Stakeholders' perceptions of environmental injustices and of community-based environmental education: A case study of the Stortplaats community in KwaZulu Natal

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By

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DECLARATION

I would like to declare that this work has never been submitted to any other institution. It is my own work. Academic contributions in this thesis from other people have been duly acknowledged and referenced. By submitting this thesis, I therefore declare that the entirety of it is my own and original work. I am the sole author of this work and any reproduction and publication by Durban University of Technology will not infringe any third-party rights.

Emmanuel Ndlovu

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ABSTRACT

The purpose of this study was to investigate stakeholders' perceptions of environmental injustices and of community-based environmental education at Stortplaats, in order to address the injustices through community-based environmental education. Environmental injustice is a phenomenon that entails the unfair distribution of environmental burdens, disproportionately exposing human life to environmental hazards. Communities in poor socio-economic circumstances are excessively exposed to negative environmental burdens such as sewage oxidation ponds, pollution, unprecedented land degradation due to sand poaching and inadequate infrastructure. Stortplaats faces such an oppressive environment. It was historically created by apartheid, but the current system seems to be paying minimum attention to corrective services. The stakeholder theory, environmental perception framework, place attachment theory and community-based environmental education model were used as frames of reference for this study. This study was informed by the interpretivist paradigm and the case study research design was adopted. A qualitative research approach was used. Convenience and purposive sampling were used to sample 25 participants who included five learners above 18 years, five educators, 10 community members, the chief, the community head, the councillor, a business person and the environmental health officer. Semi-structured individual interview schedules were utilised to gather data. These were complemented by photovoice narrations and indirect observation. A thematic data-analysis approach was used to analyse generated data. The key findings of the study indicate that apartheid contours are still visible at Stortplaats and post-apartheid promises have not been kept. The findings also show that some community members lack knowledge about environmental policies and this results in irresponsible environmental behaviour. There is also lack of effective communication between leaders and community members, leading to struggles for power and recognition and causing poor service delivery. Finally, the findings show a need for community-based environmental education to address environmental injustices in Stortplaats.

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INTRODUCTION AND BACKGROUND

1.1 Introduction

This introductory chapter provides understanding of environmental injustice and the purpose of the study. It provides an overview of the study by presenting the background to environmental injustice from global, regional, national, provincial and local perceptions. This is followed by the problem statement, research questions and research objectives. The significance of the study is discussed, followed by the delimitation of the study, limitations of the study, definitions of key terms and the summary and organisation of the thesis.

1.2 Background of the study

The existence of life on earth depends on the natural environment. Population growth combined with globalization have intensified the effects of humans on the natural environment resulting in some cases unprecedented environmental injustices such as land degradation, soil erosion, destruction of wetlands and unfair exposure to environmental disutilities. Environmental justice provides an alternative to the discourse of conservation by questioning the market's ability to bring about economic growth at the same time affirming the value of all forms of life against the interests of the powerful rich. It raises a challenge to the anodyne concept of sustainability and sustainable development and as result it has become a global concern. This is confirmed by the United Nations (UN) holding several conferences aimed at ensuring sustainable development and environmental conservation (Fuller 2014). To date it has held four mega environmental conferences focusing on environmental issues and environmental education:

1. In 1972, the UN Conference on the Human Environment, commonly known as the Stockholm Conference, was held. This was an international conference convened under UN auspices and was the first major conference on international environmental issues that marked a turning point in the development of environmental politics. The

conference considered the need for common principles to inspire and guide the peoples of the world in preserving and managing the environment.

2. The UN Conference on Environment and Development, held in 1992 in Rio de Janeiro, Brazil, is sometimes called the Rio Conference or the Earth Summit 1. This conference was held to reconcile worldwide economic development with environmental protection. Treaties signed at the conference led to the world's powerful nations nominally committing themselves to the pursuit of economic development and environmental protection. Agenda 21 outlined global strategies for environmental protection and responsible economic development.

3. The UN Session on Sustainable Development (Earth Summit 11) was held in 1997 in New York. This conference served as a review and an assessment of the effectiveness of the implementation of the key Agenda 21 components as the world moved towards sustainable development. The conference adopted a programme for further implementation of Agenda 21 and provided a forum for dialogue in building partnerships for sustainable development. To promote environmental protection, four stakeholders were identified, namely the state, the local communities, the corporate world and non-governmental organisations.

4. The World Summit on Sustainable Development was held in 2002 in South Africa. This summit was convened to discuss sustainable development and was held 10 years after the Rio summit. It was agreed to focus particularly on the worldwide environmental conditions that pose severe threats to sustainable development.

Subsequent charters, resolutions and declarations were intended to ensure continued progress in the protection of nature and habitats. Some of the resolutions on the environment and environmental education, dialogues, partnerships, charters and declarations that followed conferences are listed below: Stockholm Declaration (environmental safety and sustainable development), the Belgrade Charter (environmental education and environmental awareness), the Tbilisi Declaration (environmental education as key for environmental protection), Environment and Development Resolution of 14 June 1992 after the Rio Conference (Agenda 21); UN General Assembly Resolution 47/189 on sustainable development embodied in

Agenda 21; and the Barbados Declaration of the UN Convention on combating desertification, adopted in 1994 (UN Environmental Programme 2004).

In Africa the Green Belt Movement is an indigenous non-governmental organisation that was founded by Professor Wangari Maathai (Kenya) in 1977. It focuses on environmental conservation, community development and capacity-building through community empowerment and education. The community empowerment and education programmes are meant to encourage individuals to examine why they lack interest and agency to change their environmental circumstances. In Kenya and the Democratic Republic of Congo (DRC) communities have begun to understand that they had placed much trust in their leaders instead of working for the common good of their natural resources (Demaster and Malin 2016). South Africa also integrated the component of environmental protection in its constitution. The South African Bill of Rights, Chapter 14 and Chapter 6 of the National Environmental Management Agency (NEMA) and National Environmental Management: Biodiversity Act 10: 2000 are not silent about the issues of environmental injustice (Republic of South Africa 2000).

1.3 Concept of environmental injustice

The term environmental injustice emerged around the 1980s in the United States of America (USA) (Carl 2011). The concept was used to highlight the unfair distribution of environmental burdens and disutilities such as sewage treatment ponds, landfill zones and construction sand mines among the economically poor and marginalised people (Carl 2011). Environmental injustice therefore describes the increased possibility of exposing poor and marginalised people to environmental hazards.
Ironically, those who are socio-economically disadvantaged carry the higher burden of living with these environmental disutilities, while having less access to adequate infrastructure (Dominelli 2013). The cases of low-income communities of Warren County, Kettleman City, California and Boston that were disparately exposed to risk pollutants of industries in the USA during the latter part of the twentieth century testify to that effect. Through protracted effort by the affected and environmental justice organisations, these problems were rectified (Patel 2009). Kelbesso (2012) identifies several environmental injustices in Africa. These include the environmental pollution

caused by the exploitation of oil in the Niger Delta as a cause for concern among environmentalists. Ghana has become a victim of toxic materials by accepting the importation of electronic waste (e-waste) from developed countries (Fuller 2014). Environmental injustices caused by improper solid waste management in Kinshasa in the DRC is also cause for concern (Kelbesso 2012). The Mau-Mau revolts from the 1920s to the 1950s in Kenya were triggered by environmental injustices among poor and marginalised communities (Hayanga 2006; Muigua and Kariuki 2014). In South Africa, in the province of KwaZulu-Natal, South Durban is an industrial basin that houses over 120 industries, including two oil refineries and several toxic land-fill zones (Whitaker 2001). It is no coincidence that poor communities of coloured, Indian and black origin reside in this place and inhale toxic industrial fumes (Whitaker 2001). In order to deal with these environmental injustices, emphasis is put on the need for understanding the contexts of the existing environmental conditions and deal with the structural backgrounds that created them (Powers and Nsonwu 2020).

In South Africa, unequal and oppressive environmental conditions were deliberately created under an apartheid system of governance, and those effects persist to this day (Dominelli 2013). There is growing concern among South Africans, particularly those who were once marginalised, about systemic social transformation that would meet basic human needs and enhance the quality of life in the areas of the economy, health and education. Environmental issues form part of a litany of complaints demonstrated by a series of civil protests (Jacobs 2016). The concept of environmental protection has become a social justice issue and communities seek to challenge the abuse of economic power, which results in poor communities having to suffer the effects of environmental disutilities (Dominelli 2013). The motivation to protect the environment should come from statutory instruments as outlined by the South African Constitution, but enforcement as observed by scholars is weak and this makes environmental litigation almost impossible (Toili 2007; Carl 2011; Fuller 2012; Schlosberg 2013).

1.4 The study site

The name of the study site is Stortplaats (Afrikaans word for dumping site). This is a pseudonym; the real name of the community was withheld to avoid ethical challenges.

The sensitivity of the study in the area was highlighted by a respected academic and educator who lives in the village. It is for this reason that no map of the place was provided, to safeguard the anonymity of the place and the stakeholders who participated in the study. This rural community with a population of just over 10 000 members is located north-west of Durban in the province of KwaZulu-Natal in South Africa. The community members in this area predominantly work at menial jobs and practise subsistence farming (SA Stats 2011). The local river is the main source of water for the village's livestock and any sewage and sullage discharge into this river causes eutrophication (excess nutrients in water bodies) that results in the reduction of aquatic bio-diversity. The economic activities are mostly subsistence and informal in nature. The area covers about 16.3 km^2 and is serviced by three primary schools and one secondary school. The main stable jobs available within Stortplaats are for civil servants such as educators and health service providers. The predominantly black (99.7%) population of slightly above 10 000 comprises 54% females and 46% males (Stats SA 2016). Most members of this community depend on social grants, meaning that they are not gainfully employed (Stats SA 2011; Stats SA 2014). The village is located adjacent to a middle-class township, which is, contrary to Stortplaats, well serviced with up-to-date facilities such as clean water, functional sewage and a garbage disposal system. The settlement patterns are randomly organised, which makes it difficult for the local authorities to plan proper roads and sewage networks (Ndlovu 2015). Most of the houses are traditional structures and mud houses, exposing inhabitants to lead metal inhalation.

This area is a site for numerous environmental burdens and disutilities such as sewage treatment ponds and refuse dumps (South African Cities Network 2011; Ndlovu 2015). Sand poaching by building contractors is very common in the area, causing unprecedented land degradation. This village is serviced by a single tarred road and most of the roads branching among homesteads are unpaved and dusty, thus exposing the community to dust pollution and lead metal inhalation, posing a health risk (Mathee 1996; Sarker, Bingxin, Sultana and Prodhan 2017). Industrial and farm wastes are discharged into the local river, which is the main source of water for the village's livestock. The sewage treatment ponds produce an unbearable odour to which the community is perennially subjected and the irony in this case is that the

community does not have water-carriage system toilets; instead pit latrines are used. Local residents and those from nearby middle-class suburbs use a designated area at Stortplaats as a garbage dumping zone. Garbage piles up for months and rots without being collected and this becomes unsightly and creates a good habitat for mosquitoes and rats. The smell coming from this dumping zone is also unbearable (Ndlovu 2015). Such environmental injustices are unacceptable, as severely affected communities often face consequences in the form of health risks that have long-term implications (Carl 2011). The details of these environmental injustices existing at Stortplaats are given below.

1.4.1 Environmental injustices at Stortplaats

In South Africa the pre-democracy dark age of apartheid promoted the deliberate distribution of environmental hazards or risks among groups that were discriminated against, such as coloureds, blacks and Indians. In the post-1994 era, the apartheid contours are still visible; in some cases economically disadvantaged people still bear the brunt of environmental disutilities (Stull, Bell and Ncwadi 2016). There has been a shift from racial environmental discrimination to economic environmental discrimination (Sarker *et al*. 2017). Stortplaats is an example of a place that is beleaguered by environmental problems.

1.4.2 Sewage treatment ponds

The location of sewage treatment ponds by the municipality at Stortplaats, a rural village that does not directly benefit from the plant, is an environmental concern and an environmental burden to the community. When chemicals and organic matter at a sewage treatment plant are puddled, splashed and air-stripped, they become air-borne. Coliform microbes living in human excreta and faecal droplets are released into the atmosphere and if these pathogens are inhaled by humans, they cause gastro-intestinal disorders, skin and respiratory irritations (Coovadia 2009). Common symptoms manifest in the form of skin and retinal infections and in an extreme form may damage the central nervous system and cause depression.

Furthermore, long-term exposure to sewage-polluted air has permanent health effects such as accelerated lung aging, reduced lung capacity and the development of lung diseases such as asthma, bronchitis and emphysema (Mathee 1996; Anton and Lawrence 2016). Besides temporary health-related effects such as nausea and temporary headache, odour is a nuisance and a bother. The South African Constitution is not silent about environmental injustices. The Bill of Rights section 18A assures everybody of an ecologically safe environment and that no community shall house any environmental burdens because of its race or economic status (Republic of South Africa 2000).

1.4.3 River pollution

The local river that runs through the Stortplaats community is the major source of water for the entire village's livestock entertainment and fishing. The old, rusty sewage pipes sometimes burst, discharging raw sewage into the river. There are also cases of industrial and farm wastes that are discharged into this local river, causing eutrophication (growth of algae because of excess nutrients in water bodies), resulting in the reduction of aquatic bio-diversity and affecting the stability of the ecosystem negatively (Powers and Nsonwu 2020).

As river pollution increases, aquatic bio-diversity decreases. This results in an increase in species with reduced dissolved-oxygen demand, thus upsetting the aquatic ecosystem. This will then trigger a rise in the population of pollution-resistant insects such as chironomid midges, which can spread most poisonous metallic elements such as lead and cadmium to secondary consumers such as fish and humans (Anton and Lawrence 2016). Excessive exposure to these lethal substances in humans inhibits anti-oxidant activity, which prohibits natural detoxification. Reduced detoxification in the body of an organism causes cell malfunctioning, at the same time disrupting the regeneration of tissues and thus reducing the volume of erythrocytes (oxygen-carrying blood cells). Carl (2011) stresses that an accumulation of lethal metals in humans affects the detoxifying organs such as the kidney and the liver, resulting in histo-pathological lesions (reduced organ size). Besides the physiological effects of water pollution mentioned above, the endocrine system is not spared. The hormonal system

is disrupted, reducing an individual organism's ability to reproduce (Jameson and Jia 2012; Powers and Nsonwu 2020).

1.4.4 Refuse dumps at Stortplaats

Stortplaats accommodates sites for garbage dumping defined by the local community and community members from the nearby suburb and industries. Garbage refers to any material produced through human activity that can be described as valueless, unwanted, useless and superfluous (Gouveia 2010). This is then dumped somewhere and is expected to be collected often by the municipality for landfill zones, composting or recycling. Garbage sometimes piles up for months and rots without being collected. The smell coming from this dumping zone is also unbearable and causes lung aging (Mathee 1996). Decomposing organic matter at the dumping site results in the formation of leachates, which may infiltrate the soil and contaminate ground water. Besides polluting the soil, decomposing matter releases asphyxiating fumes and gases that cause air pollution. Gouveia (2010) explains that there is a close relationship between living near a garbage dumping area and health-related complications such as liver disorders, prostate and pancreatic disorders. Congenital abnormalities such as low birth weight, neonatal deaths and abortion are also associated with nearness to dumping sites.

Many people, including women and children, are often seen salvaging and scavenging on garbage dumps at Stortplaats (Ndlovu 2015). Every day they wade through refuse, scavenging for scrap metal, broken glass and plastics that could help them earn a living. For some children, this site has become a recreational facility where they meet to play (Whitaker 2001). This is a cause for concern and constitutes environmental injustice.

1.4.5 Sand poaching and land degradation

The high unemployment rate at Stortplaats, which is estimated to be averaging between 40% and 60%, has given rise to construction sand poaching (Stats SA 2011 and 2014). Unemployed youths are frequently seen loading trucks with sand in order

to earn a living. These trucks carrying loads of river sand can be seen daily plying the network of dusty roads at Stortplaats. Pit sand and river sand called *umngeni* are used for building and brick-moulding purposes. Digging of holes in search of sand is causing damage to fauna and flora in the area. The gullies that are left open after extracting sand are a death trap for livestock, which often fall into those empty pits. Furthermore, during the rainy season the pits provide a breeding place for vectors such as mosquitoes, thereby increasing the threat of malaria (Whitaker 2001).

Sand poaching leaves the soil bare and susceptible to agencies of erosion such as wind and run-off. Runoff causes severe soil erosion and wind erosion causes air pollution. Furthermore, in-stream sand mining that is common along the local river at Stortplaats causes river degradation (Hastaoglu, Berktay, Alnaizy, and Kocabas 2015). It lowers the bottom of the stream, leading to bank erosion. The depletion of the stream-bed deepens rivers and that becomes a threat to bridges and people who cross the flooded river regularly (Schlosberg 2013).

1.4.6 Mud houses and unpaved roads

Stortplaats settlements consist mainly of traditional mud houses. In 1994 the South African Rural Development Project classified mud houses as an environmental hazard as they expose occupants to lethal lead pollution (RDP 1994). The project further explained that the persistent inhalation of dry-wall dust irritates airways and the throat, resulting in regular coughing and difficulty in breathing. Dusty roads contribute immensely to air pollution, further exposing the villagers to health-related risks. People with compromised immune systems are vulnerable and likely to manifest symptoms such as those of asthma after inhaling dust (RDP 1994; Government Gazette 2018).

1.5 Community-based environmental education

Community-based environmental education is an activity that seeks to enhance a community's wellness through thoughtful and reasoned environmental action. It fosters collaborative environmental learning and environmental action, taking into account the social, cultural, economic and environmental conditions in the community.

Anton and Lawrence (2016) identify community-based environmental education as a means of developing positive environmental perceptions that heighten public environmental concerns. It is based on the following three principles:

- It uses environmental learning and action to foster and promote community wellness.
- Learning is social and encompasses a diversity of educational theories, all of which focus on active participation.
- Stakeholder community culture, place attachment and environmental perception are historical frameworks that are useful in understanding community-based environmental education.

The environmental injustices at Stortplaats are not only a social menace or cause for concern, but a reflection of a socio-political system that neglects the economically disadvantaged. It is anticipated that the research will provide all stakeholders with an opportunity for expressing their views about environmental injustices, at the same time forming a basis for negotiations between the affected people, business and policy-makers through community-based environmental education. Community-based environmental education would then trigger interconnections between social, ecological, economic, cultural and political matters, enhancing critical creative thinking skills. It could be used as a tool to bridge and mediate the human-nature relationship and raise awareness of human-caused environmental problems. Community-based environmental education is fundamental especially among marginalised and poor communities, as it heightens enthusiasm and imagination among community members through interactive learning (Fuller 2012). It also invokes creative and critical thinking, bringing together community members, thus promoting unity of purpose. This thesis argues that the environmental justice ideals must be foregrounded within community-based environmental education. Extensive community-based environmental education would generate a kind of motivation that ushers in new, positive environmental behaviour. Classroom implementation of environmental education has been limited to basic understanding of functional environmental literacy, with less focus on transforming the cultural and critical understanding of the environment (Schlosberg 2013). The educators argue their failure to implement the environmental curriculum in South Africa by citing lack of time and lack of resources. Above all, the

subject is non-examinable and simply an add-on (Stull *et al.* 2016). Community-based environmental education is informal and not limited to knowledge, literacy and awareness, but also includes the acquisition of values and attitudes that would inculcate environmental appreciation (Government Gazette 2018). It encourages community members to act responsibly and collectively in order to reduce environmental problems (Rambaree, Bald and Backlund-Rambaree 2020).

Community-based environmental education is a product of scholars such as Hungerford, Peyton and Wilke (1983) who saw the importance of designing corrective and preventive measures that would put a halt to the deterioration of the environment (Toili 2007; Hastaoglu *et al.* 2015). This desire was initiated by the UN in 1972 at Stockholm. A follow-up UN Education, Scientific, and Cultural Organisation-UN Environment Programme (UNESCO-UNEP) workshop in 1975 at Belgrade provided a framework for spreading environmental literacy. The main objectives were to foster environmental awareness, provide opportunities for acquiring environmental knowledge and create behavioural patterns that are not harmful to the environment (Schlosberg 2013). In 1977 the world's first intergovernmental conference on environmental education was organised by UNESCO in co-operation with UNEP and was convened in Tbilisi, Georgia (USSR) and in 1992 at the UN conference at Rio de Janeiro, Agenda 21 proposed that environmental education should not be limited to the classroom but spill over into the communities (Richter and De Sousa 2019). Scholars such as Hungerford, Peyton and Wilke (1983) were instrumental in facilitating the birth of environmental education. They came from a positivist background, hence their emphasis was on behavioural change to save the environment (Hungerford, Peyton and Wilke 1983). Sarker *et al*. (2017) opposed the behaviouristic approach to environmental education and recommended a socially critical approach that would be based on education about the environment, education through the environment and education for the environment. That translates into community-based environmental education and is meant to heighten enthusiasm and imagination among participants, as it is grounded in community interactive learning. It also invokes critical and creative thinking, which helps participants to identify and develop strategies that could be used to reclaim the environment (Rambaree *et al.* 2020). In Stortplaats, community-based environmental education would promote unity among community members by bringing

them together for the purpose of addressing the environmental injustices affecting them. A community-based environmental education model would be used as a means of creating an environmentally literate community that can engage intellectually in formulating people-based environmental policies and strategies.

1.6 Stakeholders' perceptions

The study of stakeholders' perceptions about the environment forms the basis for understanding attitudes that may lead to certain environmental behaviours (Hungerford and Volk, 1990; Fishbein and Ajzen 2010). Jacobs (2016) identifies environmental perceptions as the people's response to external stimuli regarding the environment, where a person registers an opinion and assesses it. After an assessment, attitudes develop. The attitudes that develop after continuous assessments then form a cultural stance toward a situation or process (Liefländer and Bogner 2018). Fishbein and Ajzen (2010) posit that people's perceptions about an environmental problem are more likely to have an impact on their environmental attitude, awareness, concern and behaviour than the real problem. These perceptions of environmental injustices become the departure point for any analysis of people-environment relations. Schaffrin (2011) states that environmental concerns have a strong impact on environmentally friendly behaviour, such as actively participating in environmental conservation programmes, recycling, terracing, planting trees and preventing environmental degradation. These concerns demonstrate how aware people are of environmental issues and to what extent they support efforts that could solve or alleviate environmental injustices.

People who are aware and concerned about existing environmental problems in their area develop greater sensitivity to their environment, leading to a stronger sense-of-place bond. This will be discussed in detail later (Kay and Tisdall 2012).

Scholars have struggled to explain the reason for environmental perceptions, because many studies exclude some variables (Guth, Green, Kellstedt, Smidt and Guth, 1995). For instance, two people could explain the same level of environmental concern differently. In this study environmental perceptions are classified into two sections, namely psychological factors and socio-demographic factors (Jacobs 2016).

Psychological factors are perceptions about the environment and socio-demographic factors are linked to environmental perceptions and behaviours.

Psychological environmental factors affect the relationship between people and their physical environment (Guth *et al.* 1995). Specific aspects of the psychological factors require people to work together to identify a problem and discover a solution to that problem. Therefore, environmental psychology is problem-oriented. Solutions to environmental problems identified by community members promote commonality within the society and create a wealth of knowledge about the workings of society (Rambaree *et al.* 2020).

It is therefore important to understand that some people are more likely than others to make personal sacrifices in protecting and sustaining the environment (Jacobs 2016). Therefore, there is a need to understand the implications of human perceptions in influencing the management of environmental problems through policies (Fishbein and Ajzen 2010). Conventional wisdom posits that environmentally knowledgeable people will have more positive attitudes to stewardship of the environment than less exposed individuals (Guth *et al.* 1995).

1.7 Motivation for the study

The environmental problems caused by human activities have been the subject of discussion in the contemporary world; at the same time the idea of environmental responsibility is gaining ever greater relevance (Ansell 2009; Boesak 2015; Bonds 2016). Increased populations, urbanisation, industrialisation and discharge of waste materials have caused severe, unsustainable environmental problems that demand urgent people-based solutions (Schaffrin 2011). The resulting physical changes to the environment are relatively well known, but the effects are generally not appreciated because of limited effective community-based environmental education programmes (Ansell 2009).

A large body of scientific research about environmental problems and environmental injustices articulates the effects of these issues on fauna, flora, health and food

security, but little is said about how the affected communities could actively participate in resolving these environmental injustices (see for example Fuller 2012; Johnson 2012; Rambaree *et al.* 2020). Thus, this study sought to ascertain the perceptions of Stortplaats stakeholders about environmental injustices and addressing these through community-based environmental education programmes. Most studies about addressing environmental injustices through community-based environmental education focused on the perceived drivers of the programmes without paying attention to the perceptions of the affected people and taking into account cultural or geographical differences (e.g. Anderson 2015; Burke and Pinnegar 2015). This study focused on the perceptions of stakeholders who are directly affected by the environmental injustices and sought to find people-based programmes of community-based environmental education that could be used to address the environmental challenges. Furthermore, some studies (Fuller 2012; Johnson 2012) concentrated on known environmentally concerned individuals, that is, volunteers and environmentally active non-governmental organisations, but this study allowed the outflow of perceptions from the resident community members regarded as the stakeholders.

There were also personal and emotive reasons that influenced the researcher to conduct this research. Those reasons were informed by my own experiences as a professional and an ordinary citizen. The researcher lives and works at Stortplaats and in addition to that he grew up in a segregated society where there was total spatial dispossession for minorities. The researcher understands marginalisation, and understands the pain of being silenced and muted. The researcher knows what it is to be discriminated against and understands the pain of being trivialised. The researcher witnessed a situation where the voices of the minorities were left out in any legislative processes. These experiences created a strong conviction in him that one day he has to expose any form of injustice against the poor and marginalised. The only effective weapon that can be used for the emancipation of environmentally disadvantaged communities is community-based environmental education and that is detailed in the subsequent chapters.

The researcher's desire and passion to make a change was ignited after learning about the effects of environmental oppression and how scholars could bring about environmental liberation through research. The researcher learned that it was naïve to

think that environmental education should be confined to the four walls of the classroom. Instead, community-based environmental education has the capacity to make a difference, as it provides community members with an opportunity to participate in the process of redressing environmental disparities.

When confronted with the real forms of environmental injustice in Stortplaats, one is filled with a sense of unease and powerlessness in taking any action that would contribute to the eradication of these injustices. At the same time, not trying to make a difference is unfair and unjust. This then became an impetus for how I began to conceptualise this research. My intention with this research was to contribute to socio-political reframing and to redefine the story of the environmentally marginalised, using community-based environmental education.

1.8 Statement of the problem

Although there are many studies which were done on environmental perceptions outside Africa, very few were carried out in developing countries such as South Africa. The paucity of research literature on the stakeholders' perceptions of environmental injustices and of community-based environmental education suggests the need for an exploration of these issues (Powers Nsonwu 2020). Disadvantaged and marginalised groups of people are more often exposed to environmental injustices than socially advantaged groups and Stortplaats is one good example. The Stortplaats community is subjected to inhuman environmental conditions such as sewage treatment ponds, unprecedented land degradation and garbage pile-up, which could all be classified as environmentally unjust. It is recorded that such disproportionate division of environmental burdens has a severe impact on the overall functioning of the affected communities (Tammi 2019). Such environmental issues threaten particularly the health of people living in such areas. Dominelli (2013) acknowledges that people, especially children, residing in toxic environments are at risk and sometimes suffer numerous health complications such as cancer, asthma, lead poisoning and attention deficit disorder, contributing to poor performance at school. Patel (2009) posits that in South Africa, over 13 million children and adults are disproportionately exposed and affected by environmental hazards. This unfortunate reality exists at Stortplaats, an

area in the province of KwaZulu-Natal. The question deliberated today is why people face such unprecedented environmental problems, 25 years after the advent of democracy. Are these environmental problems still embedded in the contours of apartheid and a reflection of the past policies or do the current system and the affected communities lack the understanding and desire to eradicate the disparities? This study explores the perceptions of stakeholders about environmental injustices and addressing these through community-based environmental education.

Stortplaats is plagued with a large number of environmental injustices, which include sewage ponds that cause a pungent smell, a temporary site for garbage, river pollution due to industrial and farm discharges, sand poaching resulting in severe land degradation and unpaved roads causing dust pollution. It is important to understand the perceptions of stakeholders about these environmental injustices when contemplating community-based environmental education. Failure to understand the perceptions of those affected by environmental injustices would result in strategies that deal with the symptoms rather than dealing with and eradicating the root causes of these injustices.

1.9 Aim of the study

The primary aim of this study was to investigate the perceptions of Stortplaats stakeholders about environmental injustices and of community-based environmental education and addressing these environmental injustices through community-based environmental education. Over the past decades, protection of the environment has become a major social issue and an important assignment in academic research (Kulozu 2016). Perceptions of an environmental problem determine environmental attitudes and behaviour (Akintunde 2017).

1.10 Research questions

The main research question of this study was: What are the stakeholders' perceptions of the environmental injustices at Stortplaats and of community-based environmental education as a strategy to address them?

The following research sub-questions were pursued:

1. What are stakeholders' perceptions about the environmental injustices existing at Stortplaats?
2. What are stakeholders' perceptions of the causes of environmental injustices existing at Stortplaats?
3. What are the factors that influence stakeholders' perceptions about environmental injustices at Stortplaats?
4. How could the stakeholders' perceptions be translated into community-based environmental education strategy that could be used in order to address the environmental injustices at Stortplaats?

1.11 Research objectives

The main research objective of this study was to investigate the stakeholders' perceptions of the environmental injustices at Stortplaats and of community-based environmental education as a strategy to address them.

The following research sub-objectives were addressed to:

1. Understand stakeholders' perceptions about existing environmental injustices at Stortplaats,
2. Determine the stakeholders' perceptions of the causes of environmental injustices existing at Stortplaats,
3. Explore the factors that influence the stakeholders' perceptions about the existing environmental injustices at Stortplaats,

4. To investigate Stortplaats stakeholders' perceptions of community-based environmental education as a strategy to address the environmental injustices at Stortplaats?

1.12 Significance of the study

A wide range of research on environmental injustices globally and in South Africa in particular is discussed in depth and evidence is represented during the course of reviewing the literature (Bullard 1990; Eagleton 1991; Brulle 2006; Schlosberg 2013). This research study was grounded on the premise of its expected academic knowledge contribution to the concept of environmental injustice and community-based environmental education.

1.12.1 Contribution to existing literature

This study will widen and expand the existing literature and provide a basis for further research, thus extending the boundaries of the concept. Although this research is a single-case study limited to a rural community, observations and conclusions will be useful for community members, scholars, policy-makers and local leadership. The study further provides the link between environmental problems or injustices and intervention strategies in addressing these environmental injustices and problems. Based on the study results and observations, researchers may develop theories or models that might be useful in addressing environmental injustice.

1.12.2 Community members

Stakeholders participating in a study are in a way contributing to the care, preservation and conservation of the environment. They might have had different reasons and different expectations for wanting to be involved in the study, but benefits observed include a sense of empowerment and an increase in environmental knowledge that came about as a result of the study. Increased environmental knowledge may lead to better environmental advocacy through community-based environmental education study participation. This sense of empowerment not only serves as an indirect benefit

to the stakeholders, but indirectly aids in bridging the existing environmental disparity gaps. Moreover, increased environmental knowledge is necessary for sustainable development. Environmental knowledge is a powerful tool that is not only beneficial to the participant, but also linked to an increase in positive environmental attitudes and behaviours (Devine and Wright 2011).

1.12.3 Business community

An understanding of environmental injustices by the business community, particularly those involved in environmental actions that contribute to these injustices, promotes responsible environmental behaviour. Pro-environmental behaviour or responsible environmental behaviour demonstrates that an individual is aware of environmental problems and their causes. The person has to know how he or she has to act to reduce the impact of those environmental problems or injustices. With this understanding an individual's perception of whether he or she has the ability to bring about environmental change through his or her own environmental behaviour develops. Business people or sand sellers with proper environmental knowledge understand that their actions could bring about change and those with limited environmental knowledge believe that their environmental actions are insignificant, and feel that environmental change can only be brought about by those who are in positions of power (Devine and Wright 2011). Responsible sand sellers would not take part in environmental activities that are destructive to the environment.

1.12.4 Community leaders and policy-makers

The relevance of community-based environmental education as a transformative vehicle that could be used to bring about environmental justice and equity is at stake. Environmental justice and community-based environmental education have a long historical tradition that can be traced back to biblical times when God advised Adam to till the land and look after it. What the literature reveals is the contestation of the definitive meanings of environmental injustice and how community-based environmental education could be implemented as a means of bringing about environmental justice and equity. In the South African context, environmental injustice

should not be limited only to unfair exposure to environmental burdens because of race, colour, national origin or income; the definition must be broad and inclusive, encompassing the policy failure to include the voices of the affected. As a result, any meaningful redressing of environmental injustice must include sound participation in environmental decision-making policies. It must also include recognition of cultural differences and local knowledge. Failure to acknowledge the existence of minority groups creates a socially dominant group and all the privileges begin to centre on that group, creating the potential for discrimination. This is usually followed by siting all disutilities in minority-dominated areas. Simply removing the environmental hazards in an area does not constitute environmental justice, because that does not redress culturally embedded beliefs. Literature suggests that the use of a transformative vehicle such as community-based environmental education could bring about environmental justice and sustainable development. Community-based environmental education promotes full participation in making environmental decisions, at the same time offering community members opportunities to construct behavioural codes that would ensure environmental quality (Lee 2010).

Community-based environmental education programmes are not merely intended for information dissemination, but also entail well-organised transformational activities that emphasise the critical establishment of relationships between man and the environment (Chunrong, Wesley and Satish 2014). They are a means through which new environmental identities and values of the community are created and re-established. They offer affected communities opportunities to play double roles, that is, as part of the problem and part of the solution (Coeho-Neto 2013).

According to Anton and Lawrence (2016), understanding people's perceptions about environmental issues and problems is important for policy-makers, stakeholders and community leaders in the following ways:

- Perceptions of the environment and environmental injustices may indicate the actual environmental problems when compiling objective data.
- Perceptions influence the initiation of participatory activities intended for environmental conservation.

- Perceptions of environmental issues and nature influence change in a person's environmental attitude and behaviour.
- Perceptions expose the gaps and deficiencies in environmental knowledge.

In the research world, understanding of stakeholders' environmental perceptions have the following benefits:

- Understanding stakeholders' environmental perceptions contributes to the rational knowledge of ecosystems.
- Understanding stakeholders' environmental perceptions encourages community involvement in development and planning for more effective implementation of environmental policies.

- Preservation of essential records and knowledge of environmental perceptions is crucial in a world that is fast changing and rural areas rapidly losing their cultures because of migration and industrialisation.
- Perceptions become educational tools and a foundation for agency.

1.13 Delimitation of the study

This study focused on the perceptions of the stakeholders who are directly affected by environmental injustices and sought to find their perceptions of community-based environmental education programmes that could be used to address these environmental challenges. Stortplaats community in KwaZulu Natal was the focus of this research work. This community has a population of just over 10 000 community members (Stats SA 2011). A sample of 25 stakeholders targeting five learners above 18 years old (youth), five educators residing within the community, 10 community members, the councillor, the chief, village head, the area environmental health officer and a construction sand-seller participated in this research. The study period was between February and June 2019 and this was a qualitative-based design and cross-sectional data that was collected focused on interpretive narratives of a population under study.

This research did not seek understanding of such legal avenues, as in most cases the plaintiff must prove beyond reasonable doubt an intention of discrimination and this has proven too difficult and a tall order for the already economically disadvantaged groups of people to win cases against perceived perpetrators (Stull *et al.* 2016).

Therefore, this study focused on the perceptions, that is, the ideas, thoughts and beliefs of the stakeholders of Stortplaats who participated in the study. This was done with full understanding that any meaningful and effective community-based environmental education strategy that would eradicate environmental injustices had to come from the stakeholders who were agencies of community change.

1.14 Definition of key terms

The purpose of this section is to define key terms to clarify their contextual meanings and establish working definitions for this study**.**

- **Community-based environmental education**

In this study community-based environmental education is an environmental education plan that is created as a result of community involvement and designed to satisfy the community's needs and interests (Andrews, Stevens and Wise 2002). Learning programmes are designed to promote social learning and development within communities, using formal and informal methods. The programmes are dialogical and based on agreed terms (DeMaster and Malin 2016). The method involves individuals and communities in active problem-solving processes in their contexts and encourages initiative, a sense of responsibility and commitment to sustaining a better environment (Richter and De Sousa 2019).

- **Environmental injustice**

In this study environmental injustice refers to the politicised, unfair distribution of environmental burdens and disutilities such as sewage ponds and land-fill sites among

the poor (Carl 2011). This situation usually leads to environmental distribution conflicts between those who export environmental burdens and the recipients of those burdens.

- **Environmental justice**

In this study, the concept of environmental justice is referred to as the fair distribution of environmental burdens regardless of race, tribe, gender, origin and socio-economic status (Carl 2011). People's way of life should be respected and there must be meaningful involvement of all stakeholders in making environmental decisions. Everyone is ensured of protection from environmental hazards, as enshrined in the UN Charter and the Bill of Rights.

- **Environmental education**

In this study environmental education is a process that promotes the recognition of environmental values and clarifies environmental concepts in order to develop environmental skills and environmental attitudes necessary for understanding and appreciating the inter-relatedness between man and his biophysical surroundings (Palmer and Suggate 1996). This is an age-free process that allows stakeholders to engage meaningfully on or about environmental matters (Fischer-Kowalski and Haberl 2015). In its most basic form, it implies learning about the environment and serves to provide opportunities to explore nature in the outdoors and gain knowledge and skills that can be used to defend, protect, conserve, or restore the environment (Richter and De Sousa 2019).

- **Environmental education strategies**

In this study environmental education strategies includes a broad range of teaching and learning strategies for both audiences and educators. These educational strategies are useful to formal and non-formal educators, as well as communicators. Choosing a suitable strategy depends on the purposes for introducing environmental education and the nature of the audience. There are four categories of strategies for environmental education and these are influenced by the purpose and

reasons why the programme has to be introduced. These categories are: convey environmental information, build environmental understanding, improve environmental protection skills and enable sustainable environmental actions (Mena, Murat, Lorenzo, Orta-Martinez, Pablo and Chavez 2020). Palmer and Suggate (1996) suggested that environmental education strategies should be designed to help the audience to learn about, through, in and for the environment.

- **Stakeholders**

There is fairly general agreement on the definition of stakeholders. Fassin (2012) interprets stakeholders as persons, neighbourhoods, institutions, groups and organisations that can affect or is affected by a phenomenon. In this study a stakeholder is anyone who has an interest in Stortplaats or someone who adds significant value to this area. These include learners, educators, health workers, the business community, community members, and community leaders such as village heads, councillors and the chief.

- **Perceptions**

In this study environmental perceptions are people's response to external stimuli regarding the environment, where a person registers an opinion and assesses it (Jacobs 2016). After an assessment, attitudes develop. The attitudes that develop after continuous assessments then form a cultural stance toward a situation or process constituting opinions, feelings and experiences (Liefländer and Bogner 2018).

- **Sustainable development**

In this study sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This concept is often substituted for sustainability. Relative to sustainability, sustainable development is a young concept first used during the 20th century (Lele 1991). Sustainability in environmental terms is the availability of conditions necessary to support or sustain life at present while ensuring the well-being of the future. Sustainable development, on the other hand, ensures that the needs of current

developments do not compromise the needs of future generations (WCED 1987). In 1987, the Bruntland Commission provided the oft-cited definition of sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It provides a framework for a trade-off between environmental sustainability and economic development (WCED 1987). Sustainable development was strongly emphasised during the 1992 Earth Summit in Rio de Janiero, Brazil, and since then the term has become the focus in most environmental conferences.

- **Environmental disutilities**

In this study environmental disutilities are negative environmental externalities or waste products of human activities that have lost value and are a public inconvenience and an environmental burden (Kruize and Droomers 2014). These include sewage ponds, toxic waste dump-sites, fumes, smoke and soot from industries. There is substantial evidence globally that low-income groups bear a disproportionate burden of living side by side with these environmental disutilities in their environment. This, in turn, has a negative impact on the health status of these low-income groups (Stull *et al.* 2016). Bullard (1990) concurs that there is a cross-linkage between the siting of environmental burdens or disutilities and socio-spatial patterns of discrimination in the USA.

- **Apartheid contours**

In this study apartheid contours are those structural and physical conditions that reflect or still bear the taints of apartheid (Stull *et al.* 2016). In South Africa, the issue of legislative environmental racism constitutionally came to an end in 1994; racial laws, social policies and racial zoning were repealed. The question is why we still have unfair distribution of environmental burdens (Stull *et al.* 2016). Could it be that the victimised communities are not environmentally educated or we are seeing the perpetuation and normalisation of past historical legacies (Stull *et al.* 2016)? South Africa is a signatory of many environmental charters: the African Charter on Human People's Rights (1983), Rio Declaration (1992), Enforcement and Ratification Charter (1983) and many

others. In spite of all these agreements and constitutional regulatory policies, environmental justice is still a pipe dream for many (Stull *et al.* 2016). Carkoglu and Cikentmen-Cin (2015) cite a variety of reasons why the poor and marginalised are still exposed to unhealthy environmental conditions. These reasons range from weak regulatory systems to issues of balancing economic development and environmental issues, thus reflecting the contours of apartheid.

1.15 Organisation of the thesis

Chapter One is introductory and states the purpose of the study, which was to investigate the perceptions of stakeholders at Stortplaats, KwaZulu-Natal about environmental injustices and of community-based environmental education, in order to address these injustices. The concept of environmental injustices, the study site, environmental injustices at Stortplaats, community-based environmental education, stakeholder perceptions, the motivation for the study, statement of the problem, aim of the study, research questions and objectives, significance of the study, delimitation of the study, definition of key terms and organisation of the thesis are presented. The chapter ends with a summary of all subheadings discussed.

Chapter Two provides broad insight into the theories framing this research. It justifies the rationale for the choices. A community-based environmental education model is used to underpin the study and this discourse is strengthened by the place-attachment theory, stakeholder theory and the environmental perceptions framework.

Chapter Three is a review of related literature. It provides an in-depth account of environmental injustices and how community-based environmental education has been used elsewhere as a means of redressing environmental problems. Environmental injustices and community-based environmental education are widely researched topics and the latter has been applied in many countries in line with the global millennium goals for sustainable development and growth.

Chapter Four presents the methodology of the research. An interpretive paradigm informs the research methodology. A qualitative research methodology is used for this

research, as the researcher relies on the views of the stakeholders. It also presents the research design, population and sample, sampling procedures, research tools, trustworthiness, member checks, data analysis, my positionality and ethical issues.

Chapter Five presents the findings from the research. It presents data that answers the research questions raised. Furthermore, the chapter reveals the close link between historical biographies and day-to-day practices.

Chapter Six presents significant research findings and implications. The role that community-based environmental education could play in reducing environmental injustices, empowering the affected communities in seeking litigation against the perceived perpetrators and ensuring that environmental rights are respected, is discussed. The chapter further discusses how community-based environmental education could be used to challenge poverty and effect transformation in the lives of economically marginalised people.

Chapter Seven is the concluding chapter. The summary, conclusions and recommendations are presented. Theoretical, methodological and empirical threads are weaved together, guided by the research objectives and research questions. Crucial findings that emerged are summarised. The chapter is concluded by providing avenues for possible future studies.

1.16 Summary

This chapter provided a background of the concept of environmental injustice and the antidote identified as community-based environmental education. The chapter presented the concept of environmental injustices, the study site, environmental injustices at Stortplaats, community-based environmental education, stakeholder perceptions, the motivation for the study, statement of the problem, aim of the study, research questions and objectives, significance of the study, delimitation of the study, definition of key terms and organisation of the thesis. The next chapter explores and discusses relevant theories that directed and influenced the study, namely the

stakeholder theory, environmental perception framework, the place attachment theory and the community-based environmental education model.

CHAPTER TWO
THEORETICAL FRAMEWORK

2.1 Introduction

The previous chapter provided the background of the concept of environmental injustice and the antidote was identified as community-based environmental education. Environmental injustices, the study site, environmental injustices at Stortplaats, community-based environmental education, stakeholder perceptions, the motivation for the study, statement of the problem, aim of the study, research questions and objectives, significance of the study, delimitation of the study, definition of key terms and organisation of the thesis were presented. This chapter provides broad insight into and justification for theories that framed the study.

2.1.1 Defining a theoretical framework

A theoretical framework is a foundation from which all knowledge about the study is constructed and focuses on specific variables by defining the specific viewpoint (framework) that the researcher will adopt in analysing and interpreting the generated data (Burke and Pinnegar 2015). It serves as the structure and support for the rationale for the study, the problem statement, the purpose, the significance, the research questions and research objectives. The theoretical framework provides evidence of academic standards and procedure, offering an explanation of why the study is important and how the researcher expects to fill the knowledge gap in existing literature. It serves as the guide or blueprint on which the researcher builds and supports his/her study and also provides the structure to define how he/she would philosophically, epistemologically, methodologically, and analytically approach the entire study (Mitchel, Agle and Wood 1997). Thus, it consists of the selected theory or theories that undergird/s the researcher's thinking on the research topic and definitions that are relevant. These theories simultaneously convey the deepest values of the researcher and provide a clearly articulated blueprint or lens on how the study would generate new knowledge. They form an intersection of the previously formed knowledge and the researcher's epistemological dispositions. This means that a theory living within a researcher is a product of lived experiences (Guba and Lincoln

2005. The use of theoretical frameworks seeks to provide opportunities for researchers to discover their own voices with the intellectual resources to emancipate rather than control (Guba and Lincoln 1994). The following are basic assumptions for a researcher who uses a theory:

- All thought and power relations are socially and historically constructed.
- Facts, values and ideology are inseparable.

Any qualitative research methodology cannot be separated from the researcher's view of reality and that makes ontology, epistemology, axiology and theory inextricably intertwined.

After filtering through all the possible or competing theories and weighing the pros and cons of each, four were selected to underpin the study, namely the stakeholder theory, environmental perceptions framework, the place attachment theory and the community-based environmental education model. The stakeholder theory and the environmental perceptions framework focus directly on the environmental perceptions of the stakeholders, while the place attachment theory and the community-based environmental educational model provide a firm foundation for addressing environmental injustices at Stortplaats through community-based environmental education.

The stakeholder theory was necessary for this study because it addresses moral values and inculcates community social responsibility where everyone has a part to play, thus promoting fairness and place attachment or sense of place. This theory was central in designing the research questions. An environmental perception framework is a transactional process between the person and the environment and this is controlled by socio-psychological contexts; for this reason the framework was necessary for structuring the research purpose and the research questions. In structuring the research questions about addressing environmental injustices through community-based environmental education, the place attachment theory was used. This bond between a stakeholder and his environment has several benefits, such as belonging, positive environmental emotions, active participation in community programmes and connection to the environment. A community-based environmental education model was chosen as an antidote for addressing environmental injustices (Mena *et al.* 2020).

Environmental problems and injustices have become complex because of their intricate connection to the materialistic world, which sometimes sacrifices the lives and safety of people in order to make profits (Burke and Pinnegar 2015). To mitigate the expansive environmental concerns, it is necessary to create environmental policies and community environmental programmes with full understanding of stakeholders' environmental perceptions, environmental attitudes and environmental behaviour, so as to create an environmentally conscious citizenry (Anderson 2015). The causes of environmental injustices and possibilities of addressing them depend on stakeholders' perceptions and attitudes, because these are linked to values and preferences about the environment. What the stakeholders know and understand about their environment sometimes differs widely from the views of experts; this is mainly the result of misconceptions and misrepresentations about the environment (Akintunde 2017).

It is therefore important for stakeholders to be able to articulate their environmental problems and concerns freely as a prerequisite for addressing those issues using community-based environmental education programmes (Anderson 2015). Informed stakeholders are more likely to be sensitive and alert to environmental injustices and more likely to challenge the policy-makers and perceived culprits on environmental injustices than uninformed stakeholders (Burke and Pinnegar 2015). It is against the above background that the stakeholder theory and the environmental perceptions framework were used to guide the research process by providing a framework within which to formulate the major research questions, design research instruments, generate and interpret data, discuss the results and reach conclusions. The place attachment theory and community-based environmental education model were used as a means for addressing environmental injustices.

2.2 Stakeholder theory

The stakeholder theory was first developed as a strategy for business ethics, by Freeman in 1984. By then the environmental corporate responsibility was not regarded

as a social responsibility (Powers and Nsonwu 2020). In one of the latest publications about the stakeholder theory a new trend is surfacing and that trend seeks the opinion and the perceptions of stakeholders themselves (Powers and Nsonwu 2020). Most of the studies are based on business corporates and shareholders are not the only stakeholders but part of the stakeholders. To reduce the expansive environmental problems, it is necessary for policy-makers to make environmental laws and community-based environmental programmes which are commensurate with the stakeholders' environmental perceptions (Anderson 2015). Addressing environmental injustices depend on stakeholders' perceptions and attitudes, because these are linked to values and preferences (Akintunde 2017).

There is a long-standing debate in literature about who and what really count as stakeholders (Philips and Reichart 2000). Thus, before progressing to discussing the position of stakeholders in a natural environment using the stakeholder theory, it is necessary to take a brief look at the various definitions of stakeholders in the literature. A stakeholder in any place is by definition any individual or group of individuals or organisation that can affect or be affected by changes in that place (Freeman and Reed 1983). Such a broad definition is often criticised for being of only limited practical value because of its virtual all-inclusiveness. Some scholars define stakeholders as groups of constituents who have a legitimate claim on the environment (Philips 1997). In a recent contribution, Fassin (2012) refers to stakeholders as individuals or groups that possess a stake in a place in the way that a shareholder owns shares in a company. Fassin (2012) further elaborates on the stakeholder theory and explains the differences between stakeholders, stakewatchers and stakekeepers. Stakeholders are essentially the classic owners of the environment or area, as explained in the original narrow definition. Stakekeepers operate more like pressure groups and actually do not have a stake themselves, for example most environmental non-governmental organisations. They simply protect the interests of real stakeholders. Stakewatchers are regulators and monitors; they have no stake in the environment but have influence and control, for example the state and NEMA. All the definitions outlined above are acceptable, as they align well with the major objective of the study.

The stakeholder theory is commonly used in analysing social responsibility. In this case, the stakeholders' social obligations and efforts in dealing with environmental issues affecting them are highlighted. The stakeholders' perceptions, positive environmental attitudes and positive environmental responses to environmental problems, all based on goodwill, constitute environmental responsibility. Environmental responsibility becomes an integral part of stakeholders' social responsibility (Mitchel, Agle and Wood 1997).

Sustainable development in both developed and developing communities is impossible without harmoniously integrating environmental responsibility and development. Studies on sustainable development also emphasise a lot of integration between economic development, environmental responsibility and stakeholder participation (Philips 1997). Integration is possible because social responsibility by stakeholders encompasses the concerns of stakeholders' environmental responsibility. The stakeholders who practise environmental responsibility are responsive to environmental protection and this is built on voluntarism and goodwill; although the economic benefits of these initiatives are rather neutral, the gains are social (Mena *et al.* 2020).

In the event of any form of disruption such as disaster, death or environmental injustice, community members respond in many different ways. Responses to a disruption range from community mass mobilisation action, or adaptation to acceptance (Rich *et al.* 1995). These responses to place disruption occur both at individual and community levels. If the disruption is severe and the community members feel that they are powerless to institute corrective measures, denial and emotional or physical detachment from the place may occur. Sometimes people at both community and individual levels may engage in collective action in order to oppose the change and restore the disrupted place (Ramkissoon and Mavhondo 2015). If the change or disruption is negotiated and acceptable, community members may collectively adapt to the change and redefine their community to accommodate the disruptions. If the change is unacceptable, members embark on oppositional collective action to restore the *status quo* (Scannell and Gifford 2017).

Resistance and reaction to community disruptions could hinder and stifle developmental programmes, but such emotional attachment to a place could be used

as a basis for rolling out negotiated community-based environmental education programmes for sustainable development. People with an emotional attachment to the place are more likely to engage in programmes and projects that seek to protect their environment against any form of destruction. Furthermore, as custodians of the place, residents could be empowered through community-based environmental education to ensure that their precious asset - the land - is conserved (Mena *et al.* 2020).

An important quality in common environmental responsibility is the voluntary nature of the initiatives the stakeholders undertake in their capacity as residents and owners of the land or environment. This initiative shows that the stakeholders are satisfied and convinced that they own the environment and hence it must be conserved and preserved in order to improve their quality of life. The responsiveness of stakeholders to addressing the environmental injustices and problems prevalent in the area is also influenced by ownership. Commitment to community-based environmental education programmes and change to positive environmental behaviour revolve around ownership (Fassin 2012).

Stakeholder/social environmental responsibility is influenced by perceptions and social motives, which are formed by institutions or individual principles. Stakeholder environmental responsiveness is influenced by stakeholder assessments. Stakeholder environmental performance is guided by people or community-based environmental policies and programmes. This means that stakeholders demand a social license to participate effectively in any meaningful community-based environmental programmes. The model offered by Wood summarises the above relationship.

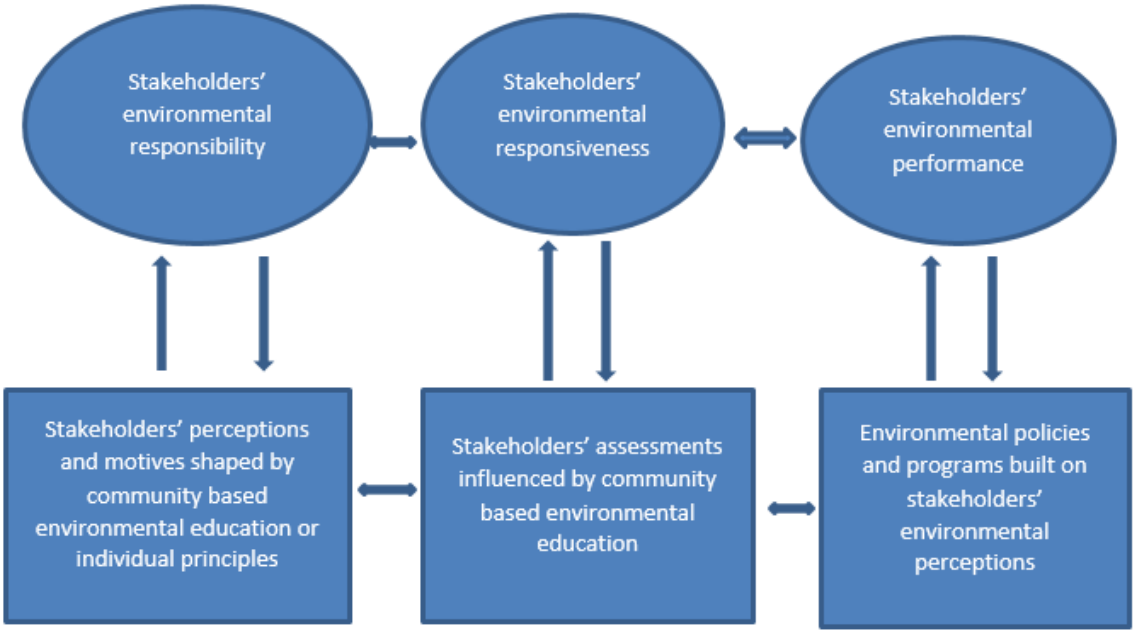

Figure 2. 1: Stakeholders' responsibility, responsive and performance model.

Source: Adapted from Wood (1991: 150)

2.3 Environmental perception framework

Environmental perception can be defined as environmental awareness or feelings about the environment, as the individual apprehends the environment through the five senses. A more encompassing definition and theoretical framework was provided by psychologist Ittelson (1973) who described environmental perception as a transactional process between an individual and his environment. He offered the general conclusion that environmental perception is an aspect of psychological functioning that is relevant and appropriate to specific environmental situations. This theoretical framework suggests that environments provide individuals with opportunities for exploration and information that are received through the five senses. Perception looks at how information is organised, identified and interpreted through our senses. Human beings and their environments are interdependent and the knowledge that people have about their environment is produced through interplay between a person and his environment (Roschel 2016). In effect, people and their environment are not distinct and autonomic entities, but instead are affixed and co-produce one another.

The environmental perception framework has been adopted as a fundamental diagnostic tool for the management of places and landscapes since UNESCO's Man and the Biosphere programme of 1968. (Roschel 2016). Since the 1970s, the perceptions, attitudes and beliefs of stakeholders have been taken into consideration by adopting a practical approach to solving environmental injustices or problems (Paco and Lavrador 2017). At the heart of this framework are environmental management and protection which, come about as a result of stakeholder awareness and concerns regarding environmental challenges. It is therefore important to understand how stakeholders in an area such as Stortplaats differ with regard to environmental perceptions (Roschel 2016). Both scientific knowledge and stakeholders' perceptions about the environment can result in a more valuable assessment and understanding of environmental challenges (Paco and Lavrador 2017). Variables such as age, level of education, sex, and income may play a role in a stakeholder's ability to interpret environmental issues, but the concept of good is universal (Fassin 2012). Different people might interpret and respond to the same environmental stimulus in different ways because of unclear beliefs about environmental challenges, but will always choose those environmental issues they care more about (Burke and Pinnegar 2015). It is therefore necessary to understand how people see their particular environments.

Environmental perception as a psychological process is concerned about how people as units (individual or group) relate to the place in which they live. It examines and seeks to explain the nature of psychological interactions taking place in the minds of people occupying a piece of land or environment (Scannell and Gifford 2010). There are three psychological aspects of environmental perception, namely affects, cognition and behaviour.

Perception involves emotional connections to a place by an individual or a group of people. Belongingness, whether at individual level or at group level, is an emotional issue that can be described as an authentic affective bond that satisfies fundamental human existence (Scannell and Gifford 2010). Psychologists assert the central role of affect in place attachment bonds, as people usually portray a sense of place in affective ways. Sometimes they display feelings of pride when they talk of their place

(Manzo 2005; Ram and Bjork 2016). Environmental perception is grounded in emotions and the evidence surfaces when individuals or groups of people are forced to leave their place in the event of war, resettlement or relocation (Twigger-Ross and Uzzel 1996; Manzo 2005; Scannell and Gifford 2010). When residents are forced to move, whether for good or bad reasons, they lose familiar social settings that are engraved in their hearts and minds. These old, tight-knit settings are broken down in order to reconstruct the new structures and the processes are painful. For poor and marginalised people, the destruction of these emotional systems causes grief. In 1963 when villagers at West End Boston in the USA were relocated to other places because their area was riddled with excessive environmental pollution, grief, sadness and feelings of disenfranchisement were visible on the faces of the victims. Many people chose to stay rather than being relocated (Fullilove 1996; Ram and Bjork 2016).

Emotional perceptions about the environment could be used as a basis for rolling out environmental education programmes that seek to promote pro-environmental behaviour. People who have emotionally perceptions about their environment are more likely to feel obliged to protect their environment against any form of destruction. Furthermore, as custodians of their environment, stakeholders could be empowered through community-based environmental education to ensure that their precious asset, the land, is preserved (Mena *et al.* 2020).

The development of a perception about an environment is a cognitive process that involves the acquisition of knowledge through memories, experiences, beliefs and senses. For an individual to develop positive perceptions about the environment, that process involves construction and reconstruction of meanings, creating new settings based on representations of new experiences (Scannell and Gifford 2010). People construct and reconstruct pieces of information so that these can be coherent, meaningful and easy to process. The processed information is then organised and packaged into schemas or cognitions, which eventually become knowledge and beliefs (Twigger-Ross and Uzzel 1996; Scannell and Gifford 2017). Environmental perception becomes a schema associated with familiarity, which is evidence of place knowledge and place organisational details. This means that an individual's environmental perception possess special characteristics that could be incorporated into personal

connections. Incorporated connections become an individual's self-concept (Ramkissoon and Mavhondo 2017).

When good perceptions and self-definitions about the environment and physical place has occurred, people can then claim ownership of the area in which they live in and can defend its existence. Furthermore, this development could be catalysed and strengthened by formal and informal learning processes such as community-based environmental education (Scannell and Gifford 2010).

Homesickness is an indication or a symptom that individuals have been absent from an environment to which they know for an extended period. This desire to visit or return to an environment to which people perceive as their home is so powerful that sometimes costs become irrelevant and immaterial (Scannell and Gifford 2010). Manzo (2005) identifies pilgrimage as another form of behaviour that exemplifies the desire to get to a significant place.

Individuals with good perceptions about their environment would only depart from that place only if their constant and rigid stay has become unprofitable to that area. This may sometimes be initiated by limited important opportunities. It may also happen if the dialectical process of being in that environment versus being away, might enhance the development of that environment. These interacting forces contribute to construction and reconstruction of the environmental perceptions. This behaviour is evident among migrant workers in the world (Shortt and Hammett 2013).

Reconstruction of perceptions about an environment as observed after disasters is another behavioural expression of human relation with their environment (Scannell and Gifford 2010). When natural disasters such as tornados, cyclones, tsunamis, earthquakes, storms and wars destroy a place, residents with good perceptions about their environment would organise themselves after the disaster and reconstruct the area. Usually the reconstruction process of destroyed important institutions such as clinics and schools entails donated free labour by the community members who have good perceptions and definitions about the place they live in. This was evident in Mozambique after the strike of the cyclone in 2011 that left many people dead and

thousands homeless. Mozambicans rallied behind one another during the process of reconstructing the destroyed places (Manyena 2016). It is their environmental perceptions and meanings which compelled them to act in a manner that supported the development and sustenance of their area. Another form of environmental perception reconstruction occurs when individuals relocate voluntarily or involuntarily. People choose to preserve the old environmental perceptions by selecting perceptions that are identical to and reminiscent of their old ways (Scannell and Gifford 2010).

The behaviours that are based on environmental perceptions are territorial. This means that they not only cover affective proximity-maintaining bonds, but also cover ownership, territorial defence, space control and belongingness (Manyena 2016). These aspects become important integral assets in implementing community-based environmental education programmes in the community that are meant to eradicate environmental injustices and the control of destructive environmental tendencies.

The primary research question of this study was to determine the perceptions of Stortplaats stakeholders about environmental injustices and of community-based environmental education. This means that the ultimate idea was to understand the stakeholders' perceptions and knowledge about the environmental injustices and the factors that influence those perceptions and knowledge. Both the stakeholder theory and the environmental perceptions framework agree that solving or improving environmental problems is possible only when an assessment of stakeholders' perceptions, awareness, knowledge and attitudes to an environment has been done (Paco and Lavrador 2017). The research sub-questions sought environmental knowledge from the stakeholders, which is an important variable that explains environmental behaviour. Stakeholders, their environmental perceptions and social experiences form the notion called personal space (Paco and Lavrador 2017). Personal space is the immediate environment that people perceive as their own. It is often conceived of as a bubble and a portable territory that can shift in size around the life of the stakeholder. This is the environment that the stakeholder can defend at all costs and programmes such as community-based environmental education that seek to preserve and conserve the environment are more likely to receive full support from community members.

2.4 Place attachment theory

Place attachment or sense of place is an important theory in understanding certain environmental actions within an area. This theory has a long developmental history and literature reveals that the concept was first introduced around the 1970s by John Bowlby and Mary Ainsworth (Najafi 2012). It entails an evaluative dimension of the place where one lives and describes what that place means to that individual. It answers the research question on how people perceive issues such as environmental injustices existing within their locale. Individual place attachment involves connections that a person has with his/her locale. This personal or individual attachment may be evoked by memories of important experiences such as personal growth, realisations and ancestral connections (Scannell and Gifford 2010).

Place attachment theory describes the bond that develops between persons or community members with their meaningful surroundings. This helped formulate the research question on how perceptions about environmental injustices are developed. It is an integration of the perceptual, psychological and socio-cultural aspects of people and their place. This involves an emotional investment and the bond that is built upon place-related experiences with friends, family and ancestors and that becomes a backbone for community-based environmental education (Kyle and Chick 2007).

Residents' emotional attachment sometimes makes them choose to stay in an environment that can be classified as dangerous and this trade-off makes them accept the hazard in exchange for what they consider as an advantage of living in that area (Wakefield 2000; Anton and Lawrence 2016). This theory helped the researcher formulate a question on why villagers at Stortplaats choose to live in that area that can be classified as unfit for human habitation, thus responding to the first research question that focuses on perceptions and the second research question that focuses on contextual dynamics that influence the development of those environmental perceptions. At the same time, the theory could be used as a bedrock in developing and incorporating positive environmental roles in the community through environmental education (Benninger and Savahl 2016).

2.4.1 Theme of place attachment

The theme of the theory of place attachment is framed around the sectors of people's experiences as represented by the affects, that is, the feelings, emotions, and moods human beings experience with reference to the places in which they were born and lived and these are liked to perceptions (Altman 1975; Giuliani 2003; Scannell and Gifford 2017). The variety of terms that reflect affective bonds with places include sense of place, ancestral ties, feeling-like-an-insider, belongingness, attachment, rootedness, affiliation and identity. Use of such words is usually motivated by the desire to describe how familiarity is maintained in order to reduce stress through being-in-a-place-where-I-belong (Kyle and Chick 2007).

The development of an affective bond with the place is not a choice, but a product of accumulated past experiences such as childhood. No human being is exempt from aspects and nuances of the affective world (Scannell and Gifford 2017). These qualify human existence in an area negatively or positively and often appear in expressions, idealisations and representations of life. Life dimensions that are formal or informal, institutionalised or non-institutionalised are all related to matters of place or territory attachment (Dominicis and Ferdinando 2015). Attachment to a place is a fundamental human need that is mediated by the central nervous processes rooted in the neurophysiological system, which is responsible for incorporating environmental information (Giuliani 2003). Continuous interaction with nature results in the development of cognitive structures that influence self-attachment to a place. In the early stages, attachment is flexible and can be modified, but when it becomes organised it operates automatically and eventually becomes a stable property of an individual (Kyle and Chick 2007). Attachment may operate at micro- or macro-levels, that is, at individual or community level and among disenfranchised or marginalised communities it is independent of the physical, social or economic characteristics of the environment (Ramkissoon and Mavhondo 2015).

The place attachment theory is a relevant tool in environmental education in schools and communities. Individuals who are attached to a place experience a sense of security in their place even if the area is riddled with multiple environmental injustices

and problems. That property could be used as an asset in promoting pro-environmental behaviour aimed at reducing environmental injustices and burdens (Scannell and Gifford 2010). Place attachment is grounded in three dimensional concepts, namely the person, psychological processes and the place dimension. The first dimension of the place attachment theory is the person who happens to be the main actor. This dimension focuses on the extent of attachment to the place, be it collectively or individually. The second dimension focuses on psychological processes such as the affective, cognitive and behavioural aspects that are influenced by the attachment. The third dimension focuses on the object of attachment, which is the environment or locale (Smit, Lannoy, Lambert, Levitt and Watson 2016).

The place attachment theory was fundamental in this research. It helped in formulating research questions based on the stakeholders' understanding of environmental injustices and the contextual dynamics that influenced those perceptions. This theory also strengthened the concept of community-based environmental education. Scholars concur that sense of place promotes positive environmental behaviour, proper environmental attitudes and responsible behavioural intentions, and these are important dimensions of environmental education (Scannell and Gifford 2010; Ramkissoon and Mavhondo 2015; Scannell and Gifford 2017).

2.4.2 The person dimension: individual or collective attachment

Place attachment can occur either at individual level or at community (group) level. Scholars such as Manzo (2005) and Twigger-Ross and Uzzel (1996) concur that the definitions of the two terms overlap and one produces the other. Manzo (2005) posits that places themselves are not significant in stimulating individual sources of attachment, but that experiences-in-place create place-meaning that triggers place attachment. As a result, an individual may feel connected and bonded to a place for good or bad. With this love for a place, the environmental education planners may use that already existing attitude to the place as an asset for bankrolling pro-environmental programmes. A person who loves the place is more likely to be supportive in engaging in programmes that prevent the destruction of his/her place.

Place attachment at community level consists of shared symbolic meanings of a place. Community or group place attachment is described as a collective process where people or all community units become attached to a place (Scannell and Gifford 2010). In that place the community members feel free to practise and preserve their culture without threats of invasion. Culture as a design for living is linked to a place through shared norms, values and historical experiences. For instance, in some parts of East Africa place attachment is sometimes religion-based. It is an abomination and a cultural violation to cut down huge trees such as the baobab, as these are religiously sacred and rain makers. Such meanings are transmitted to subsequent generations, creating an impetus for conserving the forests (Scannell and Gifford 2010).

Through religious observances, meanings and the status of places become sacred as they bring residents and worshippers together. Such respect for the environment or place could be used as an asset and foreground environmental education programmes. Furthermore, poor and marginalised communities develop stronger bonds with their place than affluent communities and therefore are more likely to be supportive when programmes that aim to preserve the environment are introduced (Smit *et al.* 2016).

2.4.3 Place dimension of place attachment

The place is the most important dimension in place attachment theory. It consists of two levels, namely social and physical. These levels give meaning to the reasons why an individual becomes attached to a place (Scannell and Gifford 2010). The social level in place attachment is explained as the bondedness to the place and is influenced by the existence of social ties, neighbourhood, belongingness and familiarity with the neighbours. While the physical level explains place rootedness, the geographic layout of that place gives birth to ownership and territoriality (Manzo 2005). People become attached to places and areas that promote social relationships and group identity. Neighbourhood bonds develop from interpersonal interactions and these are influenced and strengthened by physical features such as social arenas, clinics and the natural environment. This means that if attachment is mainly influenced by people it becomes social, but if it is directed towards the place itself it becomes physical.

Some sociologists, such as Gans (1962), Hunter (1978), McMillan and Chavis (1986) and Ram and Bjork (2016) posit that place attachment is influenced mainly by social factors that are grounded on physical features. At its highest level it is sometimes conflated with the sense of community. Sense of community becomes a system of formal and informal associational relationships based on friendship and kinship networks that are rooted in social processes and these connections are based on physical and geographic locations (McMillan and Chavis 1986; Anton and Lawrence 2016). On a broader level, well-grounded place attachment together with a sense of community based on social, physical and geographic features constitutes nationalism (Scannell and Gifford 2017). The latter concept explains how the communities who depend wholly on the place to which they are attached feel obliged to defend its territorial integrity.

Attachment to the physical environment is very important in this study. Understanding of the physical environment and the natural world in which an individual or a group of people live leads to the development of environmental identity. This refers to nature inclusion in oneself (Scannell and Gifford 2010). Hunter (1978) posits that proper environmental self-definitions and well-organised environmental identities are a positive foundation for rearing a community that can aggressively defend the environmental integrity of their place. The existence of an attachment is an asset in developing proper environmental literacy that can save the planet from environmental destructive tendencies. In summary, the three dimensions of place attachment, namely the person, the psychological dimension and the place, are not always spontaneous, but could be positively galvanised by a series of well-authored people-based programmes of environmental education.

2.4.4 Place attachment as a social capital

Social capital does not have a single undisputed definition and it is for this reason that the adopted meaning of the term is based on the topic under discussion. Surprisingly, there are no considerable disagreements and contradictions in the multiple definitions of the term; instead these discuss its relations to different disciplines (Bourdieu 1985;

Scannell and Gifford 2010). It is therefore imperative to accept that social capital is a multidimensional discipline that must be conceptualised and operationalised as such.

In its simplest form, social capital is an aggregate of existing and potential assets that are linked to institutionalised networks of relationships within the community or society (Bourdieu 1985). These relationships start from simple mutual acquaintances or recognitions and build up into strong social obligations that can be converted into economic capital. In its functional definition, it could be defined as people's ability to work as a unit for a common purpose (Scannell and Gifford 2017). It can be spontaneous or non-spontaneous, but eventually develops into a culture of mutual trust and tolerance that snowballs into co-operative co-ordination for mutual benefit. It was earlier explained that place bonding is a critical part of place attachment and the stronger emotional connections beget more negative attitudes to change and environmental disruptions of various kinds. Devine-Wright (2011) further explains that community members who are attached to a place can only accept negotiated and rationalised changes or disruptions.

This attitude and behaviour become an asset or social capital within the community. Place attachment explains the bond that exists between the natural environment and people. The natural or physical environment is an asset to those people who live within it and depend on it. The community's (individually or collectively) psychological or behavioural responses to disruptions in the place they depend on and live in, reveal a social dimension that can be summed up as social capital. Perkins, Douglas, Bill, Silberman, and Brown (2004) define social capital as the norms and networks existing within the community, which are based on mutual trust of the civil society. It is facilitated by co-operation among citizens and institutions. At both individual and community levels, social capital is grounded in two dimensions, namely cognitive or affective, contrasting with behavioural responses, and informal or spontaneous, contrasting with formally organised responses (Kay and Tisdall 2012). These dimensions yield four components of social capital psychological behaviour, namely empowerment, social bonding, neighbouring and citizen participation (Perkins *et al.* 2004; Ramkissoon and Mavhondo 2015). Each of these is examined further below.

Empowerment is sometimes referred to as collective efficacy. Collective efficacy or empowerment can be defined as a complex process by which people in the community gain control over their lives and fate. Naturally, it involves democratic participation in all spheres of life in the community and involves critical understanding of the natural environment (Anton and Lawrence 2016).

Empowerment can be summarised as the confidence that people in a particular place have in the efficacy of organised collective action and participation. In simple terms, it is a question of having a voice and a choice. Environmental hazards and injustices are destructive and disempowering and average citizens sometimes have little or no control over them, unless they can collectively mobilise and take restorative action (Rich, Edelstein, Hallman and Wandersman 1995). Thus, collective efficacy and empowerment are critical components for sustainable development and environmental protection and these could be strengthened through community-based environmental education.

2.4.5 Place attachment: asset for initiating community-based environmental education

The concept of place attachment is an asset when it comes to issues that involve environmental disruptions and community-based environmental education. The community's response to any form of environmental disruption or injustices is often influenced by numerous dynamic processes based on place-related cognitions, effects and affects (Dominicis and Ferdinando 2015). During the presentation of community environmental programmes, community members assess and try to weigh and understand the effects that change might have on their experiences in the place. If environmental changes, whether progressive or destructive, are perceived as altering the social definitions of the place, disrupting personal investments in the area, altering the habitual use of the place and affecting routine interactions within the area, these changes are resisted and opposed. This therefore means that in designing the community-based environmental education curriculum, the planners must make it people-based to reduce conflict of interest. Any form of disruption in the community is met with action or opposition. If the community members feel powerless and

disenfranchised about the introduction of the environmental education programme, acceptance or adaptation occurs and that depends on perceptions of corporate efficacy and existing networks (Scannell and Gifford 2017).

This understanding is an invaluable asset to community-based environmental education curriculum planners. Any successful community-based environmental education programme must be people-based and community-driven; this makes it acceptable and owned by the members themselves. Place attachment is a cognitive process that involves the acquisition of knowledge through memories, experiences, beliefs and senses. This means that the direction of the process could be influenced through education to ensure positive and sustainable development. If an individual is to be attached to a place, that process involves construction and reconstruction of place meanings, creating new settings that are based on representations of new experiences (Scannell and Gifford 2010). People construct and reconstruct pieces of information so that these can be coherent, meaningful and easy to process. Therefore, the dimensions of place attachment theory are essential for bankrolling effective community-based environmental education. Community-based environmental education would ensure that people or individuals recognise the environment as capital that must be affectionately protected and preserved.

The relationship between place attachment and community-based environmental education is summarised in the Figure 2.2 below.

Figure 2.2: Relationship between place-attachment and Community-based environmental education model

Source: Adapted from Ramkissoon and Mavhondo (2015:25)

2.5 Community-based environmental education model

The community-based environmental education model was developed by Andrews, Stevens and Wise (2002) after identifying inadequacies associated with classroom-based environmental education. It is an educational plan that is designed by the people and for the people in order to match the community interests and this model responds to the research question on strategies for reclaiming the environment. Community interests in this case refer to a safe environment, traditional education and sustainable development (Breen, Dosemagen and Lippincot 2015). The community-based environmental education model incorporates socio-cultural learning that involves social activities that trigger interests and enthusiasm among participants (Gabrys and Pritchard 2015). It has the capacity to motivate individual community members to have a sense of total control over their learning processes, which promotes ownership.

People are generally motivated to learn if the information to be learnt is relevant in their lives (Andrews *et al*. 2002). This model was summarised by Andrew *et al*. (2002) as shown in Figure 2.3 below:

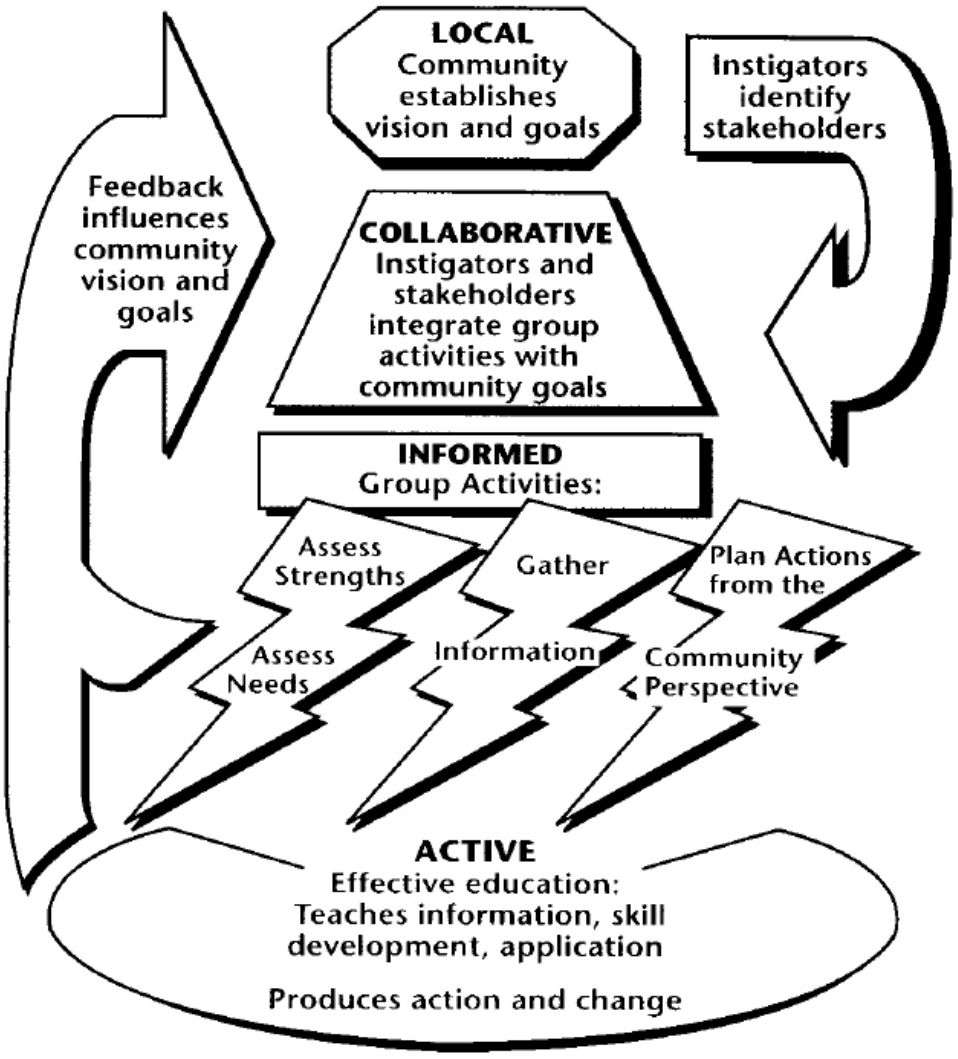

Figure 2.3: Community-based environmental education model

Source: Andrew *et al.* (2002: 164)

The above model integrates education into real-life experiences and that helps in identifying the political, social and economic root causes of environmental problems. Once connected to the environment or place, the learner can enhance agency and participate in collective protection of the environment (Chawla and Crushing 2007;

Manyena 2016). This provides optimum conditions for quality higher order learning of skills and empowers all stakeholders for better collaborative guided environmental actions to deal with a desirable local concern (Breen *et al*. 2015).

The community-based environmental education model incorporates active public participation in environmental matters by applying right-to-know education strategies. It is locally based and responds directly to the concerns of the community by focussing on the environmental strategies that a community could follow to reclaim its environment. That answers the research question on environmental education strategies. Therefore, environmental education strategies must recognise that community activities affect the quality of the environment and that community members must have a common desire to protect their environment. In order to implement that, a community must have a vision or goal and stimulated by this vision, the community must initiate the formation of groups that would engage the larger community in carrying out environmental protection activities. That constitutes collaborative learning, which relies on systematic planning procedures where everyone has a part to play. Community-based developmental programmes are sensitive to socio-political, economic and cultural factors and that increases their chances of success (Andrew *et al*. 2002, Gouveia 2010). Those activities would incorporate and integrate other community developmental projects and that would eventually improve environmental quality and policy changes.

The community-based environmental education model is transformative and empowering. Aguilar (2016) identified transformation and empowerment as the major outcomes of this model. The participants are given an opportunity to process their experiences through developed frames of reference and this occurs through steps that promote self-reflection, disorient dilemmas, remove negative feelings, explore new roles and plan for action. By nature, the community-based environmental education model is a developed hybrid of environmental education that seeks to promote environmental literacy through civic participation (Andrew *et al*. 2002; DeMaster and Malin 2016). Successful implementation of the community-based environmental education model depends on full understanding of the origins of environmental education, curriculum structure and the possible outcomes of the entire programme.

2.6 Place attachment: asset for initiating community-based environmental education

The place attachment theory and the community-based environmental education model provided preliminary research questions and those were corroborated later with the findings from the field. These are both psychological and social, as they seek to foster and support the community's sense of identity, stability, power and sustainable development (Manyena 2016). The community-based environmental education model seeks to promote environmental literacy, environmental awareness, eco-friendly behaviour for sustainable growth and development. On the other hand, place attachment fosters and supports a collective sense of community identity, stability and power for sustainable growth and development (Scannell and Gifford 2017). These two were essential in this study because they integrated complex and dynamic interpretive processes that linked both individual and community social cognitions, emotions, and behaviours as a response to any form of environmental injustice or threats that require collective or corrective actions.

Place attachment concentrates on individual and community feelings and experiences that lead to bond development and very little has been said about bonds on a larger socio-political scale. The community-based environmental education model emphasises global pro-environmental participation and empowerment, at the same time not overlooking the individual and community actions that protect the environment (Andrew *et al*. 2002). Place attachment reveals the potential for rolling out environmental education programmes and the psychological processes of place attachment simultaneously act as a catalyst for the development of environmental protection structures. Place attachment makes it easy for community-based environmental education planners to mobilise the community and ensure active citizen participation in response to perceived environmental threats to place. Place attachment creates the foundation that promotes place definition, place identity, place bonding, social bonding and collective efficacy at both individual and community levels (Dominelli 2013).

Environmental education may be a confrontational tool in dealing with environmental injustices and at the same time protecting and preserving shared environmental quality. Individuals and community members who are attached to their place and bonded to its identity are usually co-operative and constructive in planning and implementing sustainable environmental education programmes. Insufficient social cognitions, emotional bonds, social networks and community place definitions, which are social capitals, reduce the agency in responding to environmental problems. Sometimes responses to environmental problems or disruptions might be associated with apathy, acceptance or indifference. If place attachment is high, there are increased chances of successfully implementing negotiated environmental education programmes or projects. Place attachment is a powerful motivating factor for actioning community-based environmental education programmes that are meant to preserve and improve the environment for future generations. It is when place attachment is translated to social capital and collective action through environmental education that the community experiences and realises the full benefits of the attachments (Manyena 2016). Therefore, place attachment theory and community-based environmental education are inseparable and complementary.

2.7 Summary

This chapter provided broad insight into and justification for the theories that framed the study. The chapter discussed several theories that could be used as frames of reference for this study. After filtering through all the possible or competing theories and weighing the pros and cons of each, four were then selected to underpin the study: stakeholder theory, the environmental perception framework, place attachment theory and the community-based environmental education model. Informed stakeholders are sensitive and aware of environmental injustices and therefore more informed when making environmental decisions. It is against the above background that the stakeholder theory and the environmental perceptions framework were used in guiding the research process by providing a framework for the entire study. The place attachment theory and the community-based environmental education model were also selected as appropriate to provide a rationale for community-based environmental

education in order to address the environmental injustices at Stortplaats because they are concerned with power relations and transforming the *status quo* by fostering dialogue among all stakeholders (Eagleton 1991; Boudreau 2010). They entail the ability of societies to transform and develop trends in communication that can lead to sustainable development (Darder, Marta and Torres 2009). Community-based environmental education views environmental knowledge as a critical process that could transform social and environmental behaviour, resulting in liberatory potential that would help individuals recognise the environment as an asset and resource to be conserved. A community that is rich in environmental knowledge promotes a sense-of-place attitude and environmental protection and management becomes spontaneous. It is for these reasons that the two theories were chosen to strengthen the stakeholder theory and environmental perception framework.

CHAPTER THREE
LITERATURE REVIEW

3.1 Introduction

The previous chapter provided broad insight into and justification for theories that framed the study. The purpose of this chapter is to review literature concerning stakeholders' perceptions about environmental injustices and of community-based environmental education. The chapter provides foundational knowledge about environmental injustices and community-based environmental education. It also identifies prior studies to prevent duplication and give credit to other scholars. The chapter furthermore identifies inconstancies and gaps left open by prior researchers and justifies the need for additional research.

This chapter is a critical review of existing literature on environmental injustice and community-based environmental education. The literature review aims to understand the perceptions of stakeholders about the environmental injustices existing globally, regionally, nationally and locally, paying particular attention to the factors that influence stakeholders' understanding of these environmental injustices. The review will also focus on strategies that stakeholders of Stortplaats could use to address environmental injustices at Stortplaats. The chapter begins by explaining the terms perceptions and environmental injustice. This is followed by environmental injustice in developed countries, pollution, poverty and race issues, environmental injustice in Africa and neoliberalism, the South African context, gender issues and justification of some environmental injustices. The last part of the review concentrates on community-based environmental education.

3.2 Stakeholders' perceptions about environmental injustice

Investigations into environmental injustice issues have long been an integral part of sociological studies (Fanon 2010). This study focused on the perceptions of stakeholders about environmental injustices and of community-based environmental education.

According to Fanon (2010), individuals' (in) justice evaluations stem from comparisons between what is expected and what constitutes actual outcomes. Perceived instances of environmental injustice occur when reality does not align with what is expected. A combination of individual factors and contextual factors affect these justice perceptions (Gifford and Nilsson 2014). Environmental perceptions represent the meanings people or stakeholders attach to their relationship with the environment and the environmental roles they play provide a framework for managing thoughts, feelings, and perceptions (Bonds 2016). This involves awareness of, or feelings about the environment, involving an act of apprehending the environment by the senses. Stakeholders verify environmental identities through behaviour, seeking consistency between how they perceive themselves and how they think others perceive them (Edwards, Luna and Edwards 2020). In order to reconcile differences in environmental perceptions, stakeholders tend to engage in various sense-making ways to align their motivations, beliefs and perceptions. This desire for consistency and alignment affects how individuals perceive a situation, especially with regard to various environmental injustices such as the unfair distribution of environmental disutilities (Buckley and Pinnegar 2017). Studies on how perceivers' identities influence environmental (in) justice evaluations examine the socio-demographic factors of individuals such as race, socio-economic status, gender and historical issues. Edwards *et al.* (2020) posit that racial minorities in the USA disproportionately bear the brunt of environmental burdens and the victims of these environmental harms perceive these discrepancies as racial discrimination.

The social constructionist perception on how people attached meanings to their environmental world was characterised by the environmental justice movements around the 1960s (Edwards *et al.* 2020). According to this perception, environmental injustices can be seen as social problems defined by shared identities or meanings and these influence how the stakeholders perceive different social justice issues. Racial minorities in the USA scored lower than whites on the New Ecological Paradigm measuring environmentally responsible beliefs and environmental behaviours (Bullard 2000). In contrast, Gabrys and Pritchard (2016) reported that racial minorities in the USA and whites have equal levels of environmental concerns but that they vary the in

types of concerns they express. For instance, racial minorities are more concerned about neighbourhood environmental problems such as exposure to environmental disutilities than their white counterparts who are globally concerned about the environment. The focus on local environmental problems is linked to issues of environmental injustices (Gabrys and Pritchard 2016). This distinctness of environmental perceptions between racial minorities in the USA and their white counterparts stems from the history of black-white race relations since slavery, racial segregation laws and several *de facto* laws that isolated racial minorities. These historical truths have shaped the environmental perceptions of racial minorities in the USA (Bullard 2000). This therefore means that the perceptions about environmental injustices are ingrained in the historical truths about the communities. The distribution of environmental disutilities have been so heavily placed on racial minorities that Bullard (2000) termed these kinds of environmental injustices to racial minority communities environmental racism. This means that race is positively related to environmental and ecological (in) justice evaluations and perceptions.

Their racial identity may sensitise individuals to instances of racism in Africa in general and South Africa in particular. Actual experiences of discrimination, be these racially based, gender-based, economic status-based or any form of horizontal discrimination, may independently affect environmental (in) justice evaluations and perceptions. Studies indicate how discrimination experiences in general influence what people learn, evaluate and perceive about environmental injustices (Boesak 2015; Bonds 2016; Din and Zhu 2018).

The environment has been a social and political issue since the last half of the 20th century and the high levels of water and land pollution, land degradation and other environmental risks have raised reactive responses from especially marginalised and poor communities (Alibeli and White 2011). While public environmental concerns in developing countries is a reactive response, in the developed world it is proactive and eco-centric in nature (Duncker and Gonçalves 2017).

Environmental injustices around the world are heterogeneous, intertwined and usually engraved in large, complex, socio-political issues (Bullard 2000). Therefore, individual and community perceptions about environmental problems and concerns are diverse but interconnected to the existing socio-political terrain (Alibeli and White 2011).

People know about environmental problems, but they usually fail to link the environmental issue and the causes and effects of that environmental problem (Adams and Adeleke 2016). International surveys about citizens' environmental perceptions such as the *World Values Survey, Health of the Planet Survey* and *Eurobarometer* have alluded to that notion (Paco and Lavrador 2017). The *Eurobarometer* survey conducted in 2007 revealed that global environmental concerns are unique and not homogeneous (Bonds 2016). This means that there is a need to understand the perceptions of local residents in order to shape the environmental policies and implement relevant people-based environmental education programmes that would effectively manage the environmental issues. In Europe the survey indicated that 95% of citizens saw the need for environmental protection and realised that they needed to play a role in environmental programmes. Only half of that percentage were informed about environmental injustices, causes and effects and they felt that they were inadequately informed (Duncker and Gonçalves 2017). The 2008 *Gallup Poll* in the USA indicated that citizens of that country realised the need for environmental protection even if it meant a reduction in economic growth (Struwig, 2010). The *Washington Post* and *Stanford University* concurred that most Americans across all racial groups regarded global warming and the greenhouse effect as the biggest global environmental challenges (Marquart-Pyatt 2015).

Analysis of trans-national surveys on studies of environmental perceptions shows the difficulty of generalising community environmental perceptions across geographic settings (Marquart-Pyatt, 2015; Liefländer and Bogner 2018). This means that citizens of developing countries are environmentally concerned because they are directly exposed to environmental injustices, while people from developed countries are likely to support environmental management and protection because of economic well-being (Liefländer and Bogner 2018). Of interest is that economically developed countries support environmental protection anywhere in the world, yet sometimes the perpetrators of those environmental injustices are multinational corporates headquartered in those same countries (Stull *et al.* 2016). Struwig (2010) states that global environmental concerns are not heterogeneous and he highlights the need to understand community perceptions of environmental issues better. This is so because local environmental concerns revolve around livelihoods, individual experiences and

socio-economics, while the widespread global environmental concerns reflect the globalisation of human concerns. People's perception of the environment is the main point of departure for any analysis of people-environment relations (Edwards *et al*. 2020).

There are examples in the world where lawmakers made the mistake of not including the environmental perceptions of affected communities in environmental education programmes and their efforts never worked. In 1990 and 1994, the United Kingdom's Department of Environment used £6 million to increase the public's awareness of environmental issues primarily through print and visual media. The campaign design failed and awareness of environmental problems did not increase, as residents were unwilling to participate in environmental protection campaigns (Liefländer and Bogner 2018). The failure was attributed to the exclusion of previous findings about people's perceptions on environmental matters (Islam and Managi 2018). All successful environmental campaigns and policies need public acceptance and should be in line with the public's perceptions so that they can be implemented effectively (Bakuwa 2015). The study of environmental perceptions is the foundation for understanding of behavioural attitudes that need modification or those that need to be promoted and reinforced (Struwig 2010). Marquart-Pyatt (2015) identifies perceptions as responses to stimuli, which are assessed and then later registered as opinions. From opinions attitudes then develop into a cultural standpoint toward an environmental problem. Environmental concerns have a strong influence on environmentally friendly behaviour. Studies on the perceptions of environmental problems are an attempt to bridge the gap between environmentalists and political leaders and the affected people (Bakuwa 2015). Studies on environmental perceptions can be classified into two groups, namely the psychological factors related to environmental perceptions and the socio-demographic factors related to environmental perceptions (Islam and Managi 2018).

The term environmental (in) justices is now both deep and wide. It emerged in the 1980s at the edges of the civil rights and environmental movements. The term has grown as a field of social activism and lexicon of respectable international environmental organisations such as Greenpeace and the Sierra Club (Bullard 2000).

Environmental injustices do not have a universal or monolithic definition; instead the definitions are different for different contexts. For a single community, environmental injustices might have one meaning, for example a community fighting for the removal of sewage ponds in their area, and another for one struggling to stop sand poaching (Bullard 2000).

Environmental injustice is the disproportionate distribution of environmental benefits and burdens without any meaningful participation of the stakeholders, particularly poor people and indigenous groups, in making environmental decisions (Manyena 2016). Environmental injustice also includes failure to recognise the inherited rights of indigenous people. Manyena (2016) states that the occurrences of environmental injustices are not haphazard realities, but the result of institutional repression and exclusion of the powerless by the powerful. Kulozu (2016) explains that environmental injustices in Africa and other developing continents are caused by external and internal factors. If developed countries and transnational corporations inflict environmental injustices on Africa, then that is considered to be an external cause of injustices. If the state and its indigenous corporations inflict environmental injustices on their poor rural groups, then those are internal factors. Kulozu (2016) goes on to explain that environmental activities by some rural community residents can cause self-harm in the entire community. For instance, the cutting down of trees, polluting rivers and sand poaching could result in severe upsets in the entire eco-system.

How can we understand environmental injustices contextually and what conceptual mechanisms are at our disposal to make sense of these different and disparate problems? Bullard (2000), in his widely accepted definition of environmental injustices, focused on disproportionate and unfair exposure to environmental dangers and relative lack of access to environmental benefits faced by the poor, vulnerable and disadvantaged communities. This definition is widely criticised for its narrow focus on distributive injustices and neglect of historical, spatial and institutional realities (Powers and Nsonwu 2020). These criticisms prompted scholars and environmental activists to look for other all-encompassing and inclusive definitions (Burke and Pinnegar 2015). Cox (2013) and Holifield (2004), for instance, in their definition of environmental injustices, include procedural, institutional (in) justices and governance as factors that

cause these environmental problems. Cox (2013) posits that environmental injustices result from class-blind policies of the state and corporates who usually make decisions based on the middle class without consulting the poor and marginalised. This class-based bias in making environmental decisions is sometimes not intentional and at the same time far from being random. Environmental decisions made by corporates and the state that expose the poor and marginalised to environmental burdens are sometimes spontaneous, as no one speaks on behalf of the marginalised. This insight raises the need for more focus and consultation on distributional issues.

While retaining her focus on poor and marginalised communities and their exposure to environmental burdens, Pulido (2000) questions why the rich and powerful are disproportionately able to avoid both environmental burdens and the poor people. Pulido's work on environmental injustices has served as a template for much environmental justice work since 2000. Others have extended the analysis of environmental (in) justice into global spheres, for instance, global politics of environmental inequality (Newell 2005), artisanal gold mining injustices in Ghana (Tschakert 2013), solid waste politics in Mexico (Moore 2008) and agricultural development conflicts in Brazil (Wolford 2008). Still, largely absent from the available literature are the diverse forms of environmental injustices affecting indigenous people of Africa (Stull *et al.* 2016). This is true particularly with regard to rural and semi-rural environmental injustices where residents have inherent powers of sovereignty and self-governance. The fundamental struggles between the state, corporates and residents is about control of the territory; community members demand their rights to practise their cultural and traditional livelihoods, which sometimes involve questions of environmental quality (Tschakert 2013).

Environmental justice ushers in a platform for dialogue between the victims of environmental injustices and the perceived perpetrators; this platform was proposed by Bullard (1990). Its concerns are centred on unfair distribution of environmental burdens, especially among the poor, vulnerable and marginalised (Curruthers 2008; Ssebunya and Okyere-Manu 2017). Environmental justice is steeped in notions of social equity that ostensibly identify the perpetrators and absolve the victims. Such a notion is difficult to disentangle and dissociate from a political agenda. Once tainted

with politics, research findings become irrelevant to certain sections of society. Moreover, in this study, the aim was to expose scientific certainties and environmental injustice causal mechanisms, with no intentions of reparation.

Associated with environmental injustices is the 'environmentalism of the poor' concept, which entails the struggles of the marginalised against environmental injustices and the distributive tendencies that focus on how environmental burdens are distributed (Agarwal and Narain 1989; Schlosberg 2013). Both environmental justice and the environmentalism of the poor advocate three non-negotiable conditions, namely compensation for environmental harm, redistributive politics and clustering communities without allowing market forces to determine who stays where. Schlosberg (2013) criticises environmental justice and environmentalism of the poor for their association with Marxist, Leninist, socialist and communist philosophies. As a result, their plea for the eradication of environmental injustices is viewed with a lot of scepticism.

3.3 Perceptions about historical issues of environmental injustice

The concept of environmental injustice emerged in North Carolina in the USA when Robert Burns was hired by Ward (a chemical industrialist) in 1979 to dispose of polychlorinated biphenyls, a toxic industrial discharge. He was assigned to discharge the chemical in a manner that would reduce costs (McGurty 1997). Fearing that discharging the chemical haphazardly would lead to negative legal repercussions, Burns identified Warren County, inhabited mainly by poor and marginalised African-Americans. Burns chose Warren County primarily because the community was economically and politically underpowered (Carl 2011). Within a space of two years the county suffered heavily from this illegal disposal of a toxic substance.

The Warren County residents in the USA, state of Indiana, garnered support and influence from the regional and national civil rights movements and organised protests against the continuous exposure to toxic chemicals. The objective of the protesters in Warren County was not immediately achieved; however, the controversy had a major impact on the contemporary environmental policy agenda. Other counties that suffered

the same environmental injustices erupted and joined the crusade, protesting against the inequitable distribution of environmental burdens and systematic exclusion from environmental decision-making platforms. The protesters were proclaimed by the policy makers and civil rights organisations as fighting against environmental injustices, and that is when the term was coined (McGurty 1997). The term environmental injustice became popular, creating a perception that became an issue and a challenge to the contemporary world and environmental discussions (De-Luna and Kathryn 2016).

It should be noted that the Warren County conflicts or protests emerged during the period of heightened civil rights movements between 1955, after the Rosa Parks incident, and the early 1960s. In that context, the conflict was naturally transformed into a civil rights agenda, motivated by the nature of the disutility, the racial and political landscape. Civil rights leaders who had influence among African-Americans incorporated environmental injustice and environmental racism into their programme and this gained legitimacy and strength (Fischer-Kowalski and Haberl 2015). The inclusion of environmental rights into civil rights led to a marriage of social justice, which remains a rocky union even today.

Since the mid-1980s the concept of environmental injustice has developed a multifaceted character and several authors point out that the concept is understood in different ways (McGurty 1997; Carl 2011; Fischer-Kowalski and Haberl 2015). The concept, as explained earlier, was born out of the struggle for racial equality in the USA during the civil rights movement period and that understanding led to investigations into the relationship between race and exposure to environmental hazards. In exploring the link, it was found that African-Americans and people of colour were more likely to be exposed to environmental injustices than their white counterparts (Laurent 2011). This relationship that was identified was later named environmental racism; the concept was meant to describe environmental injustices based on race, gender and social class. In order to address the environmental injustice issues driven by the concept of environmental racism, the US Environmental Protection Agency (EPA) proposed the setting up of an office that would address environmental inequities. Following a series of actions combined with civic activism,

environmental equity was integrated in all federal public policies and schools, through environmental education, were made drivers of environmental equity (Laurent 2011).

The concept of environmental equity fell into disuse in 1990 because it excluded the affected communities from actively participating in the environmental decisions that affected them. It was then replaced by environmental justice, which the proponents felt was more inclusive, as it incorporated concepts such as equity, impartiality and equality in distributing environmental burdens or hazards (Carl 2011). The environmental justice office was concerned about two kinds of justice, namely distributive justice, which addressed the issues of distribution of environmental burdens or disutilities, and cumulative justice, which dealt with the treatment of different social groups in the context of environmental issues (Laurent 2011). These would be administered through community environmental education, thus educating the affected about their environment and through their environment.

In 1994, the Clinton administration transformed the civic cause for environmental justice into a federal obligation and subsequently the environmental justice strategy was defined. As a result of these institutional developments, environmental justice is now legally an operational notion globally (UNEP 2006, UN 2010). In the USA it is implemented by the EPA (EPA 2014). In its execution of duties, the EPA ensures that there is no group of people, regardless of race, colour, income bracket or origin that unfairly bears the pain of housing environmental disutilities (EPA 2014). The EPA outlines the procedures for distributing environmental burdens and in the event of a decision to place an environmental disutility such as a sewage treatment pond in an area, meaningful involvement with the affected people is encouraged. Affected communities are given an opportunity to participate in decisions that may affect their environment (Johnson 2012).

The issues of environmental injustices would not be enough without reconsidering the historical context of environmental injustices. For this reason, it is therefore essential to look at some outdated but useful articles. The Australian context that involved the pastoralists and the British is of much significance for this study. Verran (1998) looked at how Cape York pastoralists and aboriginal groups jointly called for the federal

government to legislate a statute that would protect and save them from environmental injustices perpetuated by the British colonialists. The Australian land and islands were occupied and owned by indigenous peoples (pastoralists and aboriginals) till the arrival of British settlers around the 1770s. After 1770 the British settlers and government claimed the Australian land for the Crown. This claim meant that land occupied physically by the both British settlers and the indigenous peoples became the property of the British Crown. The Australian Native Act of 1993 separated the British citizens from the indigenous peoples. The land occupied by the British citizens was subsequently given title deeds and that occupied by the aboriginals and indigenous peoples became the 'reserved land' for yet to arrive British settlers (Verran 1998). Verran (1998) traces the issues of environmental injustices and the traumatic conditions to which the indigenous peoples were subjected. The land they occupied became the dumping area for toxic industrial discharges, water bodies where polluted with sometimes raw sewage and poisonous chemicals. Their livestock started dying because of ingesting toxic materials.

In the article, *Re-imagining land ownership in Australia*, Verran (1998) details how indigenous peoples of Australia identified themselves with the land they occupied for centuries and how they viewed the irrelevance of title deeds for the land they knew belonged to them. In contrast, the British settlers believed that the absence of title deeds was proof of the fact that the land did not belong to anyone. The knowledge conflict brought about ontological arguments between the indigenous peoples and the British settlers on issues of land ownership and triggered debates among scholars on how knowledge is generated and which knowledge is appropriate. Further examining this conflict allows researchers to understand elements inherent in knowledge and how that knowledge is made. Each group was blinded by an epistemic expression of what it considered to be true knowledge. Reconciling the two juxtapositions and ontological expressions of knowledge required the creation of a hybrid culture that saw the proliferation of both systems of life in the new (Verran 1998).

The issues of land and the environment in Australia are not strange to the South African context. Most rural land occupied by poor and marginalised communal people do not have title deeds (Stull *et al.* 2016). This set-up creates conflicts of ownership,

such that residents cannot successfully seek judicial intervention in the event of environmental injustices perpetuated by non-residents in their area, since there are no valid deeds to prove ownership of the land. Just like the Australian indigenous peoples, communal people in South Africa have been reduced to a non-human domain and theirs is to be known and simply acted upon.

The dumping of disutilities and a wide range of environmental injustices perpetrated against communal and marginalised people without proper negotiations with them formed fertile ground for breeding conflict between the perceived perpetrators and the victims. In Australia the issues of environmental injustices were based on racism and epistemic differences. In South Africa the issues of race were corrected in 1994. However, some communities are still subjected to some form of environmental injustice (Stull *et al.* 2016). This is the part that Verran's work does not answer adequately and the research sought to give answers to that.

3.4 Social factors influencing environmental perceptions

The role of socio-demographic factors is perceived as relevant in linking the environmental behaviour of a group of people and environmental consequences (Clements 2012; Ifegbesan and Rampedi 2018). During the 1960s, researchers identified the relationship between people and their environment, which led to the discovery of the importance of public environmental perceptions in managing the environment (Ifegbesan and Rampedi 2018). Global environmental concerns have never been homogenous, but individuals vary greatly in their level of environmental concern. Some individuals are more likely than others to make personal sacrifices in order to protect and sustain the environment and it is therefore necessary to understand the implications of people's perceptions to influence the management of environmental problems through people-based policies (Clements 2012). Understanding of environmental degradation and environmental pollution by community members leads to better stewardship of the environment.

Early studies in the field of environmental perceptions focused on socio-demographic attributes of individuals in responding to questions regarding the environment

(Hamilton and Duncan 2010). There is a link between specific environmental perceptions and socio-demographic factors such as age, gender, religion, culture, socio-economic status, education level, media and race (Bakuwa 2015). The most consistent results show that younger and more educated people support environmental management. The media are another important factor influencing environmental perceptions by popularising environmental management programmes. Most of what people hear and see about environmental problems is broadcast through the media and hence the media contribute deeply to beliefs held about the environment (Ifegbesan and Rampedi 2018).

It is highly unlikely that a person would be concerned about an environmental problem and behave in a way that would reduce that environmental issue unless the individual knows something about that problem (Ito and Kawazoe 2017). Conventional wisdom suggests that environmentally knowledgeable people have more positive attitudes to the environment than people with less knowledge. Therefore, environmental knowledge is an important factor that determines environmental attitudes, as well as a precondition for an individual's environmental behaviour (Ifegbesan and Rampedi 2018). In this case environmental knowledge refers to familiarity, awareness and understanding of the environment and its related environmental issues (Bakuwa 2015).

Environmental perceptions are also influenced by specific religious beliefs (Struwig 2010; Clements 2012; Gifford and Nilsson 2014). Religion is a personal and social factor that is responsible for social interactions within the community. Once people come together and interact, they are more likely to influence one another. Many religious books are responsible for inculcating strong links between environmental concerns and religious values (Clements 2010). Surveys in the USA show that Protestants, secular people and Judaic Christians are pro-environmental (Hand and Van Liere 1984; Greely 1993; Guth 1995). In the United Kingdom data from the *British Panel Household Survey* in 2008 and 2009 show that non-Christians are more likely to spend money on pro-environmental activities than born-again Christians (Struwig 2010). The survey carried out in South Africa found no relationship between religion

and environmental concern (Struwig 2010). More research needs to be done to determine the effect of religious convictions on environmental perceptions.

The relationship between environmental perceptions and gender shows that females express stronger environmental concern than their male counterparts. Males will only show stronger environmental concern if the environment is a commodity (Tindall, Davies and Mauboulès 2017). Surveys indicate that women are more concerned about risks associated with environmental challenges and that they have a strong and consistent ability to predict environmental dangers (Tindall *et al.* 2017). Women have stronger positive environmental attitudes compared to males, as witnessed in Germany, Japan, Sweden and the USA (Liu and Mu, 2016). Women exhibit pro-environmental behaviour and perceive environmental problems as more severe than men. In the United Kingdom alone, women outnumber men among the poor and marginalised communities and children outnumber adults. This geographic set-up suggests that women and children are more likely to be victims of environmental injustices than men (Kulcur 2008, Wesley and Satish 2014). It is therefore commendable to acknowledge the work done by environmental justice organisations by raising the alarm about existing environmental racism and classism, but much still needs to be done. The campaigns by environmental justice governmental and non-governmental organisations seem to be gender-blind and lack gender perceptions that would improve justice for all. Kulcur (2008) argues that the environmental concerns should widen to embrace other forms of inequality such as gender. Most eco-feminists concur that women are essentially closer to nature and confronted frequently with the environment through low-paying work they do among the poor communities (Kulcur 2008; Buckingham and Kulcur 2009; Aguilar 2016).

In a cross-continental study, females reported more pro-environmental behaviour and more willingness to pay for environmental protection costs (Gifford and Nilsson 2014). The Green Belt Movement (GBM), founded by Professor Wangari Maathai in 1977 in Kenya, led to large numbers of rural Kenyan women reporting that their streams were drying up because of environmental degradation. GBM, dominated by women, worked together in growing seedlings and planting trees, which reduced soil erosion. Professor Maathai, who became an epitome of African environmental advocacy, saw that behind

the everyday hardships of the poor were deeper issues: disenfranchisement and loss of traditional values caused by environmental degradation and food insecurity. Women in Africa, for an example in Nigeria, are economically deprived, but the irony is that they play a major role in growing the economies. In most cases, women are active agents of development, restoration and conservation of natural resources and their livelihood activities are highly dependent on the environment (Egaga and Akinwumi 2015). The destruction and degradation of the environment has negative consequences for women and unfortunately, they have been blamed for causing much of the environmental destruction in rural and urban areas (Movik 2013).

Social relations in homes, which are sites for recreation and reproduction, reflect gendered environmental injustices. Wives and children undertake domestic duties as shadow-workers. Homes are treated just like workplaces and it is where females provide unregulated and unpaid labour. Domestic chores such as sewage management in homes is unequally distributed according to gender and women are assigned to filthy conditions and have to clean dirty toilets (Aguilar 2016). Kulcur (2008) points out that in most societies, cooking, cleaning, waste-disposal and caring for the sick and frail are done by females. This then brings women into contact with pollution and environmental hazards on a daily basis, adding to poverty and the burden of environmental injustices.

In South Africa close to 40% of men stated that they had more important things to do than protect the environment, whereas only 29% of women agreed with that statement (Struwig 2010). The environmental concerns of women, particularly in African countries, derive from their cultural background and household set-up, which holds women responsible for home cleanliness and litter reduction (Tindall *et al.* 2017). Female gender socialisation roles, such as being caregivers and nurturers, have also contributed to creating pro-environmental attitudes in women (Struwig 2010). Environmental injustice issues in the world develop exclusive dimensions that are embedded in social marginalisation processes. These injustices surface in the form of discrimination based on race, ethnicity, class or income and origin (Aguilar 2009). In most cases, gender inequality is neglected and not considered when discussing

environmental injustice issues, yet in most societies, rich or poor, gender inequalities still exist.

Scholars and policy-makers are obsessed with the eradication of environmental injustices in communities, not realising the structural injustices embedded in those communities that are gendered. Any voice that introduces the gender issue in the struggle for environmental justice seems to be diluting the focus and is often rejected (Buckingham and Kulcur 2009; Fuller 2012). A structurally exclusive society is not one-dimensional. It is a classist or racially divided society and is likely to marginalise age, disability, frailty or even gender. It is therefore important to broaden the components of environmental injustices by acknowledging all forms of prejudice and power.

Environmental perceptions also vary according to population groups despite similarity in other factors (Ifegbesan and Rampedi 2018). African-Americans are less environmentally concerned and are less likely to engage in environmental conservation activities than white Americans (Bakuwa 2015). The differences in environmental concerns have been hypothesised as due to lower African-American socio-economic incomes. Struwig (2010) posits that black South Africans exhibit less environmental concern than coloureds, Indians and whites. In a quantitative survey carried out in in 1996, over 50% of whites, 30% of coloureds and Indians and 16% of black South Africans expressed environmental concerns (Struwig 2010). These differences are not surprising; they are a reflection of apartheid contours, given the history of exclusion with regard to environmental resources.

Age is also a predicting factor for environmental perceptions (Bakuwa 2015). Opinion polls by *CBS News* and *New York Time* in 1999 indicated that youthful adults between 18 and 29 years supported the maintenance of the current environmental laws in the USA. The *age hypothesis* states that where there are age differences, young participants are more environmentally concerned and sensitive to environmental problems (Gifford and Nilsson 2014). A possible explanation for that discrepancy could be that young people are not integrated into the existing social order like adults who are more concerned about preserving wealth. However, in South Africa, young people are less concerned about the environment than older people (Struwig 2010). Older

people in South Africa rate dirty water as a more serious environmental concern than young people do. A possible explanation is that young people still need knowledge regarding environmental conservation (Bakuwa 2015). Nonetheless, studies show that significant differences exist in environmental perceptions between various age groups (Struwig, 2010).

The *social-class hypothesis* rests on the assumption that environmental concerns have similar properties to leisure goods, which can only be enjoyed when basic needs have been met (Dow 1992). Most poor people in both developing and developed countries live in fragile environmental areas. This is the most consistent set-up in most studies (Dow 1992; Clements 2012; Bakuwa 2015). Most poor and marginalised people are aware of environmental problems, but there are other perceived pressing and more important issues than environmental problems, for example food and shelter. In Costa Rica, which is a developing country, a 1995 survey carried out showed that over 60% of the people did not regard the environment as a major concern (Hamilton and Duncan 2010). Populations of developed countries show that it is important to address environmental challenges and express high levels of environmental concern (Marquart-Pyatt 2015). The International Society of Sustainability Professionals' (ISSP) 1993 data of 22 countries shows that economic prosperity in a society is proportional to environmental concern (Ifegbesan and Rampedi 2018). The same results were obtained by ISSP research done in 32 countries in 2000. Poor countries have more pressing problems than environmental issues and are therefore more concerned about socio-economic problems, such as poverty and crime (Struwig 2010). Therefore, household income has a significant effect on environmental concerns and higher levels of income correlate with emphasis on good environmental quality and environmental support (Liu and Mu 2016). Of significant interest is the correlation between these socio-demographic factors; high household income leads to greater access to information on environmental problems and effects (Dow 1992). Lower-class communities may also be aware of the problems posed by a poor environment, but perceive high-class income groups as the perpetrators of environmental injustices. Lower-class groups may express their general environmental concerns, but receive less support from the corporate world compared to other social groups (Marquart-Pyatt 2015). In South Africa, the residents

of rural areas and informal settlements perceive environmental problems as a very serious issue, but not a priority compared to some social problems, such as housing and service delivery (Struwig 2010). The major challenge in effectively managing environmental injustices is the translation of the globally defined environmental protocols and objectives into action at microscopic level (Fuentes-George 2013). If villagers are to change their attitude to the environment and behave in a manner that is commensurate with global environmental pronouncements, the process requires policy-makers and stakeholders to be fully convinced about the economic value of nature. In trying to entice nations into participating in international environmental programmes, the Global Environmental Facility and the World Bank have resorted to neoliberal language by assigning high economic value to sustainable land utilisation (UN 2010).

In South Africa and other developing countries, adopting a neoliberal economic approach to environmental management may cause problems. Part of the problem might emanate from conceptual differences. What politicians and policy-makers regard as effective environmental management might be different from what a villager calls proper environmental management. The intention of this research was to examine the relationship between economic principles, environmental justice and effective environmental management by investigating stakeholders' understanding of environmental injustices with the intention of rolling out community-based environmental education. Some scholars might be sceptical about the possibility of generating useful data that would foster a culture of environmental stewardship and participation, but genuine growth and economic development are driven by stakeholders, not expatriated resources (Fuentes-George 2013).

Imported ideas from conferences are usually incompatible with those of the generally disenfranchised and politically marginalised communities. The incompatibility of imported neoliberal sustainable environmental regimes emanates from differences in perceptions between those who expatriate the ideas, in most cases non-governmental organisations, politicians and lawmakers, and those who import them, who by default are villagers and community members. If the dominant economic forces marginalise the views of the local populace, issues of environmental injustices arise.

The level of education can be used as an environmental perception predictor (Duncker Gonçalves 2017). Educational knowledge consistently correlates with environmental awareness and concern (Clements 2012). General Social Survey data gathered between 1973 and 1990 showed that educated middle-class individuals expressed higher levels of environmental concern compared to the less educated and that even one additional year of schooling increased the environmental concern of an individual (Liu and Mu 2016). Individuals with tertiary education even read environmental and other conservation magazines and pamphlets. Individuals with sizeable environmental knowledge acted in a more environmentally friendly manner and were more likely to conserve the environment or participate in environmental protection strategies than less knowledgeable individuals (Ifegbesan and Rampedi 2018). The *World Value Survey* 2007 analysis showed that higher levels of education were associated with environmental support and protection. In South Africa the survey showed that education influences a positive relationship between an individual and environmental concern (Bakuwa 2015). Individuals without education are less likely to be concerned about environmental issues and educated people are more environmentally concerned (Beckett 2013)

3.5 Perceptions about the complex nature of environmental injustices globally

The idea of completely eradicating environmental injustices has been a consistent, but elusive human agenda (UNEP 2006, UN 2010). Part of this elusiveness is a result of diverse understandings, uncertainties and assumptions about this concept (Hytten and Bettez 2011). There is no single characteristic or definition that explains this concept, as it has become tainted with socio-political and historical constituents making definitive understanding impossible. This contestation makes the concept of environmental injustice float on air, allowing everyone to recognise it when it appears (Hytten and Bettez 2011). The lack of clarity now means that environmental injustices become politically malleable and prone to political abuse. Besides the contestation and complexity of the concept, scholars have documented the traumatic experiences

suffered by communities that are recipients of environmental injustices (Fuller 2012; Johnson 2012; DeMaster and Malin 2016; Stull *et al*. 2016).

In the US EPA, the legislative guidelines and definitions are well articulated and should be adhered to regardless of race, ethnicity, location or income bracket. Despite all the sound and good-to-look at pieces of legislation, the contours of environmental injustices still exist in the USA (EPA 2014). In all cases of environmental injustices reviewed in this section, there is open acknowledgement of a visible relationship between poverty and environmental injustices. In the USA alone, the strong government policies and visibly active monitoring bodies testify to the fact that the economically powerful default instinct is to abuse the poor and voiceless. This research is therefore intended to introduce another way of ensuring substantive environmental changes through a more inclusive and collective approach that would bring together all stakeholders, namely community environmental education.

Environmental protection is sometimes viewed as luxury only to be considered when people have excess leisure time and plenty of disposable income. This truth was identified by Chunrong, Wesley and Satish (2014) when they carried out an investigation into the effects of environmental injustices in Memphis in the USA. The conclusion of their study indicated that low-income communities often bear the traumatic consequences of housing environmental pollution and degradation. Their study revealed that toxic waste was shipped over long distances from its place of origin to Memphis, an area inhabited by low-income communities. The reasons for transporting the pollutants to that area was that regulations governing toxic wastes were weak and almost non-existent. In their defence, the perceived perpetrators claimed that that was the way markets worked. In their argument, Jameson and Jia (2012) contend that environmental protection is a priority for the wealth; the poor and marginalised are obsessed with food for the day and therefore worry less about environmental issues.

Memphis in the state of Tennessee in the USA is a dumping place for waste substances. This area is mainly occupied by poor and marginalised people and illnesses and disorders such as leukaemia, brain cancers and reproductive disorders

in children have reached alarming rates (Chunrong, Wesley and Satish 2014). The incidence of cancer and reproductive disorders in children rose significantly between 2000 and 2010. Cancer cases rose by 37% and mental disorders rose by 30%. These increases are attributed to toxic chemicals such as lead, chromium, mercury and polychlorinated biphenyls that flow from the dumping sites and have polluted the soil, water and air around the area. Furthermore, run-off drain water through the local streams are causing severe health problems among community members.

In their study Chunrong *et al*. (2014) established a link between childhood cancer and environmental injustices in Brazil. Diseases, disabilities and disorders that have an environmental injustice component are distributed in the community in a manner that reveals race and income levels. The prevalence of asthma is significantly higher among poor and marginalised groups of people. Compounding these issues, marginalised and poor communities often receive lower budgets for health care (Chunrong *et al.* 2014). The economics of analysis teach the concept of externalities. In economic analysis, externalities arise when a transaction affects those that are not directly involved in the transaction. Negative externalities arise if a transaction passes costs to individuals who were not involved in the transaction and positive externalities arise when certain individuals benefit from the transaction (Sarker *et al.* 2017). In this case, the principal bearers of negative externalities are the poor and underprivileged. Perceived perpetrators enjoy the benefits and profits from factories discharging pollutants (Stull *et al*. 2016).

The research carried out in Rio de Janeiro in the Santa Cruz neighbourhood community in 2010 indicated that the distribution of environmental burdens was selective. Unfair distribution was linked to the vulnerability of certain groups of people (Anjos 2013). Fanon (2010) points out that poor social groups, particularly black and traditional communities, had a greater chance of housing disutilities such as garbage dumping zones and sewage or sludge-processing plants. These communities lacked proper infrastructure such as clinics, schools and above all, suffered the indignity of marginalisation and oppression. Attempts by local communities to resist the installation of dangerous polluting plants were often suppressed by the elite (Anjos 2013).

Anjos (2013) points out that the stratification of the Rio de Janeiro community contributed to environmental injustices and this was based on environmental racism and sacrificial zones theories. The environmental injustices revealed a mechanism where the allocation of environmental burdens and disutilities was discriminatory and based on prejudice. The community was stratified and organised in such a way that the risks and burdens should be borne by non-whites or people viewed as blacks by virtue of their poverty. Santa Cruz, an area occupied by blacks and the marginalised, was reserved and considered a sacrificial zone for dumping waste and locating industries that produced dangerous fumes. Fanon (2010) points out that sacrificial zones are identified after profiling inhabitants according to certain characteristics. Relevant factors when identifying sacrificial zones include income level, education, social group birth rate and mortality rate. Brazil, being the last country to end slavery officially, is still failing to deal decisively with a model of white domination. It is for this reason that contours of racism still dominate social stratification (Regoniel 2013).

The community of South Camden, New Jersey in the USA consists of a large percentage of immigrants, most of whom are undocumented. Gendreau (2011) focused on the basic concerns of environmental injustices and health in this rural area. The community is one of the poorest in the nation and less than 50% of the adults are employed. This community is frequently targeted as a site for disposal of toxic chemicals and other hazardous facilities. It houses a municipal-trash-to-steam plant, sewage treatment plant and the resource recovery facility. The siting of these disutilities was driven by the pervasive racist attitude motivated by hatred of immigrants; these people were considered to be ‘pollution’ themselves (Bell and Ashwood 2016).

Looking at the health status of the South Camden community, Gendreau (2011) examines both aggregate health and health problems that individuals face. The health status of Camden residents is distressful. A health consultant filed a report in 2011 for the residents who lived near the disutilities in Camden County. The residents who were affected by the environmental injustices had a 90% higher cancer rate than the rest of the County residents. The number of asthmatics was three times higher than those

who lived in areas that are free from environmental problems. Sixty-one percent of the adults who lived around the disutility sites reported difficulty in breathing.

Aldhous (2010) provides a general discussion of environmental hazards associated with health effects in Memphis, USA. Continuously exposing people to hazardous substances that have known or unknown intrinsic characteristics has adverse effects and carries health risks (Aldhous 2010). While the risk measures the probability of an adverse result upon continuous exposure to a hazard, the assessment and management of evidence to prove the effects are too expensive for the already financially burdened poor communities (Cohen 2008). Furthermore, communicating a risk to the affected poor people presents a difficult task, as the language used is often unfamiliar to the residents facing the exposure (Cranor and Carl 2011).

Bullard (1990) called environmental injustices born out of racism environmental racism, describing these as a form of institutional segregation that environmentally disadvantages a certain community, based on ethnicity and race. In a bid to rectify environmental inequalities, the government of Brazil drew up an environmental monitoring agency that was expected to effectuate the models of environmental burdens. The agency sought to promote equity and guarantee access to information about issues of distribution. Despite the monumental regulations that suggest a fair distribution of disutilities, the issues of environmental racism and sacrificial zones still exist in Brazil today (Fanon 2010). Amplifying participation by all affected groups would promote discussion and democracy and this could be done through community environmental education.

Environmental injustices in India have not been adequately addressed (Bhattacharyya 2015). Soil degradation is estimated to be occurring on over 147 million hectares of arable land being used for agriculture, forestry, pasturing and fisheries. Soil erosion is rampant and causing serious degradation and terrain deformation. In some areas, environmental degradation is almost irreversible. By 1992 it was pegged at over 50% on arable land. This is extremely serious, considering the fact that 18% of the world's human population is supported by India (Bhattacharyya 2015). India is an agrarian

economy and any aggravation in the state of the land would threaten global food security.

Human behaviour has caused severe land degradation in India. Deforestation, inappropriate farming practices and improper management of sewage, over-grazing and sand poaching are the major human factors that have contributed massively to land degradation and deformation. Given the intensity and nature of injustices to the land, it is necessary to strike a balance between global developmental goals and sustainability. Sustainable development should be accompanied by judicious management of natural resources.

After realising the effects of human activities that contribute to environmental destruction, the Indian government, in collaboration with the UN food security mechanisms, embarked on strategies meant to mitigate any form of land degradation and injustices to the non-human components of the ecosystems. The strategies were incorporated and integrated into the mainstream curriculum and into community environmental education programmes. Small-scale and large-scale farmers were taught ways of controlling soil erosion, water harvesting and terracing strategies. Existing farmers were taught intercropping and contour farming strategies through community environmental education programmes (Sarker *et al.* 2017). The government, in collaboration with all stakeholders, was involved in the reclamation of acid and salt-affected soils. Strategies to mitigate land and soil degradation in India yielded some sizeable successes. This was because of strong financial support from non-governmental organisations and above all a collective approach to the problems. The programmes are owned by the participants and all stakeholders (Bhattacharyya 2015).

3.6 Exploring the causes of environmental injustices in Africa

The nature and impact of environmental injustices in Africa were created by colonial authorities who deliberately propagated the commodification of the environment, suffocating the harmonic pre-colonial relationship between nature and Africans (Hoag-Heather 2013). Colonial authorities put pressure on small-scale African farmers to

produce globally marketable commodities, resulting in a decline in traditional environmental investments. Jacobs (2016) alludes to the fact that some people in Africa, particularly the vulnerable and poor, are still victims of toxic chemicals. Some countries, such as Ghana, risk the transfer and importation of toxic waste and hazardous chemicals from the Western world.

In post-colonial Africa and other growing economies, environmental rules and regulations were developed and are available, but those procedural laws constitute environmental injustices, as they are rendered inaccessible and exclusionary because they are sometimes written in languages in which the marginalised and affected groups are not fluent (Stull *et al*. 2016). The point of interest is that constitutional institutions such as the courts are middle-class biased and access to the justice system comes at heavy financial costs that the affected poor cannot afford, which impedes the implementation of environmental justice (Ndlovu 2015). It should be noted that political, technical and legal advances towards the recognition of environmental injustices in the USA since the 1990s have been accompanied by rigorous academic debates and research.

3.6.1 Colonialism and exploitation of minerals

The exploitation of natural resources by Western governments and corporations have contributed to the escalation of environmental injustices in Africa (Kelbesso 2012). The DRC is worth mentioning; over 100 international companies were involved in the extraction of precious minerals such as gold, diamonds and uranium and in other activities such as fisheries after 1998 (UNEP 2006). Logging companies have destroyed the once virgin forests, contributing to deforestation, land degradation and global warming.

Kelbesso (2012) explains that some Western powers, such as the USA, funded and are still funding corrupt DRC leaders to gain access to the minerals and oil in Africa. Successive US governments have trained and equipped the military of that country in order to obtain the essential resources in the name of crushing drug trafficking and

terrorism. This has led to massive destruction of natural environments in the DRC and other nations such as Nigeria, causing serious environmental injustices.

The absence of national environmental policies and reluctance to implement these policies effectively have led to some African states becoming dumping zones for toxic wastes by industrialised countries and multinational corporations (Kelbesso 2012). American and European corporations have exported toxic wastes to Nigeria, Equatorial Guinea, Egypt, Benin and Guinea Bissau (Dimah 2001). A landowner called Nana in Nigeria signed an agreement with Western corporations in 1987 granting them permission to use his property as a dumping site for toxic jelly wax. The corporations would pay him hundreds of dollars in rental per month. The federal government of Nigeria was not informed of the arrangement (Kelbesso 2012). The health effects associated with that toxic jelly included burns, nausea, paralysis, cancer, stunted growth and death.

In another related case the Organisation for Economic Co-operation and Development (OECD) exported more than 2 600 000 tonnes of toxic waste to third world countries between 1984 and 1994 (Kelbesso 2012). Somalia housed a large number of containers containing radio-active waste such as lead, cadmium, mercury and deadly industrial residues from OECD countries. These toxic wastes in Somalia caused and are still causing different health-related problems in poor communities. It is currently not possible to get rid of these substances, as there is no functioning government (Clark and Jorgenson 2012).

In 2006 some international and local companies signed an agreement to dump 600 tonnes of sodium hydroxide (caustic soda) and some petroleum products at 18 open waste dumping sites in Abidjan (Greenpeace 2010). The Dutch company, Trafigura Beheer BV, oil brokers and Greek-owned companies were named in the scandal. The effects led to the death of 16 people and over 100 000 were treated (Greenpeace 2010).

Banned lethal agricultural chemicals, such as Dichlorodiphenyltrichloroethane (DDT), herbicides and asbestos products, were also transferred from industrialised countries

to Africa between 2000 and 2010 (Kelbesso 2012). DDT is no longer used in developed countries because it has a residual effect and is non-biodegradable, but the World Bank is funding the residual indoor spraying of the chemical to control malaria in sub-Saharan Africa (Kelbesso 2012). Banned pesticides were exported to Egypt by the USA in the 1970s and that led to the death of over 1 000 buffalos (Greenpeace 2010).

The conventions and treaties signed at global and regional levels banning the trans-boundary movement of toxic wastes have not yielded much result (Greenpeace 2010). Scholars and respected World Bank officials have supported the idea of exporting polluting waste to Africa. Summers, a onetime World Bank official and former Harvard University President, suggested that the World Bank should encourage the exportation of toxic waste to Africa where the value of life is negligible (Kelbesso 2012). It seems Africa is used as a sacrificial zone for dumping toxic substances and the most affected people in every case are the poor and marginalised.

The exportation of industrial waste to Africa has compromised nature and promoted environmental injustices. This contradicts the principle of environmental justice, which encourages the protection of all people from environmental hazards, regardless of their income, race or culture. If chemicals have destructive properties in the USA, then they would have the same health effects in Africa and therefore there is no moral reason to export these substances to Africa. The people who become victims of these neoliberal tendencies in Africa are in most cases the poor (Stull *et al*. 2016). Sometimes these communities are not given enough knowledge about the dangers of the toxic waste; through community environmental education some of the effects could be avoided.

In South Africa the natural environment contains a remarkable variety of plants and animals. Much more than biodiversity of fauna and flora, it is the environment that determines the quality of life for people. Environmental degradation begets life degradation and cherishing and preserving the environment enriches lives (Indexmundi 2018). Environmental degradation and destruction of ecosystems are major challenges of modern times and have been on the agenda of the scientific

community since the 1970s (Adams and Adeleke 2016). South Africa is a developing country and its population is predominantly seen as a lower middle-income group (Stats SA 2016). Social challenges include lack of proper housing, industrial and domestic waste disposal, land degradation, land, air and water pollution and low levels of education and literacy. Urbanisation has directly or indirectly affected over half of the population (Indexmundi 2018). South Africa is increasingly urbanising, with more than 50% of the population now living in urban areas (Stats SA 2016). Most recent urban dwellers live in informal settlements near larger cities and enjoy minimum municipal services. The population in South Africa can be divided into two culturally diverse societies. The larger part of the population lives in circumstances of developing countries; these are former marginalised black communities. The other part of the population enjoys the conditions of developed countries and are predominantly white, coloured, Asian and Indian communities (Stull *et al.* 2016).

In democratic societies such as South Africa, environmental management should depend on effectively understanding public concerns and perceptions about environmental challenges (Beardmore 2015). To achieve sustainable development, public engagement should form an integral part of economic and physical planning. The local environmental issues and concerns are centred on socio-economics, livelihoods and individuals' perception of their environment (Adams and Adeleke 2016). Rapid urbanisation, coupled with overpopulation, makes the conservation and preservation of the environment difficult and trying to improve the living conditions of people may result in environmental degradation (Beardmore 2015). People living in South Africa and other developing countries experience environmental problems and injustices that are different from those in developed countries. For example, citizens in developed nations are concerned about environmental problems such as nuclear and toxic waste disposal, ozone layer depletion, recycled tin cans or newspapers and acid rain, whereas citizens in developing countries experience environmental challenges ranging from drinking and irrigation water, soil pollution, desertification, soil erosion, pollution of air and water, industrial waste disposal and the conservation of plants and animals (Struwig 2010).

3.6.2. Pre- and post-apartheid causes of environmental injustices in South Africa

During the apartheid era, environmental management was enforced by strict environmental policies, fences and patrols around official conservation areas. These natural conservancies were developed at the cost of many local residents and sometimes the local communities were forcefully removed from their traditional areas to create space for animals (Struwig 2010). In that era only white communities were placed in environmentally protected areas and the black African population was excluded from environmental decision-making processes (Struwig 2010). When apartheid was abolished, environmental conservation policies changed to a natural resource management approach. The post-apartheid government in South Africa has not fully succeeded in engaging the poor and disadvantaged rural communities about environmental issues and ironically, environmental degradation often affects rural poor communities because their livelihoods depend on environmental sustainability (Adams and Adeleke 2016). Residents in informal settlements are wholly dependent on the environment and therefore it is important that environmental constraints are resolved to reduce the vulnerability of these settlements (Beardmore 2015). To address the needs of historically disadvantaged groups of people fully, the environmental disparities that were created by apartheid must be attended to first (Stull *et al.* 2016).

The democratic order in South Africa encourages public input in sustainable development, allowing all citizens to participate in environmental decision-making processes (Struwig 2010). The post-apartheid Constitution of South Africa of 1996 consists of a set of human rights clauses that include the right to live in a clean environment. Prevention of environmental pollution and prevention of environmental degradation should be observed to ensure ecological sustainability (RSA 1996). The South African Constitution places great importance and value on issues related to the environment to increase awareness of environmental challenges (Duncker and Gonçalves 2017). This was done deliberately to allow policies to redress social and environmental injustices created by apartheid.

The Constitution (1996) mandated the South African government to take legislative measures that promote environmental conservation by providing a framework for the management and conservation of bio-diversity and the sustainability of indigenous environmental resources (Duncker and Gonçalves 2017). The NEMA, which was formed in 1999, provides for inclusive environmental governance. NEMA acknowledges that different groups of people will perceive environmental problems differently and the specific environmental conditions of an area are related to the people's perceptions of environmental problems. Studies in South Africa show that residents of informal settlements understand environmental management in terms of the services and facilities it provides, such as individual and community safety and employment opportunities (Adams and Adeleke 2016; Duncker and Gonçalves 2017). The former marginalised black African communities perceive water pollution as more of an environmental problem in comparison to non-African communities. This is probably because of the poor conditions under which many black African people live (Duncker and Gonçalves 2017). This further explains that poor and marginalised people who reside in hostile and poor environmental conditions are more likely to perceive environmental issues as serious (Paco and Lavrador 2017). Environmental protection is not a new issue among indigenous South Africans, because of the nature of past traditional practices (Adams and Adeleke 2016). The current challenge for local communities is to implement environmental strategies that will support positive economic and social growth without compromising environmental conservation and sustainability (Beardmore 2015).

Although South Africans are environmentally minded, there are doubts about how much importance individual South Africans place on the issues of environmental resources and environmental injustice (Struwig 2010). This study acknowledged these historical factors and found it worthwhile to study stakeholders' perceptions regarding environmental injustices and of community-based environmental education that could be used to address them. In this study the researcher relied on the stakeholder theory and the environmental perceptions framework. These were strengthened by the place attachment theory and community-based environmental education model.

The issue of environmental injustices in South Africa is nested in a context based on historical, economic and political settings. This is an acknowledgement that modern-day environmental injustices are rooted in more than 300 years of colonialism and apartheid, which began in 1652 with the arrival of Europeans (Movik 2013). Protracted struggles of dominion between the British and the Boers continued until the early twentieth century when the notorious racist policies were finally enacted. The 1913 Land Act resulted in the alienation of blacks from their land when 87% of the prime land was allocated to or reserved for whites and the black majority was crammed into the 13% of unproductive land (Movik 2013).

The 1956 South African Water and Waste Management Act was founded on the doctrine that the environmental benefits and hazards were to be distributed in a manner that reflected racial discrimination and alienation of the majority blacks. The whites enjoyed the environmental benefits and the environmental burdens such as sewage ponds and pollution-rich industries were located away from the all-white zones. These areas sacrificed for housing disutilities were inhabited by black poor people (Chirwa 2004; MacDonald and Ruiters 2005; Dugard 2012). The environment was deliberately used to marginalise the blacks racially and this became known as environmental apartheid. Stull *et al.* (2016) explain that the rural space was used as an environmental means for marginalising people. Thus, rural communities were relegated to the least healthy areas and were economically dependent on white-owned capital.

Movik (2013) explains further that the apartheid system had serious ecological and social implications that led to the creation of social and environmental injustices that would take long to eradicate. Policies and practices were crafted with the intention to disadvantage certain groups of people, in this case blacks. Dickinson (2012) links environmental apartheid to a phenomenon called environmental racism. While environmental racism is the racial abuse of a marginalised group of people, environmental apartheid is the commitment to marginalise and abuse a certain group of people based on race (Dickinson 2012).

In 1994, with the dawn of democracy, South Africa abandoned all the abusive apartheid policies and the government under the illustrious leadership of Nelson Mandela started the laborious task of reimagining itself into a democratic and inclusive society. Boesak (2015) explains that the majority of the formerly disadvantaged in South Africa are not impressed today, because they are still languishing under the heinous shadows of environmental apartheid. Independence came, but the communities, particularly the poor formerly marginalised rural people, are still in poor circumstances, the homelands are still the sites for dumping toxic wastes and the elderly people are still dying in misery (Boesak 2015).

Industries emitting hostile fumes and dangerous gases are located within the poor communities, adversely affecting the residents. Rivers are constantly polluted by processed and raw sewage, which is exported from the affluent communities to the poor and marginalised. Heavy leaching from commercial farms pollute water in rivers, causing severe eutrophication (Stull *et al*. 2016).

Boesak (2015) acknowledges that the poor people's livelihood practices also promote environmental ills, but the effects visible today are a continuation of a system that was created over 300 years ago. The rural areas in South Africa still have limited health care facilities, roads are generally very poor and dusty and poverty is visible. In 2011, poverty rates were over 70% in the rural areas and the primary assets, which are the natural environment or the land and cattle, had been depleted and eroded, leaving the rural folk with limited safety (Stats SA 2014). Ironically, the widely celebrated South African Constitution encompasses the Bill of Rights and Section 24 decrees that everyone has the right to an environment that is not hazardous either to his or her well-being or health (RSA 2008).

The South African government, like any other state in the universe, does have limited resources to transform and rectify the environmental injustices created by the apartheid government radically, but the truth is that the rural communities are still environmentally marginalised and experience the violation of these celebrated environmental rights (Mathee 2011; Boesak 2015). Movik (2013) established that South Africa does have environmental extension services that are expected to

spearhead environmental education campaigns and deal vigorously with special injustices, but the efforts are stifled by the elites and policy-makers who have become petty bourgeoisies. The victim-blame game by the state is continuing. The rural people, who are mostly poor, uneducated and unemployed, are still exposed to an array of environmental injustices that contribute to both chronic and infectious diseases, over 20 years after democracy (Ndlovu 2015; Mathee 2011).

In participatory research carried out in a rural village called Manzimdaka in the Eastern Cape Province of South Africa, Stull *et al*. (2016) exposed first-order marginalisation. They identified a visible barrier between the urban and rural communities. The rural community is inferior and given minimum opportunities to improve their livelihoods. Boesak (2015) explains that before reaching the village, the road explains a history of physical, psychological and environmental torture of the community members who are the victims. The roads are unpaved, dusty and rough, representing environmental injustices and first-degree marginalisation.

The source of drinking water for both livestock and people at Manzimdaka is a seasonal river that runs through the village. The stagnant water is greenish and full of algae, making aquatic life an impossibility. The overgrazed land has become patchy, with sporadic dry grass and even cattle appear despondent when feeding on the grass (Movik 2013). Soil erosion has led to reduced plant growth, soil compaction and high levels of erosion. It is no longer possible to grow decent crops in this area. Bell and Ashood (2016) rightfully established that in 1999 the South African rural areas had the highest rate of fauna and flora extinction globally because of extreme environmental injustices.

In 1994 the policies of apartheid were repealed in South Africa, but the contours of environmental apartheid are still visible today (Movik 2013). The Manzimdaka study reveals that the history of abuse and exclusion is still visible in some sections of South African society. People in Manzimdaka are not demoralised by the seemingly perpetuating environmental injustices and neglect. Stull *et al.* (2016) state that the community is beginning to realise that they can no longer wait to be helped; instead they are urgently taking a step forward as agencies to change their situation. The

government can mobilise the already existing social capital to bankroll the programmes of community environmental education.

The Stortplaats community, like the Manzimdaka residents, co-exists with multiple environmental assaults compounded by low income levels and lack of access to health care centres. Ndlovu (2015) reveals that most of the residents at Stortplaats are former farm labourers of mainly foreign origin. The residents quoted in that article complain that their environmental plight is not attended to as a matter of urgency for many reasons, of which one is that they are still regarded as foreigners. This research does not suggest that these environmental circumstances are unjust *prima facie*, and driven by historically embedded discriminatory tendencies, which were structurally created by apartheid. The goal was to determine the basis for these injustices and suggest means to remedy them. NEMA (1998) outlines the litigation steps to be followed when seeking reparation, but to prove the risk effects scientifically in a competent court requires exorbitant financial resources, which the affected people do not have.

Stull *et al.* (2016) point out that in South Africa people living in heavily polluted areas and squatter camps who are exposed to environmental risks are mainly migrant workers and the authorities are reluctant to use state resources to finance their relocation. Instead, they see these residents exposed to environmental risks as ‘pollution’ that must be got rid of. These are the similarities between the Stortplaats community and Camden communities. This research therefore aimed at finding community-based solutions to environmental injustices.

The history of environmental injustice in South Africa can be traced back to the pre-democracy period and sadly the contours are still visible today (Carl 2011). The location of environmental burdens and nuisances during apartheid reflected racial segregation, but the racially segregative laws were repealed after 1994 (Carl 2011). The existing environmental injustices are not the creation of the pre-democracy era, although the effects of that dark period are still visible. The question is: why are poor people and the marginalised still exposed to environmental injustices?

3.6.3 Perceptions about neoliberalism and environmental injustice in Africa

Africa as a continent and a developing world has not been spared the environmental injustices befalling the entire world. Obsessed by the desire to catch up with other global economies, countries on this continent have allowed the invasion of their space and places by mighty global corporations, hoping to speed up economic growth and development. This part of the literature review looks at the environmental effects resulting from allowing the domination of social life by business corporates.

Neoliberalism is a concept that dominates the current political, social and academic spheres of the world. It is a concept proposing that sustainable growth and development could be advanced through liberating entrepreneurial activities and this is characterised by free trade, strong private property rights and free markets (Thorsen 2009; Anton and Lawrence 2016). The sole purpose of the government and state is to safeguard private property rights and ensure free business operations. The state should abstain from interfering with economic activities (Manyena 2016). The assumption among neoliberals is that politics does not have enough information to predict market signals (Scannell and Gifford 2017). Economic institutions enjoy maximum freedom and can only be regulated by market forces.

The deregulation of government interference in all economic spheres exposes the poor and marginalised to gross abuse and marginalisation. Any form of resistance in the form of protest about this invasion by the marginalised is criminalised and the government, through its agents of control (police and the army), crushes it (Navarro 2008).

A balanced natural ecosystem is maintained when both biotic and abiotic components live in harmony and this set-up is sensitive to any environmental changes. Africa, until the beginning of the twentieth century, constituted many balanced, naturally existing systems. The introduction of colonialism and its subsequent modern-day neoliberalism led to naturally existing ecosystems gradually being replaced by less stable artificial ecosystems (Álvarez and Coolsaet 2020). Neoliberalism appears to be either completely ignorant of sensitivity of ecosystems or drivers or this concept is obsessed

with economic growth and expansion at the expense of environmental destruction (Roussopoulos 2015). Naturally existing ecosystems are continuously exploited brutally to benefit a few individual elites.

Wright (2016) points out that the social powers founded on co-operation and sharing among African communities have been radically replaced by monopolised institutions, over which the government and the state have no control. The inherently symbiotic relationship between the community as the biotic component of the ecosystem and the environment as the abiotic component has broken down and has been replaced by free trade and environmental exploitation under the illusion of sustainable development (Wright 2016).

Shugart (2010) agrees with critics of neoliberalism in Africa; he laments that the once stable natural ecosystems in Africa, which were stewarded by the indigenous communities, were abruptly disentangled and taken away from them and enclosed as private property, disrupting the balance of nature. These broken-down ecosystems have been categorised as commodities and exploited for profit (Shugart 2010). Resistance to this process of commodifying the environment is usually met with brutal force from the state.

Karatani (2014) states that neoliberalism has turned the land and ecosystems in Africa into consumable commodities and led to environmental destruction through mining, extraction of timber and sand poaching. The affected indigenous peoples have been subjected to various forms of social and environmental injustices, prompting the formation of environmental movements and encouraging conservationists to lobby for environmental protection, ironically turning a blind eye to the root cause of these injustices (Karatani 2014). The success of these environmental protection crusades remains questionable, as the environmental destruction continues unabated. The crusades seem to be valuing the abiotic ecosystem component, turning a blind eye to the injustices committed against the biotic components, which are human beings and other animals (Lange 2015).

Harvey (2010) points out that the existing environmental injustices in Africa and other developing countries lie in the relationship between exploitation of resources and dominance. He further explains that protocols, conventions, treaties and several amendments to laws and acts related to nature have been signed at all levels. This includes the global level through UN conventions, continental level (African Union summits), national level and municipal level, but environmental crises are exponentially increasing. Central to this destructive surge is neoliberalism (Harvey 2010).

Shugart (2010) criticises neoliberalism for assuming that natural resources are inexhaustible and have the capacity to regenerate. As seen in both developing and developed countries, neoliberalism is stretching or has stretched nature to its limits. Societies and communities in Africa are collapsing; river, air and land pollution is escalating and soil degradation is rampant. These environmental injustices are a result of neoliberalism disguised as economic growth and development (Shugart 2010). It is evident that nature cannot be packaged and reduced to interchangeable units.

Despite several years of state management of the environment, armed with global treaties and other legal environmental bodies such as NEMA in South Africa, the Federal Environmental Protection Agency in Nigeria and Environmental Management Agency in Zimbabwe, environmental destruction and injustices have reached a critical point (Stull 2016). There is no hope of reversing Africa to its precolonial period when nature was able to heal itself and keep all components balanced. State-driven initiatives seem to be hindered and stifled by the same corporations that fund the activities. The only window available that could be used to save the environment and its people is community environmental education. Community environmental education calls for a reorientation of environmental education away from the techno-deterministic and state-based approach towards community-based methods that are reformative. This community-centred approach does not seek to eradicate environmental problems only, but to remove all forms of inequality through deepening democracy (Roussopoulos 2015).

3.6.4 Electronic waste and environmental injustice in Africa

Electronic waste or e-waste describes discarded electrical or electronic devices. Used electronics, which are destined for refurbishment, reuse, resale, salvage recycling through material recovery or disposal are also considered e-waste. E-waste has become an environmental problem in Africa. E-waste shipped from developed Western and Asian countries to Africa include television sets, computers, mobile phones, compact discs, batteries, electronic printers and toys. These have become an environmental nuisance, as receiving communities are not informed about proper disposal methods. Greenpeace (2010) outlines that most of the electronic equipment sent to African countries as donations from the developed world is garbage, poor, unusable and irreparable.

Computers and electronic software equipment destined for dumping in Africa often come from developed countries. These defunct computers and electrical gadgets are often donated to schools as a global computer literacy initiative (Greenpeace 2010). Some of these electronic donations are difficult to dispose of and when burnt, they release a lot of toxins that pollute the land, water and air (Álvarez and Coolsaet 2020). Even if they are buried, they contaminate underground water. Sometimes workers who burn these electronic gadgets do not have protective clothing and this further exposes them to air pollution, as the inhaled mercury is linked to cancer and a reduced immune system (Greenpeace 2010).

Developed countries have been involved in illegal e-waste trafficking to Africa and this has been justified as legal, since the Federal Government of America did not sign the Basel Convention in 1989 and its amendment in 1995, banning the export of toxic waste from industrialised countries into Africa (Greenpeace 2010). Greenpeace (2010) recorded that 47% of the e-waste exported to Africa from Europe between 2003 and 2005 was illegal; this included 2 300 tonnes from the United Kingdom. Some governments in the European Community, Japan and the USA have set up e-waste recycling projects, but deterring expenses and dangers associated with disposal have compelled these countries to resort to cheap e-waste shipment to poor countries in

Africa (Kelbesso 2012). Ironically, developing countries in Africa receive this defunct e-equipment from the developed countries wrapped as donations, unaware that this gesture is sometimes not genuine, but a dumping process. What Africa and other developing countries need is sound knowledge about the effects of e-waste and that knowledge could be disseminated through organised community environmental education programmes.

The developed countries use Africa as a sacrificial zone for disposing of e-waste disguised as donations (Greenpeace 2010). Most of the outdated electronic equipment that comes to Africa contains highly lethal chemicals such as cadmium, lead, mercury and other toxic substances that are detrimental to the land, water and air. The world's poorest countries are supposed to house those chemicals, which have immediate acute poisoning effects if inhaled or ingested; continuous exposure is much more insidious. It can lead to reduced intellectual development and behavioural disorders. In most cases, the adverse effects take years to notice and the late discovery may not be linked to metallic poisoning, but instead accepted as a normal health problem (Álvarez and Coolsaet 2020).

Continuous tension between social welfare needs and the environment's ability to accommodate those needs in a sustainable way has always been a cause for concern (Bell and Ashwood 2016). In most cases, the management of natural resources can be influenced by existing moral relationships that humans share with the natural environment.

It is not illuminating to say that the environmentally hazardous conditions faced by residents of any society are *prima facie* unjust and wrong without analysing the source of this perception or feeling. Deliberately exposing human beings, particularly those who are poor and marginalised, to environmental hazards triggers concerns about diminishing moral values in the societies of today (Cranor and Carl 2011). The moral concept involves issues of fairness. Societies are now obsessed with maximising profits at the expense of the poor and weak. Industrial and economic development is commendable in every contemporary world; the fact that people in poor communities bear heavy environmental burdens and face environmental hazards daily is ignored

(Aldhous 2010). Furthermore, there are no sound and moral explanations for these discrepancies that would justify the health effects.

The damage caused to people, particularly children, by exposing them to environmental injustices is significantly high and, in most cases, irremediable. That is cause for concern to those who are morally sound. Certain physical harms follow these children throughout their lives, limiting the choices they will be able to make. The effects might be reduced lung capacity or compromised cognitive development; whatever is the case, their future choices are constrained and compromised (Aldhous 2010). In the modern world, the pursuit of own ambitions is extraordinarily important and good health is of concern for all. Good health does not mean absence of diseases, but encompasses the ability to meet career goals (Cranor and Carl 2011).

The effects of mining in the Karamoja region of Uganda resulted in serious environmental problems to all forms of life in that area. Efforts by the state to respond to the environmental crisis were inadequate, as investors and stakeholders who were affected seemed not to be concerned with the disaster associated with the environmental crisis. The situation raised some critical moral questions on why government efforts did not yield positive results and why the locals who were bearing the brunt of the problem were not showing any concern.

Ssebunya and Okyere-Manu (2017) argue that responding to environmental injustices should not be assigned to government and legislative environmental instruments, but should be part of the social and moral responsibility of every individual. The key, but overlooked, stakeholders are the social and religious institutions that despite their differences in teaching and practices have the same understanding of environmental issues. These institutions have the power to influence their followers to adopt positive environmental behaviour. It is their united effort to promote environmental literacy and environmental education that can influence policy-makers to implement positive environmental policies.

In South Africa, e-waste has become the fastest growing waste because of rapid technological advancement. The switch from manual to digital television sets, from the

traditional sets to liquid-crystal displays and the rapid introduction of new devices such as mobile handsets and computers, have led to a large quantity of unwanted e-equipment being discarded and thrown into dustbins (Walker 2011). Stull *et al.* (2016) say that measuring the volumes of e-waste in South Africa has been difficult; however, 5% of consumer-generated waste was e-waste by 2010 and that percentage tripled by 2016.

Grey literature collected from meeting minutes, newsletters and gossip sources (newspapers) reveals that e-waste in South Africa now constitutes a large part of garbage collection (Lawhon 2013). Despite an increase in e-waste, the country does not have an explicit e-waste policy. What is currently in place is a piece of legislation covering the disposal of hazardous waste, but it does not identify e-waste as a cause for concern. The interesting issue concerning e-waste in South Africa is that the country is party to the Basel Convention, which pronounced the dangers of e-waste, although the government did not sign the Amendment to the Basel Convention, which was a reinforcement of the earlier plight (Walker 2011). It is assumed that South Africa did not sign the Basel Ban Amendment because the country exports e-waste to poorer countries and the waste is generated locally (Lawhon 2013).

Lawhon (2013) maintains that e-waste dumping in South Africa has evoked environmental injustice concerns. Several environmental research projects about e-waste in South Africa show that the concern is yet to receive sound attention from the responsible authorities such as the NEMA (Scott and Barnett 2009; Walker 2009; Walker 2011). As explained earlier, e-waste disposal requires well-articulated policies and management strategies, as some of the problems associated with improper disposal are yet to be discovered.

The people who are exposed to poor disposal methods of e-waste are the poor and the marginalised, since they are not informed about how to deal with old, unwanted e-equipment. The exponential increase in improper e-waste disposal methods highlights the failure by middle-income countries to conceptualise e-waste as a modern-day problem. Furthermore, it exposes the insensitive nature of neoliberal practices, which focus on production and making more profits, paying limited attention to the lives of

individuals (Wright 2016). If the global goal is to eliminate environmental injustice, then the authorities in South Africa need to align themselves with a culture displaying deeper concern for human protection and reconsider ways of improving environmental knowledge among community members. This could be done through initiating people-based community environmental education programmes.

3.7 Perceptions about social factors and environmental injustice

The concept of environmental injustice goes beyond socio-cultural impacts; it connects both the social and environmental societies. Schlosberg (2013), in his article, *Expanding the sphere of a discourse,* makes strong connections within the environment itself. He points out that most researchers have covered significant ground in exposing environmental injustices committed against people, omitting an important fact that the origins of these injustices are as much a reflection of how humans treat nature. Environmental injustices also apply to nature (Agyeman 2013).

The human manipulation of nature for economic gain is a crucial component in the analysis of environmental injustice because it interrupts the normal functioning of ecosystems. Mining, mono-culture, sand poaching and river pollution are activities that corrupt, interrupt and defile the functioning of ecosystems (Schlosberg 2013). These activities constitute environmental injustices to humans and non-human components that depend on the integrity of the ecosystem. Disruption of the ecosystems increases the vulnerability of both components of nature (human and non-human) and this is at the centre of climate change: global menace. Climate change is the inability of ecosystems to function well as a result of excessive abuse and ill-treatment of non-human components of the environment/ecosystems by human beings (DeMaster and Malin 2016).

Focussing on the needs of the non-human components of the ecosystems entails that people recognise the mutual relationship between humans and non-humans. This understanding serves as a bridge between conceptions of environmental injustices and general environmental concerns (Agyeman 2013).

In the South African context, the perceived conflict is caused by a gap between those who perpetuate environmental wrongs and the recipients of those wrongs. Residents, corporations and the state are culprits in the destruction and mutilation of the environment. In the USA, environmental concerns are integrated into the frameworks of the curriculum and this approach has yielded some commendable success (Schlosberg 2013). This model could be used in the South African context by initiating negotiations involving all stakeholders.

3.8 Justifying environmental injustices

During the Iraq-Afghanistan wars, most solid waste was burnt in open-air pits and the trenches by the USA military. The harmful toxins and minute particles coming from the burning of unexploded weapons, plastics and Styrofoam filled the skies of Iraq and Afghanistan, causing serious environmental damage (GAO 2010 and IoM 2011). Advocates for human rights in the USA and journalists paid a substantive amount of time criticising the acts and describing how the acrid smoke would result in medical complications such as muscle spasms, shortness of breath and fatigue in victims. The focus was exclusively on damage to USA soldiers and veterans, while minimal attention was paid to the environmental effects on civilians in Iraq and Afghanistan (Carrol 2013). During the peak of the wars in 2011, the US military was burning 900 000 pounds of military waste per day. In Afghanistan, 1 700 000 pounds of waste was burnt per day (Bonds 2016). Burning of chemicals of war without control results in serious environmental and health effects and in the USA it is prohibited (EPA 2014). The recipients of these environmental injustices during the war were the poor Iraqis and Afghanis. The irony in that case is that the environmental injustices committed against the victims and the citizens never occupied any media space. Bonds (2016), in his article, *Legitimising the environmental injustices of war*, provides a content analysis of major US media coverage of the burning pits in Iraq and Afghanistan, at the same time exposing the hypocrisy portrayed by the environmental giant advocates. Preparation for war, training for war and war itself produce a lot of pollution and leave behind a trail of destruction. The major environmental victims of any destruction are the weak and poor (Clark and Jorgenson 2012).

The USA left a trail of severe long-lasting environmental damage in Iraq and Afghanistan during operations using high-technology weapons. The civilians, the majority of which are poor, are now the victims. Those environmental injustices were defended and legitimated in many ways by the media (Bonds 2016). First and foremost, the American public was kept in the dark about the military environmental destruction activities in Iraq and Afghanistan. Secondly, and more importantly, the war was programmed in such a way that the structure and reporting encompassed the content that reflected the themes of war. The military experts ensured that reporting demonised the leaders of Iraq and Afghanistan and legitimised environmental atrocities in the public opinion domain (Bonds 2016).

Sudan in Africa has been plagued by civil wars for most of the past 50 years and this has led to a number of severe environmental problems. UNEP (2006) found that there were major connections between conflict and environmental degradation in the Darfur region and this complex and pervasive relationship brought about untold suffering and numerous deaths, particularly among the poor and marginalised. The disposal of weapons such as landmines can lead to erratic and unprecedented environmental problems (Ssebunya and Okyere-Manu 2017).

Although South Africa and other developing countries are not involved in any war, the concept of defending and legitimating environmental injustices is visible (Stull *et al*. 2016). Environmental injustices committed against the poor and marginalised are often spiced with enticing words such as social development and employment creation. These words are meant to shift the attention of environmental injustice victims and environmental justice advocates from the real issues and any form of resistance is labelled retrogressive (Ndlovu 2015). Environmental knowledge and understanding could bring about sustainable development and this research intended to investigate stakeholders' understanding of environmental injustice and how that knowledge could be used to spearhead community environmental education.

3.9 Community-based environmental education

An understanding of environmental injustice would be incomplete without discussing the roles of stakeholders in terms of their interests, relationships and conflicts. The existence of environmental injustice is a symptom of unresolved conflicts among stakeholders in an area or community. Stakeholders in this case refer to local residents, leaders, the state and the private sector. Usually stakeholders' interests are contradictory and change from time to time. Harmonising stakeholders' environmental relationships reduces environmental injustice in any area (Sarker *et al.* 2017). It is therefore important to design a multi-stakeholder activity that would bring people together, foster active, constructive debates and promote democracy. Open discussions that employing proper democratic principles reduce the perpetrator-victim scenario and that helps iron out hostilities. That could be achieved through well-organised community-based environmental education programmes (Clegg, Boston, Preece, Warrick, Pauw and Cameron. 2019).

3.9.1 Origins of community-based environmental education

Environmental education is a product of scholars such as Hungerford, Peyton and Wilke (1983), who identified the importance of designing corrective and preventive measures that would halt the deterioration of the environment. This desire was initiated by the UN in 1972 at Stockholm. A follow-up UNESCO-UNEP workshop in 1975 at Belgrade provided a framework for spreading environmental literacy. Its major objectives were to foster environmental awareness, provide opportunities for acquiring environmental knowledge and create behavioural patterns that are not harmful to the environment. The first conference on environmental education was organised by UNESCO and supported by the UNEP and was held in Tbilisi, Georgia (USSR) in 1977 (Powers and Nsonwu 2020). Sixty-six delegates from member states and observers from two non-member states participated. Inter-governmental and non-governmental organisations were represented. At the close of the conference the Tbilisi Declaration was adopted, noting unanimously the importance of environmental education in preserving and improving the world's environment. It was accepted that environmental

education should be taught at local, national, regional, and international levels outside and inside the formal schooling system. The conference adopted some of the following criteria that would develop environmental education:

- All people must play their part in ensuring the sustainable use of natural resources.
- Different educational disciplines must integrate perceptions of environmental problems to facilitate rational environmental behaviour.
- Environmental education is intended to make individuals and communities understand the environment and acquire proper knowledge in order to participate in a responsible and effective way and solve environmental problems.
- Environmental education is intended to show the socio-politico-economic interdependence of the modern world, where local decisions and actions have international repercussions. In this regard, environmental education will help develop a sense of environmental responsibility as the foundation for a new international order that guarantees the conservation and management of the environment.
- Attention is to be paid to understanding the relationship between socio-economic development and environmental management.
- Environmental education should provide practical skills required to solve environmental problems effectively.
- Environmental education will provide a closer link between educational processes and real life so as to understand environmental problems properly.
- Environmental education should cater for all ages and stakeholders in a population.

The major categories of environmental education objectives as adopted at Tbilisi are:

- Awareness**:** All stakeholders must acquire awareness of and sensitivity towards the environment and environmental problems.
- Knowledge: All stakeholders must gain experience and basic understanding of the environment and environmental problems.

- Attitudes: All stakeholders must acquire values and feelings of concern for the environment and be motivated to participate actively in environmental management.
- Skills: All stakeholders must acquire the skills for identifying and solving environmental problems.
- Participation: All stakeholders must get an opportunity to be actively involved in working towards resolving environmental problems.

In 1992, at the UN conference at Rio de Janeiro, Agenda 21 proposed that environmental education should not be limited to the classroom but should spill over into the communities. Scholars such as Hungerford, Peyton and Wilke (1983), who were instrumental in facilitating the birth of environmental education, came from a positivist background, hence their emphasis was on behavioural change in order to save the environment (Hungerford, Peyton and Wilke 1983). Lucas (1991) from Australia opposed the behaviouristic approach to environmental education and recommended a socially critical approach that would be based on education about the environment, education through the environment and education for the environment.

It is claimed that the term environmental education was first used in Paris, France in 1947; however, the formal discipline was only named in 1949 (Wheeler 1985). Palmer and Suggate (1996) say that the evolution of environmental education was influenced by nineteenth and early twentieth century writers such as Rousseau, Geddes, Dewey and Ferreira. These writers were the first to link environmental quality and the quality of education. Geddes developed instructional strategies that brought learners into direct contact with nature, while Ferreira became popular for his romantic antic: *I cannot love someone before I can love nature* (Palmer and Suggate 1996). Geddes and Ferreira's concern was the education of the whole person; the product of that kind of education would understand the principles of the ecosystem, man and his environment. Their ambitions were later rewarded when nature studies were introduced as a subject (Manyena 2016).

In 1902 the nature study subject was founded in the United Kingdom and that broadened in later years into rural studies and finally environmental studies. By the

mid-1940s environmental studies as a subject co-opted other disciplines such as historical studies, geography and nature study (Ssebunya and Okyere-Manu 2017). In 1949 the inclusion of biology in environmental studies popularised the subject and this led to the development of full-time environmental teaching in the United Kingdom. In 1965, at Keel University during the UN-organised conference that was meant to investigate and discuss the implications of failure to conserve nature, educationists and conservationists came together and agreed to establish the Council for Environmental Education. That was the first time the environment and education were linked to form a term (Palmer and Suggate 1996, Bonds 2016).

In 1970, at Forestay Institute in the USA, the UNESCO conference for the first time lay the foundation for the definition of environmental education. It was agreed that the primary objective of the subject was to ensure that human beings as the major players in the ecosystem must understand the value of the environment, while at the same time developing skills and proper attitudes towards nature that would show appreciation of ecological interrelationships (Bonds 2016). A series of conferences and environmental educational workshops that followed stimulated and prompted the need for environmental awareness.

In 1972 the UN conference held in Stockholm, Sweden declared that environmental education was not to be limited to the four walls of the classroom, but had to include adults and the underprivileged (Sarker *et al*. 2017). The learning process was to be organised through activities set up by the local leadership in conjunction with the state department of environmental education. The structure of the adult learning process, which is non-formal and voluntary, is a vital component of environmental education (UNESCO/UNEP 1997). This led to the development of environmental education into an outdoor subject that was not limited to components of the curriculum that were examinable, but became a life process involving all people.

In 1975, the UN through its organ, UNESCO, founded the UNEP, which launched a series of workshops consolidating its agenda. A workshop held on environmental education by UNEP designed a curriculum for the subject and this was adopted by 140 out of 150 countries that participated (Palmer and Suggate 1996; Fuller 2012).

The environmental education curriculum document was designed to be used in formal and non-formal education.

In 1980 the World Conservation Strategy was launched and the document outlined the desire to reinforce and foster proper attitudes and behaviour that were compatible with eco-systemic mutual interdependence (Lee 2010). The joint conference of UNESCO and UNEP was held at Tbilisi in 1977 and several themes emerged during the deliberations. The main theme was based on environmental concerns, namely environmental injustice, the relationship between humans and their environment, human dependence on nature and environmental literacy. Community-based environmental education was identified as a means of achieving sustainable growth and development and it was to become an integral part of every nation's approach (Wesley and Satish 2014).

In 1990 the International Curriculum Document for Environmental Education was published. It was left to national governments to decide how to implement it. In the formal education sector the curriculum drivers were encouraged to integrate the environmental matters into other subjects, such as sciences and geography (Palmer and Suggate 1996, Bonds 2016). The objectives of the subject were to instil the concept of sustainable development and responsible behaviour compatible with the protection of the environment, at the same time bringing up responsible and eco-caring citizens (School Curriculum and Assessment SCAA 1996). Agenda 21 of the UN Conference held at Rio de Janeiro in 1992 concluded that all nations should strive for sustainable growth and development while paying serious attention to environmental injustices, toxic waste and poverty issues. Community-based environmental education was a means of achieving sustainable growth and development. The three dimensions of community-based environmental education were to involve environmental knowledge, skills and attitude (Clegg *et al.* 2019).

3.9.2 Environmental education as cure for environmental injustices

Environmental education as a cure for environmental injustices inculcates issues of environmental feelings and morality. Community-based environmental education

seeks to promote community environmental understanding and awareness, while simultaneously developing conservation skills that would improve the environmental components (Kyle and Chick 2007; Breen *et al*. 2015). Community-based environmental education is not just limited to subject matter acquisition, but involves a change in style that would promote ecological stability. It entitles community members to participate fully in making environmental decisions, at the same time offering an opportunity to the community to formulate behavioural codes that would ensure environmental quality (Lee 2010). Environmental education connects communities to the world around them and teaches appreciation about the natural environment. It also raises awareness of issues that have an impact on the environment in which the communities live and on which they depend, by offering experiential learning outside the classroom (DeMaster and Malin 2016). That enables community members to understand the interconnectedness between social, economic, cultural and political issues. Furthermore, community environmental education fosters environmental appreciation and respect and combats nature deficit disorder.

In Brazil, community environmental education contributed significantly to a reduction in environmental injustices after the communities in the affected areas were given an opportunity to participate in environmental risk mitigation (Coeho-Neto 2013). Mattos and Da-Silva (2011) explain that in Brazil, rapid industrialisation during the nineteenth century led to unequal appropriation of land based on accumulation of wealth and privileges. This led to a situation where marginalised and poor groups of people were forced to occupy spaces with little or no economic value. As explained earlier in the chapter, the poor and marginalised are a social group whose vulnerability is higher. Vulnerability is associated with exclusion and special segregation and that tends to create conflict between the marginalised and those living in areas with infrastructural development (Stull *et al.* 2016). Brazil was no exception to that.

The Brazilian government identified community-based environmental education as a strategy that would help reduce social hostilities created by environmental injustices (Coeho-Neto 2013). The Brazilian national environmental education policy was created and Article 13 (9). 795 of 1999 stipulated that authorities such as municipalities were responsible for organising environmental education programmes and

campaigns. These programmes were not merely for information dissemination and provision of content to citizens, but were well-organised transformational activities that emphasised critical establishment of relationships between man and his environment (Coeho-Neto 2013). Community-based environmental education became a means through which the new identities and new values of the community were created and re-established. It gave the affected communities an opportunity to play double roles, that is, as part of the problem and part of the solution (Coeho-Neto 2013). It further enabled dialogue between all stakeholders, the perceived perpetrators and the victims, thus reducing the social distance between them (Mattos and Da-Silva 2011).

The African Ministerial Conference on the Environment (AMCEN), held in Arusha (Tanzania), recognised that community-based environmental education was an effective strategy for reducing environmental injustice (UN 2012). Community-based environmental education was identified as a critical tool for creating environmental awareness and enhancing community attitudes that are consistent with sustainable development. To address environmental problems facing Africa, AMCEN developed an action plan for Africa. The Africa Environmental Education and Training Action Plan 2015–2024 was prepared. In Madagascar, for example, the community environmental project designed a holistic, comprehensive programme for community-based environmental education. The programme involved all stakeholders, including non-governmental organisations and local organisations. Youths were trained and became facilitators of community-based environmental education programmes, which reduced unemployment significantly (DeMaster and Malin 2016). Besides employment, the community members felt ownership of the programmes and that enhanced success. In Ghana, a mining development company that was often accused of causing pollution became the major driver of community-based environmental education programmes (Coeho-Neto 2013).

Properly executed, community environmental education is not only an antidote for environmental injustice, but stimulates communities' attachment to their environment and provides an opportunity to understand the natural chemistry of an ecosystem fully (Coeho-Neto 2013). It provides insight into historical, national and regional environmental situations and promotes co-operation in the prevention and eradication

of environmental injustices. This then connects community members with their environment. Lee (2010) states that community-based environmental education heightens enthusiasm and enhances critical and creative thinking skills while fostering an environmentally informed community. Furthermore, it promotes tolerance of diversity in cultures.

Allowing community members to engage in environmental educational programmes inculcates respect for nature and deficit disorders and above all, it is fun (Palmer 1996; Hastaoglu *et al.* 2015). Research outlines that engaging in outdoor environmental programmes not only reduces environmental injustices, but stimulates cognitive and behavioural development of young adults (Lee 2010). In South Africa, the educational curriculum shows commitment to community-based environmental education; however, it is limited to the classroom (Stull *et al*. 2016). In the event of environmental injustices caused by natural disasters such as floods, the responsible authorities resort to mass-communication methods using loudspeakers to announce the dangers of a phenomenon without assessing the effectiveness of the process. The country acknowledges the existence of environmental injustices and the desire to eradicate them is expressed in the constitution, as the Bill of Rights pronounces. The problem is that these environmental injustices are tackled in a disjointed manner across the whole country and no one takes responsibility for evaluating the effectiveness of the programmes (Hastaoglu *et al.* 2015). The national policy on inclusion seems to exist only on paper and little practical application is visible. If inclusive community-based environmental education is properly executed, fewer environmental injustices would be noticed, as in Brazil.

Environmental education heightens enthusiasm and imagination among participants and advocates community interactive learning, which is a response to the fundamental research question on strategies for reclaiming the environment. It also elicits critical and creative thinking, which helped the researcher ascertain from the participants the strategies that could be used to reclaim the environment to answer one of the research questions. In the case of Stortplaats, community-based environmental education will promote unity among community members by bringing them together for the purpose of addressing the environmental issues affecting their neighbourhood. Although the

findings of this study are not meant for generalisation, the environmental education theory would give insight into the community's environmental literacy and that would eventually trigger intellectual engagement in formulating people-based environmental policies.

It was therefore anticipated that themes emerging from the generated data will produce in-depth understanding of environmental injustices not only in South Africa, but in all developing countries and that will expand into more effective and protracted community-based environmental education programmes. Environmental education aligns well with the research question that seeks strategies for reclaiming the damaged environment. It is based on the major tenets discussed below (Aguilar 2016).

3.9.3 Environmental education and sustainable development

Environmental education theory acknowledges that formal environmental education, public environmental awareness campaigns and training are recognised as processes by which people and communities can reach their fullest potential (Sarker *et al*. 2017). For sustainable development, education is a critical tool for promoting and improving the capacity of communities and stakeholders in addressing environmental injustices that are created by development. Basic education provides the foundation for environmental education and the development of the latter must be incorporated as an essential component of the learning process. Both classroom environmental education and community environmental education are indispensable in helping change people's attitudes to the environment (Hastaoglu, Berktay, Alnaizy and Kocabas 2015). An environmentally literate community has the capacity and skills to assess and address environmental problems without stifling sustainable development. Environmental education further lays the foundation for achieving critical environmental and ethical awareness. It fosters the development of attitudes, values, skills and behaviour that are consistent with sustainable development and promotes a democratic culture of effective public participation in policy formulation or decision-making (Sarker *et al*. 2017). Effective environmental education deals with all the dynamics of the natural ecosystems and balances it well with socio-economic development.

3.9.4 Dimensions of environmental education

Environmental education encompasses concepts that could be combined to form dimensions**.** Concepts are symbolic depictions or true reflections of actual things and are the building blocks of a theory (Boudreau 2010). The theory provides a general framework of relationships between things in a scenario and the concepts provide specific relationships between variables in the same scenario. A dimension is therefore a blueprint for action and it describes what actually happens in the real world (Regoniel 2013).

Vital dimensions of environmental education that are capable of nurturing positive environmental behaviour at Stortplaats in response to the research question on strategies are the behavioural change dimension, environmentally responsible behaviour dimension, reasoned action, planned behaviour dimension, environmental citizenship dimension and diffusion of innovation dimension. Akintunde (2017) acknowledges that none of these dimensions could independently and entirely explain human-environment interaction, but a combination of these dimensions would undoubtedly provide basic insights into possible solutions to the increasing environmental problems posed by humans at Stortplaats.

3.9.4.1 Behavioural-change dimension

This dimension is centred on the opinion that if people are informed about environmental injustices, they are more likely to be conscious and literate about issues of the environment and this motivates them to behave in manner that is environmentally responsible (Dian and Sawitri 2015). This means that if environmental literacy increases at Stortplaats, environmentally favourable attitudes are developed and this translates into actions that are environmentally responsible. Evidence suggests that the change in environmental behaviour occurs in cyclical stages, which involve acquisition of knowledge, awareness and action in line with the acquired knowledge (Akintunde 2017). However, this linear belief that an accumulation of knowledge leads to awareness and that translates into positive action has been a bone

of contention for a long time. Some scholars argue that behavioural change is not simplistic because of multiple social factors that interact with an individual at different stages to influence a change in behaviour (Andrews *et al.* 2002, Sarker *et al*. 2017).

Though this dimension is criticised and often regarded as insufficient to bring about a sound, visible change in behaviour, it provides a solid foundation for the existing relationship between knowledge, awareness and attitudes that could be translated into action in the environment. Scholars do agree that lack of environmental literacy and knowledge of environmental problems does not translate into poor environmental behaviour, but environmental knowledge as a body gives an individual the locus of control of issues (Dian and Sawitri 2015). Acquiring environmental knowledge builds and encourages agency and gives individuals the capacity to choose, achieve and manage their own issues. Individuals with sound environmental knowledge are more likely to engage in pro-environmental behaviour than individuals with lower environmental self-efficacy judgments. This responds to the research question on strategies for reclaiming the environment (Carl 2011, Akintunde 2017).

3.9.4.2 Environmentally responsible behaviour dimension

Hungerford, Peyton and Wilke (1983) proposed the environmentally responsible behaviour dimension. It is described as any actions by individuals or a group of people reflecting care for the natural environment or any action that is directed at the eradication and remediation of environmental injustice or problems. It involves both general and specific actions, ranging from talking about environmental issues with friends and family members to full participation in activities such as purchasing environmentally friendly goods, recycling and limiting the use of carbon-emitting energy sources (Hungerford, Peyton and Wilke 1983; Fuller 2012).

Individuals who understand and accept that the natural environment is valuable and under threat from anthropic and negative environmental activities are more likely to believe that their behaviour can help restore environmental order and dignity (Stern 2000; Fuller 2013). Such individuals experience an obligation and develop personal norms about pro-environmental behaviour that supports environmental sustenance.

Those issues that are regarded as valuable help in developing trans-situational goals that guide life principles that would influence behaviour.

Environmentally responsible behaviour is the central goal of the environmental education discipline, which seeks to inculcate positive attitudes and right ways of behaving towards the environment. Environmental education that simply educates people without deliberately aiming at changing their ways when dealing the environment is merely natural science (Akintunde 2017). This dimension argues that good intentions about acting correctly are a major factor in influencing responsible environmental behaviour. Responsible environmental behaviour indicates that there is an internalised sense of control over an individual's own personal life within an environment; that constitutes locus of control intention to act.

There are other major variables, such as the affective components and the practical implications that play an important part in the individual or community process of adopting environmentally responsible behaviour. The internal control centre of an individual dictates the intention of acting and this is the part that is substantially influenced by acquired knowledge. There is a marked relationship between the control centre, pro-environmental attitudes and the intention to act of an individual (Hungerford *et al*. 1983; Manyena 2016). The control centre directly affects the attitude of an individual, resulting in improved intentions of acting and environmental behaviour. Thus, the dimension encourages interaction between parameters that influence a person's behaviour. This can be achieved through sound community-based environmental education, which responds to the research question on strategies for reclaiming the environment (Gabrys and Prichard 2016; Akintunde 2017).

No single factor is responsible for current forms of garbage and waste disposal methods among the poor and disadvantaged communities in South Africa (Stull et al. 2016). People pile up their garbage and waste in the middle of the streets and roads within the community, despite well-articulated by-laws and regulations that prohibit such acts. Most of those who flout the law do so at night when law enforcement agents are not available, and others are influenced by the irregular and inefficient local authority's garbage collection system. This dimension responds to the research question on contextual dynamics that influence the formulation of perceptions about environmental injustices by stakeholders. Such actions are an indication that knowledge alone is not enough to enable an individual to act responsibly towards the environment. While environmental knowledge and effective by-laws and regulations could prompt and influence community members to have good attitudes and intentions, other internal and external factors, such as those mentioned above, may stifle environmentally responsible behaviour (Akintunde 2017). Although many factors and different constructs of attitudes may influence the control centre and intentions of exhibiting environmentally responsible behaviour, environmental education as a means of acquiring environmental knowledge is irreplaceable, as it forms a base on which predispositions for good environmental behaviour are grounded. This dimension also answers the research question on environmental education as a strategy for reclaiming the environment.

3.9.4.3 Reasoned action or behaviour

The reasoned action dimension in environmental education originates from the field of social psychology. It was developed by Ajzen and Fishbein in 1975. This dimension outlines that the behaviour of human beings is embedded in rational thoughts and that their attitudes reflect intended behaviour. People engage in environmental behaviour that is well reasoned and accordingly a person's behaviour is intentional, not incidental (Ajzen and Fishbein 1980). An intention is a likelihood or plan that a person would behave in a certain way in response to a situation. It is influenced by the person's attitudes and subjective norms towards that behaviour.

Subjective norms are created by a person's perceptions of how influential people or groups around him would think, should he perform or not perform the expected behaviour. The subjective norms are normative and influenced by what others would accept and this motivates the desire to comply with what is considered normal (Ajzen and Fishbein 1980). Accordingly, the reasoned action suggests that people have a sense or belief about whether others would approve or disapprove of a behaviour. At the same time, group approval or disapproval is factored against people's motivation and knowledge about the issue in question.

An attitude is a crucial psychological construct or tendency expressed by an evaluative response to an issue, with some degree of favour or disfavour. It is a cognitive judgment of the value of something (Akintunde 2017). An attitude to an issue is influenced by beliefs and the potential outcome of that behaviour and these are usually engraved past experiences. The important aspect of attitude is its worthiness, whether it is positive, negative or neutral. For instance, if one believes that prevention of soil erosion would produce desirable outcomes, then it could be concluded that the person has a positive attitude to that behaviour. Likewise, if the belief is that the behaviour would lead to an undesirable outcome, then that could be concluded as a negative attitude.

By focusing on attitudes and subjective norms the reasoned action provides a foundation for identifying underlying reasons for a person's intention to behave in a certain way. It is called reasoned action because it emphasises understanding the reasons for behaving in a particular way, not necessarily saying the behaviour is reasonable or unreasonable. An understanding of attitudes and subjective norms that influence intention would help environmental education curriculum designers to accurately design intervention programmes that could influence these desirable behaviours toward healthier environmental behaviour. Ignoring these factors may inadvertently stifle an environmental education intervention programme (Stull *et al*. 2016).

This dimension can be summarised using an equation:

Behavioural intention = Attitude + Subjective norms

The attitude of an individual to the environment is influenced by his beliefs in the evaluated effects of the behaviour. Beliefs, on the other hand, are subjective probabilities that specific results are produced through behaving in a particular way. This dimension suggests that an external stimulus such as an organised environmental education programme could modify the structure of an individual's beliefs by influencing attitudes (Regoniel 2013).

The behavioural intentions are controlled by subjective norms, which are in turn influenced by beliefs. This relationship is summarised in Figure 3.1:

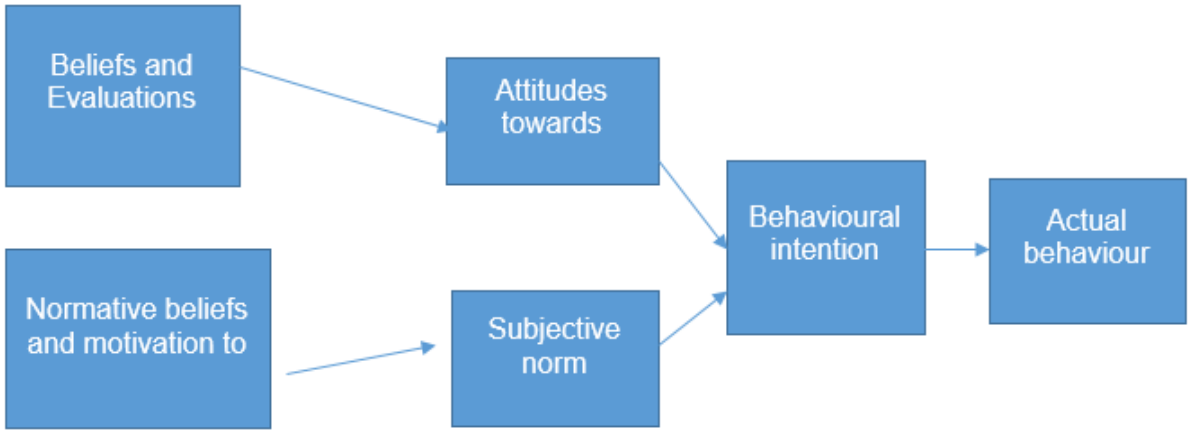

Figure 3.1: Reasoned behaviour

Source: Ajzen and Fishbein (1980: 140)

The figure above summarises how the actual behaviour, which is a reasoned action, is influenced by other factors and in a well-planned and properly executed environmental education curriculum this dimension could produce good results. In order to produce desirable outcomes, environmental education as a body of knowledge is used as a tool to strengthen attitudes that support the intended

environmental behaviour and to weaken attitudes that are environmentally detrimental. It works to increase the normative beliefs that support proper environmental behaviour while simultaneously reducing the normative beliefs that promote environmental destruction (Akintunde 2017).

3.9.4.4 Planned action or behaviour

The planned action or planned behaviour dimension in environmental education was proposed by Ajzen in 2002. This dimension explains that pro-environmental behaviour is determined by well-organised intentions and objectives; it is not situational and a reflex action. The intention is a summary of the interplay between cognitive variables that include knowledge, environmental action, skills and personality. Personality is a summation of variables such as locus of control, attitude, experiences and personal responsibility (Ding and Zhu 2018).

This dimension is founded on the idea that human behaviour is determined by three interrelated factors, namely beliefs about effects and affects, group expectations and supportive or inhibitive factors. The application of this dimension to the study is that it provides a deeper explanation of the connection between all the factors and the actual behaviour, as they influence environmental management practices. Knowledge is not a central component of this dimension, but beliefs are important. In this context, knowledge refers to an understanding of specific environmental behaviour and its effects and affects (Zhang and Gao 2018). This dimension allows for the representation of cognitive elements in the development of environmental affective beliefs. If a person understands that he has control over certain circumstances, his behavioural intentions usually reflect that knowledge. Behavioural intentions can be explained in terms of components of the previously explained reasoned action; in terms of attitude, subjective norms and perceived behavioural control. The background variables can be used to determine the skills needed for overcoming some environmental injustices and problems (Ajzen 2002; Kemp 2011).

People make decisions to behave in a particular manner after consciously or unconsciously calculating the costs and benefits or the effects and affects (Akintunde

2017). In that case, behaviour is a rational choice, which comes as a result of cognitive deliberations and self-interest. In order to help communities make rational, behavioural choices that are relatively pro-environmental, all stakeholders must have access to sufficient environmental information and that information could be disseminated through well-organised and planned environmental education programmes.

3.9.4.5 Environmental citizenship

The environmental citizenship dimension of environmental education is an idea that purports that every human being is an integral part of the global ecosystem (Hungerford and Volk in 1990). Development and environmental sustenance will only be achieved if everybody embraces environmental challenges by behaving positively toward the environment. It is about changing one's daily behaviour in order to become an environmental citizen (Ding and Zhu 2018). An environmental citizen is an individual who is viewed as a member of the ecosystem with rights and responsibilities and is expected to maintain environmental integrity. To produce an environmental citizen, proper community environmental education programmes must be planned and executed.

This dimension shows that effective environmental education programmes involve three stages. The first stage, which is the entry level, is exposure to environmental knowledge, an understanding of environmental injustices and environmental problems. This stage promotes sensitivity to the ecology and initiates proper environmental attitudes to the environment (Zhang and Gao 2018). Once right environmental attitudes are achieved, the second stage is ownership and this involves in-depth knowledge and understanding of effects and affects environmental problems. This leads to personal commitment to resolving environmental issues and problems. Once individual commitment has been achieved, the third stage is empowerment. This stage involves acquisition of sustainable environmental skills, locus of control and behaving in a pro-environmental manner (Stull *et al.* 2016). This dimension has the potential to develop a citizenry that is sensitive to the environment and prepared to shoulder environmental burdens. An environmental citizen desires to learn and seek more environmental skills that would remedy environmental problems (Hungerford and Volk 1990). This can be summarised as follows in Figure 3.2 below:

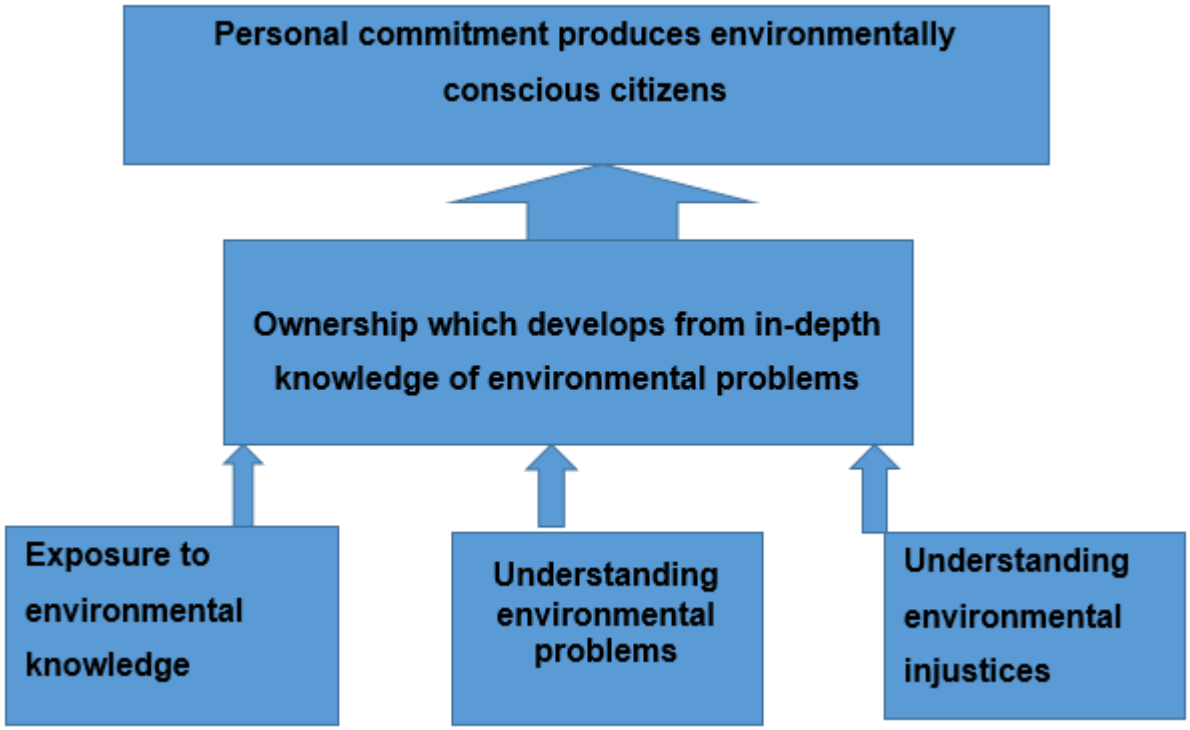

Figure 3.2: Three stages of environmental education

Source: Hungerford and Volk (1990: 44)

In order to survive, human beings interact or exploit their immediate natural environment for basic needs such as shelter, food and medicine. These anthropic activities and processes sometimes put pressure on the natural environment and cause environmental stresses (Hammond 1995; Scannell and Gifford 2017). The symptoms of environmental stress surface in the form of environmental injustices such as environmental degradation and release of toxic pollutants into communities. If these environmental stresses are not cured, the quality of the natural environment depreciates, which has a negative impact on global sustainability.

Environmentally literate communities understand the effects of anthropic activities on the natural environment. When symptoms of environmental stresses begin to show up, they respond quickly by performing activities that reduce environmental damage and problems. This quick response to solving environmental problems constitutes sustainable use of natural resources and is the prime goal of environmental education as outlined by the UN (UN 2010). A belief that pro-environmental behaviour saves the

environment and leads to sustainable development activates personal norms that influence sustainable behaviour. Furthermore, it influences an individual to feel morally obliged to act in a pro-environmental manner (Clegg *et al.* 2019 and Stern 2000).

3.10 Summary

This chapter reviewed existing literature on stakeholders' perceptions about environmental injustices and of community-based environmental education. It dealt with academic literature that focused on environmental injustice in the world, in the region and in South Africa. The chapter began by providing the historical background of environmental injustice. This was followed by environmental injustice in developed countries, pollution, poverty and race issues, environmental injustice in Africa and neoliberalism, the South African context, gender issues and justification of some environmental injustices. The last part of the review concentrated on community-based environmental education. Literature reveals that environmental injustices are indeed a global problem and the removal of these injustices demand strategies that adopt a holistic approach that is people-based or people-centred. It is the affected communities that must initiate the reclamation of their environment.

CHAPTER FOUR
RESEARCH METHODOLOGY

4.1 Introduction

The previous chapter reviewed existing literature on stakeholders' perceptions about environmental injustices and of community-based environmental education in line with the research questions formulated in Chapter One. This chapter discusses the research methodology that was used in conducting the study. The chapter explains the paradigm, the research approach, research design, population, sampling procedures, recruitment of participants, data generation methods, trustworthiness and data analysis. Ethical considerations are also discussed in this chapter.

4.2 Research paradigm

The word paradigm is an elusive concept to articulate, but it offers an explicit suggestion on how researchers can design effective research work. Kuhn (1962) first used the word paradigm in referring to a philosophical way of thinking. The term paradigm has over the years conjured up considerable controversies and debates (Guba and Lincoln 1994; Pandey and Patnaik 2014). The debates and controversies stem from the historical development of the subject and how it is defined by various academics waging academic paradigm wars or inter- and intra-disciplinary power wars, which were common during the 1980s (Guba and Lincoln 2005). A close examination of definitions formulated by the pioneers of the concept, such as Creswell (2013), Creswell and Miller 2000) and Lincoln and Guba (2005), reveal controversies and overlaps about what a paradigm really is. Creswell (1998) defines a paradigm as a set of assumptions that guides the researcher's inquiry. Lincoln (1990), on the other hand, defines a paradigm as an alternative worldview with a pervasive effect that taints the entire research inquiry. These controversies on definitions and overlaps confirm in part the nature of social sciences and reveal in full that social behaviour is dynamic, not static, and can be completely compartmentalised with clear and distinct boundaries (Pandey and Patnaik 2014). As a result, the definition chosen for this research does not preclude cross-overs. Hence the position taken from the start revolves around the

issues of knowing something and how the process of knowing something has affected our worldview.

The word paradigm has a Greek aetiology, meaning pattern. Mackenzie and Knipe (2006) describe the term paradigm as the school of thought, perspective, world view and way of thinking, shared educational beliefs or lenses that are consciously or unconsciously used by a researcher in interpreting the generated data. A paradigm inherently manifests the researcher's beliefs about the real and imaginary world in which he or she lives or wants to live. These beliefs and principles are then used by the researcher as lens in examining and interpreting the situation. Tracy (2010) points out that the paradigm determines the methodological aspects of the research project, such as the research methods and how the generated data would be analysed. Similarly, Denzin and Lincoln (2018) define the paradigm as a set of human constructions that act as indicators affirming the researcher's standpoint. It exposes the researcher's standpoint or the nature of the world lens he or she is using in interpreting the scene.

Thus, a paradigm is significant because it provides the philosophical orientation and beliefs of the researcher that were used as dictates during data generation and interpretation. In a nutshell, the paradigm tells or warns one about how meanings will be constructed from the generated data, based on the researcher's experiences and beliefs (Guba and Lincoln 1994). A paradigm comprises interrelated components, namely ontology, epistemology, methodology and axiology (Lincoln and Guba 1985, Denzin and Lincoln 2018). These elements consist of basic assumptions such as norms, values and beliefs that are contained in each paradigm. Thus, any research located within a paradigm must uphold the principles of the paradigm and be guided by the norms, values and beliefs of the chosen paradigm.

The philosophy of research is very important in any kind of study, whether natural sciences or social sciences, and if the researcher fails to think on philosophical issues that can seriously affect the quality of research itself (Biesta 2010). Prior to conducting research, the researcher must think about the underlying philosophy, as philosophy is key to the notion of a research paradigm. Research philosophy relates to the

development of knowledge and the nature of that knowledge in both the physical and social world (Bryman 2006). Research philosophy includes observations and assumptions about the physical and social world. It involves epistemology, ontology and axiology, which distinctively affect the methods used in the research process. The qualitative and quantitative research paradigms are incommensurable according to their strategies and worldview, for they reflect different epistemological and ontological assumptions (Bryman 2006). Bryman (2006) identifies four main aspects that connect the research, namely the theory of the research, epistemology, ontology and axiology. The ontology, axiology and epistemology influence the methodological approach and methods of the research study (Guba and Lincoln 2005). The choice of methodology and methods used for the study was consistent with the ontological, axiological and epistemological underpinnings of the research**.** The outlined assumptions formed the anchor of the study from the initial stages up to the final stage of interpreting the research findings. Denzin and Lincoln (2018) state that in addition to methodological assumptions, any research process is influenced by the researcher's personal and social experiences in terms of race, gender and political views. During the course of research, researchers have to affirm important underpinnings of the study, such as ethical values, power relations, positionality and respondent empowerment (Denzin and Lincoln 2018). The existing knowledge and the researcher's positionality create the lens through which the researcher understands the world and that shapes the study' research paradigm.

4.2.1 Ontology

Ontology is the branch of philosophy that deals with reality and the nature of existence. It is the philosophical assumption concerned with the way people believe that something is real by focussing on the essence and nature of the social phenomenon (Scotland 2012). It questions the concept of being or becoming and looks at the basic categories of existing things and their relationships. Ontology examines the researcher's underlying belief system about the nature of existing and being. It questions the assumptions that the researcher makes in order to claim that an investigated social phenomenon is real and it makes sense. For instance, in this study it was necessary for the researcher to understand the stakeholders' perceptions of

environmental injustices and of community-based environmental education and how these environmental perceptions were constructed and what factors influenced those perceptions. This helped the researcher understand himself and the nature of what is real and can be believed as reality (Kivunja and Kuyini 2017).

The assumptions, concepts and propositions about the nature of reality are philosophical and crucial in understanding how the researcher makes meaning out of the generated data. These help a researcher to orientate his or her thinking about the research problem, the significance of carrying out the research and how the research could contribute to the solution of the problem identified. Ontology is therefore essential to a paradigm because it helps provide global understanding of issues through the provision of themes and foundational concepts that the researcher uses in analysing sense embedded in the generated data (Scotland 2012). Ontology questions what is perceived as reality, whether it does exist in the social world or whether it is merely a social construction existing in the mind of an individual. It poses questions such as: What is the nature of reality? Is reality objective and real or it is the product of human cognition? What is the nature of the problem or situation being studied? Does the problem really exist or is it in the mind of the researcher? Such ontological questions help the researcher examine his or her belief system and philosophical assumptions about the nature of the problem under study (Scotland 2012). The ontology of the paradigm is crucial in understanding how meanings are made and it helps the researcher orientate his or her thinking about the research problem, the significance of the research and how the study might contribute to the solution of the problem.

The social ontology of Stortplaats residents is one linked to colonialism, apartheid and post-apartheid poor service delivery issues. The residents' experiences of colonialism, apartheid and KwaZulu-Natal post-apartheid violent conflicts permeate ontological insecurity. These experiences still reside in the minds of the participants and cannot be studied objectively (Sarker *et al.* 2017). Although some of the participants were born in the post-apartheid era and did not experience the traumatic events, the parent-child attachment has an impact on the being of the child. Above all, recent epigenetic studies suggest that the traumatic experiences of parents could be inherited by

offspring by means of chemical changes on the gene surface (Scotland 2012). Post-event trauma among Stortplaats residents is still visible in the being, nature and character of community members. Most of them were remorseful, reticent and uncommunicative and would only open up after strong assurance that the discussion was strictly confidential and would not be used for any purposes save for studies.

Stakeholders' ontological understanding of environmental issues can help alleviate the environmental crisis by uprooting environmentally destructive ethical, behavioural and pre-suppositions that were inherited over a long period of time. This research leveraged the lived experiences of these stakeholders and questioned the knowledge of environmental injustices and how meanings were constructed. At the same time the researcher acknowledged that the victims had free will and agency in bringing about sustainable environmental changes.

4.2.2 Epistemology

The term epistemology originated from the Greek word episteme, which means knowledge. In research, the term is used to describe how one comes to know and attach meaning to something. It explains how one came to know what one considers to be the truth or reality (Kivunja and Kuyini 2017). It is that which is valued and considered as knowledge in the common world (Cooksey and McDonald 2011). Simply put, epistemology is concerned with the primary bases of knowledge, namely the nature of knowledge, forms of knowledge, the mode or method of acquiring that knowledge and how the acquired knowledge can be communicated to other human beings (Kivunja and Kuyini 2017). It focuses on what knowledge is and how the researcher possibly acquired that body of knowledge or can acquire it so that he or she can deepen and broaden the understanding of the field of study. Epistemology is basically the study of knowledge and the justification of why that is regarded as knowledge. Therefore, the epistemology of the research looks at knowledge per se, whether it is something that must be imported and acquired externally or is something that must be born from within as a sum of individual and community experiences. Epistemology focuses on the relationship between the existing body of knowledge

before the research and what could be added to that knowledge after the research (Kivunja and Kuyini 2017). That relationship encompasses the researcher's knowledge as an inquirer and what is known by the participants.

The researcher's knowledge about the community and issues of environmental injustices positioned him within the research context so that new knowledge could be discovered. In order to understand the epistemological element of this research paradigm, very important questions of 'how and what' were asked. Those questions formed the basis for investigating what I considered to be the truth. Although scholars such as Davidson (2000) question the concept of universal truth, by taking evidence as factual truth, epistemology would help researchers ask precise and factual questions on what counts as knowledge. To obtain factual knowledge, researchers draw from four sources, namely the intuitive, authoritative, logical and empirical (Denzin and Lincoln 2018). If knowledge is based on beliefs, faith and intuition, then the epistemological basis of the research becomes intuitive. If the generated data comes from people in the know (experts, leaders, books, journals), the epistemology is grounded in authoritative knowledge. If emphasis is put on reason as the surest form of knowing the truth, then this epistemological approach is rationalistic and logical. If knowledge generated is derived from past experiences, objective facts and empirical evidence, then the epistemology is grounded in empirical evidence (Kivunja and Kuyini 2017). In this study, the knowledge was drawn from all four sources to achieve results that would be friendly to a wide-ranging audience that includes professionals and non-professionals (Cohen *et al.* 2011).

4.2.3 Axiology

Axiology relates to the ethical concerns that need to be considered and addressed when conducting research. Finnis (1980) maintains that the axiology of the paradigm refers to the philosophical approach to making decisions of right and wrong and the value attached to those decisions. This part involves understanding of concepts of right and wrong behaviour during the course of the research and defining the value attributed to participants as the source of the generated data, the data and the audience that will receive the results of the research (Scotland 2012). It addresses the

question: What is the nature of ethical behaviour? In responding to this question, it was important for the researcher to consider the human values of everyone who participated directly or indirectly in the research project. That consideration was facilitated by the following questions that were on the mind of the researcher throughout the research process: Which human values will guide the research? What must be done to show respect to all participants? What are the moral and ethical considerations that must be addressed? Which social, cultural, religious and political issues might arise and how will they be addressed? How can a researcher secure the goodwill of the participants? What are acceptable socially just, respectful and peaceful manners? How can a researcher minimise harm or risk (whether physical, psychological, legal or social) for participants and the researcher? Answers responding to these questions were guided by four dimensions of ethical conduct: teleology, deontology, morality and fairness (Cohen *et al.* 2011).

Teleology is a moral concept that postulates that doing what is considered good and acceptable is a moral obligation for all human beings and should be pursued at all costs (Denzin and Lincoln 2018). Teleology is an attempt that a researcher must make to ensure that the researched results are meaningful and have a useful outcome for the greatest number of people (Scotland 2012). To achieve this, the research methods must be pragmatic and common. Furthermore, the actions and behaviour taken in the course of the research must be acceptable and considered to be right and socially acceptable.

Deontology is the belief that every activity undertaken during the research process is intended to benefit all stakeholders, namely the participants, the researcher, the scholastic community and the public at large (Kivunja and Kuyini 2017). Deontology allows for flexibility in dealing with individual participants. Withdrawals at any stage of the research during the interview must be acceptable and refusal to respond to certain questions must be allowed as well.

The morality dimension refers to the intrinsic moral values and issues that must be upheld during the research process (Scotland 2012). For example, the researcher

must transcribe the participants' narrations accurately and make truthful interpretations of the generated data.

The fairness dimension refers to the researcher's attention to issues of fairness. All research participants must be treated with respect and their rights must be upheld at all times. This dimension is guided by questions such as: How fair will my research questions be? Will they treat all participants in the same way? Will my non-verbal actions display favouritism and discrimination towards some participants?

Therefore, the ethical conduct of a researcher during the process of researching must always demonstrate understanding of what is right or wrong. This concept is founded and grounded in the understanding that all humans have fundamental human rights, choices and dignity that must be respected. The fundamental principles for implementing ethical considerations that must be upheld are based on privacy, accuracy, property and accessibility, often referred to using the acronym PAPA (Denzin and Lincoln 2018). In order to ensure privacy, the researcher must consider the kind of information that the participants will be required to reveal to the researcher and to others about themselves, their community, their leaders, their associations or organisations. Privacy considers safeguarding the generated data and ensuring issues of confidentiality. It enables the participant to sift and select the kind of information that would be considered private and not for public consumption. Accuracy looks at the authenticity and fidelity of the generated and analysed data (Kivunja and Kuyini 2017). The researcher needs to cross-check with participants whether recording was done accurately. The researcher must clearly articulate who will be accountable for any errors and if there is any injury to participants, how they will be compensated or whether they will participate at their own risk.

The issue of ownership of the generated data relates to who will own the data and whether participants will be remunerated or compensated for participating in the research. If compensation is offered, what will be fair and just compensation? For this research, participants only received stipends for travelling; the issue will be discussed later. The accessibility issue relates to who will have access to the generated data and

how the data will be kept in order to ensure safety. Accessibility further addresses the safety of participants during the research process and after the research.

Ontology helped the researcher to recognise the certainty and the nature and existence of environmental injustices at Stortplaats. This truth of existing environmental injustices was understood and experienced by the community. Reality is relative and depends on how individuals perceive it at any given time; epistemology, the study of knowledge, looks at the aspects of validity, scope and methods of acquiring knowledge. Epistemology influenced the choice of methodology during all the stages of research and because of the nature of the study, a qualitative methodology was chosen. Axiology helped the researcher understand what the stakeholders (community members) valued and this understanding of community norms and values helped the researcher generate rich and descriptive data, as participants were free to express themselves without fear, suspicion or intimidation.

4.3 Paradigm and methodology

An important relationship exists between the paradigm and methodology. For this research, it was necessary to identify the paradigm that would permeate the research questions, the selection of the participants, data generation instruments and data generation procedures, as well as the analysis of the data (Kivunja and Kuyini 2017). The interpretivist paradigm is aligned to research methodologies and methods that generate data and analyse it qualitatively. Another example to elucidate the relationship between the paradigm choice and the methodology further could be drawn from interpretivist paradigm research seeking to uncover the stakeholders' contextual experiences. In such instances, questions that provoke feelings and create room for adjustments and reconstructions are asked. In view of such objectives, a phenomenological approach is adopted because by nature the methodology focuses on social reconstruction (Scotland 2012). In many instances, data generation follows theories from real-life occurrences. Narrative approaches are associated with the critical paradigm, as the process has the potential to transform individuals' experiences by realising the ethical and moral choices they have made.

Another example to illuminate the relationship between paradigm choice and methodology could be taken from research that seeks to understand the community's experiences of participating in decision-making during the siting of environmental disutilities in their area. The interpretivist paradigm is appropriate for this study on environmental injustice, as it assumes that there is no single reality and its epistemology undergirds the belief that knowledge is not discovered, but a product of social constructions. From this understanding, the researcher would ask questions to help him understand and know the participants' experiences and perceptions about environmental issues. The search for answers to these questions constitutes the methodology that will be used. This implies that a case study could be a suitable methodology for the research.

An interpretivist paradigm requires the researcher not to consider the existing labels as universal and valid across all contexts. Perceptions are sought in order to gain deep understanding of particular needs. Therefore, the paradigm chosen posits what constitutes trustworthiness of the generated data and the interpretation of the data is linked to the methodology chosen. Researchers who choose a positivist paradigm often use experimental methodologies such as quasi-experimental, correlational, causal comparative studies, randomised control trials and survey research methodology, while those who select an interpretivist paradigm use naturalist methodologies such as narrative, qualitative case studies, grounded theory methodology, phenomenology, hermeneutics, phenomenography and action research. Researchers who prefer the critical paradigm often use neo-Marxist methodologies such as cultural, critical race, Freirean studies, participatory emancipation, queer and action research.

Paradigms, as positioned in epistemology, ontology and axiology, have a significant influence on the methodology to be used in any research project (Sarker *et al.* 2017). Each paradigm is undergirded by certain assumptions nested in epistemology, ontology and axiology, which guide the research methodology. This relationship is essential because the paradigm choice permeates the research methodology, that is, the research questions, participants and sampling procedures, data generation and data analysis. Thus, this study was located in the interpretivist paradigm and the

qualitative case study method was chosen. The justification for the selection is detailed later.

4.4 Dominant research paradigms

Paradigms are important in research studies because they define how reality is perceived and offer a perception of how the entire research process was conducted. As such, all researchers are subject to the limitations and distortions produced by their socially conditioned nature. Therefore, this section briefly discusses major research paradigms in order to justify how the final paradigm choice was reached. Candy (1989), one of the leaders in the field of research, proposed three research paradigms, namely the positivist, interpretivist, and critical paradigm, but Denzin and Lincoln (2018) added a fourth that borrows elements from the three paradigms, known as the pragmatic paradigm. In order to make an informed paradigm choice, an understanding of different paradigms is needed. Below is a brief discussion of different paradigms.

The positivist paradigm was first proposed by Comte (1856) and is grounded in research methods that involve scientific investigations. Observations, experiments and experiences are used as legitimate tools for understanding human nature and behaviour (Pandey and Patnaik 2014). The critical paradigm is situated within the field of social justice and seeks to expose and address socio-political and socio-economic issues that lead to oppression, conflict and power dynamics. It seeks political change and social justice by confronting social oppression, which is the reason why it is called a transformative paradigm (Kivunja and Kuyini 2017). The pragmatic paradigm advocates the mixed methods approach to understanding and explaining human behaviour (Alise and Teddlie 2010; Biesta 2010).

4.4.1 Interpretivist paradigm

The interpretivist paradigm is a subjective way of understanding the world through human experiences (Pandey and Patnaik 2014). This approach seeks to understand and interpret what is in the mind of the subject and to interpret only what the subject is thinking. An effort is made to understand the context through the views of the

subjects or participants rather than the views of the researcher (Denzin and Lincoln 2018). The interpretation of the world places much emphasis on the individuals and that key tenet makes the paradigm a social construct. This is why it is called the constructivist paradigm (Mertens 2015). Unlike the positivist paradigm, where theory precedes the gathered data, the interpretivist paradigm is grounded in the generated data.

This paradigm assumes an epistemology that is subjective, relativist ontology, a naturalist methodology that is natural, and axiology that is balanced. A subjective epistemology places all meanings in the generated data and the thinking processes of the participants are recognised and given value. Knowledge is socially constructed through the personal experiences of the researcher and the participants in real life within the natural settings being investigated (Denzin and Lincoln 2018). The researcher and the participants engage through interactive processes such as dialogue, intermingling, questioning and listening and in that way data is generated. Relative ontology is based on the assumption that a situation consists of multiple truths and realities and these can be explored and new meanings can be developed and reconstructed through interaction between the researcher and the participants (Kivunja and Kuyini 2017). A naturalist methodology uses data generated through interviews, narratives, text messages, reflective sessions and other friendly and non-intimidating methods and the researcher is a participant as well (Cohen *et al.* 2011). A balanced axiology is an assurance that the outcomes of the research are a true reflection of the researcher and participants.

The interpretivist paradigm was chosen for this research because it admits that social realities cannot be understood from the standpoint of an individual, but instead are multiple and socially constructed. The interpretivist paradigm accepts that contexts are different and vital for knowledge and knowing. This affirms the suitability of this paradigm for the study, since the idea was to gain deep understanding of environmental injustices from the participants' views. This paradigm acknowledges that knowledge created through findings is value-laden and that the participants own it. This aligns with the third research question that seeks to identify people-based and people-owned community environmental education strategies that can eradicate

environmental injustices in South Africa. An interpretive paradigm was therefore chosen because it allowed the researcher to generate subjective data through interaction and allowed in-depth understanding of the stakeholders' perceptions about environmental injustices and of community-based environmental education.

4.5 Research approach

This study adopted a qualitative research approach. By definition, a qualitative research approach forms a systematic empirical investigation of meanings constructed by people (Creswell 2013). This approach is systematic in the sense that it is well planned and orderly, following rules that are democratically agreed upon by members participating in the research. It is empirical because the investigation is grounded in the experiences of the participants. In qualitative research, meanings make more sense than numbers and therefore the focus is on the subtleties found in the generated data rather than on the metrics of the collected information. The generated data contains deep detail, which provides more opportunities for insights.

4.5.1 Advantages of a qualitative research approach

A qualitative research approach aims to observe and understand a social issue in its natural setting by examining the meanings people ascribe to existing issues (D'Cruz and Jones 2014). This was an appropriate approach for this research study because it focused on understanding the stakeholders' perceptions about environmental injustices and of community-based environmental education. This approach was used because of its flexibility to unexpected ideas, sensitivity to contextual factors, its ability to generate social meanings and in-depth longitudinal explorations.

A qualitative research approach produces thick and detailed description of the participants' opinions, feelings and experiences (perceptions). Rich and descriptive generated data helps to achieve deeper insights into the problem (Denzin and Lincoln 2018). A qualitative research approach understands human experiences and social settings (Denzin and Lincoln 2018). It accommodates a wider range of epistemological and ontological viewpoints.

Qualitative research approaches are said to be ideographic research because they allow the study of individual cases, can understand different voices and make meanings (Bryman 2006). Qualitative research allows every participant his/her democratic space to express perceptions and opinions and these are not judged, but interpreted in their context. Qualitative research methods such as participant-observation, unstructured interviews and direct observation are subjective and detailed (Cohen, Manion and Morrison 2011).

Qualitative research design (interactive approach) is flexible, can be constructed and reconstructed and the participants have the freedom to determine what is consistent for them (Denzin and Lincoln 2018). It was therefore necessary to choose the qualitative research approach for this study to contribute to understanding of the complex perceptions of the stakeholders about environmental injustices and of community-based environmental education.

4.5.2 Disadvantages of qualitative research approach

The quality of the research depends heavily on the researcher and is more easily influenced by his or her personal biases and idiosyncrasies. Rigour is compromised and more difficult to demonstrate, assess and maintain. The volume of data generated makes analysis and interpretation time-consuming and sometimes not well-understood in the scientific community. The findings are more difficult and time-consuming to characterise. The researcher's presence during data gathering is unavoidable in qualitative research and that can affect the participants' responses. Issues of anonymity and confidentiality usually present problems when presenting findings.

4.5.3 Addressing the disadvantages of a qualitative research approach

Although the qualitative research approach has been identified as a distinctive strategy for empirical inquiry, many researchers have disdain for the strategy (Soy 2015). Positivist researchers who are inclined to follow scientific methods such as experiments and surveys view case studies as less desirable forms of inquiry. Their

greatest concerns have been lack of rigour in the qualitative research approach. Yin (1994, 2009) agrees that in most cases researchers who have adopted the qualitative research approach become careless during the procedure and allow equivocal evidence or biased views to contaminate the direction of the process and conclusions. To avoid negligence and bias, the researcher was guided by the theoretical framework throughout the research process and the theories used prevented any side-stepping. Above all, subjectivity and bias exist in all forms of investigation (Creswell 2013). Bias can influence the conduct of experiments and the design of questionnaires for surveys. The problems associated with bias are the same in all research studies, although it can be noted that these are frequently encountered in qualitative research approaches and are less frequently overcome (Denzin and Lincoln 2018).

The qualitative research approach is not universally acceptable, but it offers theoretical premonitions and propositions that can expand and generalise theory. Qualitative research approaches encourage substantial collection of data that is thick, massive and representative of the general population.

Another serious weakness of qualitative research approaches is that they sometimes omit important contextual sensitivities and focus on meanings and experiences. This usually happens when the sampling was selective and purposively focused on a certain group of people (Bryman 2006). To remedy that, a convenience and purposive sampling method was used. The amount of data generated through qualitative research approaches is usually too much and different scholars could interpret the same data differently. In order to minimise the excessive generation of data, only 25 participants were considered sufficient for saturation. A smaller sample size to suit a qualitative research approach raises the issue of generalisability. Creswell (2011) states that in a qualitative research approach, the sample size is not important, but it must be big enough to attain saturation and for this study 25 participants were enough to reach saturation.

4.6 Research design

A research design is a guiding principle that the whole research follows and gives direction to the researcher on what steps to follow in order to generate data that could possibly answer the research questions (Denzin and Lincoln 2018). Therefore, the researcher needs a research design that details the flow of the whole research project (Cohen, Manion and Morrison 2011). Creswell (2013) argues that a research design ensures that relevant data that answer the research questions unambiguously is generated. Relevant data assists in describing the phenomenon. The research design is synonymous to the modern-day global positioning systems, or a navigator telling the researcher where he/she is positioned and outlining the process of getting 'there'. The initial position of the researcher constitutes the set of research questions and 'there' is the set of meaningful conclusions and answers (Salkind 2010). The design outlines the structure of an inquiry and is a logical concept rather than a logistical one.

A research design is influenced by the kind of the data that needs to be generated. As in the analogy of a constructor, the work plan sheds light on what materials and precautions are supposed to be considered, the same is true of the research design. If the research design is not properly polished, the answers to identified research questions are often weak and unconvincing (Cook and Campbell 1979). This means that the research design reduces the ambiguity of generated data while simultaneously providing alternative propositions to existing theories and knowledge. New propositions challenge and reduce the fallacy of affirming the consequent, a situation where cause and effect are predicted. That minimises the chances of drawing inaccurate causal inferences from the generated data (Cook and Campbell 1979; Creswell 2013).

By nature, a research design is different from the method of data generation, but intrinsically certain research designs adopt specific research methods of data generation. For instance, most case study designs use a questionnaire and interviews (loosely structured or structured). This common link between the research design and the method does not religiously limit and assign certain research designs to particular research methods, because the data generated is irrelevant if the research design is

not logical (Denzin and Lincoln 2018). John (2009) states that the research design prescribes the logical sequence in which the research will be carried out while at the same time describing the methodology determining how the data will be generated and analysed. The research design is based on the researcher's epistemological and ontological positions and this in turn influences the research paradigm. In summary, the research design encompasses both the research approach and the research paradigm. The research design selected for this study, which was perceived as appropriate for generating convincing and meaningful answers to the research questions, was a case study.

4.7 Case study

A case study is an in-depth study of a situation allowing special emphasis to be placed on the perceptions of the participants (Cohen *et al*. 2011). Remenyi (2013) defines it as an empirical enquiry that is used to investigate a phenomenon within its life context. A case study is said to be an empirical enquiry because it generates data from primary sources, not secondary sources. It also focuses on contemporary issues that are heuristic and touch real-life situations over which the researcher does not have control (Remenyi 2013). It acknowledges that phenomenon and context are inseparable in real life, coping well with situations that are technically distinctive and entailing many variables (Creswell 2013). Useful data generated from multiple sources converge in a triangulating fashion. In other words, all generated data come together, supporting an existing theoretical proposition or disproving it (Yin 1994). In a nutshell, the case study is not only a data-generating strategy, but a comprehensive research strategy that could produce theory or disprove it. In this case, it helped the researcher to understand and apprehend the phenomena in their natural setting (Plummer 2001; Denzin and Lincoln 2018). Boundaries were not clear and multifaceted evidence was required. It was appropriate to adopt this research design, as it considered the contexts and practices that subject lives to risks. In a case study an issue is central and that must unfold in a careful and logical manner because the issue in question constitutes an argument that might add value to research knowledge. In order to generate rich data in a case study, questions such as "what," are posed. In such circumstances the researcher would have limited control over events and the focus would be based on

contemporary issues in a real-life context (Creswell 2013). Case studies are used in many organisational and management situations such as neighbourhood studies, community agencies and theses in the social sciences. In all these cases, the choice of case studies is initiated by the desire to understand the complexity of the social issue in question. Such explanatory case studies are usually strengthened by two support follow-up questions that are exploratory and descriptive, such as “how and why”. Regardless of the type of questions, researchers must exercise great care when designing case studies.

The traditional misconception that case studies are only appropriate for exploratory research and cannot be used to describe propositions is no longer accepted as a norm, as some case studies are exploratory, others descriptive and some explanatory (Denzin and Lincoln 2018). This does not imply that clear and distinct boundaries exist between exploratory, descriptive and explanatory case studies; instead there are large areas of overlap (Yin 2004). This overlap allows for accessing and generating rich data. The type of research questions posed, the extent of control of the participants by the researcher and the focus on contemporary issues compared to historical issues, determine the type of case study (Cohen *et al*. 2011).

If research questions focus on “what” questions, as in this study, the possibility is that the case study is exploratory, for example: “What are the stakeholders’ perceptions about environmental injustices existing in Stortplaats?” This question justifies the rationale for conducting an exploratory case study, the aim being to develop an understanding of how community members explain these existing environmental issues. However, the second and third research questions are more than exploratory; they seek explanation and description.

This design was therefore adopted because it is typically qualitative in nature and results in a narrative description of behaviour and experiences. The purpose of this research was not to determine cause and effect, nor was the intention to discover generalisable truths and make scientific predictions. Instead, the emphasis was placed on exploring and describing the phenomenon at Stortplaats. That intention made the case study design the most appropriate approach, since its characteristics are

narrowly focused while providing a high level of detail, which combines both objective and subjective data to achieve deep understanding (Creswell 2013).

Most research designs are based on quantitative questions, such as “who, what, where, how much and how many”, while on the other hand, a case study design focuses on answering questions of how or why. Using a case study design, in-depth data could be generated in a real-life context with the researcher having little or no control over the events (Denzin and Lincoln 2018). The case study research design was chosen because of its illustrative, exploratory and cumulative nature. It was illustrative in the sense that the generated data would help in describing the environmental injustice situation in such a way that participants or the community at large could become more familiar with the issues in question. Since the idea was to generate data that could be used to identify strategies for community-based environmental education, the research design was exploratory. The study was designed to pull together ideas and opinions and aggregate them into strategies that could be used in rolling out environmental education programmes in South Africa. Therefore, this study was cumulative in nature.

Regardless of any research design, advantages and disadvantages are evident. The potential benefits associated with case studies is that they are more flexible and allow the researcher to explore and discover issues during the research (Creswell 2013). The researcher can use a variety of data sources to gain deep understanding of the phenomenon. The generation of data in a case study design does not interfere with the natural ecosystems; instead the existing set-up is not interrupted. It involves real people and real situations, enabling the researcher to understand how abstract principles and ideas can fit together. Creswell (2013) states that case studies can penetrate in situations where numerical values cannot be used. They allow for a blend of research tools and are prototypical instances of mixed methods research (Cohen et al. 2011). That works favourably in generating rich and vivid descriptions of situations in a case. The case study design respects participants and always seeks to understand their perceptions of events, which is an integral democratic part of the South African Constitution (RSA 2000). The researcher as a human being is integrally involved in a case study design and does not consider participants as subjects, but as

co-researchers, which adds value to the richness of the case when recording the results.

The critics of the case study design have focused on the uniqueness of the generated data. Usually the data cannot be replicated (Creswell 2013). Although the generated data could not be replicated, the results are intelligible and strong on reality (Denzin and Lincoln 2018). Researcher bias and subjectivity are sometimes a problem. That problem could be minimised or eradicated through reflexivity (Cohen et al. 2011). Its in-depth nature makes the research impossible on a large scale and there are concerns of reliability, validity and generalisability of the generated results. The argument is lost in the fact that a case study design provides insight into other similar cases and identifies unique detail that may otherwise be lost in a large-scale data generation process (Denzin and Lincoln 2018).

The problem identified in this study was a gap in understanding the existence of environmental injustices. It was therefore important to understand the perception of stakeholders, given the location of sewage ponds causing an unprecedented pungent smell, a temporary site for garbage, river pollution due to industrial and farm discharges, sand poaching resulting in severe land degradation and unpaved roads causing dust pollution. The purpose of the study was therefore to understand the stakeholders' perceptions about environmental injustices and of community-based environmental education in South Africa by investigating the perceptions of stakeholders at Stortplaats.

The fundamental research questions that were outlined earlier sought to understand what was happening at Stortplaats and why it was happening. The 'what' part provided a description that was fundamental to the research enterprise and added immeasurable knowledge to the society. Competent descriptions would demonstrate existing environmental injustices and challenge accepted assumptions about the *status quo*, simultaneously promoting action. The 'why' part sought to explain the descriptions about environmental issues moving away from abstracted empiricism, which is the mindless gathering of information.

A case study is typically qualitative in nature, resulting in a description or explanation of behaviour or experiences. Such studies are not used to identify cause and effect, or to make generalisations and predictions. The emphasis in a case study is placed on exploring and describing the situation or phenomenon (Yin 1994; Soy 2015). Case study research is narrowly focused, at the same time providing in-depth detail that combines objective and subjective data to achieve deep understanding (Soy 2015). In a sense, a case study provides an in-depth study of a situation placing special emphasis on the perceptions of the participants (Cohen et al. 2011). It is for such reasons that this strategy was adopted. Participants' views were central and used as units of analysis (Plummer 2001). The study focused on stakeholders' perceptions of environmental injustices and of community-based environmental education. That helped the researcher to understand and apprehend environmental injustice as a phenomenon in its natural setting (Denzin and Lincoln 2018). It was appropriate for the research, as it considered the contexts and practices that subject lives into risks.

A case study differs from other strategies in design and nature. It approaches issues and contexts as unique or interdependent, whereas other strategies, such as experiments, divorce the phenomenon from the context and much attention is paid to limited variables. In an experiment, the context is the laboratory (Yin 1984; Creswell 2013). Surveys sometimes deal with the phenomenon and the context, but with extremely limited ability to investigate and generate deep and understandable data that exposes reality. A survey designer always struggles to reduce and limit variables, resulting in a reduction in questions and the number of participants taking part in the survey. This reduces the depth and richness of the data collected.

A case study is an essential strategy when in-depth explanations of a phenomenon are required. It was used in this research because of its ability to provide the researcher with the stakeholders' tense, integrated experiences of real-life settings. This approach also assisted the researcher in interpreting the stakeholders' understanding of environmental injustices and how community environmental education could be used as a means of correcting the situation.

The case in this study was a group of people living at Stortplaats, selected across the social spectrum. This group consisted of youths, professionals, community leaders and leaders representing the state; throughout the research process they were referred to as the stakeholders. The details of the choices and locations are explained later in this chapter.

Creswell (2013) summarises a case study as qualitative research investigating or exploring a bounded system or multiple systems in order to develop useful knowledge. The boundaries defining the study are residents of Stortplaats, more specifically those residents of Stortplaats who are stakeholders in this rural village. Yin (2009) concurs by stipulating that a case study investigates a social phenomenon in its real-life context. The stakeholders selected were permanent members of the community and they explained their understandings and perceptions about environmental injustices existing in their own contexts. They were given an opportunity to share their views on the socio-political dynamics that influenced their understanding of these environmental injustices. The stakeholders provided descriptive and reflective pieces of information, describing their societal roles and how these could be used as an asset in initiating community-based environmental education programmes.

The case study offered an opportunity for the stakeholders to expose their understanding of community rights and responsibilities and how these could lead to total freedom from environmental injustices and hazards. Soy (2015) posits that a case study could be deliberately used to provoke action through uncovering contextual conditions that are detrimental to human life, hence the choice of this approach. Baxter and Jack (2008) and Rule and John (2011) single out exploratory case studies as important in examining situations that require interventions. Based on that understanding, this study adopted an exploratory case study.

The researcher understood that participants of different ages, academic levels and political standpoints could provide data that was incompatible, but perceptions about identity and community responsibilities sometimes converge and the potential differences are essential for policy formulation (Rule and John 2011). Baxter and Jack (2008) caution against using units across the spectrum, as research schedules need

to be reorganised regularly to accommodate age and professional differences. Care was taken to select participants from different bounded contexts, as Rule and John (2011) indicate that cases should be selected because they are relevant, accessible and convenient. The reasons and rationale for the selections are explained later.

4.8 Population and sampling

Stortplaats population was the focus of this research work. The total population is identified by Cohen *et al.* (2011) as a larger pool from which the sampling elements are drawn. Theoretically the population encompasses all the elements that make up a unit of analysis (Kivunja and Kuyini 2017). Costs and accessibility are some of the reasons that prevented the researcher from reaching out to the entire population. Denzin and Lincoln (2018) stipulate that the smaller group, which is a subset and representative of the population, is called the sample.

Stortplaats has a population of just over 10 000 community members (Stats SA 2011). The area is serviced by two primary schools and one secondary school. The total number of educators living in this area is 80 and the number of learners is 2 500. It was anticipated that a sample of 25 stakeholders targeting five learners above 18 years old (youth), five educators residing within the community, 10 community members, the councillor, the chief, village head, the area environmental health officer and a construction sand-seller would attain saturation. Sampling in a qualitative methodology requires a smaller sample size that is still large enough to obtain in-depth data for all perceptions until saturation is attained (Creswell 2009). Creswell (2011) recommends between 20 and 30 participants. Although saturation has several practical weaknesses, as in some cases limitless views can emerge, Creswell (2009) points out that 30 participants are more likely to give thick and rich data, which is enough for any credible qualitative study. The study was designed to accommodate a further five participants in the event that the initial 25 did not reach saturation.

Cohen *et al*. (2011) identified two main methods of sampling, namely probability and non-probability sampling. The difference between the two is that probability sampling is the random selection of participants from a wider population and is mostly used in

quantitative studies. All population units have equal probabilities of being part of the sample. Non-probability sampling is purposive, selective, subjective and often used in qualitative studies. Since this research was qualitative, a non-probability technique was employed.

4.9 Sampling procedures

Both convenience and purposive sampling were adopted. Convenience sampling targeted participants who were conveniently accessible and available to the researcher, such as educators, community members and learners above 18 years of age. Learners above 18 years were selected for ethical reasons. Purposive sampling enabled the selection of participants who could provide expert information, such as the environmental health officer and environmental science teachers (Cohen *et al.* 2011).

Table 4. 1 Summary of participants

Unit	Females	Males	Total	Employment status	Sampling method	Reason for selection
Learners	4	1	5	Unemployed	Convenience	Conveniently accessible
Community members	10	0	10	Unemployed	Convenience	Conveniently accessible
Educators	3	2	5	Employed	Purposive	Expert knowledge
Environmental Health Officer	0	1	1	Employed	Purposive	Provision of expert knowledge
Community head	0	1	1	Unemployed	Purposive	Driver of community development
Chief	0	1	1	Employed	Purposive	Driver of community development
Councillor	0	1	1	Employed	Purposive	Driver of community development
Business person	0	1	1	Self employed	Purposive	Business community
Grand total	17	8	25			

Source: Field research (May 2019)

Neuman (2011) posits that purposive sampling is usually used in qualitative research if participants are selected because of specific characteristics that make them suitable for the study. In this study, purposive sampling was used to select stakeholders who were knowledgeable in terms of environmental injustices and issues. Important community leaders who were drivers of community development programmes were also selected for the study. Purposive sampling targeted people with expertise and professionals such as the environmental health officers and educators. The chief and the councillor as pillars and drivers of community developments were also invited to participate in the study.

These stakeholders were purposively selected with the expectation that they would provide informed experiences and understanding of environmental injustice. In choosing the four categories of stakeholders, three key characteristics were considered: the chief and councillor as community leaders were regarded as pillars of any developmental projects, the environmental science teachers and the environmental health officer were selected because of their comprehensive knowledge and experience in environmental issues and management. To reduce ethical constraints, children under the age of 18 were not selected. Invitation letters were sent to the potential participants with an attached consent letter (see appendix 8).

4.10 Contextualising the data generation phase

This study sought to investigate perceptions of stakeholders of Stortplaats, KwaZulu-Natal in order to address environmental injustice through community-based environmental education. The concept of environmental injustice is an issue of equity and social justice and is reflective of great inequality. Justifications for the methodological choices about the context were previously made and the selection of participants will subsequently be discussed. The selection of participants was performed with the full understanding that data generation permeates power relations. The area under study was called Stortplaats, a communal rural village with a population of just above 10 000. Most community members are poor and work at menial jobs (Stats SA 2011). The Stortplaats area is riddled with numerous environmental problems such as sewage treatment ponds and refuse dumps (Ndlovu

2015). Sand poaching causes land degradation. A single tarred road serves the community and roads branching among homesteads are unpaved. This exposes the community to dust pollution and lead-metal inhalation, which are health risks (Mathee 1996, Ndlovu 2015). Industrial and farm waste discharged into the local river causes unprecedented river pollution, upsetting aquatic life processes. A pungent smell from sewage treatment ponds is unbearable. Such environmental injustices, as explained earlier, are unacceptable, as severely affected communities often face consequences in the form of health risks that have long-term implications (Carl 2011). Furthermore, long-term exposure to sewage-polluted air has permanent health effects, such as accelerated lung aging, reduced lung capacity and the development of lung diseases such as asthma, bronchitis and emphysema (Mathee 1996). The odour is unbearable and a nuisance and it also causes temporary health-related effects, such as nausea and headache. The researcher is a member of this community, not an anthropologist who is fascinated by exotic issues, and in this case subjectivity cannot be completely eradicated, but can be minimised. Assuming that a researcher must be disconnected from reality and sensitive issues is impossible and contentious (Denzin and Lincoln 2018). These environmental injustices are not only a social menace or cause for concern, but a reflection of a socio-political system that neglects the economically disadvantaged (Mathee 1996; Manyena 2016). It was anticipated that the research and choice of participants would provide an opportunity for expressing views about environmental injustice, while simultaneously forming the basis for negotiations between the affected community, businesses and policy-makers (Fuller 2012).

4.11 Data generation methods

Methods applied in this study comprised individual interviews, indirect observation and photovoice. These three methods allowed for data triangulation and verification. Babbie and Mouton (2002) posit that triangulation is generally important in enhancing authenticity of results in qualitative research.

Semi-structured individual interviews (using an interview guide) were used to generate qualitative textual data from stakeholders. De Vos *et al*. (2011) identified two advantages of using this instrument in data collection. It allows the researcher to

address the same areas of interest with all participants while offering them freedom to give detailed and rich descriptions of their lived experiences.

The choice of data collection methods must be aligned with the purpose of the research and questions to be addressed. Neuman (2011) explains that qualitative methods seek to find out what people think, do and feel by interviewing, analysing documents or observation. In this study, more than one data generation method was used to obtain in-depth understanding of stakeholders' perceptions about environmental injustices and of community-based environmental education at Stortplaats. Individual interviews were regarded as the main source of data, while photovoice was used as a supporting tool to gain deep understanding of the emotional aspects of the community.

4.11.1 Recruiting participants in the sample

Introductory meetings were held with potential participants where the purpose of the study was explained. The environmental health officer and community leaders, such as the chief, councillor and village head, were approached and requested to participate in the project and they agreed despite their tight schedules. In total, 25 potential participants agreed to be part of the research project and dates, venues and logistical issues such as travel expenses and refreshments were clarified.

Of the 25 stakeholders who participated in this research, none identified himself or herself according to social and professional status during the interviews, but instead in his or her capacity as resident of Stortplaats. During the time spent with them, the participants were always punctually on time for interviews and presentations. This gesture was not only encouraging and inspirational, but motivated me to ensure that these rare voices would be heard.

The stakeholders who participated in this research introduced me to their physical and emotional space for over three weeks. The pseudonyms used by participants were unanimously agreed on by the stakeholders themselves and the researcher. At the

end of the interviews, I was convinced that the participating stakeholders were really concerned about the environmental injustices bedevilling the Stortplaats communal area.

4.11.2 Interviews

The interview questions were kept open-ended and exploratory in the hope of generating rich and vivid descriptions from participants. The intention was to facilitate deep exploration that would encourage participants to share their lived experiences about environmental injustices. The stakeholders who participated were selected using different criteria. The village head, the chief and the councillor were given invitation letters in their capacities as responsible authorities. They were part of the study right from the start, as they gave the researcher permission to proceed with the study (see appendices 3 and 4). The environmental health officer was requested to participate in the study in his capacity as a health expert. All life sciences and physical sciences educators were given invitation letters and five agreed to participate. All learners at Stortplaats secondary school above the age of 18 were also given invitation letters and five accepted the invitation (see appendix 9). Letters of invitation were distributed during a council meeting and 10 councillors accepted the invitation. All participants signed the consent forms and were informed that they were free to participate or withdraw from the interview at any stage without punishment (see appendix 8).

The interview schedules focussed on stakeholders' perception of environmental injustices and of community-based environmental education and each interview session took about one and a half hour, as informed by literature (Morojele and Muthukrishna 2012). Questions asked were different, depending on the target stakeholder group, and the whole interviewing period took about 25 hours, including breaks and general social life discussions.

Questions were created in line with common human understanding, not academic, but eliciting personal and cultural knowledge (Thompson 2016). In some cases participants were encouraged to elaborate and clarify an issue and in others the

researcher asked for detail. Each interview was audiotaped (with the consent of the participant) and transcribed later for data analysis; this was done with the consent of participants.

The interviews created an opportunity for 25 Stortplaats stakeholders (five learners, five educators, 10 community/village members, one village head, the chief, councillor, the environmental health officer and business person) to describe their perceptions (feelings and experiences) regarding the environmental injustices and how community-based environmental education could be used to address these. The interviews conducted were of the semi-structured type. Creswell (2018) states that this type of interview is partially flexible because only a few of the questions are pre-determined, and participants are given leeway to digress. The interviews were conducted using interview schedules that had slightly different questions, depending on the respondents' background and status in the community, but seeking answers to the same research questions. See appendix 10 for all participants, appendix 12 for educators, community leaders and the environmental health officer and then appendix 13 for 10 youths. During the interviews, the order of questions was always rearranged according to emerging contexts and probing was done to give participants an opportunity to express all their feelings and experiences. In order to keep a record of proceedings and a smooth interview process, audio recording (permission sought) was done and later transcribed.

4.11.3 Photovoice or photo elicitation

Photovoice (also called photo-elicitation) was used as an additional research method to consolidate and augment the individual interviews. That enabled the researcher to gain in-depth understanding of the stakeholders' perceptions of environmental injustices and of community-based environmental education at Stortplaats and circumvent the misrepresentation of data by generating meanings that a participant could not express in words only. Ten of the 25 participants were conveniently sampled and entrusted with cameras to enable them to photograph scenarios of environmental injustice. The participants were given an opportunity to present the environmental neglects in picture form (Morojele and Muthukrishna 2012). This method is more

participatory and it enables participants to voice opinions and perceptions using pictures, thus complementing the individual interviews (Budak and Taylor 2007; Denzin and Lincoln 2018).

The photovoice method is useful in raising awareness by involving emotions, as pictures are emotional documents that can portray feelings that cannot be verbally expressed. All interviews, with the consent of participants, were audio-recorded and transcribed later (with the help of a qualified interpreter) to ensure that the researcher could focus on the participants' responses during interviews.

Photovoice was developed by Wang and Burris in 1992. The method shows the power of combining words and images, to raise attention and awareness of social issues effectively. In this participatory method an individual takes photographic images of a scene in order to document and reflect on issues that are significant to him/her (Wang and Burris 1997).
It is a useful strategy for initiating dialogue between the participant and the researcher, resulting in thick descriptions about an issue (Woodgate, Zurba and Tennent 2017).

Photovoice is predominantly an unobtrusive way of entering into an individual's emotional world, which helps researchers to identify the problem of interest, revealing what might be uncomfortable or unknown. With photovoice, the participants become co-researchers and are given cameras to produce images that are the focal point for the discussion. This creates space for the participant as a co-researcher in building and setting the context for deeper questions (Woodgate *et al.* 2017).

The SHOWeD method is commonly set for photovoice protocols. This involves leading the participant through a set of questions with the assistance of photos provided by the participant (Woodgate e*t al.* 2017). The SHOWeD acronym stands for five questions, namely: What do you **"see"** here? What is really **"happening"** here? How does this relate to **"our"** lives? "**Why"** does this situation concern us? What can be **"done"** about it? The photos taken are an artistic expression of the lived experiences and emotional attachment that seek the promotion of social justice (Wang 2006). Photographs are metaphors for life situations and emotions. In such cases, the

participants' verbal interpretations of the visuals are important for understanding the meanings attached to those symbolic images (Woodgate *et al.* 2017).

A photograph is a medium of language that is universal in its appeal. It minimises language and cultural barriers, by reflecting reality as seen and experienced by an individual. Furthermore, photographs attempt to capture the essence of a problem from the perspective of those experiencing it. Ten of the youngest participants (Wang 2006) were supplied with disposable cameras to carry out this procedure of photographing areas of environmental concern identified during the individual interviews. The researcher was responsible for developing the photographs. After a week or two, depending upon the agreed time frame in which to take photographs, participants returned for final interviews. Each participant selected five of his or her best photos and detailed the story behind the photos, highlighting how these related to the environmental injustices and how concerns could be addressed through community-based environmental education (Wang 2006).

4.11.4 Indirect observation

Indirect observation was another method used for data generation in this study. It features unobtrusive signs that can provide deep and relevant insights into the experiences of participants (Anguera, Chacon-Moscoso and Sanduvete 2018). As indicated earlier, individual interviews and photovoice methods were mainly used in generating rich and descriptive data. Indirect observation was also used throughout the individual interviews and photovoice presentations. Creswell (2018) describes indirect observation as a method in which the researcher critically observes the participant during the interview and takes notes on the facial expressions of the participant and his or her behaviour when expressing an opinion or responding to a question. During interviews, aspects of human communication, such as gestures, postures, facial expressions and tone of voice, are important visual channels that frequently accompany natural behaviour and are appropriate characteristics for constructing perception in any study (Anguera *et al.* 2018). Human communication is not restricted to verbal/textual transmission of information only; it also involves non-

verbal and non-textual aspects that help in building up perception (Anguera *et al.* 2018). The data generated through observation is said to be live, as it entails that the researcher is present during the interview and he/she records impressions that are revealed (Cohen *et al.* 2011).

In this study there were three advantages of indirect observation: The first was that the interviews were carried out in a natural and non-intimidating environment, which was identified by the participants themselves. In this environment the participants were able to show freely, through facial expressions, any distasteful experiences about environmental injustices. The second advantage was that the activities and behaviour of the participants during the interviews were recorded directly, using a tape recorder, instead of relying on verbal expressions only. This was done with the consent of the participants. The third advantage was that the observations through indirect observation were integrated as auxiliary and confirmatory data in the study. A narrative that excludes indirect observation cannot provide insight into the true nature of a person though it can help one to understand his/her experiences. However, the limitation of indirect observation is that perceptibility is compromised.

4.12 Data analysis

To make meaning and describe how the generated data was related to the units from which it was collected, a thematic data analysis approach was used. The data collected was organised into constituents and components for easy analysis and that revealed the characteristics and nature of the units (Braun and Clarke 2006). This means that the researcher had to go beyond mere descriptions and add some form of interpretation, explanation and prediction (Braun and Clarke 2006). Several approaches to qualitative data analysis, such as grounded theory, and discourse analysis, are at the disposal of researchers. This researcher, however, used the thematic analysis approach (Tracy 2010). Naturally, qualitative data is voluminous and complex and therefore requires proper skills for managing it (Cohen *et al.* 2011). In this study, the generated data was processed and categorised manually by designing separate folders for every stage of the research process.

A thematic data-analysis approach analyses patterns of meanings within data pieces (Braun and Clarke 2006). In this study dominant themes were illuminated. To achieve this, the researcher identified six step-by-step stages. The first was familiarisation with data, which is, reading and re-reading the data, noting down primary ideas. Then followed the generation of initial codes; at this stage the interesting features of the data were coded in a systematic way across the entire data set. Data were then collated to relevant identified codes, involving searching for themes. All collating codes were gathered into potential themes, followed by reviewing themes, revising themes and checking whether themes were in line with the codes. The next step was defining and naming themes; this was an ongoing process of refining themes and naming them, using language that tells the story about the generated data. Finally, producing the report involved final analysis of the whole research project, directly responding to the research questions. It was a back and forth process that culminated in vivid report writing (Braun and Clarke 2006).

These iterative processes sometimes overlapped, creating the need to merge certain themes or stretch them in order to accommodate other new themes, but in the end an analysis that made sense of data in terms of participants was produced (Cohen *et al.* 2011). The reason for using thematic analysis in this study was that this approach was seen as easy and clear to research novices in terms of knowledge demand. It does not demand intricate theoretical foundations (Denzin and Lincoln 2018). The approach was flexible and allowed the researcher to identify and develop themes with minimum restrictions. It also permitted the researcher to merge the data collected during interviews and through indirect observation and photovoice processes.

The thematic analysis approach has natural weaknesses, like any other process. The process was demanding and laborious, consuming a great deal of time. Braun and Clarke (2006) point out that the flexibility of the approach constitutes a weakness, as different researchers might produce diverse themes that are incompatible and difficult to comprehend. Based on these assertions, the researcher took the initiative to safeguard against those identified potential weaknesses and the worthiness of the study was not compromised. Since there were no pre-identified codes and categories to explore, the themes that emerged were recorded.

4.13 Trustworthiness of the study

Member checking during the interviews involved procuring immediate feedback during interviews and also revisiting respondents later to ensure accurate findings. This is an indispensable technique for attaining credible qualitative research findings (Thompson 2016). Member checking was conducted during the interview because it was going to be difficult to meet some of the participants later, such as the chief and the councillor, who normally have tight schedules. The process was conducted at the end of the interview to increase the credibility of the study (Creswell 2013). The researcher had to build rapport with each participant in order to obtain honest and open responses. During an interview, the researcher would try to summarise the responses and then ask the participant to determine accuracy. After the study, the researcher also shared the findings with the participants involved to allow them to analyse the output critically and make some comments. Participants were allowed to affirm the summaries as a true reflection of their views or to indicate that these did not reflect their experiences. The researcher would play the audio recordings to individual participants and read out collected and interpreted data to eliminate any possibility of misrepresentations.

To validate the research located within the interpretivist paradigm, four elements of trustworthiness and authenticity are observed, namely credibility, dependability, confirmability and transferability (Guba and Lincoln 2005). Lincoln and Guba (1985) initially challenged the validation of interpretivism-based research, but because of pressure from other scholars, these validity criteria are now commonly accepted. Renowned qualitative research author Creswell (1998, 2004, 2009, and 2013) cited the need for establishing credibility, dependability, transferability and conformability to ensure that qualitative research is trustworthy. These requirements are endorsed by Lincoln and Guba (1999). The researcher worked hard to meet these requirements in the following ways:

4.13.1 Credibility

Credibility in the interpretivist paradigm refers to authenticity or trustworthiness and the extent to which the generated data and conclusions are believable (Tracy 2010). It aligns the findings with the reality constructed by the researcher and the participants. This was monitored by the researcher's supervisor. It is a measure of whether the process of a research project was followed accurately. It further seeks clarity on the research topic and whether it is researchable. The research topic was identified after noting the well-documented environmental injustices and by communicating with the participants to verify whether the researcher's understanding of the concept was in line with that of the stakeholders, thus member checks. Regular assistance was sought from the academic supervisor (Lincoln and Guba 1999).

To establish the credibility of the results, the researcher was always reflexive, involving the process of becoming self-aware. The researcher made regular efforts to consider his own thoughts and actions during the entire process of research. In that way, the researcher attempted to reflect critically and critique his own biases. Member checking, also known as participant or respondent validation, a technique for exploring the credibility of results, was also undertaken. The results or summary of the responses was regularly returned to participants during the interviews to check for accuracy and resonance with their perceptions. During an interview, the researcher would restate or summarise information and then question the participant to determine its accuracy. This allowed the participants to analyse the findings critically and comment on them. The participants either stated that the summaries reflected their views, feelings, and experiences, or that they did not do this. This decreased the incidence of incorrect data and incorrect interpretation of data. Triangulation was also done. This is a process of using more than one method to generate data on the same issue. Besides individual interviews, photovoice and indirect observations were used to triangulate the individual interviews. More than just cross-validating data, triangulation also helped in capturing different dimensions of the same issues.

4.13.2 Confirmability

Confirmability demonstrates the accurate identification and description of the subject in question. It refers to the extent to which the findings of a research study could be confirmed by other researchers in the same context. It is indeed a contentious issue whether qualitative studies are generalisable. To ensure some form of generalisability, the researcher grounded the study in a sound theoretical framework (community-based environmental education model and place-attachment theory), which made this research fit into the existing body of knowledge. To ensure that the results and findings were not figments of the researcher's imagination, but were derived from the generated data, reflexive journals were used. The reflexive journals kept the researcher's influence out of the study and biases emanating from step-ins were eliminated by triangulation, confirmability audits, member checking and constantly communicating with the supervisors (Kivunja and Kuyini 2017). This ensured confirmability.

4.13.3 Transferability

Transferability is used in interpretivist research as replacement for external validity in the positivist paradigm and this criterion represents the researcher's effort to ensure that enough contextual data and findings can relate to other findings in different contexts. It is also enhanced through data saturation. This criterion is still subject to controversy, as generalising of interpretivist findings is practically impossible (Denzin and Lincoln 2018). However controversial, transferability considers the possibility of transferring the findings from one context to another. In this study transferability was improved by combining convenience and purposive sampling. Data generation was also guided by the saturation theory, which stipulates that saturation is reached when similar theoretical findings are achieved. The selection of community leaders such as the community head and the chief, who are drivers of community development, was deliberately done to involve influential community members in matters that affect the community. Educators and environmental health officers were also purposefully selected to involve expert knowledge in the study.

4.13.4 Dependability

Dependability refers to the accurate documentation and auditing of the entire process. It refers to the ability to observe the same outcomes or results in similar situations. This documentation must give a clear and detailed account of the processes and explain how the researcher negotiated or navigated around the contentious societal issues (Creswell 2013). This dimension sounds like a positivist criterion, which suggests that if similar activities were repeated in the same context using the same methods, one is more likely to achieve the same results. However, Guba and Lincoln (2005) argue that interpretivist research deals with human behaviour, which is dynamic, contextual and subjective, therefore one is not able to reproduce exactly the same results, but inferences and interpretations made by the researcher are dependable.

To stabilise findings, the participants evaluated the findings, interpretations and recommendations to eliminate any exaggerations. Member checking throughout the study was done to eradicate any misconceptions. These aspects were assessed throughout the research process by recording data accurately, using an audio tape, member checking and reflexivity and implementing a pilot study. The researcher's skills and acumen ensured that the findings were a true reflection of the generated data and this was strengthened by the inquiry audits (Denzin and Lincoln 2018). Inquiry audit involved another academic researcher outside the data collection and data analysis who examined the processes of data collection, data analysis and the results of the research study. This was done to confirm the accuracy of the findings and to ensure that the findings were supported by the data collected. The researcher's skills and the researcher's supervisor's acumen ensured that the findings became a true reflection of the generated data.

4.14 Positionality in the study

It is important for a social researcher to clarify his or her position and role to make the research credible (Unluer 2012). Unluer (2012) posits that an insider has both

advantages and disadvantages in any research. An advantage is that the insider understands the culture and the socio-political chemistry of the society and has established intimacy with the community, which will promote truth-telling and judgement. The inside researcher possesses knowledge that would cost an outside researcher a great deal of time to obtain (Unluer 2012). However, the insider must deal with the following disadvantages: double dipping, overlooking taken-for-for-granted routines, preconceived assumptions and the halo effect (closeness to participants).

The researcher is a permanent resident of Stortplaats and my interest and concerns have entailed environmental injustice and other power-related injustices. It is because of this interest that the subject of my masters' dissertation was the field of environmental education, which is related to the current study. The title was: *"Geographies of environmental education: narratives of high school learners' ecological awareness*". Environmental injustice has become an intergenerational and global menace that requires a strong weapon grounded in the principles of environmental education theory (Kovacevic 2013). My own background of socio-political injustices and knowledge of environmental sciences influenced my social concern to illuminate the existence of environmental injustice perpetuated against poor, voiceless and marginalised small communities. The environment has always provided habitation for all living things, but the insatiable and never-ending needs of human beings have led to the adoption of certain strategies that are destructive to the very nature that nurtures us. Some of these strategies have led to negative consequences for the environment, such as environmental injustices. The concern is that the environmental problems and injustices that we face today are direct outcomes of individual actions, consumer decisions, state negligence and neoliberal activities of small and large business corporations. This therefore means that much more than ever before, there is a need to understand the natural patterns, ecosystems and root causes of environmental injustice and this can be done through environmental education.

The economics of analysis have taught researchers the concept of externalities. Interestingly, externalities arise when a transaction affects those that are not directly involved in the transaction. Negative externalities arise if a transaction passes costs

and burdens to individuals who were not involved in the transaction. In this case the principal bearers of negative externalities *vis-à-vis* environmental injustices are the poor and underprivileged who are sometimes not direct beneficiaries of the transaction. Perceived perpetrators enjoy the benefits and profits from factories discharging pollutants.

There is evidence that these environmental injustices are not peculiar to Stortplaats, as discussed earlier; similar problems exist particularly among developing nations and in all cases the recipients are the poor and marginalised. Chunrong *et al*. (2014) established the link between childhood cancer and environmental injustices. Diseases, disabilities and disorders that have an environmental injustice component are distributed within the community in a manner that reveals race and income levels. Asthma prevalence is significantly higher among poor and marginalised groups of people faced with environmental injustices. Compounding these issues, marginalised and poor communities often receive lower budget allocations for health care (Lee 2010).

The concern throughout the study was to maintain professional acumen and not to allow my societal position to cloud the research process. The piloting process was a rehearsal activity, as it enabled the researcher to understand himself on how he would react to participants' responses. It also cautioned and warned me about the possibility of getting responses that were going to challenge my expectations and assumptions about the possible results. Bias was strongly guarded by extensively consulting with the supervisor, who had immense experience in research processes.

The choice of place attachment and environmental education theories as lenses and individual interviews and photovoice as research methods facilitated the entire process, because the focus was placed on perceptions of stakeholders and their context. The intention was simply to generate data and analyse it in a manner that would reflect an understanding of stakeholders' perceptions about environmental injustices and community-based environmental education and how those perceptions could be used for community environmental education programmes.

4.15 Ethical considerations

The name Stortplaats (Afrikaans - dumping site) is a pseudonym; the real name of the village is withheld to avoid ethical challenges. The sensitivity of the study in the area was highlighted by a respected academic and educator who lives in the village and who suggested that the actual name be withheld. Pseudonyms were used with the consent of the participants during interviews to ensure confidentiality and anonymity. Autonomy, freedom and justice were maintained. An ethical clearance letter from Durban University of Technology's Institutional Research Ethics Committee, authorisation letters from the Department of Education, the responsible authorities (the chief and the councillor), the principal and the school governing body were sought. Consent forms were completed and signed by participants (See appendix 8). Only consenting adults participated in the research and withdrawal at any level was acceptable.

Before the interviews commenced, informed consent was sought from all participants by means of a standard informed consent form designed for this study (see Appendix 8). The researcher engaged with each participant regarding the contents of the consent form, explaining its implications. Every participant was asked about the clarity of the consent form and after the explanations and clarifications had been given, both the participant and researcher signed it. One copy was given to the participant. During the discussion on informed consent the participants were asked whether they would be comfortable with audio recording for accurate data documentation (De Vos *et al*. 2011). Issues to do with anonymity, confidentiality, voluntary participation and withdrawal from participation at any point were explained to the participants. It was further explained to participants that the audio recordings would be transcribed and securely stored by the institution and shredded after five years.

4.16 Summary

This chapter discussed the research methodology of the study. It covered the research paradigms, research approach and the adopted research design case study. The population and sample were then discussed, followed by sampling procedures, data

generation tools, trustworthiness, data analysis, my positionality and lastly ethical issues. The qualitative layout made it possible to understand the responses and interpretations of the participants. The use of an individual interview guide and the photovoice schedule ensured that the generated data was accurate. To analyse the data, themes were identified and discussed with relevance to the theoretical interpretations. The researcher's positionality was explained and the motivation discussed as eagerness to understand the stakeholders' perceptions on environmental injustice and of community-based environmental education to enable environmental education. Ethical considerations that focused on confidentiality and trustworthiness were discussed. The next chapter offers data presentation and analysis.

FINDINGS OF THE STUDY

CHAPTER FIVE

5.1 Introduction

The previous chapter discussed the operational methodology used in this study and its justification. This chapter presents the data generated based on the following critical research questions: The main research question of this study is: What are the stakeholders' perceptions of the environmental injustices at Stortplaats and of community-based environmental education as a strategy to address them?

The following research sub-questions were pursued:

1. What are the stakeholders' perceptions about the environmental injustices existing at Stortplaats?
2. What are the stakeholders' perceptions of causes of environmental injustices existing at Stortplaats?
3. What are the factors that influence the stakeholders' perceptions about environmental injustices at Stortplaats?
4. How could the stakeholders' perceptions be translated into community-based environmental education strategy that could be used to address the environmental injustices at Stortplaats?

5.2 Findings of the study

The data generated from the semi-structured individual interviews, indirect observation and photovoice interviews revealed the perceptions of Stortplaats stakeholders concerning environmental injustices and addressing these environmental injustices through community-based environmental education.

5.2.1 Stakeholders' perceptions of the environmental injustices at Stortplaats

The codes, categories and sub-themes drawn from the research question on stakeholders' perceptions about existing environmental injustices are summarised in Table 5.1 below.

Table 5.**1 Summary of themes for Research Question 1**

Question 1	Codes	Themes
What are the stakeholders' perceptions about the environmental injustices existing at Stortplaats?	1. The location of sewage ponds within our community dates back to pre-independence period. 2. Apartheid created these environmental injustices and after constitutional democracy nothing has changed. 3. Poor people are not listened to even if they complain	Apartheid contours
	1. We are exposed to the waste from the nearby suburb whilst we don't enjoy the flush-toilet systems. 2. Politicians always promise us to remove these sewage ponds but nothing has been done. 3. Even if we complain no one listens. 5. Building contractors also come here to mine *umgeni* sand causing severe land degradation. 6. The gullies left behind after mining sand collect water during rainy season and that becomes dangerous to our children. 7. These pools become mosquito breeding places. 8. Our river is polluted by farmers and industries and our livestock are dying	Unfulfilled post-apartheid promises

Source: Field interviews (May 2019)

Participants such as the chief, the councillor and Educator 1 described Stortplaats as a rural, isolated and neglected community. The community was once sparsely populated; however, the numbers have increased because of natural increase (reproduction) and incoming residents from other areas. This community is administered by the local government through political and traditional structures. The councillor administers the area on behalf of the local government (municipality) and

the traditional chief runs the daily affairs of the community, such as resolving conflicts, allocating stands to new occupants and assisting in local governance. These participants cited confusion and overlapping between the traditional leadership and the municipality, which sometimes hampered development. This was also observed by the researcher.

> *Nothing can justify the environmental injustices we are subjected to. We are subjected to bad smells every day and our cattle drink contaminated water and sometimes they develop worms. Stortplaats is rural area and we depend entirely on farming, but young people leave this area looking for employment because of lack of development services. In the end older people are not strong enough to do intensive farming. Our failure as the municipality to implement some developmental projects and servicing the area is mainly hindered by sometimes the misunderstandings between the traditional leadership and the local government. Sometimes the implementation of simple projects like building toilets gets delayed because of bureaucratic procedures. You can't introduce something without consulting everyone and sometimes it takes too long to kick-start a simple project.* ***(Councillor****)*

The researcher observed that the Stortplaats area as a rural settlement runs multifunctional economic activities like an urban settlement with sporadic monolithic farming activities, which are traditional and subsistence in nature. These subsistence farming activities are gradually being abandoned as young people, who are natural drivers of economic development, migrate out of the area in search of employment in towns and on nearby sugarcane farms. Active members of the community migrate daily to nearby chicken and textile industries, upmarket malls and townships, seeking employment and other essential social amenities such as clinics, libraries and better equipped schools. The community settlements are randomly and poorly organised for any proper centralised sewage piping and water system. On why the village homes were randomly organised, the chief had this to say:

> *Stortplaats is an apartheid construction but no one can justify the community exposure to environmental injustices. The area was created for two major purpose; it was a dumping place for the old and frail former farm workers; it was also a source of cheap labour. Retiring farm labourers were relocated to this area and it was meant to be a temporary shelter hence the location of sewage dams right within the community. The post-apartheid system has come up with policies and promises which are yet to be realised. (****Chief****)*

> *Stortplaats is an isolated village, which is surrounded by sugarcane farms and multinational plots breeding chickens. Originally it was set aside as a source of labourers and possible retiring area for aging farm workers. Houses were built as temporary shelter. What is of interest is that nothing since independence has changed. We are still subjected to apartheid era environmental injustices (**Educator 1**)*

The above historical narrations by the local chief and the educator indicate that the community is aware of the general background of the environmental injustices existing at Stortplaats. The explanations are detailed, indicating that sections of people at Stortplaats viewed the existing environmental injustices as an apartheid era creation, but at the same time not absolving the current authorities for failing to remedy the situation. Explaining how these environmental injustices came into existence at Stortplaats, the chief stated that during apartheid times, the local people, particularly the blacks, Indians and coloureds, were not perceived as human enough to be irritated by the pungent smell produced by the sewage ponds. The irony in this case, as observed by the researcher, is that the community is still a site for a sewage processing plant and is perennially subjected to the unbearable smell, yet in their houses they do not have water-carriage system toilets. Instead pit latrines are used. On being asked who was to blame for the siting of sewage ponds at Stortplaats, the community blamed the apartheid policies, but without absolving the post-apartheid government. The land in this area is still not serviced and residents are not legal tenants and owners of the stands they occupy because of the absence of title deeds. The economic implication of this is that occupants cannot use their homes as collateral.

> *The environmental problems have become part of our lives. On several occasions we have tried to express our displeasure over some of these environmental problems bedevilling our community, but nothing tangible has been addressed. These problems are far older than us and every time when leaders come to this area they always blame apartheid and its now over 20 years still singing the same song of blaming apartheid. **(Community member 1**)*

> *These problems are far older than us. We were born under such conditions and from the look of things we will die still facing the same challenges. (**Learner 1**)*

> *Our problems were long created by apartheid and we are still battling to solve some of these ancient problems. We will succeed because we have*

the constitution that backs us. We are not supposed to be living under such horrible conditions. We will certainly push until we win. ***(Councillor****)*

The attainment of independence in 1994 ideally opened the windows of equal opportunity for all citizens, but 25 years after the official end of apartheid South African society remains fragmented, with unbalanced access to social services, as revealed by the narrations. Participants acknowledge that decades of apartheid rule in South Africa contributed to unprecedented conditions of inequity, poverty and unfair exposure to environmental injustices. That legacy left trails of poverty traps and participants revealed that the deepening and worsening social inequalities were perpetuated by the post-apartheid government. Locating sewage treatment ponds next to a poor community simply because it is poor is an environmental injustice that violates fundamental basic human rights and democracy and this demands remediation and prevention. The councillor indicated that the South African Bill of Rights, which was finalised in 1996, ensures that everyone has the right to an environment that is not harmful to his or her well-being and health.

In politics we say that poverty and environmental injustices were closely linked to poverty and apartheid system in South Africa. The local government working document articulates clearly that socio-political and economic relations were part of the environmental equation and that these inequalities and injustices would be addressed as a matter of emergency and a party's post-apartheid reconstruction mandate. Apartheid was cruel and wrong and we are still struggling and struggling to remove its roots. ***(Councillor)***

The above articulations by the councillor were echoed by other participants who explained that subsequent government policies that sought to correct environmental imbalances were instituted with varying degrees of success. The question is: Why is the eradication of environmental injustices and other past anomalies not a success story? The apartheid legacy can no longer be a useful notion why rural communities such as Stortplaats are still entrenched and exposed to environmental injustices 25 years after attaining democracy. The environmental problems existing at Stortplaats are still driven by a structural apartheid system that existed around the 1980s; these problems could be understood and explained in terms of existing power configurations

and socio-political relevance. The cruelty and perverse nature of the apartheid system cannot be denied and at the same time the possibility of explaining these environmental issues using the apartheid legacy cannot be ruled out, but the researcher observed that the socio-economic relevance of the community at Stortplaats plays a major part in keeping this rural village exposed to environmental hazards.

Participants such as the learners and the community members concurred in their narrations that the existing environmental injustices at Stortplaats were mainly caused by unfulfilled promises by the local municipality. Their claim was that they were being discriminated against because they were mainly poor and could not sue the state.

> *Nobody cares for us and we are getting fed up. Its over 10 years we were promised that these sewage ponds were going to be removed from this place because they are causing a lot pain and diseases. Before every election we get visitors promising us the same old story.* ***(Community member 2****)*

> *The removal of sewage ponds within our place has become a blame game. People blame apartheid government for these ponds … Ha … Ha … Ha … Apartheid government after 25 years that's ridiculous. For how long shall we blame apartheid for our failures? This is simple failure or being inconsiderate. They know we are poor and we can't do anything (****Community member 3****)*

Community member 3's narration was echoed by L**earner 5:**

> *The painful thing is that the sewage ponds we are housing in this area treat sewage and sullage coming from a middle-class suburb which is located five kilometres away. Those guys enjoy the fresh air and we suffer their waste … but why? Look at the site of these sewage ponds and our village close by.* ***(Learner 5)***

Learner 5 then provided the picture below to show the proximity and the situation of sewage treatment ponds in relation to their village:

Plate 1: Location and situation of sewage ponds and the community

Source: Field interviews (May 2019)

Inequalities and spatial marginalisation still exist between the rich and poor. Narrations by participants revealed that the rich still enjoy the environmental good while the poor are marginalised and subjected to environmental burdens. The chief and the councillor concurred that the emancipation of the poor and marginalised from the hostile conditions to which they are subjected must be authentic and critical.

> *This community is older than the existing townships around and one wonders why we are still lagging behind in terms of development. We don't know what is actually happening. They ask you to submit a developmental proposal then two three years down the line somebody comes in and asks for the same thing. (**Chief**)*
>
> *I am now the sixth or seventh councillor of this area since 1994 and all former councillors did submit developmental proposals but nothing has happened. You see last year we submitted project proposals and when I went there at the beginning of the year somebody new was in office and he requested that I submit a new proposal. You see it's a cycle. (**Councillor**).*

This means that it is a futile exercise to attempt to emancipate the marginalised people without deliberately designing a programme of action that would support the life of a free man. In this case any attempt to save the community at Stortplaats without

designing an authentic programme such as community environmental education would be a futile exercise.

The positive social and political changes that have taken place in South Africa over the past 20 years are commendable, but the struggles against structural environmental injustices remain a major focus, as observed by the researcher. This was also narrated by the participants. Poor and marginalised rural communities are still vulnerable to injustices such as unfair distribution of environmental burdens and disutilities.

5.2.2 Stakeholders' perceptions of the causes of environmental injustices existing at Stortplaats

A summary of codes and themes identified for the research question on perceptions about the causes of environmental injustices is given in Table 5.2.

Table 5. 2 Summary of codes and themes for Research Question 2

Question 2.	Codes	Themes
What are the stakeholders' perceptions on causes of environmental injustices existing at Stortplaats?	1 Some of us are contributing to some of these environmental injustices by cutting down trees. 2. Those who sell *umgeni* sand do not know that they are causing land damage. 3. People are not aware of the policies that concern the environment 4. Even if we cut down trees who cares this is our place we have been living in this place for a century.	Lack of knowledge about environmental policies
	1.We complain about environmental problems but no one listens 2. Garbage is never collected & we don't know why 3.Environmental complaints are not attended to 4.Garbage collection services are very poor 5.Those who built sewage ponds in our area are responsible for pollution	Lack of effective communication between leaders and community members
	1. Some people dump garbage anyhow. 2. The cutting down of trees to sell firewood is too much 3. People dump used dippers and garbage in a river and that causes water pollution. 4. Burst sewage pipes are not reported in time	Irresponsible environmental behaviour

Source: Field interviews (May 2019)

When the stakeholders were asked about their perceptions of the causes of environmental injustices existing in Stortplaats, some of them confessed ignorance of environmental policies and dangers associated with damaging the environment or nature.

> *We cut down trees for constructing our homes and sometimes sell these poles to those who are building their houses in townships. By doing that I see nothing wrong with it because nature belongs to us and by selling what we have we are able raise money for food and fees for our children.* ***(Community member 9****).*

> *Those who sell umgeni sand like me honestly they don't [know] that they are causing any environmental damages. Selling sand is my only source of*

business and sometimes we need to be enlightened about some other things which we don't know. We would appreciate if someone explains to us nicely about what danger is really caused by mining sand. ***(Business person****)*

When the stakeholders were asked about what they perceived to be the causes of environmental problems at Stortplaats, this is what they said:

*We always complain about people who come all the way from town to mine construction sand at Stortplaats and no one seems to be attending to our plights. We have complained and complained but no one cares. What must we do then? We know those who are destroying our environment and when you report you are told to put down all your details … Can you do that. I mean you?? (****Community member 10)***

Community member 10's sentiments were echoed by the **Environmental Health Officer**:

*I have written several environmental destruction complaints and no one seems to be caring. I have sent letters to all Departments about the dangers of sewage ponds located within the community but every time I get there I'm told the issues are being attended to. The community complains about the smell every morning and I can't do anything about it. These sewage ponds are the major environmental menace. (****Environmental Health Officer)***

The community head had this to say:

Township people are giving us problems here at Stortplaats. They are causing all the environmental problems that we have. They brought in the sewage ponds. They are bringing in their garbage at Stortplaats for disposal. They have money and they are building mansions. They come here looking for construction sand. We really have problems here. ***(Community head)***

We are always asking questions about the presence of sewage ponds within our area and why police are not arresting those who poach building sand within our locality….but no one explains to us. Is it because we don't deserve answers or those answers are just not there. ***(Community member 10)***

Learner 4 echoed the village head's sentiments;

Every day we see our land being destroyed and no one seems to care. Lorries come in daily to fetch construction sand and they carry with them tonnes and tonnes of sand. It is easy to destroy the environment but to repair it is very difficult to mend it. It's really a sad story and we truly know that this land we are losing today was going to benefit our children and our children's children. As the youths we don't want to be blamed by the future generations for failing to safeguard this irreplaceable natural resource.

Every time I see a truck carrying sand from our place I always remember that our tomorrow is getting bleak.

Learner 4 provided the following photograph to illustrate issues of land degradation caused by sand mining:

Plate 2: Sand poaching causes unprecedented environmental degradation

Source: Field interviews (May 2019)

The narrations by community members showed that some stakeholders at Stortplaats were not aware of the environmental activities that could lead to degradation and eventually endanger their lives and those of their children. These narratives demonstrate that it is not only lack of understanding of environmental injustices that is problematic at Stortplaats, but also lack knowledge about environmental policies and statutes. Another interesting issue raised by stakeholders was lack of communication among stakeholders.

5.2.3 Factors that influence stakeholders' perceptions about environmental injustices at Stortplaats

The codes and themes identified for factors that influence the stakeholders' perceptions about environmental injustices are summarised in Table 5.3 below.

Table 5.3 Summary of the codes and themes for sub-research question 3

Question 3	Codes	Themes
What are the factors that influence the stakeholders' perceptions about environmental injustices at Stortplaats?	1. We are poor and we have no jobs so our only source of income is through selling sand. 2. Nobody recognises us here, it's like we are occupying land illegally. 3. We once complained about these environmental injustices and we were told that these sewage ponds were located first before us.	Power and recognition
	1. We live in mud houses and our children suffer chest pains from inhaling dust. 2. Our roads are dusty and that causes a lot of dust pollution. 3. Garbage lies uncollected for months and that becomes an eyesore at the same time we are exposed to some stench coming from rotting garbage.	Poor service deliveries
	1.Some of us we don't know the effects of environmental injustices on our daily lives 2. We are busy working for our families and have no time to think about the environment 3. As women we don't speak much about what happens outside our homes 4. I'm too old to think about the environment, it's for the young ones	Social factors (education, economic, gender, age)

Source: Field interviews (May 2019)

The stakeholders at Stortplaats narrated the factors that influenced their perceptions about environmental injustices. These were the narratives:

Their complaints were not listened to because they did not have power and were therefore not recognised. The following excerpts captured the main responses of the stakeholders:

Even if we complain no one listens to us. We are like a neglected community and no one pays attention to poor people. We have learnt to live with these environmental injustices. If we complain to the councillor he tells us the same old story. The old story is the municipality is still preparing to remove these filthy ponds. ***(Community member 4)***

*We are carrying a painful burden. Last time we organised ourselves and sent a delegation to council offices to present our complaints and what did we get after that ... nothing except being called "names". If you complain even if it's genuine you are labelled and that can cost you your … ehh … life. (**Community member 5**).*

*Our river is in a bad state, people come all the way from their faraway places to mine construction sand in our river and area. At times you wonder as to whether these people do not have rivers in their areas. The resulting gullies become dangerous especially during rainy seasons. Water fills up in these gullies creating water ponds that can harm our children. (**Community member 6).***

The narratives of Stortplaats community members revealed that the population in this area carry a burden of negative environmental conditions. This is contrary to the South African Constitution, which strongly emphasises the importance of ensuring environmental safety for all people, yet there is minimal empirical understanding of the effects of the environmental hazards on social functioning and development in this area. In spite of constitutional guarantees, economically disadvantaged communities facing environmental injustices are continually side-lined in decision-making with regard to the distribution of environments burdens. Strategies are in place to ensure environmental sustainability, but because of the unequal intrinsic power structures these strategies fail to address the environmental needs in marginalised communities.

The proximity to sewage waste sites compromises ambient air quality and this subjects us as a community to a perennial smell negatively affecting our physical and mental states. It's a pain every day. Everybody talks about our area Stortplaats. Everybody is living in the smell and also works in the smell. I'm luckier than others … I work outside the area so for eight hours I take leave off the pungent smell … but those who work and live here are in trouble. Its smell smell … smell … smell throughout their entire life. So, it's not nice you see … every time you are sitting and enjoying your meal … a bad smell is coming to you but ehh ... because you don't have ... you can't do anything. Even little kids complain every day and sometimes ask … why are we staying in this smelly place … why don't we move to another place which is not near these sewage ponds? But we have no choice nor alternative … so we have to stay there. We are busy fending for our children

*and we have no time to think about our environment (**Community member 1)***

The above narration by the community member demonstrated detailed understanding of environmental injustices caused by the existence of sewage ponds at Stortplaats. This understanding seemed to be frustrating the community member and at the same time desperation and powerlessness surfaced in the quotation. The community member was aware of the dangers of being exposed to a bad smell, but returning to that smelly place called home was not optional. Educator 1 and Educator 2 confirmed that the environmental injustices were making their lives difficult at Stortplaats. The above narration not only exposed the prevalence of such disparities, but also demonstrated the detrimental impact that these environmental conditions had on the overall self-esteem of the residents and social cohesion. Educator 3 and educator 4 agreed that poor rural communities such as Stortplaats host unstable environments that can contribute significantly to psychological stress and poor cognitive health in residents, particularly learners. The environmental health officer also indicated that these environmental injustices constituted oppression and could have a negative impact on people's personalities. This unfortunate effect seemed to be the reality at Stortplaats, as demonstrated in the sub-themes that were identified within the theme of environmental injustice.

The transcriptions revealed that participants were aware of environmental injustices prevalent within the Stortplaats community, as reflected in this narration:

*… in most times I go out for instance to visit my friends living in the nearby upmarket suburb … like recently I was at this township … ehh … those people live in an environment that is completely different environment from our place ... you see, living there has just taught me that ... eeh nobody cares about us. Whom do we tell … no one? You see there is nothing we can do, it's a situation that we must to learn to live with. **(Educator 1)***

The above narration revealed that residents at Stortplaats are aware of the disproportionate distribution of environmental burdens. The participant's articulation firmly compared the environmental discrepancies between the two neighbouring residential communities. This was not said directly by the participant, but her reference to environmental discrepancies between Stortplaats and the neighbouring suburb

attested to that effect. Educator 3 and Educator 5 corroborated these findings by positing that middle-class communities received better municipal attention than formerly marginalised rural communities. This created social disconnections and mistrust among neighbouring communities and such a set-up bred hostilities that resulted in village wars (*izimpi zezigodi-IsiZulu*).

> *Our major concern is the existence of sewage treatment ponds within our community. These sewage ponds perennially produce a pungent smell which is unbearable … as to why these sewage ponds were sited here yet we do not have flush toilets nobody can explain. As women we have no say when it comes to environmental issues. Our culture says the woman's place is the home and kitchen* ***(Community member 3)***

The absence of proper toilets takes away the dignity of people and proper sanitation has become a human right that everyone deserves. Lack of proper toilets has a negative impact on the environment and water has become of major concern. Proper toilets ensure good hygiene that prevents the spread of diarrhoeal diseases.

Community member 3's narration was echoed by **Learner 5**:

> *The painful thing is that the sewage ponds we are housing in this area treat sewage and sullage coming from a middle-class suburb, which is located five kilometres away. Those guys enjoy the fresh air and we suffer their waste … but why? Look at the site of these sewage ponds and our village close by. These old sewer pipes burst, releasing sewage straight into the river. The worst thing is that people do not report burst pipes, probably because they don't know where to report.* ***(Learner 5)***

Learner 5 then provided the picture below to show a burst sewer pipe that drains into the river. The community is then perennially exposed to a pungent smell and risks the spread of diarrhoeal diseases:

Plate 3: Burst sewer pipes release sewerage into the river polluting water

Source: Field interviews (May 2019)

The above picture is a symbol of torture and menace to the people of Stortplaats. Its situation within the community is unwelcome. Community members and the community leadership agree that the siting of sewage treatment ponds at Stortplaats was discriminatory and therefore remedial action should be taken as a matter of urgency. The villagers are also incensed by the fact that their place is a site of sewage treatment ponds, yet the entire community of over 10 000 people do not have water carriage system toilets or flush toilets.

> *We have requested the government through our local authorities to build us proper water carriage system toilets so that our people who can enjoy the services of the sewage ponds. As it is our community is carrying a burden which was created by others. We have complained on several occasions to the guys in offices and I believe records are there, but it seems our cry is yet to bear fruit.* ***(Councillor)***

> *You see these sewage pipes are too old and rusty. Sometimes because of too much pressure inside here … they burst releasing sewage into our homes. That sewage flows into the river which our source of water for cattle. Life in this place is tough. Sometimes children and even adults have serious diarrhoeal diseases and we lose a lot of school days because of exposure*

*to faecal matter … that's why we fail sometimes. Even our parents also get sick and take off days at work … so we lose money . (**Learner 3)***

Learner 3 provided the following picture of burst sewage pipe and excreta flowing into the River:

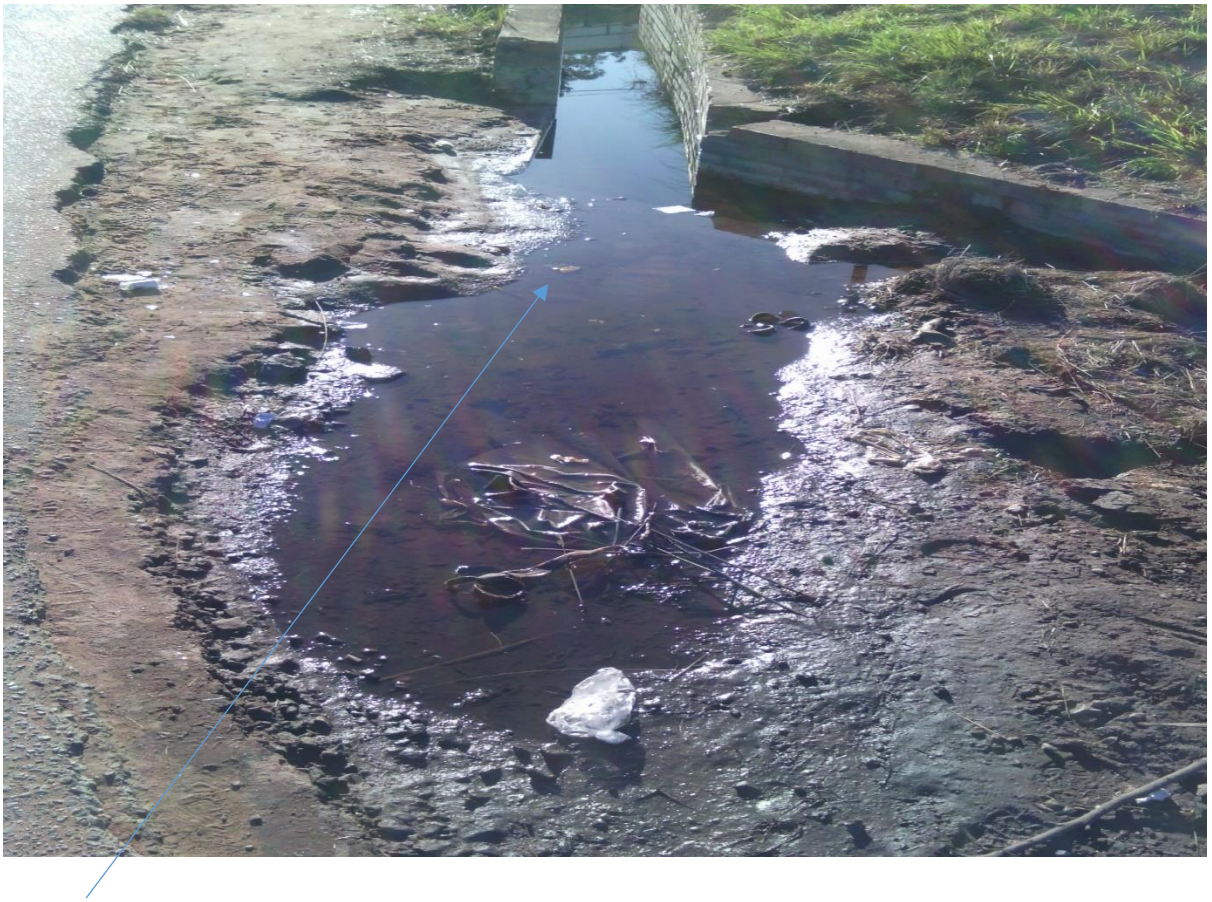

Plate 4: Burst sewage pipes exposes people to faecal matter

Source: Field interviews (May 2019)

The villagers further indicated that these sewage ponds are serviced by old, rusty pipes that sometimes burst, releasing human excreta into people's homes. The environmental health officer stated that exposure to human excreta is a major environmental concern at Stortplaats and socially unjust in view of the NEMA Act, which articulates that adverse environmental burdens such as sewage ponds should not be distributed in a manner that discriminates against persons, especially the poor and vulnerable. This exposure to human excreta is not only unsightly, but a human catastrophe that could lead to the outbreak of diarrhoeal diseases such as cholera,

dysentery, typhoid and botulism. Educator 2 reiterated that the South African Bill of Rights of 2000 affirms that all persons have a right to an environment that is not harmful to their health and well-being. Community member 7 also pointed out that thousands of people at Stortplaats lack proper sanitation and are continuously exposed to hazardous health conditions imposing costs in terms of lost work days because of illness and rapid lung aging.

> *The raw sewage flowing into the river system is not only a health risk to people and animals living on land, but even deadly to aquatic life and the river system. We have recommended that the authorities must as a matter of urgency take necessary action to rehabilitate the entire sewerage system. It's old and rust. Above all it was designed for a smaller suburban community and with the rapid increase of urban population the pressure is too much for these old pipes. The best thing is to hold certain people accountable by simply taking them to court. Even the community itself must report the burst pipes as a matter of urgency. Perhaps the knowledge about the effects is not available.* ***(Environmental Health Officer)***

> *It is clear and visible that there is a rapid decline in water quality within local river and this is threatening the health of people and the safety of the entire eco-systems. People sometimes contribute to these environmental problems. Some dump used dippers in rivers causing pollution.* **(Educator 2)**

The narrations by the educator and the environmental health officer clearly demonstrate an understanding of functional ecosystems. The rapid growth of aquatic plants because of excessive inflow of nutrients such as nitrates and sulphates from sewage constitutes eutrophication, which has a negative impact on river ecosystems. Aquatic plants such as algae and aquatic fauna require oxygen for aerobic respiration and decomposition and these two competitive processes depend on the development of biomass. Rapid growth of aquatic plants increases the basic oxygen demand in a river system and that causes the death of some plants and animals in the water. The biomass accumulation at the bottom of the water body consumes all the available oxygen and this severely upsets the balance of nature.

The environmental health officer and Educator 1 explained that oxygen deficiency in water bodies causes aerobic bacteria to mutate into anaerobes or cyanobacteria and these are able to use oxygen in sulphates and nitrates. During these processes sulphur and nitric oxides occupy the upper layers of water, releasing the very specific

smell of rotten eggs and effecting a colour change. Exposed animals and human populations are affected through various pathways. Specific health risks appear if contaminated water is used for drinking. Cyanobacteria produce toxins that are implicated in animal or human poisoning. People may be exposed to toxins through direct consumption or indirectly through ecological food chains and inhalation of airborne particles (aerosols). Numerous fatal disorders in the nervous, digestive, respiratory and cutaneous systems could be experienced. It is therefore important for the community at Stortplaats to understand all these negative effects. This could be achieved through community environmental education. The environmental health officer, citing NEMA (1998), outlined that the possible litigation steps to be followed when seeking reparations were available, but to prove scientifically in a competent court the risk effects requires exorbitant financial resources that the affected people do not have.

The environmental health officer provided the picture below to illustrate the severity of eutrophication in the local river:

Plate 5: Algae choking Local River

Source: Interviews (May 2019)

The above picture shows that the river is shrinking because of excessive growth of plants in it. The water channel is narrowing and plants cover almost 75% of the river

channel. This is an environmental catastrophe that causes the death of aquatic fauna and flora. The death and disappearance of aquatic organisms upset ecological stability, triggering environmental disasters. The Stortplaats community co-exist with these multiple environmental assaults, of which the leadership in the area, including the chief and the local government representative who is the councillor, is well aware. These environmental issues are compounded by residents' low income and lack of access to health care centres. The aim of the research was not to expose these unjust circumstances *prima facie*, but to determine the basis for the injustices and to suggest remedial means. While the chief and the village head criticised the location of the sewage treatment ponds at Stortplaats, the councillor and other residents pointed out that people actually settled near the ponds rather than further away.

> *As to why the sewage treatment ponds were located within the community at Stortplaats … it's them who are to blame. When these ponds were built here this vast land was empty. There was nobody living here. Retired farm labourers who were mostly foreigners from neighbouring countries chose to settle in this place because they could not afford to buy expensive stands and sites in the township.* ***(Councillor****)*

Agreeing with the councillor, the local environmental health officer said:

> *Some people blame the villagers for settling near environmentally hostile places. As to why people were settled here I don't know. This place is like an island … it's surrounded by farms and an upmarket middle-class suburb. I am reluctant to be drawn into a discussion as to who came first because it's a bit political and you know politics …* ***(Environmental health officer****)*

These narrations point out that people living in environmentally hostile areas are mainly migrant workers and the authorities are sometimes reluctant to use state resources to finance relocations or rehabilitate these places. Instead authorities see these residents as 'pollution' that must be got rid of.

The chief and the village head's responses were very brutal to the entire system:

> *For any anyone to claim that this land was unoccupied when the sewage ponds were located here is unfortunate and disgraceful. My forefathers fought for this area and won it long before the establishment of the Zulu kingdom. In South Africa and the entirety of Africa there is no-man's land. Every land belongs to somebody. When these ponds were created nobody was consulted. This land belongs under the chief's jurisdiction and*

> *Ingonyama Trust so for anyone to claim that the land was empty … it is unfortunate. The chief has a right to settle any one in his area in spite of his origin … that's it. As it is now I'm too old to fight for the people. It's up to the youths to stand up for their land not us the old.* ***(Chief****)*

In support of the chief, the village head had this to say:

> *Those who claim that this area was unoccupied when sewage ponds were constructed at Stortplaats are trying to mislead those who are exposing the environmental injustices. This is our area and our great-grandparents lived here. We know of no place other than Stortplaats.* ***(Community member 9)***

> *This is our place and we are reliably informed that our forefathers fought for this place and this place belongs to us, the Stortplaats people. We belong nowhere else except here. So let's leave the blame games. The truth of the matter is that some of us we don't the effects of environmental injustices* ***(Community member 10)***

These deliberations were eye-opening, as they revealed that communities, mostly the poor and marginalised in South Africa and other developing countries, are exposed to hostile environmental conditions and very little remedial action is being taken. The war of words about who was there first, the environmental injustices or the people, introduces the concept of justifying and legitimating the environmental injustices. Environmental injustices committed against the poor and marginalised are often explained with enticing and misleading words that blame the victim. In this case, the argument is that the sewage plant is part of structural development and a source of employment. These words are meant to shift the attention of victims of environmental injustice and environmental justice advocates from the real issues and any form of resistance is labelled retrogressive. The debate about who came first is irrelevant at this juncture; the issue on the ground is existing environmental injustices at Stortplaats. It is presumed that environmental knowledge and understanding could bring about sustainable development and this research intended to investigate stakeholders' understanding of environmental injustices and how that knowledge could be used to spearhead community environmental education.

Disproportionate exposure to environmental injustice often leaves marginalised communities in a state of hopelessness, coercing them to accept and internalise

environmental injustices and ultimately perpetuating these in their own day-to-day lives. In this study, this was reported by the councillor and echoed by the chief and the headman. The self-created fatal environmental injustice at Stortplaats is in the form of land degradation.

> *We are trapped as a community, it is like we can't do anything, people are frustrated and some of them are even doing activities that are perpetuating these environmental problems. In order to survive some of them have resorted to selling sand to building constructors. That is exacerbating the environmental problems. (**Councillor)***
>
> *We are a poor community and we can only earn a living through selling what we have. We have vast land and that land have got good umgeni sand that can be sold to building companies. We survive that way. (**Community head)***

As a result of economic hardship, Stortplaats's unemployed inhabitants turn to sand panning as a way out of poverty and hunger. An increase in housing projects in the adjacent upmarket suburb increases the number of clients for these sand miners, who are sometimes referred to as sand poachers. Dozens of lorries are seen carrying loads of sand from this rural area, the headman explained. River and pit sand as a critical material in the construction industry has become a fast-selling commodity, considering the heightened rate of construction in South Africa. As a result, sand miners have launched relentless attacks on the natural environment, destroying hundreds of acres of land at Stortplaats.

Learner 4 provided the photograph below to show evidence of sand mining:

Plate 6: Evidence of lorries new and old visiting Stortplaats to ferry sand

Source: Field interviews (May 2019)

The mining of *umngeni* sand for construction industries is an environmental ticking time-bomb. This process leaves the soil bare and susceptible to erosion agencies such as wind and run-off. Soil erosion causes land degradation, which leaves gullies and may cause ecological disturbances.

> *This enables me to feed my entire family and save for my future. I have no alternative … for if I don't sell sand which is the only resource that I have my family will die. You see here at … err Stortplaats nobody is taking care of us. We are neglected and forgotten.* ***(Business person)***

The narration by the businessperson, who is in the sand-selling business, demonstrates an act of desperation. The unfortunate part of this process is that the eThekwini municipality does not get any revenue from the sale of sand at Stortplaats. Efforts by municipal police officers to stop the illegal mining of sand are often hampered by officials who are paid bribes by miners.

> *This area used to be our grazing land. With this digging going on, we are going to be left with nothing for our livestock to graze on. Despite regular*

raids by municipal police officials I don't believe these illegal operations will ever stop. Stortplaats is the only place around where building contractors can buy sand at reasonably cheaper prices. The environmental costs emanating from this sand panning on land and along the local riverbed far outweigh the benefits accrued by the sand-poachers. Some people cut down trees for firewood selling in the townships and this is causing a lot damage to the environment ***(Environmental Health Officer)***

The environmental health officer provided the photograph below to illustrate the severity of the issue of sand poaching and its effects:

Plate 7: Sand poaching causes unprecedented environmental degradation

***Source*: Field interviews (May 2019)**

This photograph illustrates that sand mining leaves gullies causing a lot of land degradation and the local chief who has been parcelling out stands for once desperate farm retirees is also concerned about the rate of land degradation. Eroded land is now riddled with holes. These un-rehabilitated holes are an environmental eyesore and a serious danger to lives of children, particularly during the rainy season. They become dangerous deep pools and a habitat for mosquito breeding. Excessive river sand mining causes the degradation of rivers and that leads to severe bank erosion, resulting in deepening of rivers. ***(Environmental Health Officer****)*

Compounding the land degradation through sand mining is the random cutting down of trees and clearing of grass before a pit sand mine is established. The presence of

trees and vegetation offers many benefits to human beings, such as providing shade, creating barriers to strong winds, conserving water, regulating the climate, improving air quality, decreasing stress levels and creating a social space. At Stortplaats residents have expressed serious concerns that their environment is turning into an eyesore, but those involved in sand mining activities seem to be earning a living at the expense of the environment.

Although this has become a form of employment and a good number of Stortplaats residents are earning a living through the sand mining, the authorities need to regularise these activities so that mining is not carried out indiscriminately. This regularisation could be done through community environmental education.

What also emerged in this research was the notion of service delivery, which emphasises the issue of environmental injustices. Residents of Stortplaats are constantly coerced to accept a trade-off between the economy and health.

Regarding the factors that influenced the stakeholders' perceptions about existing environmental injustices and of community-based environmental education at Stortplaats, the salient findings identified lack of or poor service delivery as the major factor that contributes to these problems. The chief and the councillor indicated that these environmental injustices were threatening the community's sense of self. The community is riddled with numerous service delivery environmental injustices, which include an irregular garbage collection system, mud houses and dusty roads. These can be minimised if governmental commitments are fulfilled.
In relation to poor local authority service delivery, Educator 1 explained:

> *Lack of adequate service delivery frustrates us as Stortplaats community members … we do not have adequate answers for many service delivery issues … in some cases it's the water sometimes it's garbage which lies uncollected for ages. Projects are initiated but not finalised* ***(Educator 1)***

> *We have nothing and no one cares about us … so sometimes we have no option, everything seems to be going southwards and problems mount up daily. Today it's the sewage, tomorrow it's the uncollected garbage and after tomorrow definitely expect something.* ***(Community member 4)***

When asked why the municipality was failing to meet its obligations, the councillor explained that the local authorities were in a state of service delivery failure and dysfunction because of limited resources, corruption and sometimes poor governance. This research revealed that provision of basic services at Stortplaats was largely inadequate.

> *People who are supposed to do their work are doing so. What must we do, all the basic services like tarred roads, clinics, regular garbage collection, normal houses and even clean water … we don't have available.* ***(Community member 3)***

During the interviews and photovoice discussions, the participants lamented their discomfort with the prevailing level of service delivery. These participants indicated that the local government did not offer sufficient feedback to the Stortplaats community on services and development. The participants reflected that their frustration was linked to the dusty road infrastructure, which caused a lot of air pollution, mud houses and the garbage dumping site.

The improper disposal of garbage at Stortplaats also constitutes a source of pollution and this poses risks to human health and the entire environment. Garbage is any material produced through human activity that can be classified as valueless, unwanted, useless and superfluous. Improper disposal becomes an environmental injustice issue if it is committed against the poor and marginalised. An upmarket middle-class suburb, industries and the local community use a defined site at Stortplaats as a garbage dumping zone.

> *Our place is a site for dumping rubbish, we house the garbage we did not produce … is that fair? Why do they bring in all the unwanted garbage here? Do they see us as garbage as well? We need answers ...* ***(Community member 6)***

This dumping site is expected to be temporary and ideally the local authority is supposed to collect the garbage regularly and place it in the designated municipal landfill zones for composting or recycling. In reality, garbage piles up for several weeks

and rots without being collected by the local authority. This becomes unsightly and creates a good habitat for mosquitoes and rats. The pungent smell coming from this filthy dumping zone is unbearable and unhealthy. Such environmental injustices are unacceptable, as severely affected communities often face consequences in the form of health risks that have long-term implications.

> *Look at this … we are supposed to live with it until our wonderful municipal authorities pick it up. Honestly speaking this is a recipe for disaster. Our children, even adults, regularly visit this place scavenging for valuables that are sometimes found in this garbage.* ***(Community head)***

Learner 4 provided the following photograph to explain the state of this site:

Plate 8: Uncollected garbage

Source: Field interviews (May 2019)

> *Many people, including women and children, are usually seen salvaging and scavenging on garbage dumps at Stortplaats. Every day they wade through refuse scavenging for scrap metal, broken glasses and plastics that could help them earn a living. For some children, this site has become a recreational facility where they meet to play.* ***(Environmental Health Officer)***

The above narrations and photograph demonstrate that Stortplaats is indeed a dumping place for both organic and inorganic garbage. The pile of garbage in the photograph attracts flies and rodents that might transmit communicable diseases such as bubonic plague. The decomposing organic matter at Stortplaats dumping site results in the formation of leachates, which may infiltrate the soil and contaminate ground water. Besides the issue of soil pollution, the decomposing matter releases asphyxiating fumes and gases that cause air pollution. The environmental health officer went on to explain that there was a close relationship between living near a garbage dumping area and health-related complications such as liver disorders, prostate and pancreatic disorders. Congenital abnormalities such as low birth weight, neonatal deaths and abortion are also associated with proximity to dumping sites. If the garbage remains uncollected for months, the villagers burn it, further exacerbating the problem by increasing the concentration of carbon dioxide in the atmosphere. This causes global warming, another global threat.

Learner 5 provided the following photograph to illustrate what they normally do if combustible garbage remains uncollected for a long time:

Plate 9: Uncollected garbage burnt causing air pollution

Source: Field interviews (2019)

The photograph demonstrates a traditional way of disposing of organic garbage.

> *This process causes air pollution and at the same time increases the amount of carbon dioxide in the atmosphere. Excessive emission of carbon dioxide into the atmosphere causes global warming and has a greenhouse*

effect. Global warming and greenhouse effect cause climatic changes and that lead to unreliable rainfall patterns such as drought and floods. **(Learner 5)**

It should be noted that South Africa is coming from a surge of apartheid and a history of environmental racism compounded with issues of sacrificial zones. The dawn of constitutional democracy in 1994 ushered in a new era that sought to effectuate a break in the distribution models of environmental burdens. The government has since promoted the equitable access to environmental benefits and guaranteed access to information on the destination of waste and hazards. Today the greater number of former marginalised communities such as Stortplaats are yet to realise the guarantees and benefits of the new constitutional democracy. Former marginalised communities remain stuck in structural pillars of apartheid. ***(Councillor)***

In South Africa, particularly among formerly marginalised communities that live near dumping zones, such as that at Stortplaats, there is a steady increase in reported cases of childhood cancer, leukaemia, obesity, reproductive disorders and cognitive disorders among children and adults. Asthmatic rates among children have risen dramatically to the point where asthma is now considered an epidemic among South African children. These disorders are closely and strongly linked to toxic exposure. The environmental regulations are clear and outlined in the NEMA document and anchored by the constitution (NEMA 1998 and South African Constitution 2000). Why is it that we still have communities such as Stortplaats that are even now exposed to such environmental injustices?

*Our problem at Stortplaats is that we are and we never consulted as a community when some of these environmental decisions were made. I believe a turnaround could be made effective through amplifying the participation in decision-making by the affected groups. Active participation inculcates democratic principles. We were long promised RDP housing scheme, but till today people live in mud houses. We try to make a lot of noise up there but nobody listens. The government is inundated with a lot service delivery backlogs because of apartheid that left the people worse than normal human beings. Sometimes we blame the government yet the budget is too tight (****Councillor****)*

The councillor also outlined that the Reconstruction and Development Plan (RDP), which ushered South Africa into a new democratic era, came with lofty, glorious promises for all citizens, especially those from disadvantaged communities such as Stortplaats. The apartheid system had created injustices in all spheres of life and

housing was one of them. The RDP was then set out as a strategy to ensure formal housing for all former marginalised communities, including Stortplaats. This, the councillor added, was intended to progressively realise and fulfil Section 26(1) of the Constitution of the Republic of South Africa (1996). This section states that all South African citizens have the right to adequate housing. Section 26(2) unequivocally states that it is the responsibility of the government to ensure that resources are available to achieve this citizen right. Ironically, the villagers at Stortplaats are still living in traditional mud houses and in the narrative below a participant describes his dependency and expectations of state service delivery. He qualifies to receive government housing, colloquially referred to as "*Umxhaso*/RDP houses".

> *We are a neglected community since apartheid era … our constitutional government came with a lot of promises. Last time when they were here and it was towards elections they promised to build us imxhaso/RDP houses but alas!!! All ended in vain. Towards 2010 it was promise after promise … ehh ... we were expecting the world cup. We still live and sleep in mud houses and our roads are unpaved and dusty as well. We are exposed to dust every day.* ***(Community member 8)***

Participants feel that there are additional, unconstitutional and unexplained barriers to obtaining RDP housing. According to the comments by participants, one must own a plot or land to qualify for an RDP housing scheme and that plot or site must be surveyed. This is an additional layer of complexity to the community of Stortplaats, as the right to a decent house becomes unattainable because of prerequisites that are not defined in the legal provisions of the RDP scheme.

> *I don't qualify for the RDP house, I don't even qualify for the bond. I'm stuck in that mud house with my family.* ***(Community member 1)***

The Stortplaats community's lived experiences regarding accessing proper houses and services, as narrated above, constitute environmental injustice; this is supported by literature. Literature reveals that communities of low socio-economic income live a daily reality of environmental injustices that have a significant impact and effect on their lives. The councillor and Educator 3 pointed out that mud houses constitute an unstable environment that can contribute massively to psychological stress and poor mental health of regular occupants. This leads to numerous psychological and personal disorders. The unsafe environment created by lack of proper housing

infrastructure often leaves inhabitants in a constant state of anxiety, stress and depression.

These environmental injustices are not only a social menace or cause for concern, but a reflection of a socio-political system that neglects the economically disadvantaged. It is anticipated that the research will provide all stakeholders with an opportunity for expressing their views about environmental injustices, while forming a basis for negotiations between the affected community, businesses and policy-makers through community environmental education. Community environmental education would then trigger interconnections between social, ecological, economic, cultural and political matters, enhancing critical creative thinking skills.

5.2.4 Stakeholders' perceptions of community-based environmental education strategy

The codes, sub-themes and major theme for the research question on stakeholders' perceptions being translated into community-based environmental education strategies that could be used in reclaiming the environment in Stortplaats are summarised in Table 5.4.

Table **5.4: Summary of codes and theme for Research Question 4**

Question 4	Codes	Theme
How could the stakeholders' perceptions be translated into community-based environmental education strategy that could be used to address environmental injustices at Stortplaats?	1. Most people participate in escalating environmental problems unaware. 2. Sometimes community members cut down trees not knowing that it causes land degradation. 3. Some community members dump garbage in the river escalating river pollution. 4. Some community members it is the smell from the sewage ponds and rotting garbage that is a menace not understanding the effects of smell on lungs. 5. People sell sand because they want immediate gain without understanding future implications.	Need for community based environmental education
	1. We cannot change what was built long back but we need knowledge on how to live with it. 2. Understanding the impact of sand mining and the dangers to the river ecosystems would alleviate the imminent danger. 3. Environmental knowledge is the key to conservation of nature. 4. People can be organised in study circles and develop the curriculum that would suit them. 5. The curriculum must be people centred.	Knowledge is power

Source: Field interviews (May 2019)

Mobilising the marginalised communities against environmental injustice requires relating the oppressive nature of the issue to self-actualisation. The growth and realisation of self-concept are essential components of human development, which influence behavioural and cognitive well-being of people throughout the life processes. Education is an important tool that can be used to shape and direct the formation of a positive self-concept. The stakeholders at Stortplaats mentioned the need for developing a positive self-concept and community environmental education was identified as a means that could lead to positive environmental understanding.

The existing environmental injustices at Stortplaats are not only caused by external forces, but in most cases are exacerbated by community members themselves. This is worsened by lack of environmental knowledge and eco-literacy. When asked about

what could be done to reduce environmental injustices present at Stortplaats, some stakeholders replied:

> *I cannot stop selling sand because that is my only source of income. Selling sand is what puts food on my table. I have been doing this business ever since time immemorial and I see nothing wrong with that. Nobody ever complained to me because they don't feed my family.* ***(Business person)***

> *This is the only place which was available to locate the sewage treatment ponds and above all when these sewage ponds were located here very few people were living here save for a few retirees from the farms. So I feel these ponds are not offending anyone; instead it's people who were recently allocated stands here who are making a lot of noise.* ***(Councillor****)*

> *I see nothing wrong with those who are mining sand within the community or within the river. Where else can they get that sand other here at Stortplaats? The garbage is not actually dumped in this place, instead it is temporarily placed before collection. I wonder how that garbage offends people.* ***(Community member 9****)*

The above narrations by the businessperson involved in sand selling and the councillor, as well as Community member 9, indicated that some community members do not understand the effects of environmental degradation and pollution. Most rivers near cities and towns are highly polluted because of both garbage dumped by individuals and chemicals from industries. The main problem associated with water pollution and uncollected garbage is that both disrupt the natural ecosystems and could compromise the health of people.

Some stakeholders acknowledged the existence of environmental injustices, both perpetuated by outsiders and caused by local community members.

> *We have a problem of existing environmental injustices at Stortplaats, which are exported by other communities, like the sewage treatment ponds … our community is also engaged in massive environmental ills that exacerbate the problems we are facing. Some are involved in sand mining causing land degradation whilst others randomly cut down trees … you see. Our greatest problem is knowledge. We need to roll out environmental campaigns that would reduce increase eco-literacy.* ***(Environmental Health Officer)***

> *Some of our brothers and sisters see nothing wrong with the existence of these environmental problems at Stortplaats. Last time when we*

complained about the sewage ponds some people were against us as they thought that these ponds were water purification plants. So our major problem as I see it is lack of one common understanding of environmental injustices. ***(Educator 1)***

We don't actually need these sewage ponds and even people who come all the way from faraway places to mine sand are supposed to be blocked. ***(Councillor)***

The narrations by the environmental health officer, Educator 1 and the councillor demonstrated that some community members are aware of problems associated with poor environmental practices and that understanding becomes an asset for starting environmental education programmes. The environmental health officer pointed out that conditions such as environmental injustices constrict the development of a healthy self-concept. Severely affected communities develop negative identities and children who live in such areas find it difficult to rise above conditions of oppression because of negative internalised perceptions. Contrary to that, supportive and healthy environmental conditions are positively related to improved dignity of communities. Commenting on how the community environmental education programmes were going to be possible in the community that works day and night in order to put food on the table, Educator 2 explained:

People at Stortplaats respond quickly to matters that affect them. You see when there is illness or funeral … people come together to support each other. We live in a society where we say an injury to one is an injury to all. This ability to unite for a common purpose can be used to mobilise people against environmental destruction. ***(Educator 2)***

The above narration posits that neighbourhoods at Stortplaats have the ability to build up a sense of social coherency amid adverse environmental injustices, which is a social capital that can be mobilised to avert many environmental risks. This bond with a place involves an emotional investment that is built on experiences with friends, family and the physical world. This emotional attachment with the place makes the community members choose to stay in an environment that can be classified as dangerous and unsuitable for human habitation. People with a sense of place may accept the hazard as normal in exchange for what they regard as comfort and an advantage of living in that locale. Stortplaats residents demonstrated that sense-of-place attachment and the village head explained:

*We were born here … our great-grandparents were born, bred and buried here at Stortplaats. You see we have no place called home other than Stortplaats. We will always live here whether this place is bad or good … it is our only home and we will do anything to save it. Even if it means fighting to our last man to defend it … let it be so. (**Community head**)*

*At school we learn about environmental problems associated with being exposed to faecal material. These effects range from nausea to headache and in severe cases people get sick and can be admitted. Therefore the removal of sewage ponds would be the first step in dealing with these environmental problems. **(Learner 5**)*

*Mining of sand causes severe land degradation and that promotes soil erosion. Too much soil erosion reduces the land carrying capacity and soon our cattle in this area will begin to starve to death. I believe most people know the effects of soil degradation but are stuck in poverty. If they don't sell sand then their children would die. **(Learner 4**)*

The narrations above exhibit a sense of place and this is an asset, a tool relevant for the execution of community environmental education at Stortplaats. If individuals or community members are attached to their place, a sense of ownership develops, promoting pro-environmental behaviour that can reduce environmental injustices and burdens. The affective bond that an individual develops with a place is not a choice, but a product of accumulated past experiences, such as religion and childhood. No human being is exempt from aspects and nuances of the affective world.

*We are tied to our place of origin and this place defines us as a clan. We are ready to redeem our place from any environmental hazards … even if it means following the unorthodox we will do it. We will support any efforts from anybody who supports the environmental cleansing of our place **(Chief)***

The narration by the chief was often associated with brutal language, which was edited for ethical reasons, but clearly highlights that an attachment to a place is a fundamental human characteristic. This human attachment to a place is mediated by the central nervous processes rooted in the neurophysiological system, which is responsible for incorporating environmental information. When a sense of place becomes organised, it operates automatically and eventually becomes a stable property of an individual. Which can be mobilised through community-based environmental education to defend and save that place.

There was a clear subjective belief among participants that their village, Stortplaats, was a far superior place to live in, but environmental circumstances were making life difficult. In fact, participants held a strong idealistic view that if all community members were made aware of actions that contribute to environmental injustices, then this scourge would be minimised or eradicated. Community-based environmental education was identified as a means of dealing with this scourge. It produces collective self-efficacy by making community members gain control over their lives and environment. Community-based environmental education is a democratic participatory activity that consolidates the sense-of-place concept.

The stakeholders at Stortplaats cited the need for developing a positive self-concept and community-based environmental education was identified as a means that could lead to positive environmental understanding. On being asked why this strategy was considered effective in reclaiming the environment, the participants said:

> *Some of the environmental issues we have at Stortplaats were there even before we were born. I think what we need to do is to find ways of minimising the effects of these environmental problems. It's like we can't change the location of sewage ponds right now. We can continue blaming this one and that one but by the end of the day we have to learn to live with these problems. What we need right now are strategies that would minimise the further destruction of the environment. People need knowledge about the effects of some environmental …* ***(Learner 5)***

When **learner 5** was asked about how people were going to be informed about the environmental dangers, she stated:

> *Environmental education as we learn it at school is not a classroom-only based subject. Anyone can learn environmental education because it is an age-free subject*. *People must know the dangers of some either polluting the environment or contributing towards environmental degradation. Some people burn garbage thinking that is a solution to uncollected garbage yet one way or the other they are contributing to global warming by increasing the amount of greenhouse gases in the atmosphere.*

Learner 5 provided the following photograph to illustrate how lack of knowledge contributes immensely to atmospheric pollution

Plate 10: Burning of garbage is an atmospheric disaster

Source: Field interviews (May 2019)

The participants identified community environmental education as a process that could provide empowerment, social bonding, neighbouring and citizens' active participation. The environmental health officer maintained:

> *If we come together as a community nothing is impossible … once people agree to participate in activities that benefit us as a community we can totally eradicate these environmental injustices. You see, knowledge is power and more importantly, coming together as a community for a common goal improves unity.* ***(Environmental Health Officer)***

> *The issue of saving the planet against environmental problems such as pollution, both air, land and water, has become a global talk. In physical sciences, life sciences, geography and agricultural sciences environmental education is identified as an antidote for reducing environmental destruction. The problem is that the topics are not examinable at matric level and that trivialises the topic into a simple add-on subject.* ***(Educator 2).***

> *Some of us who didn't do sciences at school know nothing about environmental education, but still we are prepared to learn about it if that is going to save us and our place. Our community consists of active members who are able to take up any projects that can move us forward. Last year the Department of Higher Education introduced Adult Education and Training (AET) and most of us joined the programme. If it's for development I bet the last cent I have people will join. (**Community member 8**)*
>
> *I suggest that we design a community-based environmental education programme that would be people-based and use it as a means of increasing environmental awareness. The programme must suit everyone in the community and we have organisations that support community developmental projects. **(Environmental Health Officer)***

On the strategies for rolling out community-based environmental education programmes, the environmental health officer commented:

> *We can use participation on site activities which enables the participants to understand the environment. We can also organise workshops and make simple presentations about environmental protection and management. We can also organise non-formal environmental activities like green gardens competitions. We can also organise recreational trips and get some few tips from the parks conservancy on how to manage and protect our environment. We can also organise non-credit environmental courses. (**Environmental Health Officer**)*

The narrations above suggest that collective action and participation through community environmental education improves efficacy, in other words community members have a voice and a choice, as enshrined in the constitution. By and large the existence of environmental injustices in an area such as Stortplaats is a symptom of unresolved conflict among stakeholders in that area. Stakeholders, as defined earlier, are residents, leaders, the state and the private sector. Contradicting interests create injustices because of power dynamics and harmonising environmental relationships through community environmental education would reduce environmental injustices in the area. It is therefore imperative for a multi-stakeholder community environmental education activity to be designed to bring people together. That would form fertile ground for activating constructive debates and nurturing a democratic culture. Community environmental education that is ingrained in open discussions inculcates proper democratic principles by reducing perpetrator-victim syndrome, which irons out hostilities.

The stakeholders at Stortplaats cited the need for developing a positive self-concept and community environmental education was identified as a means that could lead to positive environmental understanding.

5.3 Summary

This chapter presented empirical findings on the perceptions of Stortplaats stakeholders about addressing environmental injustices through community-based environmental education. What surfaced throughout the findings of this study, as guided by the research questions, was: Research sub-question one: Apartheid contours are still visible; post-apartheid promises have still not been kept at Stortplaats. Research sub-question two: Lack of knowledge about environmental policies and lack of effective communication between leaders, community members and irresponsible environmental behaviour compound environmental problems. Research sub-question three: Stortplaats is plagued by power and recognition problems and poor service delivery. Research sub-question four: There is a need for community-based environmental education to address environmental injustices.

Existing environmental issues influence the lives of residents in various ways. Environmental injustices that are predominant at Stortplaats are direct outcomes of individual actions, state negligence and neoliberal business activities. The healthiness of the community remains inextricably connected to the well-being of the natural environment. The chapter presented the identified themes, which were environmental injustices reflecting socio-political and economic dynamics, basic service delivery issues and community-based environmental education as an antidote for environmental injustices.

CHAPTER SIX
DISCUSSION OF FINDINGS

6.1 Introduction

The main purpose of this qualitative study, as stated in the first chapter, was to investigate the perceptions of Stortplaats stakeholders about environmental injustice and address these through community-based environmental education. This chapter discusses the major findings of the study and judgements about what was learnt during the process of the research. The value of the findings, interpretations and justifications are also explained. Central to this discussion chapter are the following five critical research sub-questions that were pursued:

1. What are the stakeholders' perceptions about the environmental injustices existing at Stortplaats?
2. What are the stakeholders' perceptions of causes of environmental injustices existing at Stortplaats?
3. What are the factors that influence the stakeholders' perceptions about environmental injustices at Stortplaats?
4. How could the stakeholders' perceptions be translated into community-based environmental education strategy that could be used to address environmental injustices at Stortplaats?

6.2 Stakeholders' perceptions about environmental injustice

Stortplaats community members understand that they are disproportionately exposed to higher levels of environmental dangers than upmarket communities. Their concern about unfair distribution of environmental hazards, such as the sewage treatment ponds, dumping zone, river pollution, dusty roads, mud houses and sand mining, can be traced back to apartheid times. The significance of the findings revealed that environmental injustices at Stortplaats can be classified into two groups. The first group are environmental injustices that are structurally rooted in the historical contours of apartheid and are perpetuated by the post-apartheid administration. The second group of environmental injustices are self-inflicted by the community's lack of

environmental knowledge. These two sets of environmental injustices are intertwined and not distinctly separate, as one cannot be explained without mentioning the other.

6.2.1 Apartheid legacy

The most important finding from the research question on the stakeholders' perceptions of existing environmental injustices at Stortplaats was that apartheid contours are still visible 25 years after constitutional democracy. Stortplaats became a site for sewage treatment ponds during apartheid times when there were very few community members. The existence of these sewage ponds might now appear economically discriminatory, but at the time of siting, environmental racism influenced the location. This is in line with the findings of Kay and Tisdall (2012), who posit that during apartheid the distribution of environmental burdens in South Africa was based on discriminating against poor people, of which the majority were black. This is consistent with findings by Chunrong *et al*. (2014), who carried out an investigation into the effects of environmental injustices in Memphis in the USA. Their study indicated that poor communities were exposed to environmental waste and land degradation. The study revealed that toxic waste was shipped over long distances from their place of origin to Memphis, a place inhabited by low-income communities. The reason for transporting these pollutants to Memphis was that the regulations governing toxic waste were weak and almost non-existent. This agrees with the view of Jameson and Jia (2012), who posit that environmental protection is a priority for the wealthy; the poor and marginalised are obsessed with food for the day and therefore worry less about environmental issues. These were the principles that the apartheid government used. Black and poor people were often subjected to environmental hazards. The sad fact is that even today when apartheid environmental racist laws and policies have long been repealed, structural discrimination based on shadows of apartheid are still visible in South Africa (Stull *et al*. 2016). Stortplaats is testimony to that fact.

The apartheid system of governance is gone, but unfair distribution of environmental burdens remains. Similar circumstances exist in other countries where the reasons for locating environmental disutilities are not linked to race. Anjos (2013) identified that in

Rio de Janeiro, in the Santa Cruz community, there was selective distribution of environmental burdens and this unfair distribution was not linked to race, but to vulnerability in terms of socio-economic status. Poor social groups of people had a greater chance of housing disutilities such as garbage dumping zones and sewage or sludge-processing plants. These poor communities lacked proper infrastructure such as clinics and schools and above all suffered the indignity of marginalisation and oppression. There are significant similarities between the Santa Cruz community and the Stortplaats community. In Rio de Janeiro, discrimination against the community was based on income, not on environmental racism. At Stortplaats any form of environmental discrimination can no longer be explained in terms of race, but has to be attributed to other factors, such as income.

Anjos (2013) points out that the stratification of the Rio de Janeiro community contributed to environmental injustices. This was based on the environmental sacrificial zone theory. Poor communities are often sacrificed when siting environmental disutilities. Santa Cruz, an area occupied by the poor and marginalised, was considered a sacrificial zone for dumping waste. Sacrificial zones are created after profiling inhabitants according to characteristics such as income level, education, social group and place of origin. Brazil, as the last country to end slavery officially, is still failing to deal decisively with a model of master-slave mentality. It is for similar reasons that environmental injustices at Stortplaats could be explained in terms of structural apartheid that the democratic administration is still struggling to remove.

South Africa, coming from a history of apartheid, does have a history of environmental racism and issues of sacrificial zones. The introduction of a constitutional democracy in 1994 led to the state seeking to effectuate a break in laws governing the distribution of environmental burdens, as outlined in the Constitution (Stull *et al.* 2016). Twenty-five years after the advent of constitutional democracy there are still a considerable number of reported cases of childhood cancer, leukaemia, obesity, reproductive disorders and cognitive disorders among children and adults from the poor rural families found just outside urban sacrificial zones (Stull *et al.* 2016). These disorders are linked to toxic exposure (Jameson and Jia 2012). In Memphis the environmental regulations are weak, but in South Africa environmental regulations are clear and

outlined in the NEMA document and anchored by the Constitution (NEMA 1998 and South African Constitution 2000).

The structural environmental injustices at Stortplaats caused by the presence of sewage ponds is cause for concern and no amount of justification could erase how the community members feel about that. At Stortplaats the community does not have water carriage system toilets and still uses bucket toilets, yet the area is a location for treating sewage from other communities. The community members are concerned about this location and correctly perceive it as an unjust act. For the Stortplaats community members, the unequal environmental conditions created under the apartheid system of governance are still visible. The results also reveal concern about systemic social transformation that would totally eradicate those structures that constitute environmental injustices. The historical knowledge, memories, and meanings that Stortplaats stakeholders have about their community constitute cognitive elements associated with place attachment theory. These elements not only contribute to place attachment, but encompass intellectual functions such as judgement, reasoning, comprehension and problem solving which are essential cognitive processes for community-based environmental education strategies.

6.2.2 Unfulfilled post-apartheid promises

Another major finding from the research question on stakeholders' perceptions about existing environmental injustices at Stortplaats, was that the constitutional democratic government has failed to keep many promises. In South Africa, the dawn of constitutional democracy saw a shift from the narrow interests of apartheid to a democratic society based on equality, inclusivity and non-racism. This came with several promises that are yet to be realised (Stull *et al*. 2016). People became expectant and hoped for changes that would completely eradicate the woes of apartheid. Though significant strides have been made in a positive direction, many promises are still outstanding.

The failure of the responsible authorities to remove sewage ponds or control unprecedented land degradation, irregular garbage collection, failure to construct

tarred roads and RDP houses are major concerns for residents at Stortplaats. Stull *et al*. (2016) explain that poor service delivery issues in South Africa have caused frustration and anger, culminating in protests all over the country that often result in high levels of violence and destruction of property. The anger demonstrated by South Africans complaining about service delivery issues has often resulted in xenophobic attacks, which perpetuated the perception that the locals are harsh and violent (Government Gazette 2018). In 2009 alone, 105 service delivery protests were recorded, leading to the brutal murder of Andries Tatane, who eventually became a symbol of government's failed delivery system (Stull *et al*. 2016). A huge responsibility faces the responsible authorities, not only to undo the apartheid policy legacies, but to create an efficient public service that satisfies basic needs such as tarred roads, regular collection of garbage and building of affordable RDP houses. The councillor indicated that some of these poor service delivery issues are compounded by lack of expertise in many municipalities, inadequate allocated funds, skills scarcity and inadequate staffing.

6.3 Stakeholders' perceptions of causes of environmental injustices in Stortplaats

The findings of this study from the research question on factors that influenced the stakeholders' understandings of environmental injustices were lack of knowledge of environmental policies or environmental illiteracy, power and recognition problems and poor service delivery issues. These findings revealed that environmental injustices are problems that require both distributive and participative justice at Stortplaats. Distributive justice is required in the sense that the distribution of environmental burdens such as sewage treatment ponds or garbage dumping sites must be revised, regardless of socio-economic status. Participative justice requires meaningful and sound inclusion for all citizens concerned in the processes that involve decision-making. In theory, the South African Bill of Rights, in Chapters 6 and 14, section 18 and subsection A, grants all citizens equality in both distributive and participative issues of environmental justice. In applying these tools, the judiciary, which is sometimes dominated by the middle class, often consider the agenda for development at the expense of sustainability (Kovacevic 2013). There is explicit constitutional

recognition of the right to a healthy environment, but that is outweighed by the operative provisions for quick development. Ironically, the courts demand that a plaintiff must prove beyond reasonable doubt the intentions of environmental discrimination, but the cost of this is often prohibitive, making proof very difficult for the poor masses.

6.3.1 Lack of knowledge about environmental policies

The increasing visibility of environmental injustices has led to growing concern about nature and this has resulted in the escalation of environmental education to ensure eco-literacy and change to environmentally friendly behaviour. Research on ecological literacy often takes for granted that stakeholders understand environmental injustices and are aware of environmental behaviour that can cause damage to nature. In this research some participants demonstrated lack of environmental literacy and could not determine the behaviour that was harmful to the environment.
Of significant interest in this study was that some participants were not aware of the dangers of uncontrolled sand mining and the effects of pollution. On the other hand, some participants indicated some knowledge about environmental issues.

A closer look at the participants with and without environmental knowledge indicates that Stortplaats residents are attached to their area. Indirect observation suggested that some of their facial expressions demonstrated concern and worry about the environmental problems at Stortplaats. The indirectly observable facial expressions were spontaneous and demonstrated that there is a bond between the stakeholders and their place. This attests to the stakeholder theory and the place attachment theory. There is statistical evidence that rural people are more positive about their environment compared to their urban counterparts, because their area is the only asset they have (Merchant 1990, 1992). This interrelationship between rural people and the natural environment has been used as empirical evidence that environmental problems have a disproportionate impact on rural communities (Merchant 1990). These connections are part of a deeper ideological framework, which is significant both philosophically and conceptually. Significantly, this perceived relationship is based on the closeness of rural people to nature. Both sustain life and

both have suffered the impact of exploitation and manipulation (Merchant 1992). Nature and rural people are unjustly exploited by corporate systems. Warren (1997) posits that rural people are not a uniform category and therefore, if they act together in spite of their diversity, that should not be reduced to essentialism. Whether these claims are acceptable or not and whether the connections between rural communities and their environment are mutual or not, the truth is that at Stortplaats stakeholders who participated in the research demonstrated acute attachment to their environment. As a result of this stakeholder-place attachment relationship, many explanations might be at work and many questions might arise. Could this perceived stakeholder attachment translate to positive environmental roles and responsibilities? Whether this connection is a perception or a reality, the historical characterisations of the rural people and their nature have been supported by stakeholder theorists and place attachment theorists.

The place attachment theory argues that there is a deep connection between the natural environment and rural communities, as they are in a vital mutual relationship (Merchant 1990). The stakeholder theory and the place attachment theory have become central in nurturing environmental consciousness. The strands of these theories could be interwoven to produce an asset that would help reduce environmental injustice and destruction. In this sense there would be more purposeful unity within the community that would restore the quality of the environment. At Stortplaats any strategies for environmental behavioural change need to be based on grounded structural causes of environmental injustices and understanding of the connection between stakeholders and their environment would influence a community-based environmental education approach to resolving the environmental problems.

The findings also revealed the profound effects of these environmental injustices on the social functioning of communities. Residents experience uncertainty and fear, as their self-concept is reduced in quality and they feel undignified. This situation has dissolved community cohesion and residents are beginning to lose hope. Residents feel trapped in a vicious, oppressive cycle of environmental injustice that is preventing the optimal functioning of society and stifling social development. In light of these findings, there is a need for a protracted awareness campaign that would address these effects. Community-based environmental education seems to be an antidote.

6.3.2 Lack of effective communication between leaders and community members

The narrations of stakeholders about lack of information pertaining to service delivery activities and structures such as sewage treatment ponds that are located within their communities show that communication may be a challenge. Ineffective communication deters the progress of community development and is likely to result in decreased stakeholder morale and engagement. Stakeholders are not aware why sewage ponds were built in their area although they do not have water flush toilet systems. The stakeholders are also not informed about why garbage is ferried all the way from the nearby township and dumped in their area. It is not explained to stakeholders why the garbage dumped in their area is not collected in time. Environmental complaints of the stakeholders are not attended to in time. All this points to ineffective communication or lack of communication between the stakeholders and those that are perceived to be in power.

Lack of effective communication between the leaders and the community creates stress, uncertainties and conflicts (Kay and Tisdall 2012). Lack of communication leads to apathy, as stakeholders are uncertain of their roles and value in the community. If stakeholders are not aware of developing environmental policies, they tend to break rules without intending to do this or miss out on benefits that are due to them. Lack of communication between the leadership and community members causes distrust, frustration and conflict between the parties involved, resulting in destructive protests (Smit *et al*. 2016).

Stortplaats has limited resources, such as the woodlands and construction sand (*umngeni)*. Lack of effective communication may deprive some stakeholders from benefiting from the presence of municipal facilities and corporate companies. These facilities are supposed to give benefits back to the community, in the form of either employment or supporting community-based programmes such as environmental education. Therefore, when developing a communications strategy, stakeholders must make sure that communication lines between different political leaders, the business community and general community members are kept open and constant.

If communication in the community is poor and ineffective, community members are less likely to be inclined to collaborate with one another in participating in developmental programmes. This in turn then results in poor teamwork and potentially even friction among stakeholders. This becomes extremely unfortunate, as the core of any society is the people who work together. Without strong neighbourly relationships, communities will have difficult in moving towards sustainable development (Mathee 2011).

Lack of effective communication can create tension, mistrust and friction in the community. If communication issues are not addressed timeously, community-based developmental programmes would be pointless, as harmonious working relationships would be non-existent.

Lack of communication breeds animosity among stakeholders and community bonds are broken and are not easily repaired. Broken community bonds stifle and put a halt to all community developmental projects and processes. It kills the place attachment among community members (Stull *et al.* 2016). This in turn results in decreased stakeholder morale and engagement.

6.3.3 Irresponsible environmental behaviour

The quality of the local environment at Stortplaats is very important to stakeholders and their quality of life. The state of the river pollution, land pollution through reckless disposal of used materials such as diapers and biodegradable items is a cause of concern among other stakeholders. Stakeholders understand what constitutes a clean environment and know the characteristics of an environment that would not improve their way of life. Issues of irresponsible environmental behaviour, such as reckless cutting down of trees, exposing the soil to erosion, are known but not reported. Stull *et al.* (2016) agree that local environmental problems are worse in low-income areas, but people find it useless to report what they perceive as minor offences compared to serious offences such as vandalism, poor quality homes, noisy neighbours and robbery. Poor local environments are a key factor making young and professional people leave an area and besides the sewage treatment ponds at Stortplaats, the most common cause of environmental problems are the residents themselves. For example,

dumping rubbish or garbage in rivers constitutes irresponsible environmental behaviour; it is not the responsibility of the local authority to monitor the disposal of garbage. Those involved in irresponsible environmental behaviour often claim ignorance, yet some neighbours are knowledgeable about the dangers of disposing of garbage recklessly. The community needs to take full responsibility for correcting individuals who are involved in destructive environmental behaviour.

6.4 Factors that influence stakeholder's perceptions about environmental injustices in Stortplaats

The Stortplaats residents made what may be termed political statements, such as 'Nobody recognises us here. It's as if we are occupying land illegally. We are poor and we have no jobs, so our only source of income is selling construction sand. We once complained about these environmental injustices and we were told that these sewage ponds were located first, before us'. Some of the philosophical questions raised about existing environmental injustices point to issues of discrimination based on race, socio-economic status, nationality or origin, but the question is whether these factors can be isolated and prove discrimination. Some scholars have questioned whether environmental injustices are simply by-products of the market-based economy, such as differences in land values, rather than discrimination (Stull *et al.* 2016; Shortt and Hammett 2013). The findings of this study are not in conflict with the points raised, based on the stakeholders' narrations. Although race was not commented on, issues of apartheid contours were mentioned and discussed earlier. The topical issue is income as a significant variable determining the disproportionate location of environmental burdens at Stortplaats.

6.4.1 Power and recognition

The stakeholders at Stortplaats felt that they were not recognised because they were poor. They perceived the existence of sewage treatment ponds, unpaved roads, irregular collection of garbage and mud houses as expressions of injustice and this is compounded by the long, infamous history of inequalities. The residents at Stortplaats conceptualise these environmental injustices as issues of social exclusion, inequality

and marginalisation based on structural and socio-economic legacies inherited from the past. The place attachment tends to persist even under unfavourable environmental conditions, such as the exposure to environmental dis-utilities as in the case of Stortplaats. The attachment to a place becomes a social capital in executing community-based environmental education programs.

Collectively, publications agree that social exclusion, inequalities and marginalisation are the major features in burdening certain groups of people with environmental waste (Kay and Tisdall 2012; Shortt and Hammett 2013; Smit *et al*. 2016). Social exclusion, marginalisation and inequality are key drivers of a society's lack of cohesion and this translates into hostilities such xenophobic attacks, violence that is common in schools and frequent, destructive service delivery protests. Stull *et al*. (2016) posit that inequality and unfairness become more problematic when the excluded groups sense injustice, fuelled further by horizontal inequalities among people of the same race. If the feeling of being excluded persists, that becomes detrimental to the cohesion of the society and this provokes frustration among the disadvantaged groups.

6.4.2 Poor service delivery

Relative post-apartheid South African government successes cannot be denied, but the country is still facing serious challenges, as raised by the stakeholders of Stortplaats. Some of the critical issues raised are: 'We live in mud houses and our children suffer chest pains from inhaling dust. Our roads are dusty and that causes a lot of dust pollution. Garbage lies uncollected for months and that becomes an eyesore; at the same time we are exposed to a stench coming from rotting garbage.' All these issues point to services delivery discrepancies. These are some of the issues that have resulted in citizens taking to the streets to voice their dissatisfaction about the problem of poor service delivery (Mathee 2011). Local governments should be capacitated, otherwise the country is most likely to experience severe service delivery protests that could be more violent than the previous ones, which were characterised by looting, brutality and xenophobic attacks (Stull *et al.* 2016).

Poor service delivery issues as raised by the stakeholders of Stortplaats have ignited protests all over the country, which have placed municipalities under the spotlight.

Lack of effective communication between the authorities and community members have sometimes resulted in violent protests that perpetuate an unfortunate perception that South Africa is a violent nation (Smit *et al*. 2016). Lack of service delivery has sometimes resulted in xenophobic attacks stemming from the misguided perception that foreigners are straining the local governments' budgets (Mathee 2011). The history of service delivery issues led to the brutal death of Andries Tatane, who became an epitome of the new resistance to poor service delivery issues. Some stakeholders acknowledged that the government was inundated with a huge backlog of service delivery expectations. Historically the general South African population had protest as the only means of displaying dissatisfaction, given that the majority of the people were unable to participate in civic matters.

Service delivery disquiet has also been created by political campaign manifestos; politicians made empty promises during campaigns in order to entice voters and that raised the public's expectations, creating false perceptions that after the election people would receive the promised services. This is supported by the stakeholders' statements: 'We live in mud houses and our children suffer chest pains from inhaling dust. Our roads are dusty and that causes a lot of dust pollution.' Most election manifestos of different political parties promise to address issues of service delivery, for example developing infrastructure such as roads and RDP houses. Once these promises are not kept, communities begin to panic and resort to protestation (Mathee 2011). Thirty-five such protests took place in informal settlements in 2011, suggesting that communities living in informal settlements where there is a high incidence of poverty and unemployment demand better service delivery because they are near well-serviced metropolitan areas (Stull *et al.* 2016). There are key challenges that stifle the local government's performance, as cited by the stakeholders of Stortplaats. Lack of financial capacity is one of these, but more importantly and related to this study, lack of public participation. Participants have expressed dissatisfaction and frustration because of exclusion from local decision-making processes. With maximum public participation in policy formulation, South Africa's future looks bright.

6.5 Community-based environmental education strategy as an antidote for addressing environmental injustices

Environmental injustices at Stortplaats reflect a broader pattern of social exclusion and domination at work in the politics of South Africa. This then enables researchers to understand why socially marginalised groups shoulder environmental burdens such as sites of sewage ponds and garbage dumping zones. The results of this study not only exposed the national structures that produced these environmental injustices, but went on to show how in most cases the institutions that are supposed to generate solutions for environmental problems are actually entrenched in the activities that produce environmental degradation and other environmental problems. Political and socio-economic cleavages of class and lack of knowledge seem to be key to the understanding of environmental injustices at Stortplaats, but it is of interest that the results reveal that neglect by the local authority is central to the environmental injustices present in this area.

The findings from the study highlight that the environmental injustices existing at Stortplaats were initially created by apartheid and the current democratic government is reluctant to resolve these contentious issues. This reluctance is viewed by the stakeholders as discrimination based on socio-economic status and as such raises what might be termed philosophic questions, such as: Can socio-economic discrimination be isolated as a phenomenon? Can socio-economic discriminatory intention be proved? Koelble and Siddle (2013) have indicated that some environmental injustices are by-products of market-based activities that are unavoidable. The results of this study revealed that income or socio-economic status was the deciding variable in siting environmental burdens at Stortplaats and this was avoidable. Mathee (2011) states that race and socio-economic status are determinants in siting or placing environmental burdens. Stull *et al.* (2016) identify income or socio-economic status only as a more statistically significant variable in determining disproportionate exposure to environmental burdens in the post-apartheid era in South Africa.

Mathee (2011) states that middle-class communities have both the economic and political ability to oppose the siting of environmental burdens in their places successfully. In this study, the participants strongly believed that they were disproportionately represented in making environmental decisions about siting sewage ponds in their area and hence the geopolitics of environmental injustices were inextricably at work. Attempting to isolate socio-economic status from explaining environmental injustices at Stortplaats would make very little sense. Socio-economic status in most cases is a proxy for conditions other than environmental risks and exacerbates exposure (Kemp 2011). For instance, children from socio-economically disadvantaged communities who are exposed to pollution suffer from lead poisoning (Mathee 2011). This is exacerbated by nutritional deficiencies and results in reduced cognitive development.

6.5.1 Community-based environmental education strategies

Knowledge of the environment and environmental issues among the general public at Stortplaats is surprisingly low. Community-based environmental education has been criticised for turning its students into political activists (Mathee 2011). A strategic plan for community-based environmental education addresses the need for good environmental education that effectively and objectively transforms learners into environmentally literate and literate citizens. This strategy operates with the following fundamentals:

- Community-based environmental education does not have a classroom; instead the people are its classroom.
- Community-based environmental education programmes are for all possible audiences.
- Community-based environmental education is a life-long learning process.
- Community-based environmental education relates to environmental topics or issues.
- Community-based environmental education is interdisciplinary.
- Community-based environmental education is relevant to the needs, interests, and motivations of the learner in the interest of the environment.

- Community-based environmental education is based on accurate and factual information.
- Community-based environmental education presents information in a balanced and unbiased manner.
- Community-based environmental education makes use of the outdoors as a classroom whenever possible and appropriate.

Community-based environmental education reaches a diversity of learners in order to reach all citizens and it could be classified into formal and non-formal education (Hungerford and Volk 1990). Formal environmental education is a societally approved sanctioning system where participants are tested and expected to demonstrate certain competencies. This happens in public school classes, courses, seminars, and workshops. Graduates are awarded licences and certificates at the end of the course. Non-formal community-based environmental education is recreational, while at the same time it is effective. The courses offered are not credited.

6.6 Community-based environmental education as an effective intervention strategy for addressing environmental injustices

The available cost-effective recourse for ensuring environmental justice is community-based environmental education. Community-based environmental education increases openness and democratises government policies on environmental protection. It also develops a sense of environmental responsibility among stakeholders and ensures participation in the decision-making process. Stakeholders eventually become legal monitors for their environment and feel equipped to engage in the formulation and implementation of environmental policies. Most participants were strongly convinced that community-based environmental education was necessary to improve eco-literacy and responsible environmental behaviour. The sentiments of the Stortplaats members resonate well with the UNESCO documents on sustainable development (UNESCO/UNEP 1976; UNESCO 1977; UN 2010).

The participants identified community-based environmental education as a tool for constructing an environmentally responsible society. This is in line with the Tbilisi Declaration, where fundamental elements of environmental education were identified

for sustainability, even before the introduction of the concept of sustainable development. There is a need to consider rolling out community-based environmental education at Stortplaats. This should include social aspects that acknowledge the close links between people, the economy, the environment and development. The inclusion and adoption of both local and global ideas should be promoted so that community members can identify themselves with the programmes (Mena *et al.* 2020).

Properly executed community-based environmental education activates community members to participate in replacing unsustainable development patterns with sustainably sound developmental programmes. It further challenges all institutions of the society, such as schools, to establish meaningful partnerships with the community in order to achieve social change for sustainable development (UN 2010). In this case teachers as partners in sustainable development should be recognised as key independent players with special capacities that can enhance mutualistic relationships between the environment and community members for sustainable development. Their invaluable experiences and knowledge of environmental issues and appropriate strategies for overcoming environmental problems are an irreplaceable asset to the community.

The study revealed that all stakeholders acknowledged the existence of environmental problems at Stortplaats and through their narrations it was evident that they were prepared to be actively involved in addressing these problems. This is in line with the Southern African Development Community (SADC) agenda (2006), which seeks to intensify environmental education processes for equitable and sustainable environmental management through the Regional Environmental Educational Programme. However, they noted issues such as lack of harmony between the school and the community in dealing with community environmental problems. The schools as institutions serving the community should collaborate in harnessing environmental problems through harmonising human environmental behaviour and environmental policies for sustainable development. Community-based environmental education that is galvanised by strong school-community partnerships fosters culturally based approaches to eradicating environmental injustices and sustainable development. In this agenda environmental education educators in the SADC region are encouraged

to strengthen community-based environmental education processes to enhance and strengthen environmental education policies, research, training and capacity-building.

The asset is that the community members at Stortplaats understand that their area is the sole collective biophysical heritage that can sustain their lives and they feel the sense-of-place. They understand that if this natural heritage is not properly managed, it will deteriorate and waste away and that is an essential component of Place attachment. It is therefore my strong conviction that community-based environmental education will introduce principles of sustainable development and equitable sharing. Sustainable developmental principles foster an understanding that an environment is a life-support system that must be conserved for future generations. Environmental problems such as pollution and degradation must be solved. Communities must learn to preserve the quality of the environment. Community-based environmental education offers community-based strategies that help people develop problem-solving skills (Hungerford and Volk 1990). These programmes are community projects in which everybody gets involved. They inculcate human collectivity, growth in sharing space, mature political concerns, solidarity, democracy and collective involvement. Such community participatory activities bring about community evolution and revitalise environmental citizenship (Hungerford and Volk 1990).

Community-based environmental education differs from traditional education in that the educational activities are not limited to building a knowledge base and skills only, but help build a knowledge base that is sustainable, equitable and empowering. This is an educational discourse that is created through community involvement and designed to resolve community issues. These community issues might be environmental injustices or unemployment (Benninger and Savahl 2016).

In community-based environmental education, the community becomes the classroom, which is not limited to the four walls of a room. In that case the educational strategies take the form of workshops, study circles and one-on-one demonstrations (Benninger and Savahl 2016). Community-based environmental education is learner-exciting at the same time, promoting a positive sense of place, identity, community interest and collaboration. To ensure that community-based environmental education

activities foster long-term structural changes, the foundational principles described below must be established.

Hungerford and Volk (1990) designed a community-based environmental education model that uses concepts and ideas to form an easy representation. This easy conceptual model is used across all age groups. Throughout all the various implementations of a community-based environmental education model, the community identifies the existing environmental problem or issue. Then, through problem-solving study circle programmes the community identifies possible solutions. The community then designs a programme and determines a programme implementation period to resolve that environmental problem. Properly designed and implemented community environmental programmes result in improved environmental behaviour and proper environmental management. The model is summarised in Figure 6.1 below.

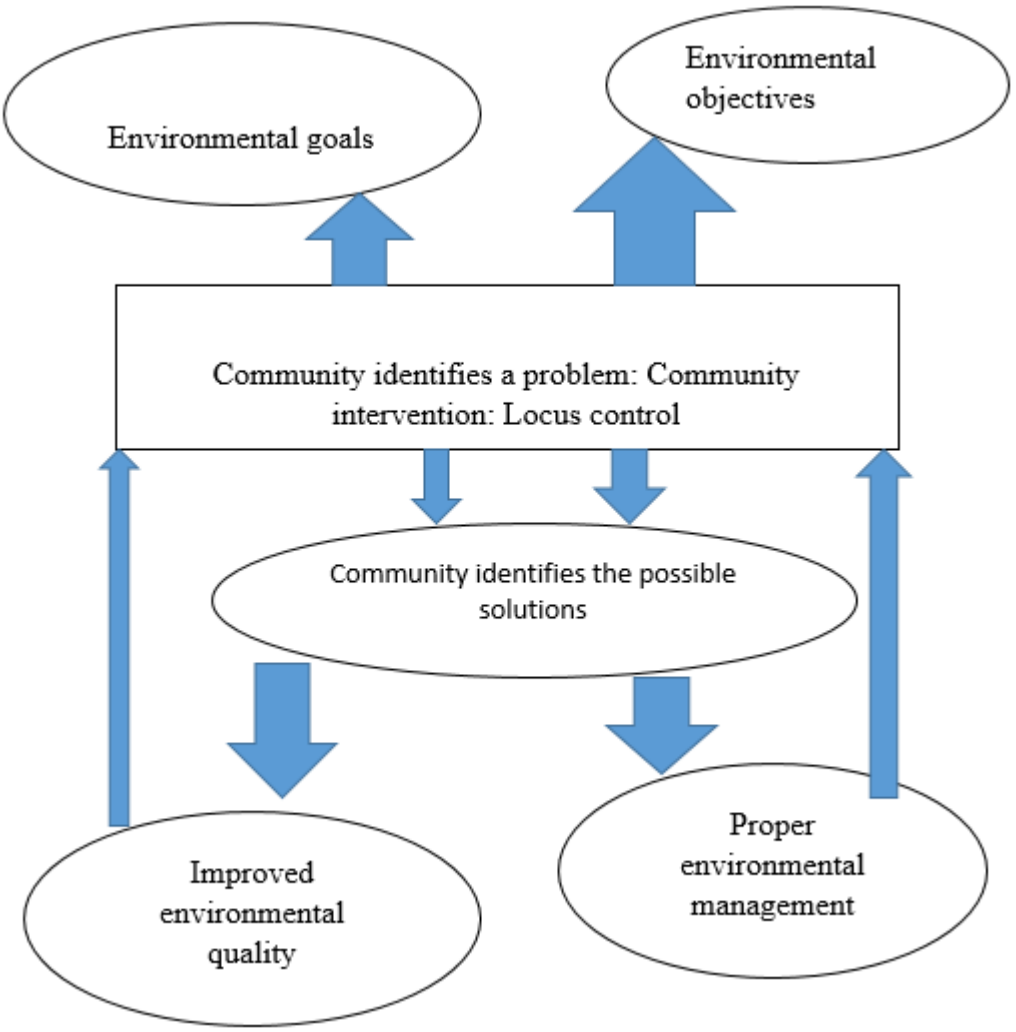

Figure 6.1: Community-based environmental education model

Source: Adapted from Hungerford and Volk (1990: 45)

Goals and objectives must be dealt with bottom-up, not top-down; that is, the community must identify the environmental problem, then engage on the processes of solving that problem. The intervention process must target the entire community and not a specific audience, empower the community, generate the locus of control and improve ownership. Ideally, properly implemented community-based environmental education is most likely to produce improved environmental quality, environmental management becomes everyone's business and community co-operation improves.

With globalisation, communities are frequently called upon to work together in solving environmental problems. This has become a mandate for every citizen to ensure that the once flourishing natural environment is preserved and conserved. Thus, community-based environmental education gains special significance in the

comprehension of environmental destruction and the identification of sustainable environmental solutions.

6.7 Summary

This chapter presented a discussion of the major findings of the study and judgements about what was learnt during the process of the research. The value of the findings, interpretations and justifications was also explained. Central to the discussions were the theoretical frameworks, namely the stakeholder theory, environmental perception framework, place attachment theory and environmental education model. The findings reveal that the existing environmental injustices at Stortplaats reflect the structural contours of apartheid, but the current constitutional democratic government has perpetuated these injustices by paying no attention to the pleas of the community. Stakeholders feel discriminated against. This discrimination is not racial, but based on socio-economic status; literature testifies to that effect. Some of these environmental injustices are created by the community members themselves. If proper knowledge is made available to them, these problems could be avoidable. The chapter looked at community-based environmental education for eradicating environmental injustices and bringing about legal justice and social transformation.

CHAPTER SEVEN
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

The previous chapter presented the discussion of the major findings of the study and judgements about what was learnt during the process of the research. Central to the discussions were the theoretical frameworks, namely the stakeholder theory, environmental perception framework, place attachment theory and environmental education model. This chapter provides an overview of the study, including the research objectives and research questions, theoretical framework and research tools and the procedures that were used during interviews and data analysis. The theoretical, methodological and empirical threads are weaved together, using research questions. The findings of the study are also used as a platform to highlight the need to understand the perceptions of stakeholders about existing environmental injustices and of community-based environmental education. The chapter further provides space for reflecting on the entire research study process, highlighting the limitations and opportunities for further studies. It is set out in four sections entailing the summary, conclusions, recommendations and avenues for future studies. The stakeholder theory, environmental perceptions framework, place attachment theory and community-based environmental education model were used as frames of reference for the study.

7.2 Summary of the study

The main purpose of this study was to generate better understanding of the perceptions of Stortplaats stakeholders about environmental injustices and to address these through community-based environmental education. Chapter One discussed the relevance of the study and gave insight into the background of environmental injustices. Community-based environmental education was identified as an antidote for addressing environmental injustices. The second chapter provided broad insight into and justification of the theories that framed the study and after filtering all the possible or competing theories and weighing the pros and cons of each, four were selected to underpin the study: the stakeholder theory, environmental perceptions

framework, place attachment theory and community-based environmental education model. The third chapter reviewed existing literature on environmental injustices and community-based environmental education. Chapter Four discussed the research methodology of the study, covering the research paradigms and research approach, and adopted the use of a research design case study. Chapter Five presented the data generated based on the critical research goal, namely determining the perceptions of Stortplaats stakeholders about environmental injustices and addressing these environmental injustices through community-based environmental education. The sixth chapter presented the discussion of the results and judgements about what was learnt during the process of the research. Central to the discussions were the theoretical frameworks, which were the stakeholder theory, environmental perception framework, place attachment theory and environmental education model. Finally, Chapter Seven summarises all the previous chapters and makes appropriate recommendations to address environmental injustices among communities of low socio-economic status. This is set out below in three sections: community participation for sustainable development, community-based environmental education for sustainable development and avenues for future studies.

7.3 Conclusions

The major objective of this study was to investigate perceptions of stakeholders of Stortplaats, KwaZulu-Natal in order to address environmental injustices through community-based environmental education.

The following research sub-objectives were considered:

1. To understand stakeholders' perceptions about existing environmental injustice at Stortplaats.
2. To determine the stakeholders' perceptions of causes of environmental injustice existing at Stortplaats.
3. To explore the factors that influence the stakeholders' perceptions about the existing environmental injustice at Stortplaats.

4. To investigate Stortplaats stakeholders' perceptions of community-based environmental education as a strategy to address the environmental injustices at Stortplaats?

Residents of Stortplaats, a village in KwaZulu-Natal, South Africa, were interviewed to generate rich descriptive lived experiences regarding environmental injustice. Semi-structured individual interview schedules were used to conduct individual interviews. These were strengthened by indirect observation and photovoice narrations by selected young participants, as guided by the literature. Purposive sampling was used to attain a sample of 25 participants who met the criteria.

7.3.1 Research Question 1

The key findings of this study from research question one, enquiring into stakeholders' perceptions about environmental injustices existing at Stortplaats, indicate that the sewage ponds at present located at Stortplaats were created by the apartheid government and this was in line with racial laws that promoted the establishment of environmental disutilities and burdens among predominantly black and poor communities. The apartheid system constitutionally practised environmental racism and those apartheid contours are still visible today. After 1994 the constitutional government in South Africa promised to dismantle the existing structural features of apartheid but in some cases those promises are yet to be kept. Therefore, the stakeholders' perceptions about existing environmental injustices at Stortplaats is that the apartheid contours are still visible and post-apartheid promises are yet to be realised.

- Apartheid contours are still visible at Stortplaats.
- Post-apartheid promises have not been kept yet.

These environmental injustices were historically created by the apartheid system and the current authorities seem to be offering minimal corrective services. The conditions

are undesirable and expose vulnerable community members to health risks, thus contradicting the Constitution of South Africa, which promises a safe environment for all citizens. The plight of these community members is perpetuated by lack of knowledge and legal protection.

7.3.2 Research Question 2

Findings on the research question enquiring into stakeholders' perceptions on the causes of environmental injustice existing in Stortplaats reveal that some Stortplaats community members are contributing to some of these environmental injustices by cutting down trees and mining sand for construction, causing unprecedented land degradation. This is done out of ignorance of environmental laws and policies. The stakeholders also indicated that complaints by concerned community members pertaining to environmental destruction are not responded to as a matter of urgency. Some stakeholders complain about garbage that is dumped in their area, some complain about the unreliable garbage collection system and some complain about the reckless cutting down of trees, leaving the soil exposed to erosion. These complaints are not attended to and no one explains the position of the state in relation to these complaints. This reveals lack of communication between the community members and those in power.

- Lack of knowledge about environmental policies.
- Lack of effective communication between leaders and community members.
- Irresponsible environmental behaviour.

7.3.3 Research Question 3

Findings on the research question enquiring into factors that influence the stakeholder's perceptions about environmental injustices in Stortplaats reveal that the residents of Stortplaats feel that those in positions of leadership fail to resolve the environmental problems in their area because they view the Stortplaats community as poor and powerless. They feel that poor and marginalised people are not listened to and recognised. Their complaints about environmental problems always fall on deaf

ears. This raises the issue of power and recognition. The stakeholders also mentioned the issue of mud houses in which they live and inhale dust, while others got RDP houses. Their roads are not paved and tarred, but dusty, and passing cars cause a lot of pollution. Garbage that is not collected for months is not only an eyesore, but a breeding place for rodents and mosquitoes. These findings point to issues of service delivery.

- Power and recognition.
- Poor service delivery issues.
- Social factors (age, gender, education, economic status)

7.3.4 Research Questions 4

In reply to the research question on the stakeholders' perceptions of community-based environmental education as a strategy that could be used to resolve environmental injustices in Stortplaats, participants indicated that community members who were contributing to environmental problems were doing so because of ignorance or socio-economic reasons. Some community members cut down trees to sell roofing material to those who are building houses, while others dispose of garbage in rivers, not knowing that it will exacerbate river pollution. Some community members consider the smell from the sewage ponds and rotting garbage as the only menace, without understanding the effects of smell on lungs. Realising the lack of knowledge about environmental problems and effects, some members suggested community-based environmental education as a means of addressing environmental problems in Stortplaats

- There is a need for community-based environmental education to address environmental injustices in Stortplaats.
- Knowledge is power

The stakeholders perceived community-based environmental education intervention strategies as effective in resolving environmental injustices in Stortplaats. Some participants indicated that they could not change what was built long ago but there was a need for knowledge about environmental problems. Understanding the effect of sand mining and dumping garbage in rivers would be a positive development in alleviating

poisoning of rivers. Stakeholders considered environmental knowledge as the key to environmental conservation and management that would bring about sustainable development. People could be organised in study circles and develop a people-centred curriculum that would increase environmental understanding.

The profound importance of community-based environmental education as a means of ensuring environmental understanding would eradicate some community environmental problems created by individuals. With minimum intervention by the government, community-based environmental education, which is people-based and people-driven, could be used as a tool to break the cycle of environmental injustice and prevent social malfunctioning of society. Considering these findings, recommendations are made for all stakeholders in different sectors of the society, to participate in the community environmental programmes that seek to reduce and ultimately remove environmental problems bedevilling Stortplaats. These recommendations relate to a greater need for literacy and awareness of the effects of environmental injustices on sustainable development.

7.4 Recommendations

The overriding goal of this study was to generate better understanding of the perceptions of Stortplaats stakeholders about environmental injustices and of community-based environmental education (see Section 1.11). On the basis of the findings, the following recommendations can be made:

Eradicating structural environmental racism could be identified as a process central to democracy, as framed within Section 24 of the Bill of Rights. This will guarantee that all community members live in an environment that is not harmful to their health and well-being. The study findings reveal that the apartheid legacy is still affecting some community members negatively, particularly poor and marginalised black communities. The state must strengthen the application of the Constitution to remove and undo the apartheid contours of racial environmental exclusivity. The environmental injustices at Stortplaats are a slow form of violence, which is deeply damaging and largely invisible and this requires urgent environmental justice.

Removing sewage ponds from Stortplaats and sending officers to enforce environmental policies and laws would not constitute environmental justice; the state must engage the stakeholders in dealing with the real environmental issues with which the community is faced every day. This can be done through community-based environmental education that would bring about sustainable development. Community-based environmental education would create a unified environmental movement that is not only capable of addressing the environmental problems, but would also form a basis for promoting stakeholder unity and inculcating positive environmental perceptions. It would also build positive sense-of place bonds.

Unfulfilled political promises, lack of communication and lack of accountability of the local government are breeding stakeholder frustrations and disillusionment with the local authorities. These factors encourage mistrust and disharmony between the leadership and the local people. In order to increase transparency and improve relationships within the communities, it is recommended that the principles of effective local democracy be adhered to. Effective democracy consists of two irreplaceable cornerstones, namely representative democracy and participatory democracy:

- Representative democracy means that people elect the representatives and servants who will work for them. The elected people represent the electorate directly and they get their mandate from the voters.
- Participatory democracy means that the people make decisions by themselves. Affected people collectively participate in decision-making and no representatives take decisions on behalf of the people. This usually works well in small communities.

To solve the issue of poor communication, it is suggested that local democracy in Stortplaats needs a combination of representative and participatory democracy. While elected leaders make the ultimate decisions, stakeholders should be consulted as much as possible. The elected leadership receives a mandate from community members and needs to keep them informed about decisions taken by the council. People must be informed about why the local authority is failing to deal with certain issues; keeping them guessing is what breeds mistrust and disharmony, which usually degenerate into violent and nasty protests. For meaningful democracy, communities

have to be in touch with the programmes of their council. Democracy is not just voting for a representative every five years; it is ensuring that community members participate in decision-making processes through various methods, including ward consultative meetings and stakeholder meetings. The involvement of community members in the democratic process serves to strengthen and deepen democracy.

Public participation is a principle that helps the government address the real needs of the community in the most appropriate way. Participation keeps community members informed about budget issues, which reduces tension and suspicion. Furthermore, participation develops responsible and informed stakeholders and allows local government authorities to get buy-in from the stakeholders for developmental projects.

Consultation, communication and participation have equal benefits for both stakeholders and political leadership:

- Appropriate decisions based on the real needs of people of the people on the ground are taken.
- Informed citizens understand the government budget and limitations.
- Government needs partnerships with communities to improve service delivery and development.
- Issues of lack of effective communication between the leadership and the community stakeholders are resolved through public participation and dialogue.

Consultation, communication and participation cannot be once-off events, but are continuous processes integrated into every local authority's developmental goals. Such an arrangement would solve some of the issues raised by the Stortplaats residents, such as unfulfilled post-apartheid promises, lack of effective communication and issues of power and recognition.

The existing environmental injustices at Stortplaats clearly demonstrate that fundamental understanding and factual knowledge of the environment is needed. In order to improve this understanding, the community may:

- Adopt community-based environmental education as a means of reducing and eventually eradicating environmental injustices at Stortplaats,
- Create environmental surveillance groups that would monitor and control environmental behaviour that threatens the environment,
- Use environmental education facilitators who are community members, which would improve ownership and consequently social learning and citizen realisation,
- Consider involving every member of the community to foster co-operation, which would strengthen community unity, and
- Consider using these community-based environmental education groups for some other developmental projects.

In doing so, community members would be motivated to design new perspectives and create new forms of action, thus promoting collective action and improving social trust.

Community-based environmental education programmes were also identified by Stortplaats stakeholders as a means of resolving and addressing existing environmental problems. Indeed, community-based environmental education programmes have become central for future humanity and sustainable development. Promoting such programmes supports an integrated approach to resolving societal problems such as environmental injustices. Community-based environmental education emerged in this study as the most important component in extra-curricular education. As explained earlier, community-based environmental education is citizen-based and derives its objectives from within the community. It fosters ecological consciousness and develops a sense of social responsibility.

Adapted from Hungerford and Volk (1990), community-based environmental education programmes could also include the business community and local authorities, to ensure that all stakeholders are directly involved. Programmes that are supported by all stakeholders improve the locus of control and give a sense of personal responsibility. Absence of the business community, which is sometimes perceived as the perpetuator of environmental injustices, reduces the effectiveness of environmental programmes. The inclusion of the local authorities, which are important

development drivers, also works positively in implementing effective community-based environmental education. In this adapted community-based environmental education programme, the councillors as representatives of the local authorities play an important role in ensuring effective and sustainable programmes. This modified model has become an all-stakeholders' project and ensures active participation by all concerned citizens. An outline of an adapted community-based environmental education programme is given in Figure 7.1 below:

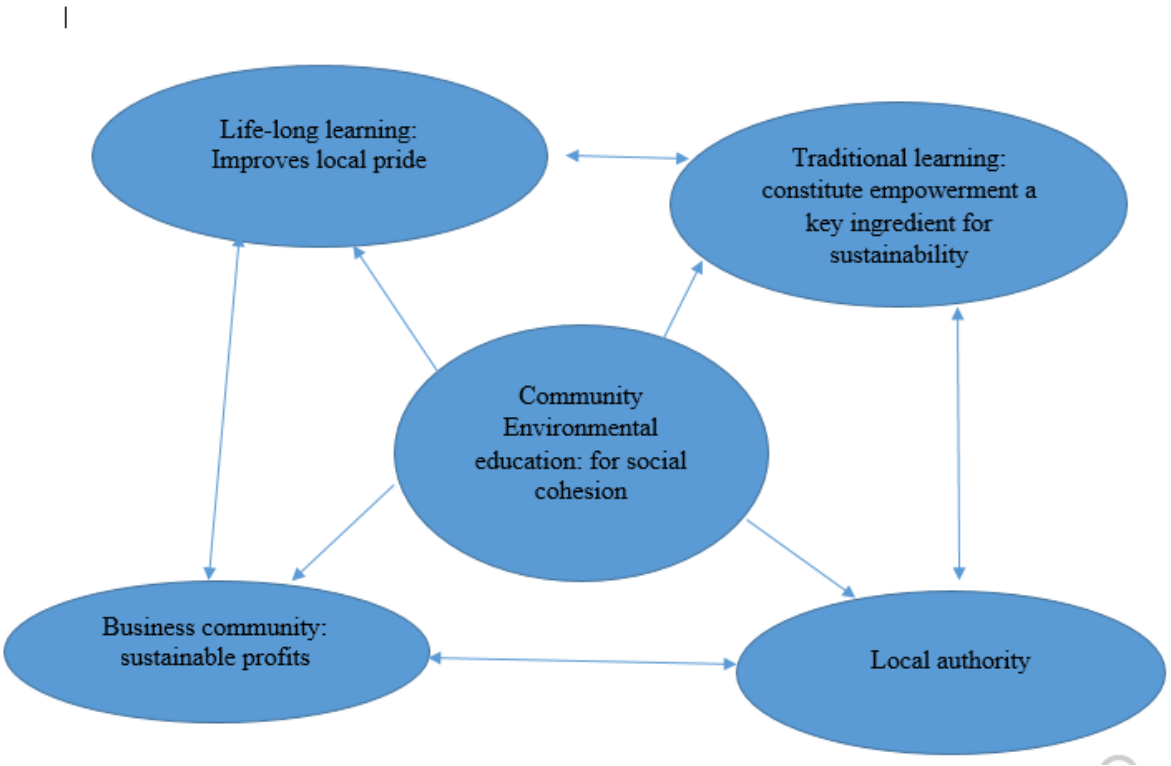

Figure 7.1: Empowerment through community-based environmental education.

Source: Adapted from Hungerford and Volk (1990:44)

The figure demonstrates how community-based environmental education could weave together all stakeholders for social cohesion, resulting in sustainable development and a strengthened sense of place, which is local pride. Effective connection among all stakeholders in well-structured community environmental education triggers lifelong traditional learning and this forms fertile ground for the local administration to appropriate sustainable development programmes. The programmes influence the local communities to own development and at the same time inculcate favourable

democratic values as enshrined in the Constitution of South Africa. Furthermore, these community environmental programmes stimulate local pride and make community members familiar with their natural environment, which strengthens their sense of place and attachment.

Community-based environmental education not only teaches the community about the environment, but also provides social learning that contributes immensely to citizen realisation and develops the community's ability to pursue answers to problems that have no ready solutions. In doing so, community members are motivated to design new perspectives and create new forms of action, thus promoting collective action and improving social trust.

7.4.1 A model for community-based environmental education

A model for community-based environmental education in Stortplaats should be deliberately created to match the interests of the community. These interests range from standard community issues to recognisable environmental components such as the disposal of waste and prevention of pollution and land degradation for sustainable development.

The model for community-based environmental education is completely different from traditional education, which is limited to the classroom. The community does not assume the classroom mentality that gives more power and an important role to a single individual, the teacher. In community-based environmental education, the facilitator occupies an unconventional role and for each session, the aim is to build the citizenry's skills and apply those skills in making proper and sustainable environmental decisions. If successfully applied, the model contributes to the community's environmental policy capacity.

The community-based environmental education model is based on the following tenets: educational activities are determined by bottom-up, not top-down processes, the locus of control generated by community members and group interests should come first and are intended to build up the individual's sense of power to act. The

programme must also engage all community members at different levels of responsibility, such as business owners, political leaders, social leaders, academics and community-based agencies such as schools and churches.

Ideally, community-based environmental education helps to strengthen community skills in planning and acting in an environmentally friendly manner. It expands the community's ability to improve environmental quality by integrating proper environmental activities with other community-based developmental activities and constitutes sustainable development. This model strengthens the sense of place through community involvement in developmental and environmental management activities.

The diffusion of innovations or new ideas in a population depends on the relative advantage of the innovation, the compatibility of the new idea with existing values, simplicity, trial-ability and observability of the results. Environmental behaviour change can only take place if the innovation is perceived as an idea that supersedes existing ones. If the innovation does not have a relative advantage compared to existing ideas, the spread or diffusion of that idea becomes less rapid. Inversely, if the innovation supersedes existing ideas, the spread becomes rapid. Hence, environmental educators must structure the curriculum instruction in a way that provokes excitement among their audiences and introduce ideas that are a cut above existing knowledge.

Another factor is compatibility of an innovation. The innovation or new environmental idea must be compatible with the existing values and practices of communities (Rogers 2003). An idea that is compatible with existing norms and practices spreads rapidly within the community. Similarly, an innovation that is perceived as being inconsistent with the norms, values and culture of the group of people is less likely to be adopted by the community. This means that an innovation that is incompatible with the norms and values of a society is easily rejected and its spread is inhibited by the residents (Bonds 2016). Environmental education curriculum planners must design innovations that are in line with the cultures of societies so as to harvest positive behavioural changes that are pro-environmental.

Innovations must be simple and easy to adopt. If an idea or expected change in behaviour is perceived as difficult to understand, it is often rejected and its diffusion through the community becomes slow. Conversely, an easy-to-adopt change spreads faster. In the same way, Schlosberg (2013) points out that environmental education planners must not aim to achieve abstract and out-of-reach outcomes; expected environmental behaviour changes must be simple and easily achievable.

Community-based environmental education must be innovative and fascinating. The innovation must also be triable on a small scale. An innovation or new idea that is triable on a small scale reduces uncertainties, as individuals get the opportunity to see results and this can stimulate interest, leading to adoption by the entire population (Ssebunya and Okyere-Manu 2017). Therefore, a triable innovation is likely to be adopted and to spread faster. It is with this knowledge that environmental education curriculum planners must organise innovations in a way that is compatible, simple and practical.

Environmental problems and injustices currently encountered in Stortplaats and other communities are direct outcomes of individual actions, consumer decisions, state negligence and neoliberal activities of small and large business corporations. Nonetheless, the truth remains that the economic health and well-being of people are inextricably connected to the well-being of the natural environment. This therefore means that much more than ever before, it is necessary to understand the natural patterns, ecosystems and root causes of the degradation of nature leading to environmental injustices. A strong weapon for nipping environmental problems and injustices that have become a menace today in the bud should be grounded in the principles of environmental education theory (Kovacevic 2013).

The amalgamation of the above environmental education dimensions provides ground work for formulating questions which seek strategies for reclaiming the environment and providing lasting solutions to environmental problems bedevilling Stortplaats. Properly executed community environmental programmes would create a rational path in finding a lasting solution to environmental problems and injustices created by human behaviour at Stortplaats. A strong conviction that the natural world is valuable helps

create an impetus to balance economic growth with environmental preservation and conservation (Hastaoglu *et al*. 2015). This means that pro-environmental behaviour is not a spontaneous act, but a product and manifestation of understanding and awareness of noxious consequences that are related to certain environmental behaviours (Stern 2000). Environmental education should be designed to focus on education for behavioural change, responsible environmental behaviour and environmental citizenship. These three dimensions could be integrated and used as tools for offering environmental education in schools and communities. Once integrated, these dimensions would provide a framework for producing a citizen who is environmentally literate and behaves in a manner that seeks to protect the environment. These models undoubtedly prove invaluable in nurturing a citizenry that will behave in an environmentally sustainable manner.

If environmental education programmes are structured in a way that targets threats, barriers, benefits and self-efficacy, optimal environmental behaviour change would be experienced (Janz and Becker 1984; DeMaster and Malin 2016). Perceived threats are founded on perceived susceptibility to ill health and the severity of consequences often drives individuals to behave in a manner that avoids them. These dimensions imply that when an individual's level of assessed risk increases, there is a possibility that the individual in question would adopt the recommended environmental behaviour. That increases environmental understanding. This deep understanding of the severity of the effects of environmental problems drives people to behave in a manner that avoids those effects (Sarker *et al*. 2017).

If the behaviour change is rewarding and the benefits to an individual outweigh the perceived barriers and costs, behaviour change is most likely to happen, but conversely, if the costs and barriers outweigh the benefits, then change is least likely to happen (Gabrys and Pritchard 2016). Environmental education becomes a stimulus necessary to initiate and trigger community engagement in desirable health behaviour. If, for instance, community members fear the negative effects of poor environmental practices, that may propel them to adopt pro-environmental behaviour. Pro-environmental behaviour is driven by self-interest in minimising one's own health risks

and this concern can be passed on from generation to generation (Davies and Polese 2015).

7.5 Suggestions for future studies

There is huge potential for research on the environmental injustices experienced by communities of low socio-economic status. Possible themes are:

- The effects of environmental injustices on the day-to-day social functioning and development of the affected communities.
- Environmental justice in Africa. This study served as a novel entry in the field of environmental justice in Africa generally and South Africa in particular.
- Community-based environmental education in Africa. This study proposed that understanding of the community's perspectives on environmental injustices is the basis for the implementation of community-owned environmental education.

There is much potential for further research on the themes that arose from the analysis of generated results, such as:

- The apartheid legacy and environmental injustices.
- Environmental injustices and unfulfilled post-apartheid promises.
- Lack of environmental knowledge and environmental injustices.
- Environmental injustices and service delivery.

7.6 Limitations of the study

The research decisions that any researcher makes naturally impose limitations on any research study. The research sample of 25 participants may be a limitation; however, the use of interviews, indirect observations as well as photo elicitations did in some way negate the disadvantages associated with a small sample. The participants' interviews and indirect observations yielded copious but extensive, richly textured

insight into stakeholders' understanding of environmental injustice. Thus, the intricate construction that data analysis called for makes up for the narrowed net of participants.

The research was conducted in a specific area with inhabitants who are mostly poor, marginalised and beset by extreme deprivation. However, even in acknowledging this, the researcher cannot with certainty indicate that the way participants responded would be characteristic of or reflective of other stakeholders living in similar conditions. What the study offered was more nuanced insight into the historical, social and political narratives of stakeholders' experiences and understanding of environmental injustices, thus opening spaces for further research. Another limitation was that the research only included the perceptions and understanding of stakeholders; it would have provided more detailed and holistic understanding of environmental injustices if social partners such as politicians and business corporations had also been interviewed. Lawmakers and business corporations could have provided insight into how stakeholders' experiences were understood by the perceived perpetrators.

The study focused on investigating the stakeholders' perceptions of environmental injustices and of community-based environmental education in a single area, Stortplaats. Stortplaats (Afrikaans - dumping site) is a pseudonym and the real name of the village is withheld to avoid ethical challenges. This became a constraint in that the participants were not free to discuss all issues, as some of the issues were considered politically sensitive. As a result, some of the participants feared political backlash and victimisation.

Another factor was that the research delved into personal interactions with the participants during data generation and sometimes the discussions tended to deviate from the focus of the study. That also affected the anticipated completion time.

This study was politically sensitive, as articulated by one respected academic who resides in the area and because of fear of being known and identified, participants requested anonymity. Maybe a questionnaire could have provided different findings, since the anonymity of participants' responses could be guaranteed. The interviews, focus group discussions and observations put significant pressure on the respondents

for immediate responses, whereas questionnaires could be answered at the participants' own leisure, with no demands for specific fixation of the situation.

The researcher's positionality formed part of the limitations of the study. His residency status brought about a crisis of legitimisation (trustworthiness and authenticity) and a crisis of representation, namely separating the researcher from the researched (Denzin and Lincoln 1998; Creswell 2013). In order to reduce that, the researcher continually engaged with the theoretical frameworks to prevent side-stepping. The people who agreed to participate in the research process had strong understanding of environmental injustices and that reduced the diversity of data generated. Nevertheless, their experiences represented the informed perceptions of the general populace. The research process was financially straining and draining to the researcher. An allocated budget was available, but insufficient for the entire research process. Travelling and refreshments for the 30 participants, material resources, transcribing and binding were more expensive than anticipated.

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APPENDIX 1

DUT
DURBAN UNIVERSITY OF TECHNOLOGY

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email: lavishak@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

5 March 2019

Mr E Ndlovu
Box 360
Hammarsdale
3700

Dear Mr Ndlovu

Understanding environmental injustices for community education in South Africa: Perspectives of stakeholders of Stortplaats, Kwa-Zulu Natal

I am pleased to inform you that Full Approval has been granted to your proposal.

The Proposal has been allocated the following Ethical Clearance number **IREC 165/18**. Please use this number in all communication with this office.

Approval has been granted for a period of **ONE YEAR**, before the expiry of which you are required to apply for safety monitoring and annual recertification. Please use the Safety Monitoring and Annual Recertification Report form which can be found in the Standard Operating Procedures [SOP's] of the IREC. This form must be submitted to the IREC at least 3 months before the ethics approval for the study expires.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely

Professor J K Adam
Chairperson: IREC

DUT DURBAN UNIVERSITY OF TECHNOLOGY
2019 -03- 05
INSTITUTIONAL RESEARCH ETHICS COMMITTEE
P O BOX 1334 DURBAN 4000 SOUTH AFRICA

APPENDIX 2

Education

Department:
Education
PROVINCE OF KWAZULU-NATAL

APPENDIX 3

Mophela

P.O Box 360

Hammarsdale

3/11/2017

TO WHOM IT MAY CONCERN

This is to certify that Emmanuel Ndlovu is granted permission to carry out a study around Mophela-Hammarsdale about environmental issues. His topic is "Understanding environmental injustices for community education in South Africa: Perspectives of stakeholders of Mpohela-Hammarsdale.."

It is believed that villagers who will participate won't be held liable for any outcomes of the study and that no information shall be used in any place other than for the purposes of the mentioned study

Yours faithfully

Councillor Sibusisa Blessing Dlamini
Ward No. 5

COMMISSIONER OF OATHS
ETHEKWINI MUNICIPALITY
EX OFFICIO DISTRICT OF DURBAN IN
TERMS OF SECTION 6 OF ACT 16 OF 1963
(AS AMENDED) CITY HALL SECRETARIAT
Dr Pixley Ka Seme Street, Durban, 4001

APPENDIX 4

File No: Misc.
ENQ. : E.B.T. MKHIZE
CELL No : 0826696785.

EMBO ILANGA TRADITIONAL COUNCIL
INKOSI ADV. E.B.T. MKHIZE
2018 -01- 27
P.O. BOX 78 ESTON 3740

DATE: 27 / 01 /2018

TO WHOM IT MAY CONCERN

This is to certify that Emmanuel Ndlovu an educator at Gabigabi High School located at Mophela in Hammarsdale is granted permission to carry out a study around Mophela-Hammarsdale about environmental issues. His topic is: *Understanding environmental injustices for community education in South Africa: Perspectives of stakeholders of Mophela-Hammarsdale.*

It is believed that villagers who will participate won't be held liable for any outcomes of the study and that no information shall be used in any place other than for the purposes of the mentioned study. The researcher is expected to protect the identity of the participants and incur any travel expenses.

Yours faithfully

EMBO ILANGA TRADITIONAL COUNCIL
INKOSI ADV. E.B.T. MKHIZE
2018 -01- 27
P.O. BOX 78 ESTON 3740

....

APPENDIX 5

School of Education
DUT
Indumiso Campus
Pmb

The Principal
Gabigabi Secondary School

Dear Sir/Madam

Re: Request for permission to conduct research at your school

1. My name is Emmanuel Ndlovu and I am a phd student at the School of Education, DUT. I plan to undertake a study titled: ***Understanding environmental injustices for community education in South Africa: Perspectives of stakeholders of Mophela-Hammarsdale***

I hereby request your permission to conduct a study using learners (above 18-years) and educators at your school. The participants in the study will be learners and educators from your school. They will be required to participate in individual interviews and photovoice activities that are expected to last between 90-120 minutes, in approximately two sessions.

Please note that

1. The school and participants will not receive any material gains for participation in this research project.

2. The learners and educators will be expected to respond to each question in a manner that will reflect their own personal opinion.

---

3. The school's or the participant's identities will not be divulged under any circumstance.

APPENDIX 6

School of Education
DUT
Indumiso Campus
Pmb

The School Governing Body (SGB)
Gabigabi Secondary School
Dear Sir/Madam

Re: Request for permission to conduct research at your school

1. My name is Emmanuel Ndlovu and I am a PhD student at the School of Education, DUT. I plan to undertake a study titled: ***Understanding environmental injustices for community education in South Africa: Perspectives of stakeholders of Mophela-Hammarsdale***

I hereby request your permission to conduct a study using learners (above 18-years) and educators at your school. The participants in the study will be learners and educators from your school. They will be required to participate in individual interviews and photovoice activities that are expected to last between 90-120 minutes, in approximately two sessions. Please note that

1. The school and participants will not receive any material gains for participation in this research project.

2. The learners and educators will be expected to respond to each question in a manner that will reflect their own personal opinion.

3. The school's or the participant's identities will not be divulged under any circumstance.

4. All learners' and educators' responses will be treated with strict confidentiality.

5. Pseudonyms will be used (real names of the participants and the institution will not be used throughout the research process).

6. Participation is voluntary; therefore, participants will be free to withdraw at any time without negative or undesirable consequences to them.

7. The participants will not, under any circumstances, be forced to disclose what they do not want to reveal.

8. Audio- recording of interviews will only be done if the permission of the participant is obtained.

9. Data will be stored in the University locked cupboard for a maximum period of five years thereafter it will be destroyed.

I thank you
Yours sincerely
Emmanuel Ndlovu

(Supervisor Prof Mago, 0619676169 email: StephenM@dut.ac.za)

02 MAR 201

APPROVED :-

APPENDIX 7

Address

Date: 20 Feb 2019

RE: **Request for Permission to Conduct Research**

Dear Sir/Madam

My name is Emmanuel Ndlovu, a doctoral student at the Durban University of Technology. I am employed at Stortplaats Secondary School. I am interested in understanding the community's perceptions of environmental injustices. My research topic is: Addressing environmental injustices through community-based environmental education: Perceptions of stakeholders of Stortplaats, KwaZulu-Natal

I intend to conduct face-to-face interviews with the participants; these interviews will be audio-recorded. I will also use photovoice with some participants. The findings will be available to all participants. Attached is the information letter giving details of my research. The recommendations from this study may influence the execution of community environmental education programmes.

I am seeking your permission and consent to conduct research within the Stortplaats rural community.

I can be contacted on 0731112482, business number 031 7725133 and email address endlovu20@yahoo.com

For more information, you may contact my supervisors below:

Prof P. Gwirayi gwirayip@gzu.ac.zw Tel +263774025720 or +263712887712

Prof. S. Mago: 071 859 5887, Email: StephenM@dut.ac.za

Durban University of Technology
Faculty of Arts and Design
Indumiso Midlands Campus,
Pietermaritzburg

I look forward to hearing from you soon.

Yours faithfully

Emmanuel Ndlovu

APPENDIX 8

Letter of Information to Participants

Title of the research study: Addressing environmental injustices through community-based environmental education: Perceptions of stakeholders of Stortplaats, KwaZulu-Natal

Principal Investigators/researcher: Emmanuel Ndlovu
Co-Investigator/s/supervisors: Prof S. Mago & Prof P. Gwirayi

Brief Introduction and Purpose of the Study

Outline of the procedure

I will request ethical clearance by submitting my proposal to Durban University of Technology. I will also seek permission to conduct research from the Department of Basic Education, the municipality and local chief as the responsible authority. I will visit areas such as the sewage treatment ponds, the river, the areas where sand mining is taking place and the homes of participants and furnish them with the information letter and seek their permission.

Risks and Discomforts to the Participant

There is minimal risk involved for you in this research. I will be considerate to you as a participant by agreeing to set dates that are convenient to you and will avoid keeping you in discomfort. I will also avoid unnecessary extensions, which may disadvantage you. Participation is voluntary and no remuneration will be paid, except for reimbursement of travel costs incurred and snacks that will be served during interviews and observations. There will be no discomfort to you, as I will treat you with humility and respect.

Benefits for you as a participant and the researcher

- This study will contribute to knowledge and improve my academic and professional understanding.
- The research will lead to the development of some journal articles for publication.
- The responsible authority will benefit from the findings and recommendations for the purposes of rolling out community environmental education.

Reasons why participants may withdraw from the study

You may withdraw as a participant from the research study at any time, since your participation is voluntary. The consent letter clearly explains that, and you do not have to give reasons for your withdrawal; just notify me.

Remuneration

No remuneration will be paid to you, but you will be reimbursed for any travel costs incurred in participating in the research.

Costs of the study

The study is estimated to cost about R15 000.

Confidentiality

Confidentiality and anonymity of the participants' responses will be strictly maintained, and it will be stated on the consent form that the participants are fully informed before confirming their willingness to take part in the research. Pseudonyms will be used to conceal participants' identity.

Research-related injury

No injury to the participants is anticipated, such as physical harm, illness and pain. The participants will not be subjected to any psychological harm such as feelings of worthlessness, distress, guilt, anger or fear, or be asked to disclose sensitive or embarrassing information.

Persons to contact in the event of any problems or queries:

Supervisor:

Prof S. Mago, Cell: 071 859 5887 Email: StephenM@dut.ac.za

Researcher Cell: +27 731112482 email: endlovu20@yahoo.com or the Institutional Research Ethics Administrator on 0313732375.

Complaints can be reported to the Director Research and Postgraduate Support, Prof S. Moyo, on 0313732577 or moyos@dut.ac.za

APPENDIX 9

School of Education
DUT
Indumiso Campus
Pmb

Dear Learner/Participant

Re: Request for your participation in a research project

I plan to undertake a study titled: Addressing environmental injustices through community-based environmental education: Perceptions of stakeholders of Stortplaats, KwaZulu-Natal

I kindly ask your agreement to participate in the project. I value what you think about your community and environmental issues. You will be required to allow me to interview you individually and probably be requested to participate in a photovoice presentation. The interviews will take approximately 90-120 minutes. We will meet in two sessions on two different days that are convenient to you. I will be requesting permission from your parents/caregivers/manager to work with you on the project.
Please note that:
1. You will not receive material gains for participation in this research project.
2. You will be expected to respond to each question in a manner that will reflect your own personal opinion.
3. Your identity will not be divulged under any circumstances.
4. Your responses will be treated with strict confidentiality. Pseudonyms will be used (your real name and the name of the school will not be used throughout the research process).
5. Participation is voluntary; therefore, you will be free to withdraw at any time without negative or undesirable consequences.
6. You will not, under any circumstances, be forced to disclose what you do not want to tell us.
7. Audio-recording of interviews will only be done if you give us permission to do so.
8. Data will be stored at the University in a locked cupboard for a maximum period of five years; thereafter it will be destroyed.

I thank you.

Yours sincerely

_____

Mr E. Ndlovu
Tel: 073 1112482 /031 7725133
Email: endlovu20@yahoo.com
If you have any questions, please feel free to contact my supervisor or myself:
Prof Mago email: StephenM@dut.ac.za

APPENDIX 10

Interview questions

STAKEHOLDER PERSPECTIVES (General)

Question 1: Introduction and biographical information to ease the situation. The researcher will introduce himself and outline the purpose of the interview. The participant is free to refuse to respond to questions that he/she feels will be embarrassing or humiliating

(a) What is your name?
(b) What is your level of education?
(c) How many people live in your home?
(d) How many individuals are gainfully employed in your home?
(e) For how long have you been living in this area?
(f) How often do you or your family members visit the clinic for health-related issues?

Question 2: Basic questions about understanding environment and environmental dangers/issues/hazards

(a) Do you think our environment is important?
(b) If the answer to (a) is **YES**, in which way is our environment important?
(c) What issues constitute a poor or good environment?
(d) In South Africa, do you think we are protected against poor environments?

Question 3: Information leading to perceptions

Sewage ponds

(a) In your own opinion, what influenced the location of sewage treatment ponds at Stortplaats?
(b) How does the community benefit from these ponds?

(c) Are there any problems or disadvantages associated with the sewage ponds located at Stortplaats? Explain your answer.
(d) (If the answer to the above question is “yes”:) If you were given powers to decide: Would you ask the authorities to remove the sewage ponds? Justify your decision.
(e) (Based on (d) answered as “yes”:) How can you or the community at large express displeasure about the presence of sewage ponds in the area without taking an action that would lead to the authorities labelling you as rioters?
(f) How can environmental education in the community be used as a driver for environmental literacy?

Question 4 River pollution and eutrophication

The increase in aquatic plants growing in the river is a sign of high levels of river pollution. Local river is choking because of the green algae that make aquatic life difficult.

(a) What causes the growth of plants in the river?
(b) Do you think that what we are seeing in the river (high eutrophication) is cause for concern? Whether the answer is yes/no, give reasons.
(c) In your own opinion, do you think any plans to reduce river pollution can be successful? Explain your opinion.
(d) Explain how environmental education in the community can be used as a driver for environmental literacy concerning river pollution and its effects.

Question 5 Sand poaching by building contractors

The increase in the population in and around Stortplaats has resulted in a marked increase in the demand for building sand, known as ‘umgeni’. This demand has caused land degradation because truckers randomly excavate the soil around the area looking for this “umgeni” that is in demand for the construction of houses.

(a) What are the observable effects of sand collection in Stortplaats?
(b) (Based on (a) above). Explain why sand collection continues unabated despite the visible damage caused by this activity.

(c) Are there any local people who are involved in the business of selling “umgeni” sand? If the answer is yes, the follow-up question is: Do they do it illegally or do they get permission from the leaders?

(d) Explain how people in the community can be organised to defend their environmental space against sand collection.

(e) Explain how environmental education in the community can be used as a driver for environmental literacy concerning sand poaching and its effects.

Question 6 Dust roads (unpaved)

(a) Do we still have many dusty roads around this area?

(b) (Based on (a): Why does Stortplaats still have dust roads connecting homesteads?

(c) What are the environmental effects of dusty roads connecting homes in Stortplaats?

(d) How can the problem of dusty roads be corrected in Stortplaats?

Question 7 Garbage dumping sites

(a) Where is the garbage dumped at Stortplaats coming from?

(b) Why is the garbage dumped in this area?

(c) What are the effects of the presence of piles of garbage in Stortplaats?

(d) How can the community be organised to defend their environmental space against invasion?

(e) Explain how environmental education in the community can be used as a driver for environmental literacy concerning garbage dumping and its effects.

Question 8 (for environmental experts)

(a) What are the health implications of exposing people to environmental hazards such as odour from sewage ponds, river pollution, land degradation, dust pollution and garbage dumping?

(b) Is the Department of Health aware of the existing environmental injustices in Stortplaats? If yes, then what is the Department doing about it?

(c) What health statistical evidence is available pointing to the existence of these injustices in Stortplaats?

Question 9 General questions

(a) Has there ever been any dialogue between the perceived perpetrators of environmental hazards/destruction and the community at large? If yes, outline the agreements/disagreements; if no, explain why.
(b) How can schools, churches, community gatherings and political rallies be used as institutions for driving environmental education literacy?
(c) What modifications, if any, can be made to the curriculum in order to produce environmentally conscious and literate citizens?

APPENDIX 11

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Emmanuel Ndlovu, about the nature, conduct, benefits and risks of this study _____ Research Ethics Clearance Number: _,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis, will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study may be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed in the course of this research, which may relate to my participation, will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, Emmanuel Ndlovu, herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Emmanuel Ndlovu	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

APPENDIX 12

Interview questions

STAKEHOLDER PERSPECTIVES (Leaders)

Question 1: Introduction and biographical information to ease the situation. The researcher will introduce himself and outline the purpose of the interview. The participant will be free to refuse to respond to questions that he/she feels will be embarrassing or humiliating

(g) What is your name?
(h) What is your level of education?
(i) How many people live within your area of leadership?
(j) How many individuals are gainfully employed in your area?
(k) For how long have you been a leader in this area?

Question 2: Basic questions about understanding the environment and environmental dangers/issues/hazards

(e) Do you think our environment is important?
(f) If answer to (a) is yes, in which way is our environment important?
(g) What issues constitute a poor or good environment?
(h) In South Africa, do you think we are protected against poor environments?

Question 3: Information leading to perceptions

Sewage ponds

(g) In your own opinion, what influenced the location of sewage treatment ponds at Stortplaats?

(h) How does the community you lead benefit from these ponds?
(i) Are there any problems or disadvantages associated with the sewage ponds located at Stortplaats? Explain your answer.
(j) (If the answer to the above response is “yes”:) If you were given powers to decide, would you ask the authorities to remove the sewage ponds? Justify your decision.
(k) (Based on (d) answer as “yes”:) How can you or the community at large express displeasure about the presence of sewage ponds in the area without taking an action that would lead to the authorities labelling you as rioters?
(l) How can environmental education in the community be used as a driver for environmental literacy?

Question 4 River pollution and eutrophication

The increase in aquatic plants growing in the river is a sign of high levels of river pollution. Local river is choking because of the green algae that make aquatic life difficult.

(f) What causes the growth of plants in the Umlazi River?
(g) Do you think that what we are seeing in the Umlazi River (high eutrophication) is cause for concern? If the answer is yes/no, give reasons.
(h) In your own opinion, do you think any plans to reduce river pollution can be successful? Explain your opinion.
(i) Explain how environmental education in the community can be used as a driver for environmental literacy concerning river pollution and its effects.

Question 5 Sand poaching by building contractors

The increase in the population in and around Stortplaats has led to a marked increase in the demand for building sand, known as ‘umgeni’. This demand has caused land degradation because truckers randomly excavate the soil around the area looking for this “umgeni” that is in demand for the construction of houses.

(e) What are the observable effects of sand collection in Stortplaats?
(f) (Based on the above). Explain why sand collection continues unabated despite the visible damage caused by this activity.

(g) Are any local people involved in the business of selling “umgeni” sand? If the answer is yes, the follow-up question is: Do they do it illegally or do they get permission from the leaders?

(h) Explain how people in the community you lead can be organised to defend their environmental space against sand collection.

(j) Explain how environmental education in the community can be used as a driver for environmental literacy concerning sand poaching and its effects.

Question 6 Dust roads (unpaved)

(e) Do we still have many dusty roads around this area?

(f) (Based on (a) Why does Stortplaats still have dust roads connecting homesteads?

(g) What are the environmental effects of dusty roads connecting homes in Stortplaats?

(h) How can the problem of dusty roads be corrected in Stortplaats?

Question 7 Garbage dumping sites

(f) Where is the garbage dumped at Stortplaats coming from?

(g) Why is the garbage dumped in this area?

(h) What are the effects of the presence of piles of garbage in Stortplaats?

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(j) Explain how environmental education in the community can be used as a driver for environmental literacy concerning garbage dumping and its effects.

Question 8. (For environmental experts)

(d) What are the health implications of exposing people to environmental hazards such as odour from sewage ponds, river pollution, land degradation, dust pollution and garbage dumping?
(e) Is the Department of Health aware of the existing environmental injustices in Stortplaats? If yes, then what is the Department doing about it?
(f) What health statistical evidence is available pointing to the existence of these injustices in Stortplaats?

Question 2 General questions

(d) Has there ever been any dialogue between the perceived perpetrators of environmental hazards/destruction and the community at large? If yes, outline the agreements/disagreements; if no, explain why.
(e) How can schools, churches, community gatherings and political rallies be used as institutions for driving environmental education literacy?
(f) What modifications, if any, can be made to the curriculum in order to produce environmentally conscious and literate citizens?

APPENDIX 13

PHOTOVOICE

Photovoice is a medium of language that is universal in its appeal. It minimises language and cultural barriers by reflecting reality as seen and experienced by an individual. Furthermore, photovoice attempts to capture the essence of a problem from the perspective of those experiencing it.

Ten of the youngest participants (Wang 2006) will be supplied with disposable cameras to carry out this procedure of photographing areas of environmental concern identified during the individual interviews. The researcher will be responsible for developing the photographs. After a week or two, depending upon the agreed time frame in which to take photographs, participants will come for final interviews.

Each participant will select five of his/her best photos (Wang 2006) and detail the story behind the photos, highlighting how it relates to the environmental injustices and how concerns can be addressed through community environmental education.

Photovoice-based questions

Question 1

a) Can you tell me about the story behind each of your photographs?

b) What made you choose these particular photographs?

c) What was going through your mind as you were taking these photographs?

d) Who was there when you were taking these photographs?

e) Is there anything in particular that you want to highlight about your photographs?

Question 2

Can you tell me how your photographs capture the issues of environmental injustice?

Question 3

If the picture depicts a good vision, or positive vision for the future, what is blocking this dream from becoming a reality?

Question 4

How would you go about restoring the situation in the picture through community education so that it reflects the kind of environment that you would wish to have?

General questions

Question 5

What makes you most proud about your community?

Question 6

What makes you most upset about your situation in terms of environmental injustices?

Question 7

After taking time to document and reflect on your community and how various environmental injustices are affecting your day-to-day living, what do you think is/are the most significant barrier(s) to removing these injustices?

Question 8

Based on our discussion here today, what do you feel community members need to support their endeavours with community education?

Participants' responses

APPENDIX 14

Environmental injustices

by Emmanuel Ndlovu

Submission date: 17-Jun-2020 09:58PM (UTC+0200)

Submission ID: 1345538741

File name: Ndlovu_Final_thesis_with_corrections_June_2020_for_Turnitin.docx (7.76M)

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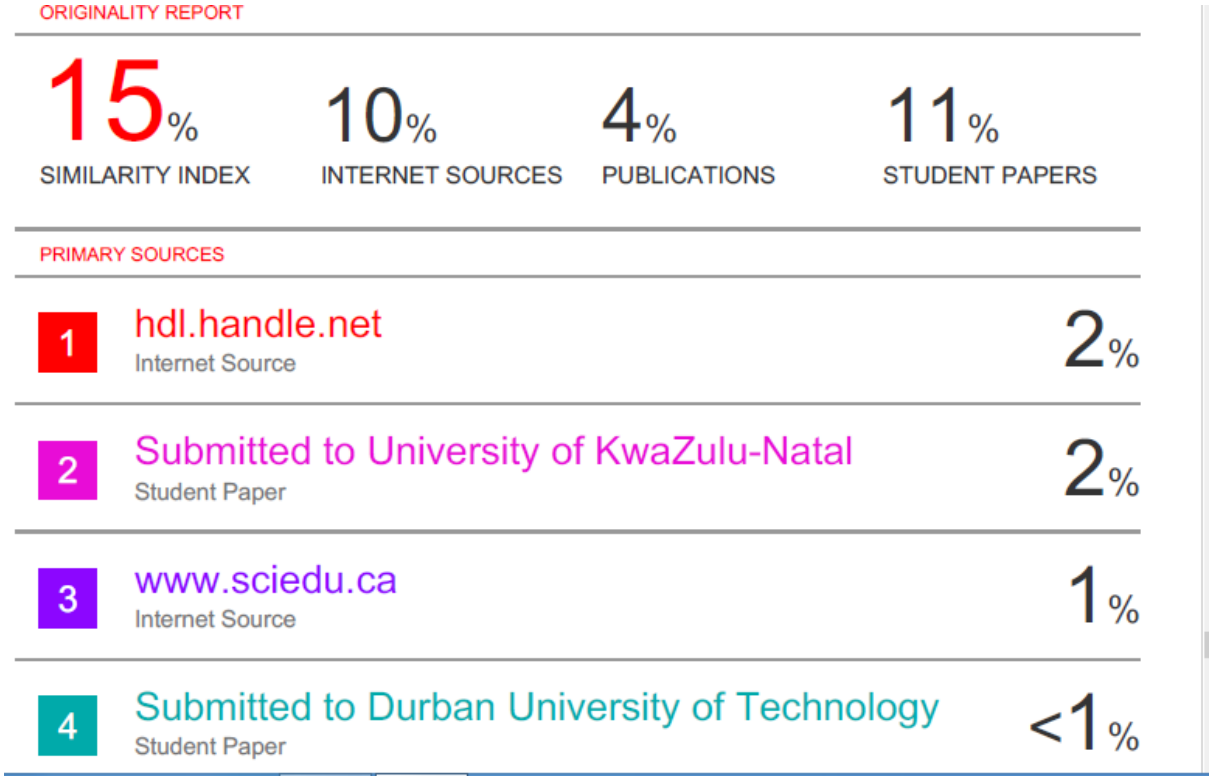

ORIGINALITY REPORT

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APPENDIX 15

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DECLARATION ON EDITING

Student: Mr E. Ndlovu	**Date:** 2020/06/26

Document submitted for editing
Thesis: **Addressing environmental injustices through community-based environmental education: Perceptions of stakeholders of Stortplaats, KwaZulu-Natal**
The above thesis was submitted to me for language editing, which was completed on 26 June 2020. M.B. BRADLEY (MA) - Language editor

APPENDIX 15

M.B. BRADLEY

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DECLARATION ON EDITING

Student: Mr E. Ndlovu	**Date:** 2021/04/09

Document submitted for editing
Thesis: **Stakeholders' perceptions of environmental injustices and of community-based environmental education: A case study of the Stortplaats community in KwaZulu Natal.**
The above thesis was submitted to me for language editing. M.B. BRADLEY (MA) - Language editor