THE USE OF PHOTO-VOICE IN EXPLORING MEREBANK'S GRADE 8 LEARNERS' AND COMMUNITY ENVIRONMENTAL ALLIANCE'S EXPERIENCES OF OIL REFINERY POLLUTION (2007 – 2015)

by

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ABSTRACT

This study explored Grade 8 learners' and the South Durban Community Environmental Alliance's (SDCEA) experiences of pollution in the South Durban basin (SDB). This pollution has been caused by recent and past incidents of explosions that took place in the refineries in the South Durban area. Different health effects, as well as the socio-economic impacts of pollution were also highlighted in the study. The aim of the study was to contribute towards the understanding of the long-term experiences of pollution in the South Durban communities, and the negative effects of pollution on their lives. A questionnaire, two focus group discussions, as well as two interviews were used in the generation of the data, which was then transcribed and further analysed in line with the three research questions of the study, namely:

1. RQ1: What are Grade 8 learners' experiences of pollution with regard to the oil refinery incident of November 2007?
2. RQ2: What are Grade 8 learners' and the SDCEA's experiences in terms of the effect of pollution on their lives?
3. RQ3: How can photo-voice be used by Grade 8 learners to respond to the community's concern about air pollution?

Photo-voice was used as a focal lens through which the literature was reviewed. Furthermore, it served as the core framework of the study. In answering the first research question, three ways of experiencing this incident were noted: a) Fear and restlessness; b) Powerlessness, and c) Agony. With regard to the second and the third research questions, the findings revealed that there was absolute unanimity from the Grade 8 learners and the manager of the South Durban Community Environmental Alliance (SDCEA) that air pollution in the South Durban area was caused by the industries in the area. This specifically referred to two refineries and a paper-mill. Also, it was revealed that accidents, flares and emissions from these industries did not only impact negatively on the health and lives of the South Durban residents, but these affected plants as well as non-living things in the area. The study also showed that the industries in the South Durban area did not only cause air pollution, but they also contributed to water and land

pollution. Of significance was the unanimity about the fact that air pollution affected teaching and learning in the schools around the South Durban area. Learner and educator absentism was high due to ill-health casued by pollution in the area. In addition, when explosions occurred, schools that were close to the refineries had to close for a few days.

The denial of these industries in acknowledging responsibility for air pollution is unjust. There was also a lack of law enforcement on the side of government towards these industries, even though the government knew that the emissions from the industries in the South Durban basin far exceeded the national, as well as the international, standards of emission. This is perceived as an unwarranted denial of the South Durban community's right to quality of life. The use of photo-voice in this study provided a space for such concerns to be raised. In this regard, it showed that photo-voice can indeed be used to 'empower' and 'emancipate' communities in need.

DECLARATION

I hereby declare that the study, "***The use of photo-voice in exploring grade 8 learners' experiences of pollution with regard to the oil refinery pollution incidents (2007 – 2015)***", is my own work and has never been submitted before to this or any other academic institution. All the resources I have used or quoted have been indicated and acknowledged by means of complete references.

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ETHICAL CLEARANCE

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MRS. DP MAGUBANE (204515586)
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Dear Mrs. Magubane

ETHICAL CLEARANCE APPROVAL NUMBER: HSS/0164/09M

I wish to confirm that ethical clearance has been granted for the following project:

"The use of photovoice in exploring grade 8 learners' experiences of pollution with regard to the oil refinery incident of November 2007 in the South Durban Area"

PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years

Yours faithfully

PXimba
.....
MS. PHUMELELE XIMBA

cc. Supervisor (Dr. Alant)
cc. Mr. D Buchler

RECEIVED
2009 -04- 23
FAC RESEARCH OFFICE

DEDICATION

This thesis is dedicated to my daughter, Zamankomose, my source of inspiration, for believing in me, supporting me emotionally and technically throughout my studies.

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CHAPTER 1

INTRODUCTION AND CONTEXTUAL BACKGROUND

This study focused on the use of photo-voice to explore Grade 8 learners' experiences of pollution with regard to the oil refinery incident of November 2007 in the South Durban area. This research study sought to contribute to the discussion that Lee and Roth (2003) were engaging in with the Science and Technology Education community. This concerned the contribution that science and technology educators can make towards community empowerment, social action, and critical democracy. At issue was how I, as a science educator, together with the learners, as my co-research partners, could meaningfully engage in a project that was aimed at bringing environmental justice to the community of the South Durban area.

According to Mhlongo (2007), the explosion of November 2007 was the second in a space of three months. Furthermore, these explosions in the refinery had consistenly occurred for many years "uncontested" by the eThekwini Municipality. This continuted despite the many attempts from the residents of Merebank, Bluff, and Wentworth through the South Durban Community Environmental Alliance (SDCEA) to bring the issue of the right to quality air for communities into the public domain. It is in this regard that the study used photo-voice to understand Grade 8 learners' experiences of pollution and its effects on their lives. Photo-voice is a participatory action research method aimed at providing a platform for critical dialogue using photographs and voices. The significance of using photo-voice lies in the fact that it captures visual data. Most importantly, it gives the participants the chance to become researchers themselves since the researcher worked in collaboration with the participants as co-partners (Maree, 2007) to engage in a discussion of the issue of pollution.

In the following sections, I provide the location and elaborate on the context of the problem that was explored in this study. This is then followed by the rationale and the significance of the study. Thereafter, I highlight the purpose of the study together with the critical questions that this study endeavoured to answer. Lastly, I provide an outline of of the dissertation is structured.

1.1 THE LOCATION AND CONTEXT OF THE PROBLEM

Figure 1.1 Map of the location of the study

Source: SDCEA, 2004

Durban is a city located in the far East of South Africa in the province of KwaZulu-Natal. It has the busiest harbour, rated as one of the ten largest in the world (Wikipedia). Durban is a city that has undergone rapid industrialisation due to its abundant water supply and labour resources (Wikipedia). The South Durban basin starts from the tip of the Durban harbour and expands as far as Umkomaas in the South. It is home to 285 000 people (SDCEA, 2004). South Durban includes communities such as

Bluff, Wentworth, Merebank, Umlazi, Isiphingo, Austerville and Mobeni. The research site is one of the schools in the Merebank residential area. There are more than three hundred industries in the South Durban area (SDCEA, 2004). The SDCEA (2004) further confirms that industries in the South Durban basin are a source of air pollution. The major polluters include the two oil refineries, Engen and SAPREF, as well as two paper mills, Mondi and Sappi. All these industrial sites emit large quantities of pollutants into the atmosphere.

Figure 1.2 Picture depicting the major refineries in the South Durban basin

Source: DEAT-South Durban Basin MPP Case study Report 2007. Emission caused by SAPREF.

The independent air quality testing in and around the South Durban basin found very high concentrations of sixteen dangerous chemicals in the air (SDCEA, Community News, Volume 5, 2004). These dangerous chemicals included sulphur dioxide (SO_2), carbon monoxide (CO), nitrogen oxide (NO), particulate matters (PM), benzene (C_6H_6), toluene (C_7H_8), and carbon tetrachloride (CCL_4) (Applied Meteorology and Climatology in South Durban, 2004). The SDCEA (2004) argues that petrol leakage and air pollution in general are the most serious threats to the residents of the South Durban basin because the underground petrol pipeline is found next to houses. In 2001, SAPREF confirmed a leakage of one million litres of petrol from the underground pipeline next to a house in Bluff (SDCEA, 2004). The SDCEA (2004) further found that

Engen had also confirmed leaks of about 15 000 to 25 000 litres of diesel from the underground pipelines close to a house in Wentworth.

Figure 1.3 Picture depicting pollution caused by the major refineries in the South Durban basin

Source: DEAT-South Durban Basin MPP Case study Report 2007. Emission caused by the Engen.

The South Durban community is located between the oil refineries, Engen and SAPREF, and the paper mills, Mondi and Sappi. Engen, a South African and Malaysian owned company, operates the refinery. SAPREF is a joint venture by the British-multinationals Shell and BP. The paper mills are operated by the Mondi company and the Anglo American venture. The South Durban area is home to historically disadvantaged black communities (Whitaker, 2001). This was due to socio-political and economic conditions of the apartheid era. Whitaker (2001) also states that the apartheid regime forced black communities to reside close to dangerous industries so that these industries could obtain cheap labour. The presence of the above mentioned industries posed a threat to the health of people in the South Durban basin (SDCEA, 2004). During the apartheid regime, South Africa allowed giant industries to dump poisonous waste in the neighbouring communities.

At the time of this study, the industries in the South Durban area did not comply with the environmental regulations, which were formulated in the National

Environmental Management act 107 of 1998 (NEMA). This was promulgated and amended by Act 46 of 2003 (Kotze et al., 2007, as cited in Nzimande, 2012). NEMA provides the objectives for improving environmental performance and contains procedures on how to handle the environmental impact of industries in normal operating conditions and in situations of incidents and accidents (SDCEA, Snapshot, 2002). The South African government has continued to protect these giant industries even though it is aware that what the industries have been doing is putting the lives of the marginalised people at stake. They were not concerned about the lives and health of the poor black communities that have been destroyed. Their only concern was the profit obtained from these giant industries. Alternatively, the community members have had to endure the explosions, spills and odour in the area. The community members, together with non-governmental organisations, have been fighting for environmental justice. This is the pursuit of equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity and/or economic status (Wikipedia). The intention of the community members of the South Durban area was to combat the problem of air pollution in their area.

Even in democratic South Africa, giant industries continue to dump poisonous chemicals in local communities. This is done irrespective of what Section 24 of the new constitution in the South African Bill of Rights says, as it indicates that everyone has the right to an environment that is not harmful to their health or wellbeing (Section 24 of the New Constitution). The situation that South Durban communities are faced with has turned them into poverty stricken communities. Most of the community members in the South Durban area are jobless, even though they are surrounded by giant industries. The situation they are faced with has made them resort to crime, drug dealing and gangsterism from an early age. They take the little money that they have and pay hospital bills because of ill health caused by the air pollution in the area. Community members do not benefit much from the industries, but instead, the industries continue to threaten their lives. This is why people in the South Durban area are still unhappy because they feel that the government is not doing enough to save them from their unfortunate situation (Mhlongo, 2007).

1.2 RATIONALE FOR THE STUDY

I embarked on this study as a result of the SDCEA Community News of March 2008. In this local newspaper, there was an open letter written by a 72 year old retired teacher from Merebank. The letter was directed to the CEO of the Engen refinery, and revealed the old man's pain, suffering, and severe depression due to the smell, huge flares, and fires from the Engen refinery. The old man had been living in Merebank for thirty years, and had recently undergone a medical examination because of the constant bloating of his stomach, and pains in his chest. The doctors had recently removed a tumour from his bladder and liver, and further advised that he undergo a brain scan, but, unfortunately, he was unable to do this due to financial constraints and the fact that his medical aid was exhausted. Since the successful removal of the tumour in his bladder and liver, he had suffered with severe depression and had been on medication ever since. His brother-in-law, who also resided in Merebank, died of cancer.

Mr D'Sa, the manager of the SDCEA, revealed his shock and disappointment after the release of the final report by the Health Department on the issue of the explosion at the Engen refinery, which took place in November 2007. The explosion resulted in a 57 hour blaze at the Engen refinery of a 30 000 litre petrol storage tanker. In the final report, Siva Chetty of the Health Department of eThekwini Metro stated that there were no significant associated health risks. Mr D'Sa regarded this statement by Siva as a convenient lie. The Health Department was convinced that the pollutants at the time of the explosion did not exceed the acceptable emissions level, yet they only measured 5 chemicals out of 300 toxic chemicals, the data was only taken from Southern works, and no data was taken in Settlers Primary and Wentworth. Mr D'Sa regarded the statement issued by the Health Department as convenient lies as the SDCEA was aware of a great number of cases where, in the days during the fire, people had triggered asthma attacks and suffered various respiratory symptoms.

People in the South Durban basin, like any other citizen in this country, felt that the two refineries, as well as the paper mill in their area were violating their right to clean air by polluting their area. Both refineries, as well as the paper mill did not abide by the legislation that deals with the prevention of pollution and degradation of the environment.

1.3 SIGNIFICANCE OF THE STUDY

The study mainly dealt with the use of photo-voice as a research method in exploring Grade 8 learners' experiences of pollution. The importance of the study was to open people's eyes to the power of photo-voice. Photo-voice was used as a tool to empower learners with regard to the problem of pollution in their communities (Wang, 1999). It is empowering in the sense that, when learners are engaged in different group discussions, they share ideas and have the ability to learn from each other. It is also empowering in the sense that marginalised people, which in this case are the learners, are given a platform where they can voice their concerns and problems in terms of pollution in their community.

The significance of using photo-voice lies in the fact that it captures the visual data (photographs) and most importantly, it gives the participants the chance of becoming researchers themselves, since the researcher worked in collaboration with the participants as co-partners (Maree, 2007). This type of research empowers participants as they are directly involved in the study. They also feel honoured in realising that their knowledge, based on their experiences, is useful in this research project.

The findings of the study aimed to create an increased awareness about the health and socio-economic effects of pollution with respect to the residents in the South Durban area. The findings will be useful to Life Sciences educators as the results can be used to merge what is taught in the science classroom with the reality in their community. This could also aid in students' understanding, and internalisation in relation to the material taught in class, especially with reference to air pollution.

The findings of this study could also be useful to policy makers, the Durban city management, and the environmental section of the oil refineries as oil refineries contribute significantly to air pollution. The participants' voices have to be heard in order to draw the attention of people in government/ industries (people in power) so that decision-makers can become more conscious about the health effects of air pollution.

The findings of this study will also be useful to education planners. It will illuminate the issue of the health effects of pollution, which will hopefully result in the inclusion of a section on air pollution in all grades when planning curriculum content.

Another benefit of this is that learners will learn more about air pollution from an early age and will therefore become more conscious about it.

1.4 OBJECTIVES OF THE STUDY

The objectives of the study were as follows:

(a) To explore the use of photo-voice in Grade 8 classes in order to understand learners' experiences of pollution and how this affected their lives, physically and mentally.

(b) To explore the experiences and the effects of pollution on Grade 8 learners, other than physical and mental.

(c) To get learners to engage in issues of air pollution. In terms of photo-voice, pictures taken by the learners of 'pollution in their lives' could be used in class to reveal their experiences and their understanding of their right to live in a pollution-free environment. The use of photo-voice dates back to the work of Wang, Burris and Xiang, who used photo-voice to create policy improvements and changes in women's health in China (Wang, 1999).

1.5 CRITICAL RESEARCH QUESTIONS

The research questions guiding the study were as follows:

1. RQ1: What are Grade 8 learners' experiences/understanding of pollution with regard to the oil refinery incident of November 2007?
2. RQ2: What are Grade 8 learners' experiences/understanding of the effect of pollution on their lives?
3. RQ3: How can photo-voice be used by Grade 8 learners to respond to the community's concern about air pollution?

1.6 OUTLINE OF THE STUDY

The study consists of five chapters, which are as follows:

Chapter 1

This is an introduction to the study. It provides the background to the problem, including the purpose, significance, as well as the rationale for the study.

Chapter 2

The second chapter firstly looks at the significance of photo-voice as a research method/tool used in the study. The chapter also reviews the general issues of pollution and different studies regarding pollution in the South Durban basin. It reviews the literature, which addresses the following themes:

- The relationship between pollution and respiratory problems.
- The role of educators in the community.
- The role of participatory action research in transforming the science classroom.

Chapter 2 also outlines the theoretical framework:

- Critical consciousness documentary photography

Chapter 3

This chapter looks at the research method, research design, and the research instruments used to answer the research questions. The chapter looks at why photo-voice was employed as the preferred research method in this study. The chapter also elaborates on the selection of the research site and the selection criteria.

The instruments used to collect data were interviews, a focus group discussion, and a questionnaire. The data contains answers (responses) to the three research questions mentioned in 1.7 above. This chapter describes briefly how the researcher analysed the data. Finally, the chapter discusses validity, reliability, and the limitations of the study.

Chapter 4

The fourth chapter looks at the analysis of data generated from the research tools.

Chapter 5

The chapter discusses the findings of the data.

1.7 DESCRIPTION OF TERMS USED IN THE STUDY

There are certain special terms used in the thesis that have a particular meaning. These terms are explained below, and are arranged in alphabetic order.

AIR POLLUTION

The introduction of particulates, biological molecules, or rather harmful materials, into Earth's atmosphere causes disease, death to humans, damage to other living organisms such as animals and food crops, as well as the natural or built environment.

CARDIO-VASCULAR DISEASES

Cardio-vascular diseases are diseases related to the heart and the tubes that carry blood around the body.

CRITICAL CONSCIOUSNESS

Critical consciousness describes how marginalised people learn to critically analyse their social conditions and act to change them.

DOCUMENTARY PHOTOGRAPHY

Documentary photography refers to a popular form of photography used to chronicle both significant and historical events, and everyday life.

ENVIRONMENTAL JUSTICE

The fair treatment and meaningful involvement of all people, regardless of race, colour, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. This is evident when everyone enjoys the same degree of protection from environmental and health hazards and has equal access to the decision making processes regarding a healthy environment in which to live, learn and work.

GROUNDWORK

Non-profit environmental justice services and developmental organisations working primarily in Southern Africa. They seek to improve the quality of life of vulnerable people throughout Southern Africa by assisting civil society to fight social and environmental injustice.

GROUP AREAS ACT NO. 41 OF 1950

The group areas act no 41 of 1950 forced physical separation between races by creating different residential areas for different races. Implementation began in 1954 and it led to the forced removal of people living in ‘wrong’ areas, and the wholesale destruction of communities.

PHOTO-VOICE

Photo-voice is a participatory action research method by which people can identify, represent, and enhance their community through a specific photographic technique. It entrusts cameras into the hands of people to enable them to act as recorders and potential catalysts for social action and change in their own communities.

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

The aim of this chapter is twofold. Firstly, it provides a review of the literature regarding the empirical work done on the phenomenon being explored in this research. Secondy, it explores the conceptual framework underpinning this study. It is thus divided into two parts. The first part explores the empirical research that talks to the following three themes:

(a) The relationship between air pollution and respiratory problems;
(b) The role of science educators in raising awareness about environmental issues in the community; and
(c) The role of participatory action research in transforming the science classroom.

The second part discusses the conceptual framework that underpins the study. The two constructs that were explored to inform the conceptual framework are as follows:

(a) Critical consciousness; and
(b) Documentary photography.

2.1 THEME 1: THE RELATIONSHIP BETWEEN AIR POLLUTION AND RESPIRATORY PROBLEMS

Air pollution impacts negatively and in different ways on our lives. These negative effects are caused by different pollutants that are emitted into the atmosphere (Clark, 2004). If polluted air is breathed in, pollutants damage the respiratory tract and get into the lungs. Air pollutants trigger asthma, worsen previously existing respiratory illnesses, and provoke the development or progression of chronic illnesses including lung cancer, pulmonary diseases, and emphysema (Physicians for Social Responsibility (PSR), 2009). It has been proven scientifically that there is a connection between air pollution and deteriorating health.

The table below shows the different air pollutants and their effects on human health:

Table 2.1: Pollutants and their effect on human health

Pollutant	**Effect on human health**
Acids and aldehydes	Causes eye, nose and throat irritation.
Benzene	Causes leukaemia, chromosomal changes, and decreased resistance to infection and anaemia.
Carbon monoxide	Causes reduction in oxygen carrying capacity in blood and thus weakens heart contractions, which then results in fatigue, headaches, weakness, confusion, disorientation, nausea, and dizziness.
Lead	If inhaled, it can retard the production of haemoglobin. High concentrations result in fatigue, cramps, loss of appetite, anaemia, kidney disease, mental retardation, blindness, and death.
Nitrogen dioxide and nitric oxide	Cause inflammation of the lungs and bronchial tubes.
Particulate matter	Cause cancer, respiratory diseases, and heart attacks.
Sulphur dioxide	Cause irritation of the respiratory system leading to asthma, and chronic bronchitis. It also causes irritation of the eyes, increased mucus production, coughing, and shortness of breath.

Source: Understanding Life Sciences Grade 11 (Isaac, Chetty, Manganye & Mdhluli, 2009, p 284- 285), and Applied Meteorology and Climatology in South Durban (SDCEA, 2004, p 37-38).

Several studies done nationally and internationally indicate that there is indeed a connection between air pollution and respiratory problems. The major cause of air pollution, particularly in South Africa, is attributed to industries (SDCEA, 2004). These major industries include oil refineries, Eskom, coal mines, and coal industries. The refineries like Engen, SAPREF, and SASOL contribute significantly to air pollution, which results in respiratory and cardiovascular problems.

Nationally, research studies conducted by different institutions have come to the same conclusions regarding the contributory role of refineries towards respiratory and cardiovascular problems. A study was carried out by the then University of Natal,

Peninsula Technikon and Technikon Natal in collaboration with the University of Michigan where they conducted an 18 day study at the research site, Settlers Primary School in the South Durban basin (SDCEA, Community News, 2005). Settlers Primary School is situated between the two oil refineries, Engen and SAPREF, with Engen approximately 500-700 metres away, and SAPREF being 10,1 metres away (SDCEA, Community News, 2006). The study investigated air contamination and diseases related to air pollution among learners and teachers. The study revealed that both the students and the teachers in Settlers Primary School were highly susceptible to asthma, 54 times higher than the international averages. The study provided evidence that the prevalence of asthma is caused by the presence of dangerous gases emitted by the refineries close to the school (SDCEA, Community News, 2005).

Another study was undertaken by the Durban's Nelson Mandela School of Medicine, and a University in the United States in 2002 at the same school, i.e. Settlers Primary School. The study confirmed the results that there was indeed a relationship between air pollution and deteriorating health within the community (Clark, 2004). The study found that an abnormal 52% of learners and teachers at the Settlers Primary School, which is close to the Engen refinery, suffered from asthma. When the industries produced 'flares', many children suffered from diarrhoea, chest pain, headaches, and people who lived in the outer neighbourhood had these symptoms only while at school (Galleymore, 2010). The study also revealed that increases in air pollution tended to increase asthma symptoms. Clark (2004) points out with dismay that the refineries continued to deny any form of responsibility to the air pollution and the prevalence of asthma within this community.

Another study done in 2006 by the University of KZN and a non-governmental organisation also confirmed the relationship between air pollution and respiratory, as well as cardio-vascular illnesses. This comparative study involved seven schools. Four schools in the highly polluted South Durban basin were compared with the three schools in the less polluted North of Durban (Groundwork, June 2014). The results also confirmed that children and their adult family members in the South Durban area were at increased risk of having asthma attacks and other chest ailments due to the emission of gases that include sulphur dioxide, particulate matters10 (PM10), nitrogen dioxide, and nitric oxide.

The problem of air pollution and ill health is also faced by people who live close to SASOL and other refineries worldwide (Groundwork, June 2014). Groundwork identifies Eskom, coal mines, and metal industries as the other industries that contribute to air pollution and the ill health of residents (Groundwork, June 2014). One of the health research initiatives undertaken by Groundwork (2014) revealed that Eskom, with its fourteen coal-fired power stations, impacted negatively on the health of people who lived in the Mpumalanga Highveld in close proximity to the power stations. The Mpumalanga Highveld is reported as one of the worst air quality areas in the world and in 2007, the government declared the Highveld Priority Area (HPA), a priority area for air quality (Groundwork, 2014). Groundwork (2014) further argues that the level of emissions from Eskom highly exceeds the permitted levels according to both South African Air quality standards, as well as the World Health Organisation (WHO). According to Groundwork (2014), other residents who experience the same ordeal are residents of Hawerklip, East of Delmas in the province of Mpumalanga. This is due to the presence of the Keaton Mining Company. The health risk the residents face in this area is that of breathing coal dust from trucks offloading coal at the Keaton Mining Company. This practice has continued to occur irrespective of all the attempts by Groundwork and other non-governmental organisations to try and bring environmental justice to the people of Hawerklip (Groundwork, June 2014).

Abroad, a study that assessed the relationship between air pollution and the number of emergency room visits in an industrial town was carried out in Steubenville, USA, where there is an industrial community of 31 000 inhabitants in the mid-Ohio valley. The steel industry is the major source of air pollution there. Among the two hospitals that serve the community, one was chosen for the study because of its central location, active emergency room, and stable size. Pollution and temperature data were obtained from instruments located approximately 300 metres from the hospital. The study revealed that there was a connection between an increased amount of pollutants in the atmosphere, high temperature, and an increase in the number of patients visiting the emergency rooms due to respiratory problems (Somet, 2012).

2.2 THEME 2: THE ROLE OF SCIENCE EDUCATION IN RAISING AWARENESS OF ENVIRONMENTAL ISSUES IN THE COMMUNITY

Science educators play an important role in conscientising learners in the educational sphere, and in society at large (Walker, 1990). This is inevitable because teachers teach in particular societies. In order to help the politically oppressed and marginalised members of society, teachers need to understand the politics of how society is structured, how it is changing, and how it can be changed (Wikipedia).

The role of educators in the community was evident in the case where science educators worked together with community members to solve the problem of quality and quantity of water in a rural area in Malawi (Gray & Nchesi, 2004). Teachers and learners, as discussed by Gray and Nchesi (2004), explored the pollution of water in the river used by the local schools and the entire community. The project engaged both the learners and teachers of fifty local schools in Malawi. The teachers and learners became field workers as they were expected to test water, collect data on different aspects of water quality, and give the results to the Water Research Commission. Upon discovery, Gray and Nchesi (2004) state that the water indeed was polluted. The teachers and learners also discovered the source of the pollution.

In a study embarked on by Lee and Roth (2003) where they expanded their role as science educators in the community, similar ideas are shared as those of Grey and Nchesi in terms of teachers working in collaboration with the participants in solving challenges in the community (Lee & Roth, 2003). Lee and Roth conducted an ethnographic study surrounding water issues in the community where Roth lived, in Canada. Some of the residents in the community had trouble accessing safe drinking water, and their attempts to be connected to the water main supplies failed. Lee and Roth's study was triggered by the death of seven people due to drinking contaminated water in Walkerton, Ontario, in Canada. Roth felt that even if different research studies were done concerning the issue of the quantity and the quality of water in their community, this was a scientific and technological issue. People, especially in the rural areas, felt the pinch of water scarcity and thus sought social justice. The study then focused on the issues of environmental health in Hagan Creek, and the aquifers underneath the watershed. The researchers worked in collaboration with activists, which

included both teachers and learners, as well as local residents. Their mandate was to find ways to maintain sufficient water quality and quantity, and to maintain the balance between the ecological and agricultural needs of the watershed (Lee & Roth, 2003).

In another study that was spearheaded by teachers of local schools in 2007 in Red River valley in Minnesota, the community members, especially children, experienced adverse health effects due to their exposure to insecticides (McGovern, 2007). McGovern (2007) explains that the project was aimed to build strong and connected communities where children could grow up healthy and protected against pesticide exposure. The intention of the study was to reveal that children may be exposed to pesticide through their fathers, who are engaged in farming (McGovern, 2007). McGovern (2007) cautions that farm workers can unknowingly carry hazardous pesticides into their homes through their clothing.

In the same light, educators in the South Durban schools, in collaboration with the SDCEA, worked together to tackle the problem of air pollution in the South Durban basin. Children from the local schools in the South Durban basin were involved in protests where they blocked SAPREF's main gate in Isipingo in 2006. The children stated that they were sick and tired of smelling Shell's pollution.

Another protest that was directed at the Mondi paper mill in the South Durban area took place on the 20th of November 2002. The reason why residents of the South Durban area were angry and protested is because the Mondi paper mill wanted to build a coal-fired incinerator. The residents were furious because the then city manager, Mike Sutcliff, had already agreed to the building of the incinerator by the Mondi paper mill even though he was aware that Mondi was ranked the third biggest industry to contribute to air pollution in the South Durban basin. Sutcliff also knew that it was scientifically proven that the building of the coal-fired incinerator would cause an increased emission of sulphur dioxide, as well as dioxins into the air (SDCEA, 2002/2003).

In 1995, members of the South Durban communities, led by Desmond D'Sa, protested against the giant industries SAPREF and Engen. The protest was held during the ribbon-cutting ceremony by former president of South Africa, Nelson Mandela, at the Engen refinery. Mandela advised the protestors that they must have facts and figures

about polluting industries because that is what counts at the end of the day. It was then that D'Sa and the protestors founded the South Durban Community Environmental Alliance (SDCEA, 2014).

In August 2002, Greenpeace activists and overseas environmental experts joined forces with Wentworth residents to protest against Engen and SAPREF. They were concerned about the manner in which Engen and SAPREF handled community concerns about pollution, and also how the government responded to queries from the communities living close to the refineries. The protestors' main concern was that Engen proposed to increase their production by 20% a day, which would increase overall pollution in the area (Ismall, 2003).

Different events, such as the commemoration of arbour day, as they pertain to environmental conservation, are organised by the SDCEA in collaboration with educators in local schools. They organise events to conscientise and mobilise people with regard to the dangers of air pollution. With the help of their educators, learners are expected to write poems, essays, or short stories about their environment and how air pollution caused by local industries impact negatively on the environment, as well as on the health of the local community.

2.3 THEME 3: THE ROLE OF PARTICIPATORY RESEARCH IN TRANSFORMING THE SCIENCE CLASSROOM

Teachers involved in different educational projects, like the Maths Education Project (MEP), and the Primary Education Project (PEP), which are based in the Western Cape, collaborated with teachers involved in the masters' programme 'Action Research and school improvement' in order to research and scrutinise aspects of their classroom practise (Walker, 1990).

Teachers who were involved in the research found out that action research was an appropriate strategy that could be used by teachers in order to improve their work. Action research refers to a variety of evaluative, investigative, and analytical research methods designed to diagnose problems or weaknesses (McNiff, 2002). Walker (1990) states that action research can possibly do that because it has the potential to inform important questions about transformative curriculum practice in education, and it also contributes to the professional growth of teachers trained under apartheid education.

Carr and Kemmis (as cited in Walker, 1990) are of the same idea that action research has the potential to improve both the practise and the situations in which practices are carried out. Carr and Kemmis (as cited in Walker, 1990) go further and state that action researchers might intervene in all patterns of action that divide (break) the community and isolate individuals in terms of power and wealth.

Roth and Tobic (2005) find that collaborative action research (co-teaching) can improve teachers' work in the science classroom. A research study done in the early 1990's involved science teachers in elementary schools, science specialists, and resident teachers in Vancouver. The findings of that research revealed that much learning occurred at an unconscious level, such as when one teacher slowly began to change his ways of questioning children, such that the children moved from providing yes/no and one word answers to elaborating issues using longer discourse. The research also revealed that when two teachers begin to work together and share the responsibility for planning, teaching and reflecting on lessons, there is a greater range of action responsibilities. Roth and Tobic (2005) continue by stating that in co-teaching, some of the learning arises from the teachers' conscious reflections during debriefing and planning meetings. Zesaguli (2004) shares a similar idea as Roth and Tobic that action research assists science educators to reflect on their work and thus improve their methods and practices. Zesaguli argues that when educators work together, they can improve their practices and their teaching profession.

2.4 THE CONCEPTUAL FRAMEWORK

The conceptual framework of this study is underpinned by two theoretical concepts: critical consciousness and documentary photography. These are discussed in length in the section below.

2.4.1 Critical consciousness

Critical consciousness is the ability to perceive social, political and economic oppression, and to take action against the oppressive elements of society (Freire, 1974 [2005]). Freire, the developer of critical consciousness, explains critical consciousness as a socio-political educative tool that engages learners in questioning the nature of their historical and social situation (Wikipedia). Critical consciousness is a popular educational and social concept that is grounded in post-Marxist Critical Theory.

Critical consciousness, also known as conscientisation (conscious raising), is an educational and social concept. It was developed by the Brazilian educator, philosopher, and educational theorist Paulo Reglus Neves Freire (Freire, 1974 [2005]). Friere developed the methods of critical consciousness in order to help the oppressed third world people in Brazil to gain awareness of the world's conditions while teaching them to read, hence his first book is titled 'Pedagogy of the Oppressed'. Freire further states that critical consciousness also includes taking action against the oppressive elements in society, as well as in life in general. Since the mid-20th century, when Freire was developing his ideas of critical consciousness, the focus was increasingly on the 'rights' perspective and social injustice. In his attempts to instil his notion of critical consciousness, Freire divided critical consciousness into three components:

- Critical reflection (critical social analysis):
  Critical reflection refers to a social analysis and moral rejection of societal inequalities that constrain wellbeing and human agency.
- Political efficacy:
  The capacity to affect social and political change by individuals, or collective activism.
- Critical reflection:
  Individual or collective action taken to change aspects of society, such as institutional policies and practices, which are perceived to be unjust. This critical action includes activities such as voting, community organising, and peaceful protests.

Freire also believed that there is a strong relationship between reflection and action in a sense that people do not act to change their social condition without some consciousness or awareness that their social conditions are unjust. Once they act to change their social condition, they, in turn, obtain a deeper understanding of the unjust in their social conditions.

Paulo Freire grounded his educational and social concept in Post Marxist Critical Theory. Like Karl Marx, Paul Freire believed that the world needed to be changed and transformed through education. Freire believed that education should allow the oppressed to regain their sense of humanity, in turn overcoming their conditions. He further maintained that the oppressed individual must play a role in his/her liberation

(Freire, 1974 [2005]). His views about the 'banking model of education' was that students should not be passive recipients of knowledge during teaching and learning. He supported the promotion of learning through engagement with the world, rather than teachers simply depositing knowledge into their students. He stood for collaboration, and rejected sharp hierarchies between teachers and students. Freire regarded students as participants and as equals to teachers. He emphasised the importance of equity between students and teachers in which both learn, question, reflect, and participate in meaning-making.

He laid the foundations of what is currently known as critical pedagogy since he believed that social relations create a 'culture of silence' that instils a negative, silenced, and suppressed self-image in learners. Freire further expressed that learners should develop critical consciousness in order to realise that this culture of silence is created to oppress. Regarding the culture of silence, Freire continues that individual consciousness helps end the 'culture of silence' in which the socially depressed embrace the negative images of themselves created by the oppressors instituting extreme poverty. He thus viewed education as liberal education since, according to him, this is the tool that could liberate the people from social injustice.

2.4.1.1 How is critical consciousness used in educational research?

Critical consciousness has been used in educational, as well as in science research, especially in photo-voice projects where participatory action research is involved. In their study, Carlson, Engebretson and Chamberlain (2006) used a photo-voice project to involve 54 participants who resided in a low income African-American urban community. The participants (residents) were expected to take photographs of things in the community of which they were proud and things that they wanted to change, as well as to tell the story of why those photographs were important. This correlates with critical consciousness since the participants had to know their world first before endeavouring to change it.

Another photo-voice project was conducted in Yunnan, China. This was was done in collaboration with women in China, and was aimed to reveal issues about their work and their health, and also how they wished their lives could be changed for the better by reaching people in power (Wang, 1999). Wang continues, saying that using

photo-voice as a tool for action reflects participatory action research's commitment to meaningful social change.

In South Africa, one of the national photo-voice projects was conducted by educators in collaboration with subject advisors. This study was conducted during the National Environmental Education and Training (NEEP-GET). In this project, both photo-voice, as well as newspaper articles were used to develop lesson plans that addressed local environmental issues in all learning areas (Jacobs, 2005, pp. 10-18). The findings from the project indicated an increase in learners' understanding and aesthetic sense of the environment.

2.4.1.2 How is it related to my study?

Critical consciousness, as embraced in my study, focuses on marginalised learners, who were also community members within the South Durban basin. The study dealt with the learners' lives as they were put at stake by large industries, and the government in power did not protect them. Maree (2007) states that critical research focuses on the contexts and conflicts in society, and that people at grass roots level seek to be freed from that situation by taking action.

Alternatively, Henning (2004) sees the aim of Critical Theory being to promote critical consciousness and to break down inequality. Cohen, Manion and Morrison (2007) argue that in a critical framework, the marginalised and the taken for granted are given the opportunity to take action for emancipatory interest. This relates to my study because the learners, who were participants in the study, were given an opportunity to voice their painful experiences of the effect of pollution in their area with the intention of freeing themselves from their situation.

Cohen, Manion and Morrison (2007) further argue that critical theorists claim to disclose the needs and the struggles of the people, regardless of whether people are aware of their situation or not. My study is framed under Critical Theory because it deals with power relations within society, where people in power and large industries in the South Durban basin do not care about the health or the powerless communities of the South Durban basin.

In critical research, there is no distance between the researcher and the participants. The researcher works in collaboration with the participants as co-partners

(Henning, 2004). This is evident in this study because the researcher worked in collaboration with the participating learners.

2.4.2 Documentary photography

Documentary photography refers to the popular form of photography used to record events in everyday life (Frizot, 1998). The photographer tries to produce truthful, objective and usually photography of a particular subject (Wikipedia).

Historical background: Documentary photography dates back to the era when photographs were taken using a silver plate and mercury gas (daguerreotype) to photograph the ruins in East Egypt and America. Photographs were then meant to accurately describe hidden, forbidden and difficult to access places or circumstances.

The use of documentary photography has captured minds since the nineteenth century, where, as part of archaeology, John Beasly Green went to Nubia in 1850 to photograph the major ruins of the region. In France too, people like Henri Le Secq, Edouard Denis Baldus, and Gustave Le Gray were asked to document the historical monuments to develop an archive of France's rapidly disappearing architectural and human heritage. In the 1930s, the Great Depression brought a change in the documentary of both rural and urban conditions. Dorothy Lange and Walker Evans produced photographs for the Farm Security Administration, which documented the lives of farm workers in America and how the Depression had affected them.

2.4.2.1 Where is it used?

Documentary photography is mostly used in the art world. It is also used in research as a means to provide evidence of human rights violations. This can be done by deepening our understanding and emotional connection to stories of injustice by capturing and sustaining public attention, and mobilising people around social and human rights issues (Wikipedia). Documentary photography is also used in photojournalism where news is given using mainly photographs, especially in magazines. However, in education documentary, photography is used to complement a study in subject areas like social studies, language arts, arts, photography, history, life sciences and architecture (Becker, 1986). In a research study done by The European Weed Research Society, photographs were used in Life Sciences to illustrate/document a process, a technique, an experiment, or a phenomenon. In weed science, photographs were used to show (describe) the spread of weed populations in a given habitat.

Photographs of plants were used to help others in identifying these when encountering that plant (Becker, 1986).

In another research study, educators, who were also researchers, realised that they wanted the youth to receive a good environmental education, yet the method (tool) for doing so was not apparent. After a series of discussions, teachers decided to use photographs to enhance the understanding of environmental education, as well as an appreciation of the environment. The teachers decided to work in collaboration with professional conservation photographers and the multiple resources they provide. These teachers also came up with the idea of working together with the US Environmental Protection Agency, and engaging all the sectors of society in order to improve the quality, accessibility and dissemination of environmental education material and programmes.

One of the research studies done where documentary photography was used as a framework to underpin the study is that of Fournier, Mill, Kipp and Walusimbi (2007) on Ugandan nurses. This research study was performed from September 2003 to June 2004. The aim of the research was to reveal the challenges and opportunities of Ugandan nurses during the provision of care to AIDS patients. The study involved six nurses from a government hospital in Kampala, Uganda. The participants in the research study were given cameras in order to take pictures of their work. The pictures were then used to show their life experiences (Fournier et al., 2007). Their discussions about the photos helped them to share ideas on how they could take action to improve the care they provided to individuals with HIV and AIDS.

Caroline Wang carried out several research studies on the rural women of the Yunnan province in China. In her studies, she used documentary photography as the framework to underpin her research. Most of these studies were done in order to improve the health and welfare of the marginalised women of China (Wang, 1999).

2.4.2.2 How is this related to my study?

Striker (as cited in Wang, 1999) defines documentary photography as the descriptive language of pictures. Documentary photography is used to describe a huge orderly arrangement of visual styles, genres and commitment (Wang, 1999). This is reflected in my study since the learner participants reflected on their own lives, their

experiences and the hardships that they encountered in the South Durban area. This was done using photographs taken with their own cameras. Wang (1999) also maintains that documentary photography is characterised as social conscience presented in visual imagery. It was used as the framework underpinning my study because the learners, who were also vulnerable community members, had to air their concerns using photographs, as well as their voices.

Photo-voice is a participatory research strategy commonly implemented in health research as a mechanism for personal and community change (Wang, 1999). Photo-voice has the ability to enable a group to overcome social barriers. One of the ways of doing this is to give the vulnerable group cameras to take photos that reflect their daily lives, that is, they express their stories and perception of the world using photos, hence they use documentary photography. Photo-voice is framed by documentary photography because photo-voice uses photography as a means for marginalised groups (communities) to have a voice in representing their own concerns (Rowland, 2006). The photos that they use in their discussions, when the group airs their concerns about the unjust situations in their communities, are taken using cameras that were entrusted into their care. In photo-voice, both photos and voices are used as a tool for making social changes and enabling liberation among marginalised communities. Wang (1999) emphasises the fact that photos on their own do not have much power to cause social action and social change, but if photos are used in collaboration with voices, they enhance empowerment, which results in social action and change.

2.5 CONCLUSION

This chapter presented a brief summary of national as well as international studies carried out regarding the health effects caused by air pollution. Different studies have proven that communities who live close to industries, particularly, refineries, and the mining and coal industries are susceptible to diseases like leukaemia, asthma and other respiratory diseases. These diseases are caused by chemicals like sulphur dioxide, carbon monoxide, benzene, toluene, as well as particulate matter, which are emitted by industries, particularly refineries.

South Africa is the biggest source of emission of air pollutants in Africa, and is ranked 12th in the world. The giant industries do not abide by the laws that were meant to protect vulnerable community members, who live close to the industries, against air pollution. The national government does not do enough to enforce the law to the polluting industries, even though the government is aware that these industries do not meet the emission standards required by the NEMA: Air quality act. The national government is supposed to enforce laws to clean up pollution, but instead it supports the idea of Chevron seeking to build another refinery in the South Durban basin (as at the time of this study), despite all the concerns and complaints of the residents through the SDCEA and an NGO called Ground-work.

Educators have a clear understanding of pollution and its effects on the health of community members, and need to play an important role both in class and in the community in order to conscientise leaners, their parents, and community members at large about the dangers of air pollution to human lives. Educators need to go out and work in collaboration with community members to solve problems of pollution in the South Durban community.

Both critical consciousness and documentary photography were discussed as the framework that underpinned this study. These frameworks were used in photo-voice, since photo-voice deals with the use of photographs and voices by people who feel that they are unjustly treated, and that there is inequality socially, economically or politically. Photo-voice was thus used with the aim of emancipating the participants from the unjust situation in their community. This is evident in the communities who live close to giant industries, since those communities have to use their own funds to pay health facilities while the shareholders of these industries enjoy the profit they make at the expense of the residents' lives.

CHAPTER 3

RESEARCH METHODOLOGY

This was a qualitative study that sought to make use of photo-voice in exploring Grade 8 learners' experiences of pollution with regard to the oil refinery incident of November 2007 in the South Durban area. The first section of this chapter presents the research approach selected, and the latter sections present the research relationships established; the process of data gathering and analysis; and the ethical issues that were raised and discussed. Finally, the conclusion discusses the limitations of the study.

3.1 RESEARCH APPROACH

3.1.1 Qualitative research

Qualitative research is a naturalistic inquiry, which explores the attitudes, behaviour and experiences of selected persons in their setting (Dawson, 2002). According to Dawson (2002), qualitative research endeavours to obtain an in-depth opinion from participants using different methodologies. Few people thus participate in qualitative research. Dawson (2002) continues in saying that in a qualitative study, there is intense contact between the researcher and participant/s and that contact lasts longer.

The data collected in a qualitative study is used to understand and also to explain an argument by using evidence from the data and from the literature about the phenomena that the researcher is studying (Henning, 2004). Neumann (2000) argues that the data in a qualitative study is in the form of words and images from documents, observations and transcripts. Neumann (2000) further explains that the research procedures in qualitative research are particular, and replication is very rare.

3.1.1.1 The reason for choosing a qualitative approach

I chose a qualitative study because I intended to explore Grade 8 learners' in-depth attitudes towards and experiences of pollution. My intention was to work with a few participants so as to obtain rich data from each participant and to save time. Qualitative research was also suitable for the methodology and instruments that I

intended to use in order to answer the research questions. The methodology that I chose for the study was photo-voice.

3.2 PHOTO-VOICE

Wang (1999) defines photo-voice as a participatory action research method that enables people to speak for themselves, and on behalf of others, to policymakers or any other targeted audience in order to eradicate social inequity. In photo-voice, the participants use photos as well as voices to reveal their life experiences.

As a participatory action research method, there is no space between the researcher and the participants because they work in collaboration in the process of gaining and creating knowledge (Wang, 1999). Photo-voice is normally used by marginalised communities to voice their health or any other social concerns so that they can bring about social change. The marginalised communities relay their concerns to the people in power so that they can remove inequality either in politics, economy, or in gender. Photo-voice is grounded in the Theory of Critical Consciousness (Wang, 1999). According to Wang (1999), education regarding critical consciousness promotes individual change, communities' quality of life, and policy change aimed at achieving social equity.

According to Strydom, de Vos, Fouche and Delport (1998), photo-voice is a research method where people can identify, represent, and enhance their community through photographic methods. The participants are given cameras so that they can take photos that reflect their real life situation. This then reveals the second theory which frames this study, documentary photography, which has greatly informed the photo-voice approach.

3.2.1 The reason for choosing photo voice

Firstly, photo-voice was chosen as the research method in this study because it accommodates anyone, irrespective of whether the person is literate or not, or whether the person is able to use a camera or not (Wang, 1999). Photo-voice is appropriate in my study because during the photo-voice training, the researcher gets an opportunity to show the participants how to use a camera. So, whether the participants were able to use a camera before or not, by at the end of the training, they should be able to use cameras.

Secondly, I used photo-voice because this study was aimed to empower the learners in sharing their experiences of the effect of pollution on their lives. Photo-voice was thus a suitable method for this study because it gave a true reflection of the learners' experiences of pollution through the photographic technique of using cameras. Collins (1998) states that participants enjoy using cameras to tell their stories because it does not feel like they are participating in an academic research project.

The third reason for choosing photo-voice in my study was that it is emancipatory (Wang, 1999). This is related to my study because in my study, the underprivileged and voiceless learners, and the community at large, had the intention to free themselves from the unfortunate and compromising situation of the environmental injustice that they were experiencing at the time of this study.

3.3 RESEARCH RELATIONSHIPS

3.3.1 Gaining access

Gaining access to the research field was not as difficult as I thought it would be. I thought it would be difficult because it was the first time that I had gone to the participating school, and also because it was my first time meeting with the principal. Both the principal and staff at the school were so welcoming, which eased my anxiety.

I first arranged a meeting with the principal telephonically. Before I met with the him, I drafted a letter of consent to the principal (Appendix A) stating that I was a Masters' student specialising in science education, and that I intended to conduct research in his school with the Grade 8 learners in order to explore their experiences of pollution in the South Durban area. The letter also contained the details of my supervisor in case the principal needed to discuss anything concerning the research.

The meeting with the principal was held in October 2008 at the selected school in Merebank. At the meeting, I revealed my intentions to the principal and also gave him the consent letter to sign as a way of giving me permission to conduct the research at his school. I also provided the principal with the dates and suggested times for the meetings/ workshops with the learners. We discussed the suggested dates and decided to alter certain dates in order to suite certain events that were supposed to take place at school. It was not easy to arrange dates and times because I had to make arrangements at work so as not to clash with the arrangements at the research site.

On the same day, the principal invited the Grade 8 Natural Sciences educator, who was also head of the science department at school. The aim of inviting him was to inform him of my intentions to conduct research at the school, and to request his assistance in the whole process. The Natural Sciences educator was willing to work with me and it was easy to work with him as he was also a first year M.Ed student, so he easily understood what the whole process comprised.

At the end of the meeting with the principal, he signed the letter of consent and asked if I could share the findings of the research with the school. I had to arrange a meeting with the NS educator so as to outline the study and also to explain the methods that I intended to use in the study. The consent letter was given to the NS educator asking him to help select the participants. I outlined my study using charts in my presentation.

3.3.2 Selection of the research site

I conducted the research in the selected secondary school in Merebank in the South Durban area. The reason I chose this school was that Merebank is one of the residential areas in the South of Durban and is situated close to several dangerous industries. The industries around Merebank are dangerous because they are sources of air pollution, which results in a serious of respiratory problems, such as cancer, leukaemia, and severe chest pains. These industries included two oil refineries, two paper mills, and at least three hundred other small industries, which, during their production process, emitted smoke with dangerous gases (SDCEA, 2005). The SDCEA (2005) states that explosions, as well as the leakage of pipes from the refineries impact negatively on the health of people who live in the South Durban area. The problem of having industries around residential areas dates back fifty years ago and was brought on intentionally by the government during the apartheid era. I chose a school in Merebank as my research site because the learners who studied and lived in Merebank at the time of this study experienced the effect of air pollution caused by industries.

I chose the school in the Merebank area because it is stated in the SDCEA Community News (2004) that people in the South Durban area were involved in a long struggle for environmental justice with the Government and the oil refinery. They had been pleading with the eThekwini municipality to help them solve this problem, and had been involved in demonstrations for a long period of time. According to the

SDCEA Community News (Volume 5, November 2004), the issue of pollution in the South Durban area was robbing learners of their quality teaching and learning time at school.

I also chose the school in Merebank because it was not too far from where I lived and also from where I worked, especially because I was using public transport to get to the research site. I did not have to absent myself from work in order to go and collect the data in Merebank, but instead, I took two hours off work so as to visit the school. Therefore, I had to choose a research site that was not far from my work place.

3.3.3 Selecting the participants

The study involved eight Grade 8 learners. They were selected on the following basis:

(a) They had to be taking Natural Sciences as one of their learning areas. This is because pollution is one of the topics covered in Grade 8 in this subject (DoE, 2004), meaning that the learners would have an understanding of what pollution is, and hence I could obtain in-depth data from them.

(b) They should be living in the South Durban area so that they would have experienced air pollution emanating from the surrounding industries both at home and at school.

(c) This was a methodological choice. I chose eight learners because in photo-voice, it is recommended to keep the size of the participating group small for in-depth discussion, since the study is grounded in qualitative research. I also decided to work with a sample of eight learners because a small group could be easily organised and controlled. The sample size was thus restricted by both time and money.

3.3.4 Sampling method

Sampling is a process in which a pre-determined number of observations are taken from a large population (Check & Schutt, 2012). Cohen, Manion and Morrison (2007) state that factors such as time, expenses, and accessibility frequently prevent researchers from gaining information from the whole population, therefore, they often need to be able to obtain data from a smaller group of the total population in such a way that the knowledge gained is representative of the entire population under study.

One of the goals of sampling in qualitative research, as stated by Dawson (2002), is to get a small group of people and then explain or describe what is happening within a wider research population. This is done because qualitative research is premised on the fact that everyone is different, therefore, it does not support the generalisation of the research results. Qualitative researchers believe that the results obtained in the research process are only applicable to that sample of participants on which they conducted research.

The sampling method used in this study is purposive sampling. Cohen, Manion and Morrison (2007) explain that in purposive sampling, the researcher hand picks the participants to be included in the sample on the basis of their judgement of them possessing a particular characteristic of significance to the study. In this study, the sample was selected based on the fact that the learners lived in the South Durban area and were directly or indirectly affected by air pollution in their area.

Maree (2007) adds that in purposive sampling, participants are selected because they are the richest possible source of information since they have in-depth knowledge of a particular issue at hand. The sampling in my study was done on the basis that the Grade 8 learners possessed in-depth knowledge of pollution, and were also affected by air pollution in their area.

3.3.5 Research bias

Research bias is where the scientist performing the research influences the results in order to portray a certain outcome (Check & Schutt, 2012). I tried as much as I could to deal with the unequal power between the researcher and the participants. Even though I was not a resident of South Durban, the participants were not hesitant to participate in the research. We got along quickly and easily because, as a Grade 8 educator, I was used to their behaviour and thus understood them easily. As a researcher, I understood that the participants were doing me a favour by participating in the research, which is one of the reasons why I treated the participants with respect. I also believe that they were not scared of me because I introduced myself as an educator and a student as well. They trusted me throughout the research process because I initially explained to them what my intentions were without hiding anything. The fact that I was an educator made communication easy.

3.3.6 Research duration

The research process took about six months, which included two weeks of planning and organising. I decided to use the time when the learners were busy with exams so that they would not be disturbed and disrupted during valuable teaching time. Our meetings were held at the learners' school after the examination sessions. My role as a researcher was to organise meetings and also to facilitate the discussions in the meetings.

3.4 DATA COLLECTION PROCESS

Letters seeking consent for the undertaking of the study were sent to the Kwa-Zulu Natal Department of Education, and were also given to the following individuals:

(a) The school principal (Appendix A).

(b) The Natural Sciences educator (Appendix B).

(c) The parents or guardians of the participants, so that they could allow their children to participate in the research (Appendix C).

(d) The SDCEA manager (Appendix D).

(e) Learners also gave written assent to participate in the study (Appendix E).

I outlined the study to the learner participants and thereafter discussed the consent letter with them. They were also given written assent as a way of asking for their participation in the study, which I discussed with them as well. Having sought formal permission from the principal of the school, parents of the participants, learner participants and the manager of the SDCEA, I focused on how the research questions could be answered using different research instruments.

The three research questions guiding the study were:

- What are Grade 8 learners' experiences/ understanding of pollution with regard to the oil refinery incident of November 2007?
- What are Grade 8 learners' experiences/understanding of the effect of pollution on their lives?
- How can photo-voice be used by Grade 8 learners to respond to the community's concerns about air pollution?

The following instruments were used to collect data for the study:

(a) Questionnaires (Appendices F and G).
(b) Two focus group discussions (Appendices I, J and K).
(c) Evaluation forms of the meeting (Appendix H).
(d) Interviews (Appendices L and M).

I then considered how the above-mentioned instruments were to be used to answer each research question. The instruments used to answer the three research questions in the study are illustrated in the form of tables (see Tables 3.1, 3.2 and 3.3 below). The tables consist of two columns, the first of which shows the instruments used to generate the data. The first column also shows the different activities, which are grouped in the different phases that the learners were engaged in. These phases referred to in the tables are similar to the stages that Wang (1999) suggests should be followed when using photo-voice as a research instrument. The phases were also in line with the features of participatory action research, as stated by Neumann (2000) in that participatory action is emancipatory and is also subjective. The second column shows comments on how the participants endeavoured to answer the research question.

Each of the three tables are divided according to each research question respectively.

Table 3.1 Data sources for Research Question 1

Data source	Comment
Phase 1: Learners' ideas. **1. Questionnaire**	The questionnaire was based on the learners' understanding and personal experiences of pollution with regard to the oil refinery incident of November 2007 (see Appendix 6A). The questionnaire was administered to eight selected participants. Aim: • To find out the learners' understanding of pollution. • To find out learners' personal experiences of pollution with reference to the oil refinery incidence of November 2007.
Phase 2: Learners' experiences. **2. Focus group discussion**	The focus group discussion involved eight selected participants. Participants verbally discussed their experiences of pollution, which they initially wrote as their responses to the questionnaire (Appendix G). The discussion was video recorded so that it could be transcribed later on. Aim: • To promote interaction within the group so that the participants could share their ideas about their experiences of pollution. • To track changes in the learners' ideas.
Phase 3: Learners' reflection. **3. Evaluation forms**	Eight selected participants were given an evaluation form with four questions at the end of the focus group discussion. The learners responded to the questions in the evaluation form. Questions were based on what they liked or disliked or otherwise learnt from the focus group discussions. Aim: • To give the participants an opportunity to reflect on their own learning.

Table 3.2 Data sources for Research Question 2

Data source	**Comment**
Phase 1: Recruiting audience. **The first interview**	An interview with manager of the SDCEA using a list of interview questions (Appendix L). Questions concerned the founding of the SDCEA and its mandate, as well as the cause and effect of air pollution in the South Durban area. Aim: • To get more information on the cause and effects of air pollution in South Durban basin. • To recruit an audience for the photo-voice findings.
Phase 2: **The second interview.**	An interview with the manager of the SDCEA using a list of questions (Appendix M). Follow-up questions on explosions caused by the refineries in the South Durban area. Aim: • The cause and the effect of the explosion in SAPREF in April 2015. • To find out the developments that occurred since our last interview.
Phase 3: **Recording.**	Participants were given disposable cameras. They were expected to take 14 photos in their area. The photos they took had to reflect their experiences of air pollution in their area.
Phase 4: **Contextualisation**. Focus group discussion.	Each participant was given a list of questions, which guided them to discuss three of their photos that reflected the effect of pollution on their lives. The participants responded to the list of questions (Appendix G).

Table 3.3 Data sources for Research Question 3

Data source	Comment
Phase 1: **Codifying.** Identifying common themes in the collected data.	Participants had to identify common themes in their stories and categorise them. All the categories were put on sticky notes so as to make the presentation easier. This was done in a group.
Phase 2: **Presentation.** Presenting the concerns of the participants to the relevant stakeholders	The manager of the SDCEA was invited to the presentation. A video with the participants' concerns was presented. The participants did not need to be there and remained anonymous so as to not be targeted by the giant industries.

3.4.1 The research instruments used to answer the first research question

3.4.1.1 The questionnaire

The first research instrument used to answer the research question in phase one was the questionnaire. According to Macmillan and Schumacher (1993), questionnaires are the research instrument used by the researcher in order to obtain information from the participants. In this study, a questionnaire was used to reveal the learners' knowledge and understanding of pollution with regard to the oil refinery incident of November 2007.

The questionnaire consisted of one open-ended question, and space was provided for the participants to respond in writing (Appendix G). The single question in the questionnaire was aimed at finding out the participants' knowledge and understanding of pollution and its effects on the health of the people in the South Durban area. By responding to the questionnaire, the participants got an opportunity to explain what they remembered about the explosion and its impact. In the case of this study, the learners explained their experience of pollution. The participants' had to answer the questions individually. The questionnaire used in this study was a bit different from other questionnaires in the sense that the respondents were asked to write their names on it, since the intention was also to use their responses during the analysis of the data in comparison to what the participant said in the first research group

meeting. The questionnaire was administered personally to the eight participants so as to ensure the validity of the study.

3.4.1.1.1Piloting the questionnaire

The questionnaire was first piloted in a group of eight learners in my school. Piloting the questionnaire was vital as it was used to test on a small scale how the questionnaire would work (Neumann, 2000). I used Grade 8 learners to pilot the questionnaire because they were of the same grade as the selected participants in the study.

3.4.1.1.2 The aim of piloting the questionnaire.

The aim of piloting the questionnaire was to find out (check) if the questions in the questionnaire caused any confusion that could result in different respondents assigning different meanings to the question. Another aim of piloting the questionnaire was to check if the terminology and the language used in the questionnaire was understandable and appropriate to the research study (Cohen, Manion & Morrison, 2007). After going through the responses of the pilot group, I found that their responses did not indicate any misunderstanding of the question in the questionnaire, and therefore no changes were made.

3.4.1.2 Focus ground discussion

After responding to the questionnaire, the participants discussed their responses and shared their experiences and memories, as guided by the given questions (see Appendices I, J and K). Kruger (as cited in Jafta, 1996, p, 37) states that the focus group is a carefully planned discussion setting designed to obtain perceptions in a defined area of interest in a permissive, non-threatening environment. According to Cohen, Manion and Morrison (2007), focus group discussions are a research instrument where participants have to sit together in a group and take turns in voicing their experiences of this issue at hand, which was pollution in this case, thus promoting interaction within the group. The focus group discussion was video recorded so that the data could be transcribed at a later stage. In this study, the participants were engaged in two focus group discussions. The first focus group discussion came directly after the participants responded to the questionnaire, and it involved all eight of the selected participants.

3.4.1.2.1 The aim of the first focus group.

The first focus group was constituted to answer the first Research Question. The main aim of using a focus group discussion in the study was to track any changes in the participants' ideas from what they had said in the questionnaire.

3.4.1.3 Evaluation Forms

An evaluation form with four questions (see Appendix H) was administered and the participants were expected to fill it in in order for them to reflect on their learning. This was done because one of the objectives of participatory action research is to enable the participants to create and also to gain knowledge (Strydom et al., 1998). The questions in the evaluation form dealt with what the participants learnt in the focus group discussion, as well as clarifications that the participants might have needed regarding the entire study. The evaluation forms were not piloted, but the questions were clarified when the forms were administered.

3.4.1.3.1 The aim of using the evaluation form

The evaluation form was used so that the participants could get an opportunity to reflect on what they learnt in the first focus group discussion.

3.4.2 The research instruments used to answer the second research question

3.4.2.1 Interviews

I conducted two interviews with the manager of the SDCEA. The first interview was aimed at finding out about the SDCEA, i.e. when it was formed and why, the effect of pollution on people who live in the South Durban area, as well as the reaction of the South Durban communities towards pollution and the refineries. The second interview was a follow-up on the data collected from the first interview. The second interview was triggered by the explosion and fire that occurred at SAPREF in April 2015. A semi-structured interview was used to answer the second Research Question. I interviewed the manager of the SDCEA (South Durban Community Environmental Alliance) in order to obtain in-depth information about all the activities of this non-governmental organisation (SDCEA) to fight for environmental justice in the South Durban basin.

The SDCEA works in collaboration with the residents of the South Durban area to fight the people in power over the right to quality air and environmental injustice since they had a problem with air pollution, which was caused by large industries in

their neighbourhood. I recruited the manager of the SDCEA to also serve as an audience for the photo-voice findings since one of the aims of using photo-voice is to present the concerns of the marginalised people to people in power. I chose to interview the manager of the SDCEA because of the knowledge he possessed on pollution since he once worked at SASOL, which also contributes to the air pollution in this country.

The face-to-face interview with the manager of the SDCEA was conducted at the SDCEA offices, and the venue was suitable for an interview because it was free from disturbances such as loud noises and distracting movements and any other disruptions. The interview had five open-ended questions (Appendix L). The interview questions were written down and were pre-tested before the actual interview with the manager of the SDCEA took place. Before we started with the interview, I had to explain to the interviewee that the information he gave me would be used for academic purposes. I could not jot down notes while the interview progressed because I felt that that would distract me from paying full attention to the interview (McMillan & Schumacher, 1993). I also asked the interviewee to grant me the permission to tape-record the interview. The interview was then tape-recorded so that I could transcribe it at a later stage, and that I would also be able to return to the tape many times in order to fully understand the information that was shared in the interview. Once the interview was finished, I thanked the interviewee for his time and valuable contribution. The interview went very well because all five questions were well answered with in-depth information. The interviewee also promised that he was prepared to give more information whenever I needed it.

The second interview was also a semi-structured interview. I initially intended to do the second interview online, but I ended up doing a face-to-face interview. I first phoned the participant in order to ask him to be an interviewee and to explain to him that I did not intend to do the face-to-face interview, but the questions would be sent to him. I had to remind the participant that the interview was done for academic purposes. I also had to clarify for him that this second interview was a follow-up of the first one. That actually changed because I felt that it was going to take too long for the interviewee to respond to my questions online. Nine interview questions were sent to the manager of the SDCEA, and he was asked to respond in writing. After the interview, I then transcribed the recording.

3.4.2.1.1 Pre-testing the interview questions

I used my colleagues to pre-test the interview questions so that I could find out if all the questions were well constructed and easily understood. Pre-testing of the interview questions is necessary to check the bias as well as ambiguity in the questions (MacMillan & Schumacher , 1999).

3.4.2.1.2 The aim of using an interview

The aim of choosing a semi-structured interview was to get an opportunity to probe for more detail and to seek clarification and elaboration when necessary (Cohen, Manion & Morrison, 2007). An interview gives the interviewer an opportunity to observe, record and interpret non-verbal communication (body language and voice intonation) as part of the respondent's feedback, which is valuable during analysis (MacMillan & Schumacher , 1999). The interview provided detailed information about the effect of pollution on the residents of the South Durban basin, which was related to the second Research Question of the study. I also chose to interview the manager of the SDCEA because he was in power and the SDCEA was behind the struggle for environmental justice for the residents of the South Durban basin, so, he fully understood the history and situation regarding air pollution in the South Durban basin.

3.4.2.2 Focus group discussion

The second research meeting (focus group discussion) involved seven learners. This focus group discussion was aimed at answering the second Research Question. The parents of the eighth learner did not grant her consent to continue participating in the study, giving the reason that the learner was no longer staying in Merebank, and she had to attend to an emergency in the family. This was not a problem because the study was not based on the number of the participants, but was rather qualitative and based on what the participants said (Neumann, 2000).

A focus group discussion was held at the participants' school. The venue was not suitable for the focus group discussion because it was noisy and there were learners moving up and down the corridors and peeping through the window, which was very distracting. There were three main activities that had to take place during the particular

meeting and the events took place on two different days. The three activities were as follows:

- Photo-voice training;
- Contextualisation; and
- Evaluation forms.

3.4.2.2.1 Photo-voice training

In the photo-voice training, the participants were given disposable cameras and were taught how to use them (Wang, 1999). I gave the participants disposable cameras because they were expected to go to their residential areas and capture images that reflected the effect of pollution on their lives. I decided to use disposable cameras because they were cheap and easy to use, so they would be easy to replace if they got lost or broken.

In the photo-voice training, we discussed the minimum and the maximum number of photos to be taken by the participants in their area using the cameras given to them. We agreed on a minimum of five photos and a maximum of eight photos. We decided on the maximum of eight photos due to financial constrains since I could not afford to process more than 64 photos. We also discussed the type of images the learners were expected to capture. This was important due to ethical reasons. According to Wang (1999), the researchers are not allowed to take pictures of the people without asking for their permission or consent to do so. The participants were given ten days to go and take photos. The photo-voice training was video recorded as proof that it did occur.

3.4.2.2.2 Contextualisation

After processing the photos, the participants gathered for a discussion of their photos and the stories related to their photos. The discussion was held at the participants' school. The environment was conducive for the discussion because there were no distractions. Each participant was expected to take their own photos and from those photos choose three photos that they thought best reflected the effect of pollution on their lives. After choosing three photos, the participants were given hand-outs with five questions (Appendix K). Each participant was given an opportunity to show the group members their photos and also to tell their unique stories about what the photographs meant to them.

According to Wang (1999), in photo-voice, photos are used in collaboration with voices because photographs alone outside the context of the participants' voices and stories would contradict the essence of photo-voice. The five questions were used as a guide during contextualisation. The participants were expected to answer the questions based on the photos selected (see Appendix K). As they answered the questions, they reflected on the effects of pollution on their lives, as well as the sources of pollution. The discussion was video recorded so that I could go through the data as many times as I needed to during the transcription of the data.

3.4.2.2.3 The aim of contextualisation in the focus group

The aim was to share the individual and collective experiences of the effect of pollution in the South Durban area. The focus group discussion was so important in answering the second research question as it gave more information on how the residents in the South Durban basin were affected by air pollution.

3.4.3 The activities used to answer the third research questions

In order to answer the third research question, the researcher and the participants were involved in two activities, as according to Wang (1999):

- Codifying; and
- Presentation of the data to the people in power.

3.4.3.1 Codifying.

On the one hand,Wang (1999) defines codifying as a means to identify common themes in stories and to categorise them. On the other hand, Wang and Burris (1994) define codifying as a process of identifying and sorting data into categories and meaningful issues, themes, and theories. During this process, the researcher and the participants came together in order to go through the different effects of pollution as mentioned by the participants in the focus group discussions. The aim of doing this was to codify the collected data. The participants had to record the categories on sticky notes and organise these into broader themes. This stage was also video recorded so that during the presentation, the stakeholders would have a clear picture of the effect of pollution in the participants' community.

3.4.3.2 Presentation of the data to the people in power.

All of the information relayed by the participants was compiled into one video cassette, which was presented to the manager of the SDCEA, who in this case represented the people in power. This is also linked with one of the objectives of my study because it was aimed at community development and personal growth. Through this presentation, the SDCEA received a loud and clear message about the suffering of the people in the South Durban area due to air pollution.

3.5 DATA ANALYSIS

The analysis of the data focused on the information obtained using the following:

- Participants' responses to the questionnaire;
- The transcripts of two group discussions (focus group discussion);
- The transcripts of two interviews of the manager of the SDCEA;
- Notes on the evaluation forms; and
- The transcripts of codifying and the end presentation.

I read through all of the above collected data with the aim of checking incomplete, inaccurate, inconsistent, and irrelevant data. I then went through the collected data in detail for a second time with the aim of fully understanding the content of the data. I then focused on the data collected from each participant in response to the questionnaire, the transcripts of the two focus group discussions, the transcripts of the two interviews, as well as notes on the evaluation forms. A collective story of each participant was then made using all the data I had for each participant. This made it easy when I analysed their stories. I tried to find common features in the stories of the participants. These common features and connections in the stories of the different participants helped me to find common themes, which thus made reporting easy since I could not report everything that happened to each and every learner in detail.

This method of analysing qualitative data is known as the inductive method. This method is performed by extracting themes or generalisations from the evidence or organising data to present coherent information (Neumann, 2000). It is known as the inductive method because it is aimed at condensing raw textual data into a brief

summary format. It is also used to establish clear links between the evaluation or the research objectives, and the summary findings derived from the raw data. The data collected was analysed qualitatively using words only.

3.6 ETHICAL CONSIDERATION

In this section, I will discuss ethical principles and how I dealt with these during the study. Ethical consideration is important because it ensures respect and trustworthiness from both the researcher and the participants. Neumann (2006) states that the researcher has a moral and professional obligation to be ethical, even when research subjects are unaware of, or unconcerned about ethics.

I submitted the ethical clearance application to the Department of Education in order to ask for permission to conduct research at a selected school. After obtaining permission from the Department of Education, I had to negotiate with the principal of the selected school in order to gain access to the school, as well as to the learner participants. This was important because as a researcher, I was an intruder, so I had to negotiate this first. I explained to the principal that the name of the school and those of the learners that I intended to work with would not be revealed, and that the reason for conducting this research was for study purposes only. I promised the principal to supply the school with a copy of my final work.

One of the challenges that I faced during the negotiation period was the issue of time because the activities were done during examination time. I initially thought that examination time was suitable for holding meetings with the participants because they only came for a few hours, but I did not think of their own transport arrangements. We could not meet before they sat for exam sessions because the learners had morning papers.

I also sought permission from the Grade 8 Natural Sciences educator, who assisted me in selecting appropriate learner participants, and arranged venues for the meetings. I also sought consent from the manager of the SDCEA. Learners were given both consent forms for themselves, and for their parents or guardian to sign because they were still minors. Consent was sought in the form of writing and signed by the participants before the commencement of the research. Cohen et al. (2007) explain that

informed consent is the procedure by which individuals choose whether to participate in the investigation after being informed of the facts regarding the study. I had to explain to all of the participants the purpose of the study and how it was going to be conducted, and that they could withdraw from the study at any time if they wished to do so. Participants were also informed that all of the findings were for study purposes only.

I had to give learners disposable cameras so that they could take photos that revealed their experiences of air pollution, but not of people without seeking permission to do so first. When the data was analysed, I ensured the anonymity and confidentiality of the participants by making sure that no real names were used in the write-up of the research, only pseudonyms. I made sure that during data constitution, the learners did not write their names on the questionnaires that were distributed to them.

The video containing all of the collected data was edited before it was presented to the people in power. It was edited by blurring the faces of the participants with a mosaic. The aim of hiding their identity in this way was to protect them so that they could not be targeted by the giant industries that are implicated by the learners in the study. The data was stored in a secured place during data collection and upon submission of the thesis, it will be stored in the school of Maths, Science and Technology at the University of KwaZulu Natal for a period of five years, after which it will be disposed of.

3.7 LIMITATIONS OF THE STUDY

The date of the meeting with the SDCEA manager was constantly changed due to the urgent meetings he had to attend. The time available for meetings with the learner participants was limited. I initially thought that revision and examination time was the most suitable time to hold meetings with learners as I did not want to take them away from their lessons. The practicality of it was not feasible as I encountered the problem of time, as well as problems with the venue. I was expected to use an hour because after an hour, another group of learners would wait outside the venue with the intention of using it for another purpose.

I could only work with eight learners since I was guided by photo-voice as the methodology in this study. Photo-voice suggests that, for in-depth data, the researcher should use a minimum of eight participants.

3.8 CONCLUSION

This chapter has given a full descrition of the research method used in the study and also the variety of research instruments used for data constitution, namely, a questionnaire, two focus group discussions, and two interviews. This entails everything that I did during the data collection from the moment of seeking the research site up to how I analysed the data, which is detailed in the next chapter. This chapter also presented my justification for choosing photo-voice as a research method, the interpretive approach, and the use of the research instruments.

I have illustrated the challenges that I was faced with as a novice researcher in the entire research process, and how I overcame those challenges. I could not have overcome these challenges if the gatekeeper, the Natural Sciences educator, and the participants were not so co-operative. After the experience of conducting this research, I concluded that the research process is a very complex process, which requires the researcher to be flexible.

CHAPTER 4

PRESENTATION OF THE RESEARCH RESULTS

In the previous chapter, the research methodology that was employed in the study was presented. This chapter presents the results of the data gathered to answer the following three research questions:

RQ 1: *What are Grade 8 learners' experiences/understanding of air pollution with regard to the oil refinery incident of November 2007?*

RQ 2: *What are Grade 8 learners' experiences/understanding of the effect of air pollution on their lives?*

RQ 3: *How can photo-voice be used by the Grade 8 learners to respond to the community's concern about pollution?*

During the presentation of the results, critical questions were answered by referring to the data sources, namely, a questionnaire, the transcription of two focus group discussions, the transcriptions of two interviews, and the notes on the evaluation forms. I used qualitative data analysis, which is an inductive process. Qualitative data analysis involves organising the data into categories and identifying the patterns (relationships) among the categories (McMillan & Schumacher, 1993).

4.1 ANALYSYS OF CRITICAL QUESTION 1

RQ 1: *What are Grade 8 learner's experiences/understanding of air pollution with regard to the oil refinery incident of November 2007?*

In line with the method of photo-voice, a focus group discussion was organised to address the following two aims:

- Firstly, to offer the learners the opportunity to respond to the open-ended questionnaire individually.
- Secondly, to allow the learners to share what they had written with their peers so that they could learn from each other's experiences.

As pointed out in Chapter 3, Section 3.3.3, I started working with eight participants whereafter one had to withdraw, leaving seven learners; hence the reference to P1- P7 in the presentation of the data in the tables below. In answering this research question, three ways of experiencing the incident were noted. In the following section, these three are elaborated on further.

4.1.1 Fear and restlessness

This experience was expressed in a variety of ways. Some of the learners talked about it as a horrifying experience and some experienced it in an anxious way, as illustrated in the excerpts below (refer to Appendix K):

P1*: 'The lightning struck the tanker and the tanker caught fire and this really alarmed many people'*

P2: *'On that particular day, pollution brought worst fear'*

P3*: 'I saw a huge amount of some smoke coming to the air. I told myself that I do not want to be sick because I was scared of suffocating. I did not know what to do, fear got into me'.*

P5*: 'I live directly across Engen refinery and when my family and I saw that oil tank burst into flames we were absolutely afraid of the fumes the burning oil tanker was soon to release. We evacuated Merebank for a night. When we got back the next morning we were amazed to see the oil tank releasing a huge amount of black smoke'*

P6*: 'On that day it was my cousin's graduation ceremony. Someone told my dad that we should go and look outside, everyone was running to the cars. My dad said we should go and stay with his sister because of the smoke in the area and we had to leave and we were scared.'*

P7*: 'Most of the people were like move or leave the area because of fear'.*

P8: 'People who stay there were really worried and some of the residents moved out of the place until the fire became studious because another explosion could happen'.

4.1.2 Powerlessness

The experience of powerlessness was expressed as well as despair and feeling vulnerable, since many accidents occurred in their area. This is noted in the excerpts below (refer to Appendix K):

P2*: 'It happened second time already, people want to go or move around to find a safer place to hide'.*

P6*: 'There is even more accidents happening in Merebank just before that one'.*

4.1.3 Agony

The experience of agony was expressed by some learners as illness and some learners expressed the experience as suffering. This is evident in the excerpts below (refer to Appendix K):

P1*: 'Many children got ill, approximately 24 people were rushed to hospital in order to receive treatment, this was not very light treatment, it was severe.'*

P2*: 'People got sick, most practically live on asthma pumps because the body has become dependent on the pump just to keep you going. That cost a lot of money because if you go to the local clinic with the problem of asthma people are expected to get their own money to get the treatment.'*

The data gathered using an open-ended questionnaire and the focus group discussions also revealed that the explosion that occurred at Engen in November 2007 was caused by lightning, which struck the petrol tanker. It was also eluded to in the data that people in the South Durban area always lived in fear as they were uncertain as to when the next explosion would occur seeing as the explosion of November 2007 was not the first one that year. The data also revealed the different unpleasant experiences of the participants during the explosion.

Most of the participants felt negative about the health impact and the trauma that they had to go through whenever there was an accident at the refinery. There was also a sense of despair and acceptance of the situation since they had come to an understanding that they had to be displaced for few days after any explosion.

4.2 ANALYSIS OF CRITICAL QUESTION 2

RQ 2: *What are Grade 8 learners' experiences/understanding of the effects of pollution on their lives?*

The data was collected by conducting two interviews with the manager of the SDCEA (South Durban Community Environmental Alliance - see Appendices L and M), as well as conducting a focus group discussion (contextualisation) with the learners (see Appendix I). In answering the research question, I first focused on the interview conducted with the manager of the SDCEA, and thereafter the second (follow-up) interview. Lastly, I related these to the learners' focus group discussion (contextualisation).

4.2.1 The first interview

The first interview focused on the following three aims:

- Firstly, to find out the effects of air pollution in the South Durban area.
- Secondly, to find out how SDCEA was founded and also how this non-governmental organisation assists the victimised community in order to curb the problem of air pollution and its effects on their area.
- Lastly, to find out about the attitude and the relationship that the refineries had at the time of this study with the SDCEA.

The following effects of pollution were highlighted in the first interview with the manager of the SDCEA:

- Air pollution causes respiratory illnesses, chest disorders and burning eyes.
- 52% of learners and educators in one of the primary schools in the South Durban area had different respiratory illnesses.
- Air pollution causes asthma, cancer and mental illnesses.
- The South Durban area has become the stinking area of chemicals.
- Residents had to re-paint their houses every year.
- Residents had to change curtains, and wash them once a week because of chemicals that come into the house.
- Children lose out on quality education as they are sick most of the time and their learning skills are declining.

The second aim of the first interview with the manager of the SDCEA was to find out how the SDCEA was founded and also how it assists people in the South Durban area to deal with the issue of pollution. The interview analysis revealed that this non-governmental organisation, SDCEA, was formed in 1995 and started operating in 1996. The organisation was formed due to the problem of pollution in the area, and the organisation is aimed at fighting for environmental justice and quality air. The alliance comprises sixteen organisations from civil structures, rate payers, church based organisations, conservationists, environmentalists, and clinic committees across the areas from the tip of the Bluff right down to Wentworth.

The third aim of the first interview was to find out about the attitude and the relationship that the refineries had at the time of this study with the SDCEA. The interview revealed that different studies and scientific data show that refineries and other chemical industries are the major cause of pollution in the South Durban area. It was also evident that the SDCEA was not happy about the presence of the industries in their residential area. They felt that the industries did not care about the lives of people in the South Durban area because the management of those industries and their families did not live close to the industries, so they were not affected by the air pollution caused by these industries. The SDCEA felt that the industries were only interested in making a profit at the expense of the lives of innocent people. This is why the SDCEA went as far as to suggest that the industries should relocate.

4.2.2 The follow-up interview

Subsequent to the first interview, I also conducted a follow-up interview with the manager of the SDCEA. The interview was triggered by yet another explosion at SAPREF in April 2015. The aim of conducting the follow-up interview was to find out if there were certain developments pertaining to the issue of air pollution caused by the industries in the South Durban area. The following aspects were highlighted in the interview:

- The cause of the incident, which took place on the 17th of April 2015, was an explosion of the key pipeline carrying fuel along the Durban coastline. Two workers died and one was in a critical condition in hospital. SAPREF's spokesperson was not willing to give SDCEA a full report about what the exact cause of the accident was. All further attempts by SDCEA to obtain full details

of the cause of the accident were in vain, even after urging the Durban City Council to intervene.

- Engen has more accidents than SAPREF. Processes and events at the refineries, besides explosions, ranged from the constant release of black smoke, the dumping of toxic chemicals, to leaks on flares headers and the release of a 'rotten egg smell'.
- Most accidents in both refineries were caused by the use of outdated technology and old pipes.
- The use of the "bucket brigade" method to monitor air quality was reliable and effective compared to the municipality's air quality monitoring stations. The same air quality monitoring stations were good and reliable and were successfully used mostly in developing countries to monitor air quality. In the South Durban area, the air quality monitoring stations were not trustworthy due to the following reasons:

  (a) The stations were not constantly checked for faults.
  (b) The stations were sometimes not switched on.
  (c) The data contained in these was not constantly collected.
  (d) There was poor management of the stations in terms of looking after them, and they were not serviced on time.

- More health studies related to pollution and chronic respiratory diseases in the South Durban area are done and the findings continue to relate air pollution to chronic diseases like asthma, cancer, and leukaemia, which are prevalent in the South Durban area as compared to other areas where air pollution is not problematic.
- The evidence used to pin down the giant industries to acknowledge responsibility for air pollution is there. The problem is that the Government is too lenient on the refineries even though they are aware that these companies do not abide and comply with the law that governs the emission of pollutants by these industries. In the past, industries were expected to shut down for six months so that proper fixing and servicing of machines could be done thoroughly. In that period of shutting down, there is no pollution and production. Recently, the industries shut for at least two weeks, although thorough servicing of the machines was not done. This was because the

industries felt that shutting down for a period of six months would reduce their profit. These industries used old and outdated technology, which caused abundant pollutants in the atmosphere.

In first world countries like Britain and the Netherlands, where these refineries originated, they use the most recent technology and do not experience the problem of air pollution, which is experienced by the people in the South Durban area. This is because the government in these first world countries complies with laws that find that once acceptable limits and world standards are exceeded, these companies are shut down. In South Africa, the refineries can emit 19 tonnes a day, whereas in Europe, the limit is two tonnes a day. This is evidence that technology that could minimise or combat pollution is there. So, what the communities in the South Durban area and the NGOs like SDCEA are fighting for is something that exists, it is only that this country lacks law enforcement.

- Industries should not relocate. The only thing that the industries could do is to implement the Best Available Technology (BAT). Industries should not relocate because of the following reasons:
  (a) Wherever they decide to locate they will cause pollution, unless they implement the Best Available Technology.
  (b) Employees in these industries woulod lose their jobs if the industries relocated, and they would not be able to feed their families.
  (c) Relocation of the industries would cause a socio-economic crisis in the South Durban communities.
  (d) Implementing the Best Available Technology results in quality jobs, because this results in healthy people working in industries, healthy workers will thus have quality of life and a prolonged life span.
- Communities too cannot relocate at the expense of the industries. The South Durban area was declared a residential area and not an industrial area.
- Learners of the South Durban area were involved in different meetings and different campaigns that were aimed at demanding the industries to minimise pollution in their area since pollution has adverse effects on the health of the residents in the South Durban area. The schools in the affected areas always

welcomed researchers who intended to do studies regarding issues of pollution in the South Durban area using learners as well as educators.

- The parents of these learners served as watchdogs in the community as they always informed the SDCEA about the flares and explosions in the area so that the SDCEA could come and take samples. The parents were also engaged in workshops and public meetings where air quality and different programmes were discussed.

4.2.3 Focus group discussion (Contextualisation)

According to the method of photo-voice, during contextualisation or storytelling, each learner is expected to select and talk about two or three photographs from the photographs taken in his/ her area. The learners select photographs that are most significant and best reflect their real life situations. Below are the stories relayed by learners using their photographs:

Photographs

Figure 4.1 Picture of Learner Participants - Merebank Secondary School, Durban, 2008

PARTICIPANT 1: PICTURE COLLECTION

Participant 1 took pictures of different things that contributed to the destruction of the ozone layer and caused global warming.

Figure 4.3 Aerosol sprays pollute

Figure 4.2 Car exhausts emit gases

She took pictures of industries in the South Durban basin, the exhaust pipe of the car, as well as aerosol sprays. The participant believes that people should drive less, industries should improve their technology to lower or stop emissions in the industries. She also suggested that the government should assist industries to fit air generators that can purify air.

Figure 4.4 Industries pollute

PARTICIPANT 2: PICTURE COLLECTION

Participant 2 took pictures of industries very close to a residential area, a lifeless plant, as well as a picture of a house with affected paint outside. Industries emit chemicals that affect both living as well as non-living things. The plants and paint in nearby houses in the area were affected by the chemicals from the industries in the South Durban area.

Figure 4.5 Pollution destroys plants in houses

Figure 4.6 Polluting industries

Figure 4.7 Pollution destroy paints on houses

PARTICIPANT 3: PICTURE COLLECTION

Participant 3 took pictures of the industries in the South Durban area, a cricket player, and the himself alone in his room. The participant used to play cricket when he was young but, due to asthma attacks and other respiratory problems caused by the presence of the industries, he was always confined to his room during his spare time. His dream of becoming a professional cricket player had faded. It was revealed in the first focus group that most of the youngsters in the area did not participate in sports like other youngsters in other areas. They did not even get an opportunity to socialise with other people in sports. It was difficult for them to participate in sports due to the diseases associated with the respiratory system.

Figure 4.8 Emmisions of industries

Figure 4.10 This cricket player always stays indoors

Figure 4.9. Pollution causes cardio

PARTICIPANT 4: PICTURE COLLECTION

Participant 4 took pictures of tankers in the industries, the residential area at night, and industries causing water pollution. Huge tankers in the industries sometimes explode and cause smoke and fire, which affects the lives of many people in the South Durban area as the situation triggers asthma attacks. These explosions sometimes occur at night, so people in this area do not sleep peacefully because of the explosions and flares caused by the industries. Industries also cause water pollution, which seriously affects aquatic ecosystems. The participant suggested that the government should fine the industries if they happened to pollute water so that they could stop water pollution.

Figure 4.12 Tankers of the industries which blow

Figure 4.11 At night people are scared explosions might occur

Figure 4.13 Water pollution

PARTICIPANT 5: PICTURE COLLECTION

Participant 5 took pictures of industries, a tanker, and a car. Industries emit dangerous gases that affect residents financially and emotionally. This is because many residents have respiratory problems and whenever they get asthma attacks or cancer, they have to pay the money from their own pockets. The industries do not assist them, even though the industries are thought to be the cause of their illnesses. Tankers are used to store petrol in the refineries, and they sometimes explode and cause serious effects on the local residents. Cars used by the employees who work in the industries also contribute to air pollution.

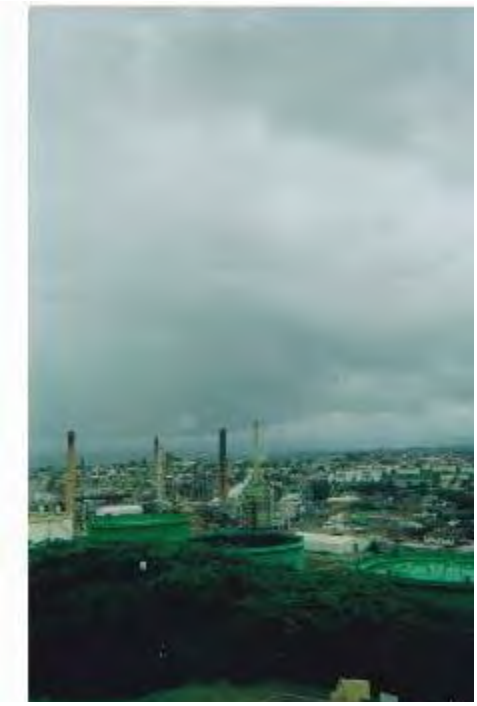

Figure 4.14 Industries and tankers which caught fire

Figure .4.15 Cars also cause pollution

Figure 4.16 Industries emitting gases

PARTICIPANT 6: PICTURE COLLECTION

Participant 6 took pictures of industries, cars and the damaged environment. Industries cause water pollution, which kills aquatic life and releases very bad odours during the decomposition of dead aquatic organisms. Cars and trucks transporting products to and from the industries also add to pollution in the South Durban area. Pollution results in acid rain, which destroys the environment. This is why the environment in the South Durban area is damaged. The participant suggested that the government should teach the South Durban residents about the importance of the trees, they should also encourage the residents to plant more trees, especially during arbour day in order to obtain oxygen from the plants and also to make the environment beautiful.

Figure 4.18 Destruction of the environment

Figure 4.17 Industries in the SDB pollute water, destroying aquatic life

Figure 4.19 Car releasing gas

PARTICIPANT 7: PICTURE COLLECTION

Figure 4.20 Industry and the surrounding houses

Participant 7 took pictures of industries, houses close to the refineries, and the participant with his friends on the school grounds. Industries in the South Durban area emit dangerous gases directly to the residents because houses are very close to the industries. This emission affect residents. This is why the participant was unable to play with his friends during break like they normally did before. This was due to the fact that most of them, including the participant, had problems with respiratory illnesses. The participant felt that the people in power did not care about their lives as they violated their right to clean air.

Figure 4.21 Industries emitting gases anytime of the day

Figure 4.22 Not active at school during break

Discussion

The data collected from the learner participants and the manager of the SDCEA shows that there was absolute unanimity regarding the fact that air pollution in the South Durban area was caused by industries, especially the two refineries and the nearby paper-mill. There was also unanimity regarding the fact that air pollution causes negative health effects such as respiratory problems, chest disorders, cancer, as well as leukaemia. In addition to the unanimity observed, there was additional unanimity among the learner participants and the manager of the SDCEA that air pollution affects the teaching and learning in schools around the South Durban area. This is due to learners and educators being constantly ill because of pollution in the area. It was also due to the fact that when explosions occurred, the schools that were close to the refineries had to close for a few days.

The participants expressed a sense of anger and frustration in the fact that their right to breathe clean air is violated by the refineries that cause air pollution. Some of the participants think that protests and negotiations with the refineries can be the only means of emancipation from their situation.

4.3 ANALYSIS OF CRITICAL QUESTION 3

RQ 3: *'How can photo-voice be used by the Grade 8 learners to respond to the community's concern about pollution?*

In response to critical question 3, learners had to find common themes emerging from their stories (codifying), as well as from the first and second interviews. They then had to categorise the themes and put on sticky notes as to make the presentation easier. Lastly, the learners' concerns and recommendations were presented to the relevant stakeholder.

4.3.1 Codifying

The following four themes emerged from the data collected by the learners:

- Sources of pollution.
- The health effects of pollution.
- Different types of pollution in the South Durban basin.

- The environmental effects of pollution.

The second step was to categorise the themes. All the categories were put on sticky notes for presentation. Themes were sorted into four categories:

- Sources of pollution;
- The effects of pollution;
- Types of pollution; and
- Recommendations.

4.3.2 Presentation

The third step was the presentation of the learners' concerns regarding their area and health, as well as recommendations to the relevant stakeholder.

In this case, the stakeholder was the manager of the SDCEA. The presentation was done in the form of a video so as to protect the participants' identity. The video was presented to the manager of the SDCEA because this non-governmental organisation fights for quality air for the residents of the South Durban area. The photos and the voices in the video were used to emancipate the residents of the South Durban area from the problem of air pollution.

4.4 CONCLUSION

In this chapter, I discussed the key issues that emerged from the research findings, as well as an analysis of the gathered data. The next, and final chapter, presents a discussion of the results, as well as the conclusions and recommendations of this study.

CHAPTER 5

DISCUSSION OF RESEARCH RESULTS

This chapter focuses on a summary of the main findings of the study based on the data obtained from the questionnaires, interviews, and the two focus group discussions. The findings are discussed in relation to some of the ideas developed in the literature review and conceptual framework. The discussion is guided by the research questions, which is followed by the recommendations and conclusions of this study.

5.1 DISCUSSION AND KEY FINDINGS

5.1.1 Research findings of the first Research Question

The study first looked at the learners' experiences emanating from the explosion in November 2007. An analysis of the data showed that the air pollution that resulted from the explosion in November 2007 had a negative effect on the learners. Even though the explosion occurred in the evening, the learners were affected because they resided in the South Durban basin. This was eluded to by the SDCEA (2004), where it is stated that the explosion of November 2007 at the oil refinery impacted negatively on the health of the learners and the economy of their families.

This occurred because a number of learners had to absent themselves from school due to suffering respiratory problems. One of the Settlers Primary School learners in Merebank missed ten school days a month due to asthma attacks (Kings, 2014). Kings (2014) further states that the headmaster of Merebank Secondary School admitted that asthma was a chronic problem at school and that the problem escalated during the exams when stress triggered attacks.

The explosions also affected the economy of the learners' families because parents had to use their own money and take sick learners to hospital. The explosions also aggravated chest problems. Chest problems require constant medication and consultations, as well as emergency treatment and hospitalisation (Kings, 2014). Kings (2015) further illuminates that pollution, which was worsened by the explosions in the refineries, also cause cancer, and this makes the socio-economic crisis even worse in most families. According to Kings (2014), this situation is caused due to people with

cancer needing more money to access more advanced treatment such as chemotherapy. The refineries did not help the residents with their hospital bills nor with consultation fees when seeking medical attention; it was only in a single case where the residents were assisted with hospital bills (SDCEA, 2008). Instead of helping with hospital bills, the Engen refinery gave R500 to each family in 2011, and the money was meant to buy curtains, as the residents' existing curtains were stained black during the explosion (Kings, 2014). Between 1995 and 2010, twelve explosions were recorded at both refineries (Kings, 2014). The data analysis also revealed that the explosion in November 2007 was the third in a space of three months.

5.1.2 Research findings of the second Research Question

The study looked further at the learners' experiences of the effect of pollution on their lives. It was evident from the interviews with the manager of the SDCEA that the problem of pollution caused by the industries in the South Durban basin had been going on uncontested for many years. Both the eThekwini municipality, as well as the national government were silent about the emissions of the refineries even though the government was aware that these emissions far exceeded the permitted levels set by the South African Air Quality Standards, as well as the World Health Organisation (Groundwork, 2014). Instead of taking action against the refineries, the government approved a licence for the refineries to erect more plants, which will emit even more pollutants.

This case is similar to a study carried out in the Mpumalanga Highveld where the government was silent about the issue of air pollution caused by Eskom power stations even though the government understood the health effects of pollutants on the people living close to the coal-fired power stations. The government further gave Eskom the licence to construct new coal-fired power stations even though Mpumalanga is one of the worst air quality areas in the world (McDaid, as cited in GroundWork, 2014). In 2013, Eskom even went further and applied to the Department of Environmental Affairs for exemptions from air pollution standards. This too shows that the industries know and understand that the government is lenient towards them and is often silent about their wrong doings.

An analysis of the interview also revealed that air pollution affects the health and the economy of people who live in the South Durban basin, even though it is an

indisputable fact that the community is poor and most of the community members are jobless. This idea was also shared in the SDCEA Community News (Volume 10, 2008). The economy is affected in that many people are sick and have to spend most of their money on hospital bills due to respiratory problems caused by air pollution and the industries do not help them financially in such cases. Local and national studies done regarding the negative effects of pollution on people who live close to industries show that people do not benefit at all from these industries. These cases are evident in South Durban area as well as in the Mpumalanga Highveld. Even though community members are sometimes compensated financially, the effects on their health, lives, as well as environmental destruction can often not be undone (Groundwork, 2014).

5.1.3 Research findings of the third research question

The learners broke their silence about their concerns as well as the community's concern about pollution. The learners' concerns were taken to the SDCEA as they considered the SDCEA as a non-governmental organisation that could voice their concerns to both the giant industries, as well as the eThekwini municipality. The learners clearly stated that the industries, particularly the refineries, were the major source of pollution in the South Durban area. The learners presented their concerns to the SDCEA highlighting different types of pollution caused by the industries, the effects these have on the health of the community members, and how pollution degrades and damages the environment. Besides air pollution, industries also cause land pollution since they often dispose of toxic chemicals on land, which eventually leads to the contamination of water sources. The learners put forward different recommendations regarding the presence of the industries in South Durban area. One of the recommendations that they proposed was that the industries should use modern technology in order to minimise air pollution.

5.2 RECOMMENDATIONS

The recommendations proposed here are based on the research findings of the study, and are directed at curriculum designers, the management of the oil refineries, the SDCEA, people of the South Durban area, the Department of Environmental Affairs, and the eThekwini municipality. A recommendation for further studies to be conducted in the South Durban area is also put forward in order to reveal the experiences of the powerless community members.

5.2.1 Recommendation for curriculum designers

The section on pollution is covered in Grade 8 in Natural Sciences under the environmental sciences section. The issue of pollution poses a threat to human life, be it locally or internationally, and it needs serious attention. Curriculum designers should include the section on pollution as early as in Grade 3 if we seriously want to combat the problem of pollution. The curriculum should also be expanded and should also include first aid and rescue mechanisms in the case of explosions that result in air pollution. It is evident from the study that even though the learners understood the issue of pollution, they seemed to not understand whether to remain indoors or to relocate in case of explosions.

In-depth environmental knowledge that can be shared with the learners at school from an early age could increase environmental literacy amongst community members and put more pressure on heavy polluters to clean up their act. The section on pollution in the Natural Sciences, as well as in the Life Sciences curriculum should be integrated into more learning areas other than Geography because it only benefits learners who are in the science stream and those who are taking commercial subjects do not benefit. This is important because all learners should be conscientised about air pollution and its effects on their lives. The curriculum should also include different projects that will enable learners to collaborate with environmentalists in order to find more information about the negative effects caused by pollution on the environment. This could also include competitions among schools based on environmental awareness so that learners can understand and internalise the issue of pollution.

5.2.2 Recommendation for the management of the oil refineries

The management of the oil refineries should take the initiative and educate community members in the South Durban basin about air pollution, safety measures, and things they need to do in case of flares and explosions. Even if the refineries deny the fact that there is a link between their activities and health problems, and they claim that they have reduced their emissions, they should, with the help of the SDCEA, identify community members with respiratory problems caused by air pollution and assist them financially in terms of medical care and financial aid for tertiary education. The industries should also organise free mobile clinics, which should be stationed in close proximity to the community so as to assist them in case of explosions and flares.

The analysis of the data in the previous chapter revealed that the Engen refinery built a computer room and supplied computers to one of the schools in the South Durban basin. The Engen spokesperson confirmed that the refinery gives R5 million a year to community projects (Kings, 2014). They should widen the circle and do that in many schools in the South Durban basin. They should also organise sports inter-schools competitions in the South Durban basin. Since the refineries use outdated technology, the suggestion is that they should improve their technology in a way that will reduce the emissions of pollutants because it is their moral obligation to ensure that their actions do not pollute the air in a way that will violate people's right to clean air. The industries should abide by the rules stipulated in the South African air quality standards, as well as the World Health Organisation.

5.2.3 Recommendation for the SDCEA and the South Durban community members

The SDCEA should continue working with the community members, organising workshops and more seminars so that they can conscientise local community members about what is happening around them. They should also invite people from outside who experience similar problems in order to share their experiences with them. The SDCEA should work in collaboration with other non-governmental organisations like Groundwork and the Highveld Environmental Justice Network, which is based in the Mpumalanga province, because they have common objectives in fighting for environmental justice. They should share ideas, plan together and increase their power whilst sharing and streamlining their efforts in demanding environmental justice. By so doing, the SDCEA will easily resolve the issue of air pollution like they did when resolving the issue of the dangerous dumping site in the South Durban area. The SDCEA must oppose the building of a new Chevron plant in the South Durban area since it will add further to pollution.

Community members should plant more trees and conserve existing plants so as to prevent the accumulation of high levels of carbon dioxide and other potentially dangerous gases. They should continue to join forces and exert more pressure on the people in power until their voices are heard, whilst at the same time keeping a healthy relationship between themselves and the people in power.

5.2.4 Recommendation for the Department of Environmental Affairs and the eThekwini Municipality

The Department of Environmental affairs and the eThekwini municipality should ensure that the industries abide by the laws governing the release of different pollutants by industries. This can be done by servicing, activating and taking data from the air quality monitoring stations. Even though the municipality releases an annual report about the emission of the pollutants by the industries, which shows that the emission is not dangerous to the lives of the community members in the South Durban basin, it should also listen to the people at grass root level. The reports always support the industries and ignore the suffering of the people in the South Durban basin due to air pollution caused by the industries.

Access to unpolluted air is a human right and the local government has the duty to protect the constitutional rights of the community members to a clean and healthy environment. This seems to not be happening in the South Durban basin because people have been suffering in this area since the apartheid regime. It is high time that the eThekwini municipality should carefully monitor the air monitoring device in the right way. They should be very strict and punish those industries who do not follow the rules regarding the emission of pollutants for the sake of the poor, powerless, voiceless and suffering community members of the South Durban basin. By doing so, they will not only be helping the people of the South Durban basin, but also the world at large. This is because the pollution they do not attend to contributes to global warming and climate change.

The EThekwini municipality should not have given a licence for the building of the Chevron plant in the South Durban area because it will escalate the problem of pollution that already exists. The licence should not have been given to Transnet too to transport oil to Johannesburg using underground pipes because sometimes there is a leakage in the pipes, which can have detrimental effects on the health of community members, as what happened before with SAPREF.

5.2.5 Recommendation for further studies

Studies that look at educators' experiences of air pollution in the South Durban basin are recommended. Studies should include educators who teach and reside in the South Durban basin. Getting more information on how air pollution affects teaching and

learning in schools and their experiences and understanding of air pollution is of vital importance in fighting for the good air quality of the areas surrounding industries.

5.3 CONCLUSION

The study revealed that there is a connection between local environmental problems and global environmental problems. This is evident in the issue of pollution and its effects in our environment and our communities. The struggle and pleading voices for clean air by the affected communities seem to be falling on deaf ears on the side of the industries, as well as Government. Even though a number conferences have been held in different countries, and numerous agreements have been signed, pollution is still and will remain an insurmountable problem because giant industries put profit before the health and wellbeing of the poor.

This study attempted to highlight the plight of the residents of the South Durban basin in fighting for their human right to quality air. It particularly gave a voice to the Grade 8 learners who participated in the study, and created a platform for their voices to be heard in this matter.

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APPENDICES

APPENDIX A PRINCIPAL'S CONSENT LETTER

Box X045
Inanda

4310

Re: Principal's consent for the study to be conducted at his school

Dear Colleague

As part of my course work in the faculty of Education at the University of KZN, I am requested to work in collaboration with the Grade 8 Natural Sciences learners in this research study. This study explores the use of photos and voices in Grade 8 classes in order to understand learners' experiences of pollution and its effects in their lives, with particular reference to the incident of the oil refinery of November 2007 in South Durban area.

I would like you to grant me permission to conduct the study in your school as I intend to work together with eight Grade 8 Natural Sciences learners. The study involves holding four meetings/workshops in your school (Merebank Secondary School) on the following dates: 30 October, 5 November, 13 November and 19 November 2008. Learners will be given disposable cameras which will be used to take photos that reflect their experiences and the effects of pollution in their areas.

No real names will be used in the write-up of the study and the actual data will only be used for study purposes. The learners participate at their own will and they are free to withdraw from the study at any point. I will do everything to guarantee the learners' anonymity and confidentiality. If you have questions, you may contact Dr Alant, 0836187027. I can be reached at 0833519677.

Yours sincerely

D.P. Magubane

Declaration

I _____ (Full name) hereby confirm that I understand the content of this document and the nature of the research project and I consent for the study to be conducted at Merebank Secondary School.
I understand that the leaners are at liberty to withdraw from the project at any time should they desire it.

Signature _____

Date_____

APPENDIX B EDUCATORS' CONSENT LETTER

Box x045
Inanda
4310

Re: Educators' consent for assistance in the study

Dear Colleague

As part of my course work in the faculty of Education at the University of UKZN, I am requested to work in collaboration with eight Grade 8 Natural Sciences learners in this research study. The study explores the use of photos and the voices in Grade 8 classes in order to understand learners' experiences of pollution and its effects in their lives, with particular reference to the incident of the oil refinery of November 2007 in South Durban area.

I would like you to assist me in choosing the sample of learners that I am going to work with, and also to be present in the meetings held with the learners at school. The learners I intend to work with are eight Grade 8 learners who live in Merebank. The study involves holding four meetings/workshops at Merebank Secondary School on the following dates: 3 November, 5 November, 21 November and 25 November 2008. Learners will be given disposable cameras, which will be used to take photos which reflect their experiences and the effects of pollution in their lives.

No real names will be used in the write up of the study, and the actual data will only be used for study purposes. The learners participate at their own will and they are free to withdraw from the study at any point. I will do everything to guarantee the learners' anonymity and confidentiality. If you have questions you may contact Dr Alant, 0836187027, and I can be reached at 083351967.

Yours sincerely
D.P. Magubane (Mrs)

Declaration

I _____ (full names) hereby confirm that I understand the content of this document and the nature of the research project and I consent to assist in choosing learners who will participate in the study and also to attend meetings held at school.

I understand that learners are at liberty to withdraw from the study at any time should they desire it.

Signature _____

Date _____

APPENDIX C PARENTAL PERMISSION LETTER

Box x045
Inanda
4310

Dear parent/ guardian

Re: Request for your child' participation in air pollution research study

A request is hereby made for your child_____ (name of the child) to participate in the above mentioned study to be undertaken at Merebank Secondary School on the following dates: 5, 13 and19 November 2008. Each meeting takes about an hour. The purpose of the study is to explore the use of pictures and voices in Grade 8 Natural Sciences classes in order to understand learners' experiences of pollution and its effects in their lives.

Learners will be expected to attend our which will be held at their school on the above mentioned dates. Learners will be given the disposable cameras so that they can take photos in their areas which reflect their experiences and the effects of pollution in their lives. Learners will be expected to bring photos so that they can be discussed in one of the meetings with the facilitator. All the meetings will be video recorded.

Learners who participated in the study do this in their own free will as they are not compelled to take part. The learners' real names will not be used in the write up and the actual data will only be used for study purposes. I will do everything to guarantee your child's anonymity and confidentiality. The learners who participate in the study can withdraw from the study at any point. I have spoken to _____ (learner's name) who have shown willingness to take part in the above study. If you have questions you may contact Dr Alant, 0836127027, I can be reached at 0833519677.

Yours sincerely
D.P. Magubane (Mrs)

Reply slip:

I, Mr/ Mrs/ Ms_____ hereby give/ do not give_____ consent for my child for participating in the above study as outlined in the above request.

Signature: _____ Date: _____

APPENDIX D SDCEA MANAGER'S CONSENT TO ASSIST

Box x045
Inanda
4310

Dear Sir

Re: Request for participation in the research study on air pollution in the South Durban area.

As part of my course work in the faculty of Education in the University of KZNA, I am expected to explore issues of pollution in the South Durban basin. A request is hereby made for you to participate in the above mentioned study. This will firstly be done by exploring learners' experiences of pollution with regard to the explosion in Engen refinery in November 2007.

I would like you to assist me in finding in-depth information pertaining to issues of pollution in the South Durban area, since the SDCEA works closely with community members, including learners. I would like us to hold interviews in the SDCEA offices.

If you have questions you may contact Dr Alant, 0836187027. I can be reached at 0833517796.

Yours sincerely
D.P. Magubane

Declaration

I _____ (full name) hereby confirm that I understand the contents of this document and the nature of the research project and I consent for assistance in giving the information on the issues of pollution in the South Durban basin.

Signature_____ Date_____

APPENDIX E LEARNER CONSENT LETTER

Box x045

Inanda
4310

Dear learner,

Re: Request for your participation in air pollution research study

A request is hereby made for you to participate in the above mentioned study to be undertaken at Merebank Secondary School on the following dates: 5 November, 21 November and 25 November 2008. Each meeting takes about an hour. The purpose of the study is to explore the use of pictures and voices in Grade 8 Natural Sciences classes in order to understand learners' experiences of pollution and its effects on their lives.

In this research, you will be expected to attend meetings, which will be held at your school on the above mentioned dates. You will also be given disposable cameras so that you can take photos in your area that reflect your experiences and the effects of pollution on your lives. All the meetings will be video recorded and the video cassettes will be kept in the University of KZN for five years and thereafter be incinerated.

You only participate at your own free will as you are not forced to take part in the study. No real names will be used in the final write up and the actual data will only be used for study purposes. I will do everything to guarantee your anonymity and confidentiality. You are free to withdraw from the study at any point. If you have any question you may contact Dr Alant, 0836187207, and I can be reached at 0833519677.

Yours Sincerely
D.P. Magubane (Mrs)

Declaration
I _____ (full name) hereby confirm that I understand the contents of this document and the nature of the research project and I consent to participating in the research project as outlined in the above request. I understand that I am at liberty to withdraw from the project at any time should I so desire.

Signature _____ Date_____

APPENDIX F THE QUESTIONNAIRE

NAME: _____

QUESTION: What is your experience/understanding of pollution with regard to the oil refinery incidence of November 2007?

APPENDIX G LEARNERS' RESPONSES TO THE QUESTIONNAIRE

PARTICIPANT NO. I.

My experiences of pollution on November 2007 when Engen oil tanker caught fire. On the evening of November 2007 at approximately 7h30 we experienced a severe storm, lightning struck the tanker of petrol consisting of at least seven hundred thousand litres of petrol. The lightning struck the tanker and the tanker caught fire and this really alarmed many people. People were requested to evacuate immediately in case of explosion of other tankers. Many people were affected by pollution that was caused by the burning petrol. The fuel, of course, was burning directly and the smoke was released right at the people. Many children got ill, approximately 24 people were rushed to hospital in order receive treatment, this was not very light treatment, and it was severe. Many of them had to be retained in hospital in order to be observed for their conditions. This had a negative impact on schools the following weeks. In fact it had to be closed.

Chemicals from the fuel were released into the air and settled on houses, cars causing damage to property, and children really lost out on school that specific week. Many pupils did not attend school and many were taken to hospital. People that worked in Engen , it had a negative impact on them, they had to go home, in fact they could not work because the bosses said they will not be safe. The petrol tanker took about one and half days to completely burn out. Many of the animals as well were severely affected, mostly the birds. You may not see it directly, but it is proven fact that you could see a reduced number of them, there were hardly any and this had a negative impact on the environment, and considering the other major polluters that surround Merebank area, and in fact the basin, you would know that as much as the other industries pollute the air we had the severe storm which also caused the tanker to come alight

After schools had been opened Engen did compensate for the loss specifically in Settlers Primary being at the foot step of the industry, it had really a negative impact on them. They did compensate, as I said, and they now have air monitoring systems at the school. They have also given them the computer room where learners could learn about air pollution, the effects, causes and precautions to take, such as using eco-friendly

products, doing more things responsibly. Being the learner at the school I know that as much as they regret everything that happened, the negative impact of their product outcome, they really try their best. I really feel that there should take or go one step further and use technology.

PARTICIPANT NO.2

On that particular day pollution brought worst fear. It was not like any other day. People got sick, most people practically live on asthma pumps. It is a must because the body has become dependent on the pumps just to keep going. That cost a lot of money because if you go to the local clinic with the problem of asthma people are expected to get their own money to get the treatment.

The refineries and Mondi are well established industries so it is going to be loss if it is closing down. You cannot move people out of the area because it is not going to work. Many people have invested the money in their homes here. There is a beach view.

PARTICIPANT NO.3.

I was attending the karate lesson. What I saw? I saw a huge amount of smoke coming to the air. I just went to my house. I told myself that I don't want to be sick because I was scared of suffocating. I did not know what to do. Fear got into me. The presence of the industries really affected people especially children at a young age are supposed to be playing sports but they don't because they suffer from respiratory problems. They cannot participate in everyday activities as opposed to a child in Johannesburg, they live a healthy life there. They have time to interact with people in sports. As for a child in our local area it is unfair to them because they are deprived of that privilege.

PARTICIPANT NO.4.

The oil refinery use a lot of chemicals substances when they are working and that affects our lives by causing asthma. Asthma is caused by the air pollutants that is released from the oil refinery. They pollute the air each and every day. Pollution affects our lives daily because we as human beings we pollute the air by burning fire and we had all different types of stuff such as plastic, rubber, branches of trees and leaves, paper etc.

Pollution is not only caused by fire, there are also caused by the following: dumping, ships release the oils into the water and that caused animal to die.

PARTICIPANT NO. 5.

My understanding of pollution is this:

- *Harming human life*
- *Destroying nature and the environment.*
- *Damaging property, e.g. houses etc.*

The concept of pollution is definitely a bad thing.

The incident of November 2007 was terrible. I live on the road directly across Engen refinery and when my family and I saw that oil tank burst into flames we were absolutely afraid of the fumes the burning oil tank was soon to release. Therefore we evacuated Merebank for the night. When we got back the next morning we were amazed to see the oil tank releasing a huge amount of black smoke. The tank was left to burn for about three days because it could not be put out with water. This was my experience of the incident of November 2007.

PARTICIPANT NO.6

On the 27 of November we cannot blame the refinery about the refinery about the severity of pollution but it occurred because of the storm. On that day I was at my cousin's graduation ceremony and someone told my dad that we should go and look outside, everyone was running to their cars. My dad said we should go and stay with his sister because of the smoke in the area and we had to leave and we were scared.

PARTICIPANT NO 7

On that day it was horrible because our health was a big concern. It was not the first time it happened. That affected many people. There was a guy from school, his sister was affected by smoke. Most of the people were like move or leave the area because of fear. The smoke affected people. Seriously. Those people who had asthma were wheezing.

PARTICIPANT NO.8

In November 19 2007 there was at Engen, there was a tank which exploded, in other words, lightning struck it and there was, I think, 30 000 litres of petrol. They could not put the fire. We had to wait for three days before it goes up itself. The residents were told that they must stay inside the houses and they should not come out. The people who stay there were really worried and some of the residents moved out of the place until the fire became studious because another explosion could happen. So, that is what happened and the policemen just instructed them to stay in the houses and some firemen. There is even more accidents that happene in Merebank just before that one. The accident of November 2007 was not the only accident that happened that year.

APPENDIX H EVALUATION FORM OF THE FIRST MEETING (5/11/2008)

NAME: _____

1. What did you like about the meeting?

   _____
   _____
   _____
   _____
   _____

2. What did you dislike about the meeting?

   _____
   _____
   _____
   _____
   _____

3. What did you learn?

   _____
   _____
   _____
   _____

4. Do you need clarification about any part of the study?

   _____
   _____
   _____
   _____
   _____

APPENDIX I RESPONSES TO THE FIRST FOCUS GROUP DISCUSSION

PARTICIPANT 1

1. What did you like about the meeting?
   It opened my eyes about how the explosions in the industries affect the lives of people in Merebank.

2. What did you dislike about the meeting?
   Nothing, in fact.

3. What did you learn?
   We should be vigilant and listen to what the firemen or people on the radio says so as to stay safe during the explosions.

4. Do you need any clarification about any particular part of the study?
   No.

PARTICIPANT 2

1. What did you like about the meeting?
   The one thing I liked was at the first meeting was everyone said something about how they were affected when the fuel tank caught fire in November 2007.

2. What did you dislike about the meeting?
   I did not dislike anything.

3. What did you learn?
   The one thing I learnt was there were more people that were affected by the incident of November 2007.

4. Do you need clarification about any particular part of the study?
   No.

PARTICIPANT 3

1. What did you like about the meeting?
   I enjoyed the fact that when questions were asked, the response was quite good because everyone had a comment and as well we understood we were all saying.

2. What did you dislike about the meeting?
   There was nothing to dislike about the meeting we had.

3. What did you learn?
   Everyone had their own ideas and concerns of pollution and as well as the night of the incident in Engen.

4. Do you need clarification about any particular part of the study?
   No.

PARTICIPANT 4

1. What did you like about the meeting?
   Really enjoyed the fact that everyone understood the problems that we faced in the area and we all had different experiences.

2. What did you dislike about the meeting?
   There was nothing to dislike.

3. What did you learn?
   I learnt that everyone had their own concerns on that night of November 2007.

4. Do you need any clarification about any particular part of the study?
   No.

PARTICIPANT 5

1. What did you like about the meeting?

   I liked that we got to discuss about air pollution in Merebank.

2. What did you dislike about the meeting?

   I do not have any dislike about the meeting.

3. What did you learn?

   I learnt about pollution in Merebank and precautions I need to take during explosions.

4. Do you need clarification about any particular part of the study?

   No, I was able to understand it with clarity.

PARTICIPANT 6

1. What did you like about the meeting?

   We were free to share what we experienced not in a classroom situation.

2. What did you dislike about the meeting?

   No, there is nothing I did not like.

3. What did you learn?

   I learnt that Engen compensate Settlers School when there is explosion because they are highly affected as they are close to Engen.

4. Do you need clarification about any particular part of the study?

   No.

PARTICIPANT 7

1. What did you like about the meeting?

   The fact that we shared our personal experiences about the problem of pollution we have in Merebank.

2. What did you dislike about the meeting?

   Nothing.

3. What did you learn?

   I learnt how explosions and pollution affect our learning and also how it affect our environment in Merebank.

4. Do you need clarification about any particular part of the study?

   No.

APPENDIX J CONTEXTUALIZING/ STORYTELLING

(21/ 11/ 2008)

NAME: _____

1. What do you see on the photograph?

_____
_____
_____
_____

2. What is really happening?

_____
_____
_____
_____

3. How does this relate to our lives?

_____
_____
_____
_____

4. Why does this situation or concern exists?

_____
_____
_____
_____

5. What can we do about it?

_____

_____

_____

_____

6. What is your message to people in power?

_____

_____

_____

_____

APPENDIX K CONTEXTUALIZATION (STORY TELLING BY THE PARTICIPANTS)

PARTICIPANT 1
Picture 1, 2 and 3
Question: What do you see on the photographs?

Picture 1*: A car exhaust.*
Picture 2*: Aerosol sprays and other chemicals.*
Picture 3*: Industries.*

Question: What is really happening?

Picture 1*: This is the thing here or an object that allows smoke from burned petrol or diesel to be released into the air causing air to damage the ozone layer. Smoke released from the car exhaust also trap the electronic surface.*

Picture 2*: These product are aerosol sprays which release chemicals that cause air pollution. Our lives are at risk because air pollution is a huge health hazard.*

Picture 3: *Industries are major air polluters, which is a huge hazard in the environment.*

Question: How does this relate to our lives?

The smoke released from car exhaust create hotter temperatures which result in many people, mostly elders having to suffer from stroke which can lead to death. This puts our lives at hold since bad health deprives you of doing numerous social, educational, and sometimes even mental activities. Our right to receive fresh air is violated and birds are scarce in the area.

Question: Why does this situation/concern exist

Workers to and from the refineries use cars and the community too use cars. The chemicals that are released into the air cause greenhouse effect. The chemicals trap heat and restricting it from escaping into space. The situation exists simply because of air pollution and the negative effect it has on our lives the presence of industries affect both human beings as well as animals.

Question: What can we do about it?

Firstly, we can make use of technology to solve the problem. By driving less or using vehicles if only necessary will also play an important role. You can also not drive a car for too long and switch it off. When I say by using technology, I mean by air fortification system that purifies smoke or the air that come out from the car exhaust. We should also monitor what we use and only use healthy products.

What is your message to people in power?

The message I would like to ask the government to solve this problem, is to use technology. Technology is a modern situation or problem solving that we can use with the industries. We can get the government to help produce air generators, which can be fitted on the chimneys outlet of the industries that actually release pollutants. Air generators can purify it into oxygen and release chemicals and the outcome of the product safely.

PARTICIPANT 2

Picture 1, 2 and 3

Question: what do you see on the photograph?
Picture 1*: The industries.*
Picture 2*: The lifeless potted plant.*
Picture 3*: The house.*

Question: What is really happening?

Picture 1: *The industries that are close to our community emit dangerous gases, which impact negatively on the lives of people who live next to industries and also those who work in the industries too.*

Picture 2: *Bad and harmful gases from the industries pollute air and also kill the plants. That also affect our environment because plants give us oxygen.*

Picture 3: *Pollutants and smoke from the industries make the house dirty and our parents do not have money to make that house clean every time.*

Question: How does this relate to our lives?

Industries emit smoke with dangerous gases and this affects the plants in the environment. This is not good because trees are important in our lives, and air

pollutants affect plants and will cause the shortage of oxygen This situation affects us financially because our parents have to buy paint every year since our houses are not looking good since pollution affect paint in houses.

Question: Why does this situation/concern exist?

The industries were built close to the houses so that workers could be close to their work place. Pollution destroys our environment because of the dangerous pollutants that are present in gases they emit. From the industries cause acid rain and acid rain damage paint in houses

Question: What can we do about it?

We should write to major industries and complain about the problem of pollution and also request that they play a part in manufacturing safely.

What is your message to people in power?

They should not take our lives for granted because we are sick of asthma.

PARTICIPANT 3

Picture 1, 2 and 3.

Question: what do you see on the photograph?

Picture 1: *Industries.*

Picture 2: *The cricket player.*

Picture 3: *The participant sitting in his room by himself.*

Question: What is really happening here?

Picture 1: *Industries that are found in our area release gases that affect our lives. Even though the presence of industries affect us negatively, but they also help our communities by sponsoring school science laboratories and computer laboratories. They also give us money whenever we get affected by explosions and flares.*

Picture 2: *I used to play cricket and I love it but I can no longer play it because I developed asthma.*

Picture 3: *I now prefer to stay indoors as I do not like to move around because of asthma attacks.*

Question: How does this relate to our lives?

Most of the people in this area are not working but they use their money in doctors because many family members are sick and some of us do not get the compensation from the industries. My dream of become a professional cricket player is gone because I no longer play cricket. I am very weak and cannot breath normally sometimes so, I survive with my asthma pump and that is why I prefer to stay indoors.

Question: Why does this situation/concern exist?

Most of the children with whom I played cricket do not play it any more due to health problems, they can no longer participate in sporting activities even if they are gifted in those sporting activities.

Question: What can we do about it?

Picture 1: *we should ask people in the most polluting industries to consider our lives, our dreams and our future by reducing pollution.*

What is your message to the people in power?

The NGOs should negotiate with the government and learn from other countries because there are countries with many industries but those industries do not pollute the environment.

PARTICIPANT 4

Picture 1, 2 and 3

Question: what do you see on the photograph?

Picture 1: *The tankers in the industries.*

Picture 2: *The residential area at night.*

Picture 3: *Water polluted by one of the industries.*

Question: What is really happening here?

Picture 1: *The tankers in industries sometimes cause accidents like the major accident which occurred in the Engen refinery in 2007. This accident affected us a lot because it occurred at night and most people were so confused about what to do. Most people also experienced the asthma attacks.*

Picture 2: *Most of the accidents in the refineries occur at night and people in our area experience sleepless night because we do not know when the next accident will happen. Flares and emission in the industries also occur at night.*

***Picture* 3:** *Industries also pollute nearby rivers by throwing waste in them. This result in the pollution of the sea since the rivers eventually end up in the sea.*

Question: How does this relate to our lives?

Fishermen are also affected because of pollution in the sea which result in the death of sea life.

Question: Why does this situation/concern exist?

The situation occurs because of many industries that pollute water in our area.

Question: What can we do about it?

We can ask the NGO to talk to the government about nature conservation otherwise all the sea organisms will become extinct

What is your message to the people in power?

The government and community organisations should talk to the industries in our area to stop polluting water or else should fine them if they continue polluting water.

PARTICIPANT 5

Picture 1, 2 and 3

Question: what do you see on the photograph?

Picture 1: *Industries.*

Picture 2: *Tankers in industries.*

Picture 3: *A car.*

Question: What is really happening here?

Picture 1: *Industries emit dangerous gases, which affect both living and non-living things. The residents are affected financially, emotionally and psychologically.*

Picture 2: *Tankers in the industries sometimes explode and those explosions affect our health and our school work because we have to stay indoors and not go to school.*

Picture3: *Different road transport add on pollution in our area. Many people who work and visit many industries in our area use cars and the emission from those cars add air pollution.*

Question: How does this relate to our lives?

It relates to our lives because the presence of industries in this area affect us a lot and no one cares about us.

Question: Why does this situation/concern exist?

Besides pollution and flares in the industries, there are sometimes explosions, which usually occur at night. These explosions affect us emotionally because most of us experience severe attacks and we get confused since we do not know how severe the effect and the damage might be.

Question: What can we do about it?

The non- governmental organisation and the community should work together and teach other community members the benefit of using public transport for the sake of the environment.

Question: what is your message to people in power?

High people in the industries should organise buses for their workers so that they do not use their cars to and from work. The government should watch the industries carefully if they follow the rules of emission of pollutants and if they do not follow those rules they must be closed totally because they are a health risk. The management of the refineries has to ensure that they hire skilled workers so as to avoid all the accidents that occur in the refineries.

PARTICIPANT 6

Picture 1, 2 and 3

Question: what do you see on the photograph?

Picture 1: *Polluted water.*

Picture 2: *Car also cause air pollution*

Picture 3: *The environment.*

Question: What is really happening here?

Picture 1: *Industries in our area do not only pollute air, they pollute water too.*

Picture 2: *Our community members as well as employers in the industries use cars trucks and buses in our area, and that also add in the problem of pollution.*

Picture 3: *The environment is no longer beautiful due to acid rain caused by the industries polluting air.*

Question: How does this relate to our lives?

Water pollution is also a serious problem in our area because it kills aquatic life which result in very bad odour. This affect our ecosystem since all aquatic plants and animals will in future be extinct. Even our environment is not beautiful anymore, trees, grass, flowers, all the flora, in our area does not grow properly, and does not show the beauty it is supposed to show.

Question: Why does this situation/concern exist?

Our environment is affected by pollution in the area.

Question: What can we do about it?

We should always remember to plant trees because they are important in our lives. The government and non-governmental organisation should teach people about the importance of trees so that people will be encouraged to plant more trees, under the circumstances

What is your message to people in power?

People in power like the government and the industries should buy trees for our community so that they can be planted during arbour day.

PARTICIPANT 7

Picture 1, 2 and 3

Question: What do you see on the photograph?

Picture 1: *Industries.*

Picture 2: *The participant at the school ground.*

Picture 3: *Industries with houses around.*

Question: What is really happening here?

Picture 1: *Industries are emitting smoke all the time, whether during the day or at night.*

Picture 2: *The participant is sitted with his friends in the school ground. They used to play during break time but now they cannot due to cardio-vascular problems they are faced with.*

Picture 3: *Industries in the South Durban basin are very close to the houses and that is why it is easy for community members to be affected by the chemicals from the industries.*

Question: How does this relate to our lives?

People in the South Durban area, young or old, cannot live their normal lives because of the health problems caused by air pollution in their area.

Question: Why does this situation/concern exist?

The people in power do not care about our lives, they are only interested in the tax paid by the giant industries.

Question: What can we do about it?

We should keep on demonstrating until our voices are heard.

What is your message to the people in power?

People in power should respect our lives and our right to clean air.

APPENDIX L FIRST INTERVIEW WITH THE MANAGER OF THE SDCEA (19/09/ 2008)

1. Who is SDCEA and where do you come from?

The alliance is an NGO, not for profit (eh), registered under the department of social housing. We have been in operation since 1996.(Ehm), we have sixteen organisations which make up the alliance, from the civil structures, rate payers, church based, conservationist, environmentalists, clinic committees across the areas from the tip of the Bluff right down to Wentworth.

2. When was this non- governmental organisation established?

We were formed in 1995 after Mandela came to South Durban to open up the expansion under the Engen refinery, and shortly after that we realised that fighting for pollution will make a great department because people were busy dealing with issues like housing, which are very much important and because pollution issues were not looked forward to struggle of for people in this country pre- 1994. So, we united to fight under one burner and we became highly structured, fighting for environmental justice under one burner.

3. Which industries maybe, as you said, you are fighting for environmental justice, which industries seem to contribute much on pollution in this area?

In the information that we gathered since 1995, (ehm), both the influence of structures and the influence of explosions and fires and also through the scientific data we find that the major pollution is caused by the major big refineries and other industries.

4. From your knowledge when you get the information from the community, what effect does pollution have in their lives, economically, physically and emotionally?

Remember, there is an explosion we got in the refinery and something of that sort. We find that people complained about respiratory problems, chest disorders, eyes are burning and basically there is a problem related to explosions. Subsequent to that we had scientific studies, one in 2002, and Settlers school study showed that learners and educators experience problems, 52% of them are getting illnesses, and through the campaign, we got the government to engage in health studies that compared four primary schools in South Durban, one in Lamontville, one in Merebank, one in Wentworth and one in the Bluff. They also gathered a sample of each school in Ntuzuma, Inanda, Newland East and Newland West and they found that the cancer rate was high around schools in South Durban and that asthma rate was escalating. It was also found that people were prone to mental illnesses in the South Durban communities. That is also done monitoring data over industries in South Durban and found that even at low levels, there has actually been there.

5. Besides health effects, what other effects does pollution have on things like plants?

The culture of life, in fact, is also affected. You find that while they are eating, they cannot enjoy good meals, they have to go out to enjoy good meal because it is a constant stinking area of chemicals. Secondly, you find that most of the house in the area, you got to re-paint your house every year. The action you got to do, you got to change your curtains, wash them once a week because of all the chemicals that come into the house. You also find that children are losing on quality education most of the time they are sick and they have to leave the school. You also find that the learning skills are dropping as well. The result is that they are bringing the children that are slow learners due to the chemicals in their area.

6. From what I read from the media, it seems as if the management of the refinery does not co- operate.

We had seven explosions in 2007 in that refinery. Maybe that one is the biggest and the reason why they continue to operate their plant in a cheap rate is that their families and homes, their families do not live around the refinery. Most of the senior managers are living 60km away, their families are enjoying fresh air. The second thing is that they are putting profit first so that they gonna provide huge profit for shareholders who are actually not based in South Africa. Most of the shareholders are overseas are just listed in the stock exchange market, so that shareholders do not know that the profit they are getting is based on the expenses of poor people and that poor people in South Africa are paying the price for them to earn a good profit and live better lives. The people who live alongside the facilities are dying of cancer, asthma, and leukaemia and they are not enjoying any kind of profit making. So, we have realised that we are paying the price and the time has come to say that these industries should move out of the area, should be relocated as they do not provide any benefit whatsoever.

APPENDIX M FOLLOW UP QUESTIONS ON EXPLOSIONS CAUSED BY THE REFINERIES IN THE SOUTH DURBAN AREA (SECOND INTERVIEW)

1. Do you in any way know what the circumstances were that led to the recent explosion and the fire in SAPREF, 17 April 2015?

The cause of the incident which took place on the 17 April 2015 was the explosion of the key pipeline carrying fuel along the Durban coast line. SAPREF was not willing to give SDCEA full report about what an exact cause of accident was. All further attempts of SDCEA to obtain full details of the cause of the accident were in vain even after urging the Durban city council to intervene.

2. Besides this recent explosion and fire, do you know of any other huge explosions that have occurred in both refineries since 2007?

ENGEN has more accidents than SAPREF. Things that are done by the refineries besides explosions range from the constant release of black smoke, dumping of the toxic chemicals to leaks on flare headers and the release of rotten egg smell.

3. Do you know what the circumstances were that led to these incidents (explosions).

Most of the accidents in both refineries are caused by the use of outdated technology and old pipes

4. In the article Beauty and the beast, by Suzan Galleymore in 20/2010, you are quoted as showing dissatisfaction with the use of the bucket system. What were/are your objections? Which method is being used currently? What method do you propose and why?

The method of using the bucket brigade to monitor air quality is reliable and effective compared to the to the municipality air quality monitoring stations. The air quality monitoring stations. The same air quality monitoring stations are good and reliable

equipment and used successfully in other countries. The municipality air monitoring stations are not trustworthy in our country because of the following reasons:

(a) Poor management of the stations in terms of looking after them and servicing them.

(b) They are not constantly checked if there are faults on them.

(c) They are sometimes not switched on

(d) The data is not constantly collected in the stations.

5. Subsequent to the health study which you initiated in 2002 that compared the effect of pollution in schools around South Durban area and those that are far from the industries, have there been any other studies of this sort in the South Durban area?

Yes, more health studies are done. The recent follow-up comparative study was spearheaded by the University of KwaZulu-Natal and was funded by eThekwini municipality. The aim of that study was to look at the relationship between respiratory problems that prevail in the South Durban area and the presence of the industries in the area.

6. If there were studies conducted, what were the findings?

The findings of the study continue to relate air pollution caused by the industries with the chronic diseases like asthma, cancer and leukaemia. This was not the case with the areas where air pollution is not so adverse.

7. Is there more evidence to pin down giant industries so that they acknowledge responsibility for air pollution in South Durban basin?

The evidence to pin down the giant industries to acknowledge responsibility for air pollution is there. The problem is the government that is too lenient to the refineries even though the government is aware that they do not abide and comply with the law that govern the emission of pollutants by the industries. In the past, industries were expected to shut down for six months so that proper fixing and servicing of the machines can be done thoroughly. In that period of shutting down there is no pollution and production. Recently, they close for at least two weeks and thorough servicing of the machines is not done. This is because the industries feel that shutting down for a period of six months will lower their profit.

These industries use old technology which cause abundant pollutants in the atmosphere. In the first world countries like Britain and Netherlands where they also have such refineries, they use the most recent technology and they do not experience the problem of pollution. This is because their government says once the industry exceed the acceptable limits and world standards they shut you down. This shows that technology can minimise or combat pollution. So, what the communities in South Durban area and the NPOs like SDCEA are fighting for is something that does not exist, it is only that our country lack law enforcement.

8. Since 2002, your demands have been relocation of the industries and not people, clean industries which create quality jobs. Have there been any changes to these demands since our last interview in 2008? If so, please specify?

Industries should not relocate. The only thing industries could do is to implement BAT. Industries should not relocate for the following reasons:

(a) Wherever they locate they will cause pollution unless they implement BAT.

(b) Employees in industries will lose their jobs if the industries relocate, they will not be able to feed their families.

(c) Relocation of industries will cause socio-economic constrain.

(d) Using BAT result in quality jobs because of healthy people working in industries, healthy people result in quality and prolonged lifespan.

9. Are other members of the community involved in the mobilisation of South Durban residents in your various causes? If yes, who are they and in what capacity are they involved?
    - What role have schools, particularly, Settlers Primary and Merebank Secondary, played in this regard?

Most schools in the South Durban area are invited in different campaigns to fight pollution in the area. SDCEA also organise different competitions and workshop so as to teach learners about pollution and the effects of pollution in South Durban communities

    - What role have school learners (from the above schools) played in this regard?

Learners of the South Durban basin are involved in different meeting and different campaigns which are aimed at demanding the industries to minimise pollution. Schools always welcome researchers who intend to do studies regarding the problem of pollution in South Durban basin using either the educators or learners, or both.

- What role have the parents (of learners from the above mentioned schools) played in this regard?

Parents serve as watchdogs in the community as they always inform the SDCEA about the flares and explosions in the area so that SDCEA can come and take samples. Parents are also engaged during the workshops and public meetings where air quality and different programmes are discussed.

Exclamation Translations

To whom it may concern

The thesis entitled "The use of photo-voice in exploring Merebank's Grade 8 learners' and Community Environmental Alliance's experiences of oil refinery pollution (2007 – 2015)" has been edited and proofread as of 29 March 2016.

Please take note that Exclamation Translations takes no responsibility for any content added to the document(s) after the issuing of this certificate.

Kind regards

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