. An ethnographic study is a written description of a particular culture - the customs, beliefs, and behavior based on information collected through fieldwork (Harris & Johnson, 2000). The very nature of ethnographic case study method of inquiry allowed me to observe the natural environment of the school and the classroom and also allowed me to probe deeply into the school scenario (Bogdan & Biklen, 1992; LeCompte & Preissle, 1993; Cohen & Manion 1997). Such descriptions are embedded in the life-worlds of learners and educators and produces insider perspectives of the participants and their practices in respect of curriculum responses to community-based air pollution.

According to Patton (1987) ethnographic inquiry takes as its central and guiding assumption that any human group of people interacting for a period of time will evolve a culture. It is one social research method, which draws on a wide range of sources of information. The ethnographer observes or participates overtly or covertly in people's daily lives for an extended period of time, watching what happens, listening to what is said, asking questions and collecting whatever data is available to throw light on his or her concerns (Hammersley & Atkinson, 1993: 2). The main thrust of my research was to

examine how the curriculum (teaching and learning) responds to community-based air pollution in the South Durban region.

Denscombe (2003) has succinctly stated that one of the characteristic features of ethnography is the significance it attaches to the role of the researcher's "self" in the research process. Ethnography as a method of inquiry gave me first hand information as a researcher. Furthermore, Ball (1990) claims that the researcher's identity, values and beliefs become a part of the equation, a built-in component that cannot be eliminated as an influence on the end product findings of the research. The aim of the naturalistic researcher is not to present a single reality asserting itself as truth (Guba & Lincoln: 1994). Naturalistic researchers should aim to discover multiple realities that coexist within any research. Ethnography generally uses emergent protocols, non-standardized instruments and various forms of qualitative analysis. The ethnographic mode of inquiry suited the study, since I was concerned with the subjective truth, namely, the way learners and educators construct meaning and thus interpret and act upon the social context (living within an industrial basin) in which they find themselves.

3.3 Data Source: Sample of Participants

I used purposive sampling (see Table 3.1) where the researcher handpicks the cases to be included in the sample, on the basis of judgement of typicality's (Cohen & Manion, 2000). In this way I built of the sample that was satisfactory to my specific needs. My first group of participants were four learners. Orion¹ Primary School is "feeder" school to Valley Secondary School². I traced the learners who had attended Orion Primary School and examined their life worlds in respect of how the curriculum responds to community-based air pollution. My second group of participants were four educators from Valley Secondary School. Two educators were selected per learning area and subject specialisation namely within the Human Social Sciences, i.e. Geography and Life Orientation). At the time of the research being conducted, the FET phase did not have a

¹ Pseudonym: used for ethical reasons.

² Valley: A pseudonym used for ethical reasons

unit of grade10 learners doing History. Being a type of tracer study, I could not extend the research to more than two subjects within Human Social Sciences. The study was conducted in their first language, which is English.

William (as cited in Strydom, 2002) reminds us that for researchers in the social sciences, ethical issues are pervasive and complex, since data should never be obtained at the expense of human beings. Keeping this in mind, I followed the procedure of gaining ethical clearance from UKZN Ethics Committee, the Department of Education and the Principal. Furthermore, ethical clearance issues were addressed with all participants in the study. Endorsing the ideas of Fontana and Frey (2003) who claim that no social scientist would dismiss the three fundamental ethical concerns namely, consent, right to privacy and protection from harm, consent forms were administered to both the parents' of learners and the learners involved in the study. Central to this idea, is the position of Cohen et al (2000) who believes that interviews are always an intrusion into the life of the respondent, be it in terms of time, threat or sensitivity of the questions or the possibility of invasion of privacy. Keeping this in mind, all data collection was preceded by negotiation and consensus. No identities have been used; all participants including the name of the school where the research was undertaken have been protected by the use of pseudonyms.

3.4 Data Collection Methods

One of the characteristics of ethnographic fieldwork is that one cannot predict what will happen in the field, one has to be alert to data from the most unlikely sources. Cohen et al (2000) states that typical ethnographic research employs three kinds of data collection: interviews, observation, and documents. This in turn he claims, produces three kinds of data: quotations, descriptions, and excerpts of documents, resulting in one product: narrative description. Taking this into cognisance, (refer to Table 3.1), my data collection strategies included participant observation (I am a classroom educator and interacts daily with learners. I also used in-depth interviewing and focus groups interviews (with learners and educators respectively). Ethnographic methods are a means of tapping local

points of view, community "funds of knowledge" (Moll & Greenberg, 1990), a means of identifying significant categories of human experience up close and personal. Furthermore Moll & Greenberg (1990) claim that ethnography enhances and widens top down views and enriches the inquiry process, taps both bottom-up insights and perspectives of powerful policy-makers at the top, and generates new analytic insights by engaging in interactive, team exploration of often subtle arenas of human difference and similarity. This is particularly relevant to the study conducted, since curriculum responses to community-based air pollution sheds light on educators and learners lived experiences of teaching and learning within the context of air pollution. Furthermore, the research highlights the need for "responsive teaching" at the level of the Curriculum Planning in the Department of Education. Researching these learners lived experiences will reflect the environmental problems South Durban learners face.

3.4.1 Observation

In response to critical question one (see Table 3.1) observation was used as a starting point to gain objective data. Initial data was obtained, being passive and unobtrusive in the natural setting. The frequency of observation occurred on a daily basis (40 minutes per session), since I am a classroom educator who interacts with the learners daily. My primary data collection tool was the audiotape recorder, which I used to record my interviews, narratives, conversations, and discussions. I kept detailed field notes on a regular basis in my personal diary. Ethnographers spend a great deal of time on site, so that they can develop more intimate and informal relationships with those that they are observing (Cohen & Manion, 1997: 110). I was successfully able to achieve this, since my informal discussion with educators revolved around "personal health problems" which included wheezing, sinusitis and asthma, with a view that these are some of the side effects of community-based air pollution that both educators and learners face on a daily basis. Furthermore, as an educator, I developed respiratory problems since I started teaching (2001) in the South Durban. Data gathering firstly involved recording of journal entries, field notes and memory notes from observation. This also involved accounting for, explaining the data and making sense of the data collected. Cohen and Manion

(1997) maintain that this will allow for “funneling” of issues from the wide to the narrow. This seemed at the time to be the most appropriate method of sifting the data from broad themes into specific themes, before I started the second method of data collection.

3.4.2 Participant Observation

The second method of ethnographers was participant observation, which involved entering into the social life of those studied, sometimes assuming the insider role. Denscombe (2003) puts this idea very succinctly, when he claims that the ethnographer needs to share in the lives rather than observe from a position of detachment. Participant observation is an omnibus field strategy in that it simultaneously combines document analysis, interviewing of respondents and informants, direct participation and observation, and introspection (Cohen et al 2000). In participant observation the researcher shares as intimately as possible in the life and activities of the people in the observed setting. Woods (1996) claims that experiencing an environment, as an insider is what necessitates the participant part of participant observation. The challenge was to combine participation and observation so as to become capable of understanding the experience as an insider while describing the experience for outsiders. This meant that I not only saw what was happening but also "felt" what it is like to be part of the group who experiences respiratory health problems. This allowed for comfortable interaction with participants, with issues being addressed more directly. In support of this idea is Denscombe (2003) who reminds us that one of the main purpose of ethnography is to provide rich descriptions of real-life situations as they really are.

3.4.3 Interviewing

In response to critical question two, the following were addressed. The research instrument was interviewing. I used two types of interviews, namely in-depth interviews and focus group interviews of educators and learners respectively. This involved using set of semi-structured questions, together with probing as and when the need arose. In-

depth interviews took approximately 35 minutes each and were conducted on a one to one basis with four learners and four educators respectively. This type of interviewing involved gathering of data through direct verbal interaction between educators and learners individually. At this juncture it is important to highlight the three main purposes of the interviews. Firstly, it was used as a principal means of gathering information and had direct bearing on the critical questions and research objectives. As Tuckman (1972) describes it as providing access to what is inside a person's head, makes it possible to measure what a person knows, what a person likes or dislikes and what a person thinks. Secondly, interviewing was used as an explanatory device to identify feelings and relationships (with particular reference to educators and learners lived experiences) in the study. Thirdly, interviewing was used as a follow up with other methods used in the study, namely participant observation. Interviewing also assisted me in going deeper into the motivations of respondents and their reasons for responding as they do. Being an ethnographic study, interviewing was one of the very valuable methods of collecting data.

In response to critical question two, my next method of collecting data was focus group interviews (see Table 3.1). Focus group refers to a carefully planned discussion designed to obtain perceptions on a defined area of interest, in a permissive, non-threatening environment. This type of interviewing served a means of better understanding how the participants as a particular interest group feel or think about curriculum responses to community-based air pollution. These interviews were structured for approximately 45 minutes. This involved two focus group interviews, namely learners and educators respectively. I used semi-structured interviews as this allowed me flexibility to direct questions on issues that I wished to probe. This allowed the participants space to express opinions, feelings and preferences. In ethnographic research, interviews are used to validate observations made during the participant's observation. It also helped me to gain direction for future observations. Semi-structured interviews, as a research method is informal and less rigid than a structured interview. Focus groups were created for a process of sharing and comparing data among participants.

3.5 Triangulation

Interviews were used to cross check the accuracy of the data that was gathered from my observation and vice versa. Methodical (method) triangulation was used. Triangulation strategies also served to validate some of my initial impressions and “enhance the scope, density and clarity of constructs”, which emerged from my investigation (LeCompte & Preissle, 1993: 48). This helped to facilitate the problem of researcher bias. According to Cohen & Manion (1997: 234) triangular techniques help overcome problem of “method-boundedness. I triangulated issues arising from in-depth interviews with those arising from focus group interviews between educators and learners. Campbell and Fiske (as cited in Cohen et al: 2000) claim that triangulation is a powerful way of demonstrating concurrent validity, particularly in qualitative research. Mathison (1988) elaborates on the idea of triangulation by claiming that its use in naturalistic and qualitative approach is necessary in order to control bias and establishing valid propositions because traditional scientific techniques are incompatible with this alternate epistemology.

Golafshani (2003) also advocates the use of triangulation by asserting firstly, that triangulation strengthens a study by combining methods and secondly, it is seen as a validity procedure where researchers search for convergence among multiple and different sources of information, to form themes and categories in the study. Cohen et al (2000) identifies four categories of triangulation namely time triangulation, space triangulation, investigator triangulation and methodological triangulation. However, he claims that it is methodological triangulation that is most frequently used and has the most to offer.

3.6 Data Analysis and Interpretation

The next step in the research inquiry was to record the interviews and observations. Data was categorized according to key concepts and themes. Analysis of data also included examining how data were similar to and different from each other. This allowed for a clearer perspective on the curriculum responses to of community-based air pollution.

Data analysis included discourse analysis of transcripts and pattern analysis. A variety of methods were used to collect data that allowed for making sense of the data and accounting for responses. An ethnographic researcher takes the role of being a detective, looking for trends and patterns that occur across the various groups or within individuals (Krueger, 1994). The process of analysis and interpretation therefore involved disciplined examination, creative insight, and careful attention to the purposes of the research study. The analysis and interpretation were conceptually separate processes.

The analysis process began by assembling the raw materials and getting an overview or total picture of the entire process. The approach to data collection and analysis is unstructured in the sense that it does not involve following through a detailed plan set up at the beginning; nor are the categories used for interpreting what people say and do pre-given or fixed. This does not mean that the research is unsystematic; simply that initially the data are collected in as raw a form and on as wide a front, as feasible. Pure descriptions and quotations are the raw data of qualitative inquiry. My role in analysis covered a continuum with assembly of raw data on one extreme and interpretative comments on the other. My analysis meant bringing order to my data, organizing what was there into patterns, categories, and basic descriptive units. The analysis process involved consideration of words, tone, context, non-verbal, internal consistency, frequency, extensiveness, intensity and specificity of responses. Krueger (1994) reminds us that data reduction strategies are essential in the analysis. Furthermore, interpretation involved attaching meaning and significance to the analysis, explaining descriptive patterns, and looking for relationships and linkages among descriptive dimensions.

Guba and Lincoln (1985: 333 – 334) asserts that ethnographic analysis of data entails four dimensions, i.e. deductive/inductive, generation/verification, subjective/objective and construction /enumeration. The emphasis was on the participants and their views and perceptions, so this was more inductive than deductive. I transcribed the tapes and reflected on my field notes. Detailed notes were taken throughout my discussions and conversations with participants (see Table 3.1). Miles and Huberman (1984) recommend, that as a qualitative researcher, field notes be coded during data analysis. Data analysis

involved checking for completeness, to gain a global perspective of the data, to show emerging patterns and ask questions of the data (LeCompte & Preissle, 1993: 236-237). I looked for patterns and regularities in the data. I “colour coded” emerging patterns and themes as starting point of analysis.

Data analysis started from transcribing interviews into themes and categories. I ensured that each unit of analysis was discrete, yet integrative as a whole. This entailed coding and defining categories. I examined the differences between data collected from one to one interviews with those collected in focus group interviews. This was followed by domain analysis that examined at any symbolic category that included other categories (Cohen & Manion, 2000). Thereafter links and relationships between domains were established. I made speculative differences and summarized the data that emerged (Guba & Lincoln, 1985). Patterns, categories, themes and regularities in the data were determined. McMillan & Schumacher (2001) establish that qualitative data analysis is primarily an inductive process of organising the data into categories, identifying patterns and relationships. Theory was generated, drawing on comparisons and contrasts in the data in the final interpretation.

Having focus is essential in data analysis and interpretation. Cohen (2000) explains that the agony of omitting on the part of the researcher as matched only by the readers' agony in having to read those things that were not omitted, but should have been. In considering what to omit, a decision was made about how much description to include. Detailed description and in-depth quotations are the essential qualities of qualitative accounts. Sufficient description and direct quotations were included to allow readers to understand fully the research setting and the thoughts of the people represented in the narrative. Description was balanced by analysis and interpretation. The purpose of analysis was to organize the description in a way that makes it manageable. This meant dividing the data into broad but workable themes. The thesis brief is also limited; hence I was forced to omit data that extended beyond the thesis focus, generally referred to as “agony of omission”.

3.7 Limitations of the Study

This study is limited to the educators and learners from a selected Durban high school and deals with curriculum responses to community-based air pollution in the year 2006. The size of the traced group involved in the study is not representative enough of the entire school or South Durban to enable generalisability of data to all learners in the school and South Durban. Also the purposive and opportunistic sampling procedure in obtaining participants to interview decreases generalisability of the findings and the reliability of findings as well as validity whether internal or external. In support of this is Patton as cited in Golafshani (2003) who states that validity and reliability are two factors which any qualitative researcher should be concerned about while designing a study, analysing results and judging the quality of the study. Cohen et al (2000) emphasis the idea of reliability when he claims that if the research were to be carried out on a similar group of respondents in a similar context, then similar results would be found. He further claims that reliability in qualitative research is dependant on trustworthiness of the researcher. Thus there must be a match between that the researcher records as data and what actually occurs in the natural setting that is being researched.

The meshing of fieldwork procedures with individual capabilities and situational variation is what makes fieldwork a highly personal experience. Therefore the validity and meaningfulness of the results obtained depend directly on the observer's skill, discipline, and perspective. This is both the strength and weakness of observational methods in qualitative research. This is illustrated in views of Carmines and Zeller (1979), who sees reliability as the tendency towards consistency found in repeated measurement of the same phenomenon and it is difficult to repeat the research in exactly the same way and under the same conditions. Stenbacha (as cited in Golafshani, 2003), claims that the issue of reliability is an irrelevant matter in the judgement of the quality of qualitative research. On the other hand is Cohen et al (2003), who claims that it is very easy to slip into invalidity as it can enter into any stage of the research.

In this regard Cohen et al (2003) highlights two types of validity, namely “internal validity” and “external validity”. Internal validity he claims demonstrates that the explanation of a particular event or set of data, which a piece of the research provides, can actually be sustained by data. External validity, on the other hand refers to the degree the results can be generalised to the wider population, cases or situations. Given the background and previous research conducted in the field of community-based air pollution, external validity seems limited while; there are attempts to find confidence in internal validity were made by both in ensuring the fitness of the methodology to the purpose of the study and using different and rigorous instruments for data collection. It is also acknowledged that there would be far greater confidence in external validity, internal validity and reliability, if the study were extended to, for example, all schools in the South Durban Basin. However, the researcher was limited for the following reasons, namely time constraints, limited free periods and lack of resources.

3.8 Chapter Summary

This chapter presented the research methodology by providing the research design, the data source i.e. sample of participants and data collection methods, which involved observation, participant observation and interviewing. Two types of interviews were conducted namely, in-depth interviews and focus group interviews. Methodical triangulation, data analysis and interpretation were presented. This chapter is concluded with the limitations of the study.

In the next section, the findings, analysis and significance of the study are presented.

CHAPTER FOUR

FINDINGS, ANALYSIS AND SIGNIFICANCE

4.1 Introduction

In the previous chapter of the study, I presented the research methodology, namely qualitative research. This represents a naturalistic mode of enquiry where I used ethnography as a method of inquiry.

This chapter deals with data analysis, interpretation and presentation of findings. The process of data analysis involves preparing the data for analysis, conducting different analyses, moving deeper and deeper into the understanding of the data, representing the data and then making an interpretation of the larger meaning of the data (Creswell, 2003). In this chapter, the findings supported by qualitative data are presented and discussed.

I commence this chapter with a description of the context of the site of investigation, Valley¹ Secondary School to a global view of the community. Both Orion² and Valley are schools located within the South Durban Basin and are victims of local air pollution. Therefore I give details of the various factors and relationships between the above two schools. The data responds to two critical questions³ asked in the study. Evidence emerging from the data would assist in understanding curriculum responses to community-based air pollution at Valley Secondary School. In the data collection process several themes were identified. These themes are presented in this chapter in the following way (see Appendix A and Appendix B). Theme one which is learner and educators perceptions of community-based air pollution and its relevance to curriculum.

¹ Valley: a pseudonym used for ethical reasons

² Orion: a pseudonym used for ethical reasons.

³ What are the perceptions of educators and learners to community-based air pollution?
How do educators and learners respond to community-based air pollution?

Theme two reflects on how learning and teaching responds to community-based air pollution. Theme three highlights curriculum challenges in learning and teaching within the context of curriculum implementation and delivery. Finally theme four focuses on critical thinking and empowerment of learners and educators respectively. The analysis and significance of these aspects would assist in understanding curriculum responses to community-based air pollution.

4.2 Context of Valley Secondary School

Valley Secondary School comprises a total learner population of 1100 and an educator population of 40. Over 80 % of the learners reside in communities within the South Durban Basin. The majority of Valley Secondary learners have been born and raised in the South Durban Basin. Thus, we find that local air toxic waste has become a part of their home world, their social world and their schooling. Orion Primary⁴ represents a “feeder school”⁵ of Valley Secondary School. The concept of “feeder school” implies that on completion of the Grade 7, many Orion Primary learners attend Valley Secondary to complete secondary education. Feeder schools are defined according to demographical location. Statistics indicate that Orion Primary School is rated as having the world’s highest asthmatic rate. Several studies indicate that this primary school has been, affected by local air pollution, which is caused by nearby industries.⁶ Learners who attend Valley Secondary are further subjected to community-based air pollution from their primary school days. Valley Secondary is no different from many schools in the area; the evidence of local air pollution is obvious.

Upon entering the gates of Valley Secondary, learners and educators not only see the air pollution, but also feel it in the atmosphere. Huge bellows of smoke emitted from nearby industries clouds Valley Secondary. This foggy atmosphere is very noticeable in the early morning skies. Valley Secondary stands out as a neat, well-maintained and very organised institution of learning, but battered by toxic emissions. This school is lead by a

⁴ Pseudonym: used for ethical reasons.

⁵ Refers to a primary school, which transfers learners to neighboring high school on completion of the Senior Secondary phase, which is Grade 7.

⁶ See Community Air Monitoring Reports – GroundWork 31.

committed and dynamic Principal, who ensures that the culture of learning and teaching prevails despite the problems of local air pollution. Valley Secondary embarks on various initiatives to plant more trees, thereby trying to make the environment friendly and conducive to education. Despite the environmental injustices at Valley Secondary, learners strive to achieve high academic excellence and have great interest in sport.

In understanding, the above context and site of investigation within the global picture of the community, learners and educators at Valley Secondary show interest in the activities of SDCEA. Learners and educators take tours organised by SDCEA, A Toxic Tour called “ The Cradle to the Grave” and they rely on the “one stop knowledge shop”⁷ for their resources in air pollution. At Valley Secondary, learners and educators complain of unpleasant smells, of course some days the smells are so bad that they make learners and educators feel sick. According to Van Wyk (2004), the air in South Durban Basin is laced with dangerous chemicals. As learners and educators continue learning and teaching at Valley Secondary, the “clouds of death” hang above the skies in the south Durban. Majority learners and educators who participated in the study complained of suffering from sinusitis, wheezing, asthma, and other respiratory conditions. Both educators and learners claimed that they get used to it and accept the conditions as natural. Amidst the industrial fumes, learners at Valley Secondary participate in Life Orientation (Sport) once a week. In trying to achieve the objectives of the NCS, educators and learners are challenged by several health problems. The above context sets the background for the analysis and findings in the study.

4.3 Analysis of Findings: Learner Responses (Appendix A)

In this section, I plan on analyzing how learners and educators respond to community-based air pollution respectively. In response to the Critical Question: *What are learners’ perceptions of community-based air pollution with reference to curriculum(teaching and learning)?* The following findings are presented. Firstly, the most common

⁷ SDCEA is makes available to the community, booklets, pamphlets, workshops, slide shows, Newsletters etc

environmental problem is identified. Secondly, the background of learners' community is presented. Thirdly, the impact of air pollution on learners is highlighted. Comparisons and similarities between learners and educators are also made from the data.

4.3.1 Most Common Environmental Problem Identified: (Appendix A)

Question 1 required responses on the most common environmental problem in the South Durban Basin identified by learners. The following excerpts are relevant:

Jill⁸.....*I have been born and raised in this community and as far as I know it has always been air pollution.*

Nelly⁹..... *I have lived here all my life. My mum has been teaching in this community for many years. Industries have become a negative part of this community.....the perpetrators of air pollution.*

Kammy¹⁰..... *Well!my mum is a teacher at a school within South Durban for about 25 years. She is well aware of the health problem learners face in these communities. She often describes the incidents of how learners feel when they are worst hit by the pollution.....fainting, respiratory problems.*

The above evidence suggests that the most common and widely accepted environmental problem identified by learners was community-based air pollution. However, both Nelly and Kammy have parents who teach within the South Durban Basin and these learners are well aware of the problems experienced by learners as well as educators. Jill saw air pollution in this community as a major problem, since she claimed that she was born and raised in this community. Significantly, what the data clearly illustrates is that these learners have grown with local air pollution prevalent in their communities for many years.

⁸ Jill: A Pseudonym is used for ethical reasons.

⁹ Nelly: A Pseudonym is used for ethical reasons.

¹⁰ Kammy: A pseudonym is used for ethical reasons.

4.3.2 Enduring Nature of Air Pollution (Appendix A)

In response to the question (2) on learners' perceptions of community-based air pollution, all learners presented a sense of enduring struggle illustrated in the following excerpt:

Tina.....*All my life local air pollution has existed. I am a victim. This is and remains a sore point. I have bitter memories of my family member's experiences of respiratory problems. The injustice of death and illnesses caused by local air pollution and this hurts.*

Nelly.....*Air pollution has become a part of my "whole" world. I face it on a daily basis. Being part of the struggle for clean air in the South Durban seems ongoing.....we have to be strong about it.*

The sense of sadness and hurt is illustrated by Tina who suffers from a respiratory condition. Both her family and her experiences have created feelings of betrayal, on the part of industries.

4.3.3 Learners Community Background (Appendix A)

In response to the question (3) on learner's community background, the following extracts are significant.

Kammy... *My primary school was and still is situated in such a low lying area....and surrounded by major industries like Sapref and Engen. Being sandwiched in the middle makes, this school a prime target for daily air pollution. This industrial belt is nicknamed "Cancer Valley".*

Jill.....*We are well aware of the industries that are causing the pollution.*

Nelly.....*Engen, Mondi and Sapref are the giantsthe perpetrators of community-based air pollution.*

Ken.....*I live in this community and I school here. So I am breathing this stale and toxic air every second. I have been a victim of air pollution since primary school. I am well aware of the problems, the causes and effects of air pollution,*

*because it is part of my life. I need to understand it. My uncle recently died from a respiratory condition. I was on TV...Carte Blanche*¹¹. Regarding air pollution and how it affected us at school. Our local newspapers report on incidents of air pollution, more often than the Daily News and the Mercury or TV.

All learners have been raised in South Durban communities and have since primary school experienced community-based air pollution. There is clear understanding displayed by learners, because they have been living in South Durban for far too many years. The association between respiratory problems and the eventual death of an uncle illustrates learners' awareness of the relationship between industrial air pollution and diseases. Learners are extremely familiar with the names of industrial giants and display tremendous perspicuity in respect of how air pollution infects and affects their lives. Interestingly, media seems to play a significant role in keeping these learners aware and informed of community-based air pollution. Learners seem to be informed regularly by the local media of the incidents of local air pollution. A cursory review of media reports indicate that local newspapers such as *The Tabloid* and *The Southern Star* provide regular coverage on community-based air pollution. The harmful incidents of community-based air pollution have also been highlighted in the *Daily News*, the *Mercury*¹², *BBC*¹³ and *SABC*¹⁴. Medical reports of such incidents seem to be often delayed. When incidents of harmful effects of local air pollution appear in the newspaper, industries protect themselves by immediately quoting the number Environmental Impact Assessments (EIA) undertaken. If these EIA's were undertaken by all polluting industries, how is it that the harmful effects of air pollution are not predicted and adequately reported? In the light of the number of harmful incidents reported in the media about local air pollution, makes one wonder if these EIA's include experts in both the technical and medical field.

¹¹ Carte Blanche did a documentary about air pollution in 2004. *Gases fume learners at a nearby school*.

¹² See SDCEA: Press Releases. (2000 – 2006). Community Newsletters

¹³ See *Durban's poor fight for clean air* by Clark Grant. 13 December 2004, BBC NEWS

¹⁴ See Durban South Mondi Incinerator. Rehana Dada. 24 November 2002.

4.3.4 Impact of Air Pollution on Learners: (Appendix A)

Learners were asked about the impact community-based air pollution had on their lives (Question 4). Local air pollution seems to have created a very negative impact on their lives of those learners who have developed respiratory conditions. The following excerpt illustrates how learners felt:

Tina..... *Certainly, a very negative impact. We are stuck with this problem. These are the "big giants".....They are too powerful, because we have been fighting this battle to bring about environmental justice for many years.*

Kammy.....*This problem has existed for a rather long time. We continue to live here even though this is the problem. I think that it is quite amazing how learners have made it a part of their culture.....part of their lives.*

Jill.....*Definitely has a negative impact on the community because of the large number residents (learners) who suffer from respiratory problems .Only time can be the judge....when it comes to change. We have to firstly understand our problems, before we look for solutions. We also need to be in control of our lives especially schooling.....with time we will feel empowered. I try to keep my spirit going.*

Both Tina and Kammy felt strongly negative about the impact industries have on schools. There is a strong degree of acceptance of the situation. These learners felt that they will be stuck with the air pollution. Learners as a part of the community do not have the power to uproot industries. Tina and Kammys' responses are closely linked to the concept of "powerlessness". Tina acknowledges the sense of frustration and powerlessness as she sees personal destiny out of her own control, and in the hands of others (giant industries). These learners can reach a level of emancipation, which will involve gaining power to control their own lives. Tina's powerlessness is further indicated by the utterances..."giant" and "stuck with the problem", which is a clear indication of a power struggle. Currently, these participants are the first recipients of the FET. It is assumed that a sense of emancipation can be reached given time.

Jill on the other hand tries to have control of her life, which is displayed by the utterance of “spirit going”. Critical theory asserts not only that individuals should have maximum control over their own lives. It is specific in locating the sources of unfreedom, oppression, class and social justice. This is clearly indicated in Jill’s response when she asserts that she needs to gain more knowledge about the problem before she takes action. Jill in comparison to Tina and Kammy, shows a desire for change but nevertheless claims that air pollution is most certainly impacting negatively on her life. Emancipation is concerned with structural constraints upon the freedom of the individual (Gibson, 1986). In understanding the impact industries had on learners, Tina’s response is significant.

Tina.....Many of my friend's parents work for these polluting industries. I suppose they are feeling obligated to a certain extent. Many parents in this community are dependant on these industries for employment and a living. They work at Mondi, Engen, Sapref and other nearby industries.

Learners’ display in-depth understanding on issues of power and a sense of uselessness is evident by Kammy and Tina. It is evident that Tina considers themselves “stuck” in a situation, which leads to the feelings of despair and hopelessness. Critical theory, by its very nature attempts to explain the origins of everyday practices and problems. Furthermore, critical theory also attempts to reveal those factors, which prevent groups and individuals taking control of, or even influencing, those decisions, which crucially affect their lives McLaren (1989). Tina seems to have insight as why learners as a group are prevented from taking action against industries. The sense of control that many learners face is evident in utterance..... obligation”. Their parents work for these industries.

All of the above responses arise from theme one, which is an overall perspective of learners ‘perceptions to community-based air pollution. Community-based air pollution has influenced negatively on learners. However, the strong sense of endurance amongst learners is captivating. The analysis and discussion moves from learner perceptions of community-based air pollution to educator perceptions to community-based air pollution.

of anonymous, historical rules, always determined in time and space and have defined a given period, and for a given social, economic, geographical, or linguistic area. In light of the above, educators responses seem to be dictated by the social circumstances (they are part of this community), the economic (the fact that they are dependant on the industries for jobs) and the geographic (low income groups have been historically located near polluting industries. All three educators seem very clear and direct that in no uncertain terms, air pollution is the most common problem in this community. Ms Randles is very confident that air pollution is confined to this community for specific reasons. Similarly Ms Thomas came across very vociferously, while Ms Naledi's response of "glaring in the face" is a reflection of what could be more obvious than air pollution. She depicted a sense of frustration and agitation in her tone. In view of the above responses, it becomes clear that Ms Randles and Ms Thomas are very familiar with the problem and speak with authority. Ms Thomas made it very clear that she has been teaching in this community for far too many years and she feels confident to speak on the issue of community-based air pollution.

4.4.2 Educators Community Background

With regard to the community background of educators, it is clear that three educators live in this community and therefore are very familiar with the issue and coverage of air pollution at a community and school level.

Ms Naledi.....*I have been a resident in this community for the past 30 years. I am quite familiar with the problem of air pollution.*

Ms Randles.....*I have been born and brought up living in Valley community. As I speak to you, I feel upset because I have a baby who is affected by respiratory conditions, i.e. sinusitis and asthma. At the end of the day, because I live here, we have made a life for ourselves in the community. I learn to live with it in some ways. As a mother with a child experiencing a respiratory condition, and as an educator, I feel that I have a better perspective of the experience of learners with respiratory conditions.*

Mr Pearson.....*I may not be living here, but I can assure you one thing. Since I came to this school I had an operation...a personal chest condition. I spend 75% of my life teaching in this polluted environment. Either way, whether you live here or work here, you get the pollution in the "face" and "in your blood. This is similar to apartheid. You felt it everywhere, at work and at school. It was like a "shadow".*

In analysing, Mr Pearson's response (above), it is a powerful indication of the way air is pervasive, "in your blood". This is indicative of very strong emotion being displayed. To compare community-based air pollution to apartheid is a reflection of the internal pain Mr Pearson faces. To call air pollution a "shadow", also indicates that he carries the problem home even though he does not live in this community. The major part of his day is spent at school. Educators who live in this community show a great amount of sympathy for learners with respiratory problems. Educators demonstrate a clear understanding of the problem and like the learners, in accepting their situation.

4.4.3 Facing Financial Obligations

In response to the Question 3 (Appendix B) on educators' perceptions to community-based air pollution, the following excerpts are interesting.

Ms Randles.....*At a school level sometimes we accept help and assistance from these industries because we are desperate for funds. Sometimes, our hands are tied. We do not have choices. We are forced to accept the following situation. We have taken donations from nearby industries, accepted adverts for our brochures, we accepted and still continue accepting free paper from Mondi, we allow our learners to attend free tuition classes at Engen, we accept the trees they are willing to sponsor for Environment Day, we participated as educators in the "Personal Excellence and Empowerment Programme offered by Sapref and many others you know.*

Mr Pearson.....*Many learners' parents work for the industries, so they are afraid to complain.*

Ms Randle's response is clearly linked to the relative autonomy of education, where economic relationships dictate form and other aspects of life. Her response is a clear indication of schools being financially obligated to the industries. Furthermore, this illustrates why Valley secondary accepts these industries help. This also indicates how one group's interest (industries interest) is being served at the expense of others (educators and learners health) at schools and in communities. Foucault (1980) asserts that discursive practices are not simply ways of producing discourse. They are embodied in institutions, in patterns of behaviour, in forms of transmission and diffusion and in pedagogical forms.

4.4.4 Impact of Air Pollution on Educators

In response to question (4) on educators' community background, the following is important.

Ms Randles.....*Air pollution has most certainly had a very negative impact on me as an educator. However,as negative it may be...I cannot allow it to destroy me of living in the Valley community. There are plenty local media reports. Our local newspapers carry incidents of residents, learners, educators and names of schools affected by of air pollution on a regular and on-going basis. However, reports of air pollution incidents in the national newspapers seem sporadic. Since my child is affected by this respiratory condition and I teach in this environment, I have to read about it all the time. I need to keep myself informed regularly.*

Ms Thomas... *I have been teaching at two schools within the Valley community. I can assure you that I am very familiar about all the negative impacts it has had on me as educator and on my learners. We suffer from respiratory conditions, but we have to move on daily.*

Generally, all educators were very explicit that air pollution influenced both teaching and learning. However, educators who reside in the Valley¹⁸ community made it a part of their life and their culture. Ms Randles expressed ways in which she keeps herself informed about community-based air pollution. Both learner and educator perceptions of community-based air pollution are similar at one level of analysis, in that they seem to endure the same struggle, either learn or teach within these toxic conditions. This discussion concludes theme one which is educator and learner perceptions to community-based air pollution.

The discussion moves to theme two which is curriculum responses to community-based air pollution

4.5 Curriculum Responses to Community-based Air Pollution:

In response to Critical Question Two: *How do learners and educators respond to community-based air pollution within the official school curriculum*, the following four themes have emerged from the data:

- Integration of Local air pollution into the Formal Curriculum
- Curriculum Responses to Community-based Air pollution
- Curriculum Challenges in Schooling
- Critical thinking and Empowerment

These themes will be presented with educators and learners concurrently. Analysis will be at the level of illustrating similarities and differences between educators and learners responses.

¹⁸ Pseudonym: used for ethical reasons

4.5.1 Integration of Local Air Pollution into the Curriculum

In response to the question (Appendix A and B) on how the curriculum integrates community-based air pollution, the following extracts are significant.

Jill.....*At a more general level, the school has integrated air pollution into what we call a "Literacy Programme". Fortnightly, the registration is extended by approximately 45 minutes. Teachers in the various departments have turns to select articles on relevant and current issues pertaining to our lives.*

Nelly.....*Community-based air pollution is definitely integrated into Valley High's formal curriculum in the Literacy Programme.*

Kammy... *What is amazing is how often we are given articles about community-based air pollution by such a variety of educators, all trying to address the issue from their subject perspective. Our language department prepares us for participation in debates, speeches and competition.*

Ms Thomas.....*The levels of integration vary from the general curriculum to the specific subjects. The following takes place, namely; learners participate in drama. Plays are staged at the Assembly, illustrating the role of government, Ngos and industries in air pollution. . These experiences are for the learners "cathartic". Furthermore, in June 2002, two educators and a group of learners were involved in painting a mural near the Valley Railway Station. This was an initiative between business, industries and schools to create an awareness of environmental issues among commuters and pedestrians.*

Ms Randles.....*The Literacy Programme creates a sense of enlightenment and empowerment amongst both learners and educators. Both educators and learners are then forced to understand the broader context of community-based air pollution.*

Ms Naledi... ..*At a general level, learners participate in Earth Day Protest, organized by GroundWork and other NGO's through the main streets of Durban. Industrialist in the South Durban Basin handed a memorandum to the Mayor Oden Mlaba highlighting the ill effects of community-based air pollution. An environmental Club is also active at school.*

Clearly the active sense of air pollution is felt “in the blood”. However, attempts at including it into the curriculum has been sporadic at times incidental from learners point of view. In contrast to educators responses which are distinct. According to Gibson (1986), literature for example becomes means of controlling radical tendencies. When critical theory addresses itself to literature it can also provoke violent and vituperative (abusive) responses. Furthermore, Widdowson (1994) as cited in (Gibson, 1986), asserts that all education is a political activity, and the teaching of English (literature) is especially so. Strongly linked to the “Literacy Programme”, is the notion that language has become an increasingly important focus for understanding local air pollution. Interestingly, the Literacy Programme was introduced after the new curriculum was put in place. Valley Secondary tries to espouse the ideology of the new democratic curriculum.

Ms Thomas’s response is significant, since the Art (paintings, drawings, sculptures and fine arts) hold within themselves images of liberation, visions and emancipation. She indicated that educators and learners were involved in the painting of murals at Valley Railway Station. Art is also prominent because it reveals society (expressions were reflected about community-based air pollution) feelings and emotions. Learners engaging in production and staging plays based on local air pollution reflects the extent to which they understand air pollution.

Furthermore, Ms Thompson’s utterance of “cathartic” is indicative of learners’ state of emotion on the issue of community-based air pollution. This reflects the desire to be emancipated, to be set free from the shackles of environmental injustices. Learners claim that levels of integration of community-based air pollution into the formal curriculum is empowering, liberating and challenging. What is evident is that learners are participating at different structures and levels. The levels of this participation are not very clearly understood by learners. Their personal circumstances (respiratory conditions) seem to disillusion them in some ways. The sense of struggle and endurance seems more evident than the levels of full participation for liberation, empowerment and freedom.

4.5.2 Life Orientation Responses to Community-based Air Pollution

With reference to curriculum responses to community-based air pollution in the subject Life Orientation, the following extracts are significant (Appendix A and B).

Nelly....*In Life Orientation, we cover a section on Citizenship Education. This helps us identify and address social, environmental and in particular human rights issues. We also address problems affecting our communities and our learners. We are also given case studies. However this is only one part of the LO syllabus. We brainstorm ideas about the role of NGO's. Our lessons revolve around the Bill of Rights and The SA Constitution and role of democracy.*

Mr Pearson... *In Life Orientation, I focus on a section called Citizenship Education. In the NCS human rights, environmental and social justices are addressed in learning outcome 2. In my subject, I include community-based air pollution in as many sections as I can. These are living experiences of learners at Valley Secondary School. I do contribute to citizenship, democracy and education through the formal curriculum.*

Ms Naledi.....*I successfully incorporate community-based air pollution into Life Orientation. The problem arises when learners start to challenge you, namely How can this subject teach us so much about our rights, yet our human rights are violated under our noses? As an educator, I have to agree with them.*

Educator and learner responses are similar, in that both elaborated about the concept of citizenship education in the NCS. Common areas covered in Life Orientation included environmental justice, social justice, The Constitution and The Bill of Rights. However, what is evident at Valley Secondary as a school is that there is contribution to citizenship and democracy education through more than the formal curriculum. It is also becomes clear that sometimes learners and educators have shown that the NCS has worked counter to its transformatory social aims.

4.5.3 Geography Responses to Community-based Air Pollution

When asked about the inclusion of community-based air pollution in the subject Geography, both learners and educators indicated that it was covered in the NCS (Grade 10) syllabus. Once again, in terms of content, learners displayed a sophisticated account of knowledge of air pollution.

Jill.....*Many aspects of air pollution are integrated into our Geography Syllabus, namely weather patterns, atmospheric circulation and structure of the atmosphere, wind direction. The effects of air pollution on man. Our teacher has used community-based air pollution to empower us on the issue. I can easily relate to this environmental issue since “we live here and experience it daily. As learners. We are faced with unpleasant smells that this air pollution causes while we are at school.*

Ms Naledi*In Geography, we focus on issues pertaining to air pollution. To be more specific, I would say that it is Learning Outcome 2 and Assessment Standard 3, which actually describe the links between environmental problems and social injustices in a local and global context.*

In examining both educator and learner responses to integrating community-based air pollution into the subject Geography, there is a deep sense of understanding and relating to lived experiences. Clearly, what is evident is that experiential learning plays a pivotal role in understanding the NCS. Any serious move to support environmental education has to be rooted in local communities, bring with it local participation, knowledge, orientation and be geared towards dealing with concrete realities of daily life. To this effect, what is important from an environmental perspective is that in drawing on learners' experience, educators need to help learners to interrogate experience as much as to access and validate it. From this point of view, what must be established is that quantity of experience does not necessarily ensure quality of learning. What remains significant is that educators must note that there is a disjuncture between policy as text

and the reality as lived? Essentially, as participatory and as democratic as the National Curriculum Statement may seem is learning outcome 2 (in Geography and Life Orientation), it can work counter to democratic ideals. Interestingly, Apple and Beane (1999) claim that the most powerful meaning of democratic citizenship is formed not in glossy political rhetoric, but in details of everyday experiences.

4.5.4 Learning and Teaching within the Context of Community-based Air Pollution

When learners and educators were questioned about how they learn and teach within the context of community-based air pollution, the following extracts are relevant.

Jill.....*Everyday, I carry my “asthma pump” to school. I will not know when I can get asthmatic attack. I just count on medication.*

Kammy.....*I must admit that I carry a cell phone, so that I could contact my parents immediately. I am aware that carrying a cell phone is against the school rules. However, I must admit that the Principal and administrative staff are very understanding. They do not hesitate to make telephone calls.*

Ms Thomas.....*I carry our medication daily to school, and continue to teach. I am passionate about teaching Maths. I was transferred from a nearby primary school to this school to teach Maths. Life has to go on..... I live with this medical condition.*

Ms Randles.....*I have been temporary for far too long. When I was appointed at this school, what was more important to me is to have a job, not only worry about my health. I do not have a choice in the matter.*

When learners and educators were asked how they teach and learn within the context of air pollution, the immediate responses from both educators and learners were that they relied on medication. Both educators and learners carry “inhalers” and “medical pumps” to school. Ms Randle’s response of being temporary for far too long is an indication of the concept of class and poverty. Her economic obligation to have a job was far more overriding than the issue of her health or child’s respiratory condition. Ms Thomas’s

utterance to “ being passionate about Maths”, indicates the degree of selflessness” that prevails amongst educators who are suffering from respiratory conditions. Upon reading my field notes that I gathered from observation and discussions with educators in the staff room, I discovered the following. Educators who shared respiratory problems were very compassionate, understanding and accommodating to each other. They assisted each other when their affected educators were absent and when they were unwell especially during the invigilation sessions. Both Ms Thomas and Ms Naledi also indicated that they shared their “inhalers” and “asthmatic pumps” with learners on several emergencies. The educators are very literate about the harmful effects of community-based air pollution. The Principal, as head of Valley Secondary, made it a rule that the medical conditions of all learners had to be recorded and updated by both form teachers and subject teachers on a regular basis. Both learners and educators also have displayed extreme care and empathy in handling cases pertaining to the health of Valley Secondary. However, what is clear is that Valley secondary is very responsive in handling community-based air pollution in relation to health and disease.

4.6 Curriculum Challenges encountered in Curriculum Delivery

When asked what some of the challenges learners and educators encounter in learning and teaching within the context of local air pollution. The following learner excerpts are significant.

Nelly.....*We are forced to acknowledge and inform ourselves about air pollution problem. We have to learn to fight the effects of air pollution. We have to try to learn and not let the problem cripple us. Once we grapple with our medical conditions, we can handle bigger challenges for environmental justice.*

Jill.....*Well.....we are faced with terrible odours such as rotten egg, rotten vegetables, paint smells, sharp burning smell. Many learners have developed asthma and wheezing problems and I think many of our educators as well.*

Kammy.....*Interestingly what happens is that some learners move to the richer areas like, Montclair, Yellowwood Park and Amanzimtoti where air pollution is not so rife.*

Ms Thomas.....*Educators in this institution are very dedicated and committed to teaching. This problem has become a part of our lives. However, we also try not to make it a problem and ruin our lives, we live in hope. We constantly provide words of encouragement to learners or educators who are unwell.*

Ms Randles.....*My child is regularly ill, suffering from respiratory conditions. The Principal of this institution is certainly very accommodating and understanding. However I have concerns about my role function as a teacher. So in no uncertain terms are learners neglected in terms of my absence. Should I be absent from school, on arrival I go the extra mile to catch up in my non teaching periods and the breaks with my teaching Hopefully, government, industries and the Department of Education would work together and combat the problems of air pollution. It is getting very serious, since both learners and educators are affected at schools. With time, the Department of Education will perhaps work with the Government in addressing community-based air pollution and its impact on the curriculum and schooling in the South Durban Basin.*

With regard to curriculum challenges amongst learners and educators, there is a high level of tolerance and acceptance of the situation. In the above sentiments, Nelly displays insight into how understanding would lead to or enable acceptance of the problem. This characteristic of critical theory has great relevance to the study, since Nelly is able to handle the problem quite differently from some of friends. In support with Nelly is Tina who claims that she tries to help herself when she is faced with health problems at school. Common sense assumptions and everyday language of those in familiar settings is highlighted. Showing how common sense interest is served at the expense of others. Like Tina and many others learners in the South Durban Basin, they continue to suffer with respiratory health problems while big industrial cooperates continue to benefit financially. These learners' healths are being compromised at the luxury of industries.

Both educators and learners choose not to make community-based air pollution ruin their lives. They live optimistically. Clearly, Nelly illustrates that knowledge in local air pollution is not simply explanatory, but is committed to enabling change towards better

relationships, towards a more just and rational society. Interestingly, Tripp (1993) as cited in Marsh (1997) asserts that curriculum should be facilitated by autobiography, examining and retailing episodes from our life stories. This is particularly relevant to the study, in that learners and educators “experiences and “life stories” of curriculum experiences within the context of local air pollution has been integrated into the formal curriculum. The democratic values espoused in the NCS in both the subjects Geography and Life Orientation allows for adequate integration of community-based air pollution into the formal curriculum.

Valley Secondary has responded positively to handling challenges in teaching and learning in both Geography and Life Orientation within the context of community-based air pollution. Firstly, this involved making meaning of the purpose of school and how educators and learners’ social and historical context shapes their view of schooling and the world. What is clear from the data is that both learners and educators do not allow themselves to be ruined in handling curriculum challenges to community-based air pollution. They have a deep awareness of the fact that it was apartheid spatial planning that placed low-income people near polluting industries. Ms Randles lives in hope that intervention takes place at higher levels of education are significant. Kammy’s utterance “to move to richer areas” illustrates the case of class and poverty. Through apartheid spatial planning low income, people were located near polluting industries. Currently some people choose to relocate, to move away from the polluting industries.

Secondly, both educators and learners show insight about how power regulates discourses and which ones are legitimised. Thirdly, it is educators more than learners that seem empowered from mainstream priorities and power structures. Fourthly, educators and learners promote self-reflection so that changes of perspectives on community-based air pollution can be developed; exposing one’s values and openly working to achieve them.

4.7.1 Critical Thinking and Empowerment in the Curriculum

Both educators and learners were questioned about studying community-based air pollution contributed to critical thinking and empowerment.

Jill.....*Our educators teach us in both Geography and Life Orientation about The Constitution, The Bill of Rights, environmental injustices and social justice. We have certainly gained a vast array of knowledge in these subjects. This has allowed me to gain a better perspective on community-based air pollution.*

Kammy.....*While I acknowledge that I have been trained to think critically and analytically on issues pertaining to the environment. But you also need to understand that at Valley Secondary and Valley community, this has become a way of life, a culture. We challenge community-based air pollution problems and move on with our lives, we cannot stagnate.*

Nelly.....*However, what worries and concerns me, is that amidst all the values espoused in the NCS, our powers are still being limited and our human rights to clean air are being violated. So how democratic and fair is the NCS. I wonder if this just an illusion.*

Ms Thomas.....*There is a big difference between policies laid in the NCS and textbooks with those in reality of lived experiences. There are still limits to exercising our critical minds and empowered bodies when we live with the harmful effects of air pollution daily at school. How will the Department of Education address these issues? They do not create sufficient platforms for us educators to address pertinent community-based problems that affect life at school.*

Ms Naledi.....*Studying community-based air pollution has certainly created spaces for educators to become empowered and emancipated, but the question lies in when and how can we address this burning issue with the Department of Education officials. Perhaps only when scores of learners and educators are rushed to hospital because nearby industries are emitting its toxic soup which we are expected to drink because we have no choice in the matter.*

In contextualising learners and educators responses, the concept of praxis becomes clear in the study. Praxis in the NCS, with reference to the subjects Geography and Life Orientation, has involved lived experiences of participants within the community.

Both learner and educator responses indicate that the curriculum provides enlightenment as to the actual conditions of social life and school life. However, what is significant is that, in the NCS (with reference to Geography and Life Orientation), the interrelationship between curriculum, democratic education and schooling becomes even clearer when it is looked at from a human rights perspective. This has direct effect on curriculum responses to community-based air pollution, in that any significant denial of the necessities of life (namely the right to clean air) clearly involves a diminution of citizenship for both educators and learners. Thus social and environmental rights should be seen as necessary conditions for citizens to exercise their civil and political rights at school or in the community.

4.7.2 Environmental Education as a Separate Subject

Arising out of the theme on critical thinking and empowerment, learners and educators were questioned on whether in the NCS, the subjects Geography and Life Orientation created ample opportunities to address further issues pertaining to community-based air pollution. This brought in another dimension to the curriculum responses to community-based air pollution. This is reflected in the following excerpts.

Nelly.....My teachers tries as far as possible to create ample opportunities to address these issues in detail. Nevertheless, justice is not done given the space and time. What would be a very good idea if all issues pertaining to the environment, social justice, environmental injustice, citizenship, human rights etc could be all drawn into one solid subject called "Environmental Education". Its aims, objectives and actual value will be focussed and defined. It will not be scattered. Both Geography and Life Orientation we as learners cannot see the value and global picture of integration of learning outcomes.

Jill.....I cannot concentrate on these issues in different subjects (example Geography and Life Orientation). I would actually prefer all these aspects on air

pollution to be encapsulated into one concrete subject, which will address air pollution at different levels.....maybe called Environmental Education.

Kammy.....*We are currently given ample opportunities to address issues pertaining to community-based air pollution. What would be a challenge in the NCS is to offer all these aspects pertaining to environment and geography into one subject. Perhaps a subject called, Environmental Studies or Environment Education. We need to focus on sustaining our environment before we reach out for other form of education.*

Ms Naledi.....*You must understand that learning outcome 2 both Geography and Life Orientation covers many aspects of the environment, spatial injustices, geography, the Constitution, Bill of rights, etc. I think justice will be done if it was al incorporated into one subject called Environmental Education. Justice will be achieved if the Department of Education introduces EE in the following way, Grade 10 (community-based air pollution, focussing on local case studies and within the province; Grade 11 (regional air pollution, provincial studies) and Grade 12 (international level, with particular focus on selected case studies and the role of world environmental organisations). After all the entire curriculum needs to be responsive to society 's needs. The need for sustaining the environment of the future is imperative.*

Ms Thomas.....*What I think what should happen is that Environmental Studies should be introduced and it should absorb the subject Geography. The Department of Education has already introduced Travel and Tourism, Engineering Graphics, Technology and many others. The curriculum must be relevant and in keeping with to the demands of society and the future. We need strong, sharp and immediate focus on Environmental Education.*

Arising out of the above responses is a strong and clear move for environmental issues to be absorbed into a separate subject called Environmental Education. While the transformatory objectives of the NCS in both Geography and Life Orientation is being

recognised by certain educators and learners, the focus seems to lie in establishing it as a separate subject. Arguments proposed for Environmental Education as a separate subject range from the broad continuum of absorbing Geography into the so-called new subject Environmental Education, to the specifics of suggesting a structure of the core components for the various NCS grades.

Further motivations for EE as a separate included alternative names for the subject, and very structured ideas by educators. Such motivations also illustrated the levels of thinking amongst educators in curriculum implementation, delivery and implementation. Educators also indicated that the current curriculum should be relevant and in keeping with the demands of society's needs. Furthermore educators proposed the success in the future NCS means that there should be need for strong, sharp and immediate focus on environmental issues through it being a separate subject.

4.8 Chapter Summary

In summarising the findings, four broad categories emerge. In response to theme one, which is learner and educator response to community-based air pollution the following are evident. Firstly, that air pollution was the most common environmental problem identified by both educators and learners. All participants in the study were knowledgeable and well informed about air pollution. Collectively, they present a sense of enduring struggle against community-based air pollution. They have been part of the struggle for clean air for many years and reside in the South Durban Basin. Participants display perspicuity in respect of how air pollution infects and affects them. Finally, on theme one, both educators and learners the same struggle to teach and learn within context of community-based air pollution.

Secondly, with reference to theme two, the following is evident. At Valley secondary community-based air, pollution is integrated at a general level of curriculum and in the formal curriculum. However, attempts at including community-based air pollution into the curriculum have been sporadic at times and incidental from learners' point of view. On

the other hand, educators' responses were very constructive and established. Furthermore with reference to curriculum response to the subjects Geography and Life Orientation, both educators and learners responses were similar in that they displayed sophisticated accounts of knowledge of community-based air pollution. There was a deep sense of understanding of content and relating to lived experiences.

Thirdly, regarding curriculum challenges in teaching and learning within the context of community-based air pollution, both educators and learners live rely on medication to assist them at school. However, they choose to live optimistically amidst the air pollution at Valley Secondary. Issues of class, poverty and powerlessness govern the lives of educators and learners.

Fourthly, in contextualising theme four which was critical thinking and empowerment in curriculum implementation and delivery, praxis emerged from responses. This was reflected in that learning took place when it was grounded in real lived experiences. Praxis did constitute curriculum deliberation on the "why" question (why air pollution affected low-income people, that illuminated meaningful resonance amidst the what and how of community-based air pollution. Integration of community-based air pollution into the NCS (Geography and Life Orientation) enabled both educators and learners to understand the subjects better through the process of informed critical action. Finally, arising from theme four was the proposal that all aspects pertaining to the environment be absorbed into a new subject called either Environmental Education or Environmental Studies. Participants in the study provided several motivations for the support of EE to be included as a separate subject for future curriculum initiatives by the Department of Education.

In the next section, recommendations are made based on the findings, and a conclusion regarding "curriculum response to community based air pollution" is presented.

CHAPTER FIVE

RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

The previous chapter highlighted the findings and significance regarding the responses of learners and educators to community based air pollution. It seems that both learners and educators are really concerned about learning and teaching within the context of community-based air pollution, curriculum challenges that they face schooling in this community, the need for Environmental Education as a separate subject in the curriculum and being able to think critically and empower learners and educators on environmental injustices.

These recommendations are shaped around the following

- The Need for Responsive Teaching
- Empowering Learners
- Recommendations For The School
- Recommendations for Curriculum Planners and Policy Makers
- Curriculum Challenges that Needs to be Addressed

5.2 The Need for Responsive Teaching

From the findings, it can be suggested that educators need to teach learners why their diseases e.g. (asthma, leukaemia, wheezing respiratory problems etc) plague some communities and not others. Learners should understand why community-based air pollution disproportionately affect poor communities. As educators, we need to ensure that learners are able to relate their personal lived experiences with new information. Educators should take time to brief learners about the history environmental racism and spatial injustices that prevail in locally, regionally and internationally. Teachers need to educate learners about the nature, cause and preventative measures when handling their

lived experiences such as asthma, wheezing and other respiratory conditions. This should be encouraged as a “life skill”. Learners should be introduced to coping strategies in dealing with their lived experiences at all community levels respectively. Educators should keep learners informed of websites for online help on “respiratory problems”. It is important that educators be sensitive to learners’ medical needs, after all this affects the way in which they receive the curriculum daily. The study recommends that Continuous Assessments tasks must continue to focus on community-based problems.

The research findings clearly indicate that learner responses to community-based air pollution have sporadic and at incidental and therefore educators must dwell deeper when addressing this community-based problems. Further recommendations is positioned, in trying to become effective teachers in a post-apartheid South Africa, learners must learn that a democratic curriculum must invite young learners to shed their passive roles of “knowledge consumers” and now assume the active roles of “meaning makers” in addressing the air pollution crisis that learners have become innocent victims of.

5.3 Empowering Learners

It is not sufficient for learners to accept that community-based air pollution is prevalent in their community as indicated in the findings. The question that remains is what can the learners do about air pollution within the context of curriculum and schooling. According to SDCEA (2004), there are a number of things that learners can do. SDCEA as an active body recommends the following. There should be prompt and accurate reporting of incidents of community-based air pollution. All complaints must be reported to the local city council. In response to the findings on learners having limited empowerment, the study recommends that educators encourage learners to record factors such as flaring, bad smells, whether learners are sick or not and if they had to see a doctor. Since the findings also indicated that the activities of the school’s environmental club are limited, it is recommended that learners be encouraged to become actively involved in the club’s activities. To this effect the RCL (Representative Council of Learners) need to play a leading role in the environmental affairs of the school. Learners should be trained to

understand that empowerment on community-based air pollution begins at grassroots. Arising from the findings, which indicate that class, poverty and powerlessness govern participants in the study, recommendations are twofold. Firstly, that learners in practicing democratic education within community-based air pollution the intention is to lessen the harshness of social inequalities in schools and secondly, to eventually to change the conditions that created them. Therefore, both learners and educators must engage in on-going curriculum deliberation.

Furthermore, in response to the following finding, that both Geography and Life Orientation enabled learners to understand the subjects better implies that experiential learning does play a significant role in learning. However, recommendation in this regard means that educators emancipate learners to a greater degree of informed critical action.

5.4 Recommendations for the School

In response to the findings on curriculum challenges for educators and learners, the study recommends that there be proper implementation and enforcement of the constitutional rights of learners and educators at school level. The school needs to run workshops and seminars on how to deal with learners with respiratory conditions. This could be part of the “First Aid Programme”. Protecting learners and educators from community-based air pollution is plainly an ethical choice. The researcher argues that for schools in the South Durban Basin, that the real choice is not scientific but moral. The school must therefore, involve themselves in writing a Schools Environmental Management Plan and Policy. Support groups and teams must be created in schools and there must be active participation from parents groups. The School Governing Body as an important stakeholder, must also become actively involved in addressing the community-based problems that affect the lives of both learners and educators at schools. All schools should design policies and plans to alleviate community-based problems that affect curriculum and schooling. The right to a clean and healthy environment is a “Constitutional Right” of all South African citizens. As a school and as citizens, we should be able to primarily hold these companies and industries accountable for the

environmental injustices and the harsh realities of community-based air pollution that educators and learners face in the South Durban.

5.5 Recommendations for Curriculum Planners and Policy Makers in Education

5.5.1 Current Curriculum Policy

Against the background of the findings of curriculum responses in community-based air pollution, the researcher argues that South Africa has a history of policies and curriculum structures that have been developed by experts outside the schools and handed down to teachers. Interestingly, Le Grange & Reddy (2000) argue that they have observed first-hand how top-down curriculum and policy processes as well as contextual realities militate against enabling change. In view of the findings that the both learners and educators present a sense of enduring struggle against community-based air pollution, the study recommends policy and curriculum need both process and structural reform in consultation with educators and schools. However, it may be naïve to believe that the shift from policy into practice is a simple process. This may be particularly so given South Africa's complex challenges because of historical legacies and apartheid spatial planning. Fullan (1991:117) reminds us that change does not involve putting the latest policy into practice (NCS), but depends on what the educators do and think and all levels of curriculum implementation and delivery.

To this regard, the findings from the research indicate that the disjuncture between “policy as text” and “reality as lived” must be taken into account within the context of community-based air pollution. Furthermore, according to Harley and Wedekind (2004: 211) a few educationists have shown how Curriculum 2005 has worked, “counter to its transformatory social claims”. I therefore fully endorse the view of Apple and Beane (1999: 120) when they assert that the most powerful meaning of democratic citizenship is formed “not in glossy political rhetoric, but in the details of everyday lives”. This has particular relevance in understanding community-based air pollution in the National

Curriculum Statement. Like industries, schools in consultation with The Department of Education, Government and Environmental Laws should have a S.H.E. (Safety Health and Environment) Policy.

5.5.2. More Relevant Approach to Environmental Education

The findings also indicate a strong motion for environmental education to be introduced as a separate subject. Recommendations for this must be understood against the following background. Past approaches to environmental education have been many and varied. They have also changed with our understanding of education, the environment, development and environmental issues. Although these trends have been clarified within current policy and curriculum reform processes in South Africa, the researcher sees this as insufficient. According to (Clacherty, 1994; Wals & Alblas, 1997), the purpose of Environmental Education is to develop the necessary knowledge, understanding, values, skills and commitment to allow people to be proactive in securing a healthy, functional and sustainable environment. Arising from the results of the study is the evidence that the NCS incorporates community-based air pollution and several aspects of the environment in learning outcome 2 in both Geography and Life Orientation. Thus, we find that environmental education is an extension to the NCS. The evidence from the findings also indicates that environmental education is also becoming a peripheral concern amid the initial implementation of the NCS. Thus, the following recommendations are made. Constructing a suitable perspective for Environmental Education as a separate subject must be understood against the following background.

5.5.3. Constructing a Suitable Perspective

There are several publications written by environmental activists, which contain a wide range of contested perspectives that are very useful for policy and curriculum development initiatives in Formal Education. Constructivist theory acknowledges that the teacher is not a transmitter of knowledge, but rather a facilitator and a provider of experiences from which learners will learn. Fraser and Fiser (1997) claim that

Environmental Education advocates the use of Constructivist theory that knowledge is a social construct. The findings from the research also indicates there is great potential for using the local environment (example community-based air pollution) to introduce environmental education and greater relevance to school curricula. This study recommends that in addressing environmental issues, greater success will be achieved if they were studied as a separate subject.

5.5.4 The Challenge of Changing Perspectives

Most early approaches to Environmental Education treated the environment as a physical world. The aim was to communicate information about problems to change people. In post-apartheid South Africa, as our complexity of environmental interactions advances, so approaches to Environmental Education are changing to include conservation and sustainable development but also peace, democracy, environmental racism and spatial injustices. The findings from the research clearly illustrates how the NCS addresses issues in keeping with the new democratic government, The South African Constitution, Human Rights and its relevance to community experiences. Ensuring proper implementation and enforcement of all constitutional rights is one of the many recommendations of the study.

5.5.5 Curriculum Policy and Issues

Policy and curriculum initiatives have in post-apartheid South Africa been given attention to active learning situations in varied environments ranging from the local neighbourhood to wild life areas. The more real, active and challenging the work the better it is. Policy and Curriculum development processes need to address local and global needs for environmental problem solving, social justice and change towards more sustainable living. The findings indicate that adding the environment to curriculum reform agenda as a mode of critique or as a cross-curricular theme is not enough? The way policy and curriculum initiatives go about placing the environment at the centre of education reconstruction is crucial. Recommendations lie in addressing the key issue like

how policy and curriculum change can be undertaken by and with all relevant stakeholders, in particular teachers, learners and government.

5.5.6 The Need for Environmental Education as a Separate Subject

Curriculum planners should bear in mind that a programme in Environmental Education consists of virtually every subject area, some making significant contribution. We are now living in era where the academic study of subjects is giving way to integrated learning and when learning by experience is complementing rigid textbook class work. In the light of the findings, the study recommends that having exemplified the inclusion of community-based air pollution into the subjects Geography and Life Orientation, the baton be passed to the Department of Education to treat environmental education as a separate subject for the future. In order to appraise the success of the incorporation of Environmental Education (EE) in the NCS, there is a need for on-going evaluation and assessment. For Environmental Education to achieve its objective of holistic development of learners, the emphasis on exam-driven learning has been already replaced with experiential learning.

5.6 General Conclusion

The DoE advocated nine priorities for its Trisano (“Working together”) programme. One of which was that schools must become centres of community and cultural life. Schools need to possess a sense of citizenship, which can spark in them a willingness to achieve equity or enact equitable education policies. In this regard Young (1996) states that the mere existence of equitable policies does not guarantee democratic change. Thus we find that curriculum is constructed and reconstructed in practice. The following extract from (Cornbleth, 1990: 27-28) is significant. “Context both situates and shapes curriculum, thus changing a curriculum involves changing its context. There is no generic curriculum context, no fixed set of parameters that can be imposed on any curriculum”. Recommendations include that the struggle for clean air at Valley secondary School continues. It is important that environmental justice activists, non governmental

organizations, learners, educators and “researchers “ must continue telling stories of real people fighting community-based air pollution. It is distressing to learn that, in post apartheid S.A, low income communities continue to inhale ‘the deadly fumes of environmental injustice’ associated with environmental unfriendly industrial production technologies.

As we move purposefully and boldly into the “second” decade of democracy, education needs to remain a priority of the government in addressing the inequalities of the past and building a better future for the poorer and disadvantaged communities who continue to struggle for clean air, after all it is a constitutional right of all South African citizens. Sweeping changing to the curriculum including environmental law, new policies and environmental awareness is in South Africa at a relatively infant stage. Not only has the research covered vital areas of community-based air pollution, but it will also have a particular resonance for young learners in other poorer communities. Upon gaining a deep insider perspective with the true victims of the community-based air pollution, the research recommends that a vital role be played in bringing these realities both at micro level and macro level i.e.

Micro Level:

- to the learners and educators who hope will try to become pro-active in environmental issues.
- to the schools which will try to ensure that they revisit their Schools Environmental Policy.

Macro level:

- to provide a clearer and separate perspective on curriculum responses to community-based air pollution to the Curriculum Policy makers and Planners of the Department of Education.

The study urges the Department of Education that the recommendations in terms of future Curriculum Policy and Planning be given priority in respect of this reality and this

injustice that Valley Secondary School in South Durban continue to face. Research findings indicate that both learners and educators everyday experiences of oppression, of being 'silenced of having their cultures and 'voices' excluded from curricula and decision making have ideological messages that are contained in such acts. The study recommends that enlightenment, empowerment, critical thinking and emancipation be used as foundational concepts to bring about change in the oppressive conditions of Valley Secondary School. Finally, and most importantly, the study recommends that Valley Secondary to continue to achieve academic excellence despite the problems of community-based air pollution.

5.7 Chapter Summary

In summarising the recommendations of the study, the following recommendations were made. Firstly, that there is a strong need for responsive teaching, with several recommendations made for educators in handling learners with respect to community-based air pollution. Secondly, recommendations were made on how learners could be empowered at a school level. Learners were also guided on how they should handle air pollution incidents. Attention was paid to re organising the already existent Environmental Club at Valley secondary School. Alternatives were provided for addressing curriculum challenges to local air pollution. Thirdly, a number of recommendations were made for schools that handle community-based problems. Fourthly, recommendations were provided for Curriculum Planners, Policy, and Policy Makers at the level of the Department of Education. This included strong motivations for the inclusion of Environmental Education as a separate subject for future curriculum change.

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APPENDIX A

SEMI-STRUCTURED INTERVIEWS WITH LEARNERS

(NB: probing will take place throughout the interview)

THEME 1: LEARNER PERCEPTIONS:

1. Is air pollution the most common environmental problem of the South Durban Basin “ Probe?
2. What are your perceptions of community-based air pollution?
3. Which community do you reside and how does air pollution affect you?
4. How knowledgeable and informed are you about environmental issues such as community- based air pollution that is prevalent in this community?

THEME 2: CURRICULUM RESPONSES:

5. What are your perceptions of integrating local community-based air pollution into the school’s formal curriculum?
6. How do you learn in within the context of community-based air pollution?
7. How do your subjects integrate community-based air pollution into the formal curriculum?

THEME 3: CURRICULUM CHALLENGES

8. What are some of the challenges you encounter in learning within the context of community based air pollution?

THEME 4: CRITICAL THINKING AND EMPOWERMENT:

9. How knowledgeable and literate are you as a learner about environmental community based air pollution?
10. Does your teacher create opportunities for you to address the community based air pollution within his/her subject? How does he or she achieve this?

APPENDIX B

SEMI-STRUCTURED INTERVIEWS WITH EDUCATORS

(NB: probing will take place throughout the interview)

THEME 1: GENERAL PERCEPTIONS:

1. What is the most common environmental problem you can identify in the “South Durban Basin”?
2. What are your perceptions of community- based air pollution?
3. Which community do you reside and how does air pollution affect you?
4. How knowledgeable and informed are you about environmental issues such as community- based air pollution that is prevalent in this community?

THEME 2: CURRICULUM RESPONSES:

5. What are your perceptions of integrating local community- based air pollution into the formal school curriculum?
6. How does your teaching in general respond to community- based air pollution ?
7. How does your specific subject respond to community- based air pollution in the (NCS) National Curriculum Statement?

THEME 3: CURRICULUM CHALLENGES

8. What are some of the challenges you encounter in curriculum delivery and curriculum implementation within the context of community- based air pollution?

THEME 4: CRITICAL THINKING AND EMPOWERMENT:

9. How knowledgeable and literate are your learners about environmental community based air pollution?
10. How do you encourage critical thinking and empowerment amongst learners with reference to community- based air pollution?

ANNEXURE C

COPY OF INFORMED CONSENT TO THE PRINCIPAL

The Principal
Valley Secondary School

Sir

Re: Consent for Conducting Research At Valley Secondary School:

With reference to our discussion, I Mrs P Naidoo will be conducting research at our school - Valley Secondary. I have applied for consent from the Department of Education – a letter will be forth coming. I am a permanent educator in the Human Social Science Department. Being a Geography Specialist educator, I have taken great interest in local air pollution, which is prevalent in the South Durban Basin. Community-based air pollution is a major environmental problem affecting the South Durban residents.

I am currently a Masters of Education student at UKZN. My research topic is “Curriculum Responses to Community-based air pollution: An Ethnographic Study”.

As part of my research I would like to interview 4 learners and 4 educators in the Human Social Science Department (FET). I would like to examine educators’ and learners’ perceptions of curriculum responses to community- based air pollution. The interview will take approximately take approximately 40 minutes and will be audio taped. The data from the interview will be used only for the purpose of this study and will not be used for any other purpose without consent. Learners and educators are not obliged to answer all the questions that I ask, and will be free to withdraw from the study at any time. Please note that no real names will be used in any of the published research and all material will be confidential.

Your co-operation and support in this regard is highly appreciated. If you require any further information please feel free to contact my supervisor, Professor R Sookrajh – (031) 2607259.

Sincerely

Mrs P Naidoo - Educator
Human Social Sciences
Telephone: 4021150
Cell: 0720157079

ANNEXURE D

COPY OF INFORMED CONSENT FORM TO PARENTS

Letter of Consent

Dear Parent

I, Mrs P Naidoo am currently a Masters of Education student at UKZN. Community based air pollution is an environmental problem that is prevalent in the South Durban Basin. Valley is part of the South Durban Basin. I am interested in how the official school curriculum responds to community based air pollution at Valley Secondary School.

As part of my research I would like to interview your child about his/her perceptions of curriculum responses to community based air pollution. The interview will take approximately 45 minutes and will be audio taped. The data from the interview will be used only for the purpose of this study and will not be used for any other purpose without your consent. Your child is not obliged to answer all the questions that I ask, and will be free to withdraw from the project at any time. Please note that no real names will be used in any of the published research and all material will be confidential.

Thank you for your assistance. If you require any further information please feel free to contact my supervisor, Professor R Sookrajh – (031) 2607259.

Sincerely

Mrs P Naidoo
Telephone: 4021150
Cell: 0720157079

-----Reply slip -----
I, _____ (parent's name) do hereby give consent for my child/ward _____ to participate in this study. I understand that his/her real name will not be used in any write up and that his/her response will be confidential. I also understand that my child is free to withdraw from the study at any time. I agree for my child's responses to be tape-recorded.

Learner's Name: _____
Parent's Signature: _____

Date: /09/ 2006

ANNEXURE E

COPY OF INFORMED CONSENT FORM TO LEARNERS

Letter of Consent

Dear Learner

I, Mrs P Naidoo am currently a Masters of Education student at UKZN. Community based air pollution is an environmental problem that is prevalent in the South Durban Basin. Valley is part of the South Durban Basin. I am interested in how the official school curriculum responds to community based air pollution at Valley Secondary School.

As part of my research I would like to interview you about your perceptions of curriculum responses to community based air pollution. The interview will take approximately 45 minutes and will be audio taped. The data from the interview will be used only for the purpose of this study and will not be used for any other purpose without your consent. You are not obliged to answer all the questions that I ask, and will be free to withdraw from the project at any time. Please note that no real names will be used in any of the published research and all material will be confidential.

Thank you for your assistance. If you require any further information please feel free to contact my supervisor, Professor R Sookrajh – (031) 2607259.

Sincerely

Mrs P Naidoo
Telephone: 4021150
Cell: 0720157079

-----Reply slip -----
I, _____ (learner's name) do hereby agree to participate in this study. I understand that my real name will not be used in any write up and that my response will be confidential. I also understand that I am free to withdraw from the study at any time. I agree for my responses to be tape-recorded.

Learner's Name: _____
Learner's Signature: _____

Date: /09/ 2006

ANNEXURE F

COPY OF INFORMED CONSENT FORM FOR EDUCATORS

Letter of Consent

Dear Educator

I, Mrs P Naidoo am currently a Masters of Education student at UKZN. Community based air pollution is an environmental problem that is prevalent in the South Durban Basin. Valley is part of the South Durban Basin. I am interested in how the official school curriculum responds to community based air pollution at Valley Secondary School.

As part of my research I would like to interview you about your perceptions of curriculum responses to community based air pollution. The interview will take approximately 45 minutes and will be audio taped. The data from the interview will be used only for the purpose of this study and will not be used for any other purpose without your consent. You are not obliged to answer all the questions that I ask, and will be free to withdraw from the interview at any time. Please note that no real names will be used in any of the published research and all material will be confidential.

Thank you for your assistance. If you require any further information please feel free to contact my supervisor, Professor R Sookrajh – (031) 2607259.

Sincerely

Mrs P Naidoo
Telephone: 4021150
Cell: 0720157079

-----Reply slip -----
I, _____ (educator's name) do hereby agree to participate in this study. I understand that my real name will not be used in any write up and that my response will be confidential. I also understand that I will be free to withdraw from the study at any time. I agree for the interview to be tape-recorded.

Educator's Name: _____
Educator's Signature: _____

Date: / 09/ 2006

ANNEXURE G



PROVINCE OF KWAZULU-NATAL
ISIFUNDAZWE SAKWAZULU-NATALI
PROVINSIE KWAZULU-NATAL

DEPARTMENT OF EDUCATION
UMNYANGO WEMFUNDO
DEPARTEMENT VAN ONDERWYS

Tel: 033 341 8523

Fax: 033 341 8612

Private Bag X9137
Pietermaritzburg
3200

228 Pietermaritz Street
Pietermaritzburg, 3201

NHLOKOHHOVISI

PIETERMARITZBURG

HEAD OFFICE

Enquiries:

Imibuzo: M Francis

Navrae:

Reference:

Inkomba: 0220/06

Verwysing:

Date:

Usuku:

Datum: 21/11/2006

To: Parvathy Naidoo

RE: APPROVAL TO CONDUCT RESEARCH

Please be informed that your application to conduct research has been approved with the following terms and conditions:

That as a researcher, you must present a copy of the written permission from the Department to the Head of the Institution concerned before any research may be undertaken at a departmental institution bearing in mind that the institution **is not obliged to participate** if the research is not a departmental project.

Research should not be conducted during official contact time, as **education programmes should not be interrupted**, except in exceptional cases with special approval of the KZNDoe.

The research is not to be conducted during the fourth school term, except in cases where the KZNDoe deem it necessary to undertake research at schools during that period.

Should you wish to extend the period of research after approval has been granted, an application for extension must be directed to the Director: Resource Planning.

The research will be limited to the schools or institutions for which approval has been granted.

A copy of the completed report, dissertation or thesis must be provided to the Research Directorate.

Lastly, you must sign the attached declaration that, you are aware of the procedures and will abide by the same.

for SUPERINTENDENT GENERAL

KwaZulu Natal Department of Education



PROVINCE OF KWAZULU-NATAL
ISIFUNDAZWE SAKWAZULU-NATALI
PROVINSIE KWAZULU-NATAL

DEPARTMENT OF EDUCATION
UMNYANGO WEMFUNDO
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Pietermaritzburg
3200

228 Pietermaritz Street
Pietermaritzburg, 3201

INHLOKOHHOVISI

PIETERMARITZBURG

HEAD OFFICE

Enquiries:
Imibuzo: M Francis
Navrae:

Reference:
Inkomba: 0220/06
Verwysing:

Date:
Usuku:
Datum: 21/11/2006

RE: PERMISSION TO CONDUCT RESEARCH

TO WHOM IT MAY CONCERN

This is to serve as a notice that Parvathy Naidoo 204515990 has been granted permission to conduct research with the following terms and conditions:

- That as a researcher, he/she must present a copy of the written permission from the Department to the Head of the Institution concerned before any research may be undertaken at a departmental institution.
- Attached is the list of schools she/he has been granted permission to conduct research in. however, it must be noted that the schools are not obligated to participate in the research if it is not a KZNDoe project.
- **Parvathy Naidoo** has been granted special permission to conduct his/her research during official contact times, as it is believed that their presence would not interrupt education programmes. Should education programmes be interrupted, he/she must, therefore, conduct his/her research during nonofficial contact times.
- No school is expected to participate in the research during the fourth school term, as this is the critical period for schools to focus on their exams.

for SUPERINTENDENT GENERAL
KwaZulu Natal Department of Education