

**AN EXPLORATION OF THE IMPACT OF ENVIRONMENTAL
EDUCATION INNOVATION ON STUDENTS IN

SUSTAINING LAND RESOURCES:
A CASE OF MKHONDO VILLAGE**

By

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Declaration**

I declare that this dissertation has not been submitted for a degree at this or any other university and it is my work in design and execution. The title of the study is:

An exploration of the impact of environmental education innovation on students in sustaining land resources: A case of Mkhondo village

All the sources that I have used or quoted have been acknowledged by means of complete references.

Sikhulile Bonginkosi Msezane

JUNE 2014

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ABSTRACT

The aim of the study was to investigate the impact of Environmental Education in learners with regard to unacceptable waste dumping which causes land degradation in Mkhondo village. Large parts of the Mkhondo area, including the informal settlement, the location and the local school, are very untidy due to littering by the residents and learners. The situation is contrary to the objectives of the Decade of Education for Sustainable Development (DESD). The study was focused on the impact that Environmental Education as an extracurricular activity would have on the students in reducing or eradicating littering.

Data was collected through focus group interviews with the learners and the parents as well as observations. The study revealed that learners showed no concern about the negative impact of disposing of litter inappropriately even after the extra-mural activities on Environmental Education, which indicated that they were not concerned about the environment at school as well as at home. The initiative of Environmental Education was implemented in a short period, hence learners were not yet fully acquainted with the responsibility of taking care of the environment and alleviating littering on the school premises. I therefore recommend that educational campaigns on appropriate solid waste disposal should be initiated in the school and in the community. Further studies should be conducted on how Environmental Education can be integrated in the curriculum as an examinable subject.

Key Words: Environmental Education, Sustainable, Impact, Solid waste, Degradation, Litter, Focus group, Natural resources and Land resources.

GLOSSARY OF TERMS

- **Environmental Education:** It is a programme that promotes and advocates efficient usage of natural resources and prevention of natural resource degradation. It is also the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among people, their culture, and their biophysical surroundings. Environmental Education also entails practice in decision making and self-formulation of a code of behaviour about issues concerning the environment (Taylor et al. 2009:180).
- **Solid waste:** It is unwanted material that causes degradation of natural resources.
- **Human activities:** All functions of humanity that influence natural resources positively or negatively.
- **Sustainable development:** The continuous usage and development of natural resources without compromising future existence.
- **Unacceptable waste disposal:** It is littering that negatively affects land resources.
- **Illegal dumping:** Unacceptable solid waste disposal in areas where disposal is strictly not allowed.
- **Untidy:** Disorderly and unorganised place that is littered with waste materials.
- **Impact:** It is an influence of Environmental Education that could be negative or positive.
- **Land resources:** Naturally occurring resources whose existence is in danger from solid waste.
- **Litter:** Substances that affect the environment such as papers, plastics, empty bottles and tins. Waste disposed of improperly.
- **Refuse:** It is unwanted material consisting of combustible and non combustible solid waste materials from households, stores, offices, and institutions.
- **Garbage dump:** Place where rubbish is discarded.
- **Degradation:** Deteriorating of environment through depletion of resources such as air, water and soil.
- **Swill:** Kitchen refuse.
- **Focus group:** is a small homogenous group gathered to study or assess.
- **Environmental degradation** is the deterioration of the environment through depletion of resources such as air, water and soil.

GLOSSARY OF ACRONYMS

ABBREVIATION	DESCRIPTION
WCED	World Commission on Environment and Development
UNESCO	United Nations Educational, Scientific and Cultural Organisation
IUCN	International Union of Conservation of Nature
UNEP	United Nations Environment Programme
ECA	Environmental Conservation Act
DESD	Decade of Education for Sustainable Development
SADC	South African Development Community

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CHAPTER 1: ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Environmental Education is vital in reducing unacceptable solid waste disposal. Knowledge and understanding of Environmental Education are important since degraded environment means a lower quality of life for all. It is therefore a collective responsibility of all human beings young and old to secure a sustainable environment for the present and future generation. Environmental Education is the kind of education that promotes sustainable living and it is paramount that our learners are well educated in eradicating inappropriate solid waste disposal in schools as that might influence good patterns of behaviour even in their homes. Chapter 1 outlines the background of the study, the problem statement, the research questions, rationale and purpose of the study, the aims and objectives of the study, delimitations and limitations, chapter demarcation and ends with a summary.

1.2 BACKGROUND

We are all equally responsible for taking care of the environment for future generations. Therefore we need to change our patterns of thought about the environment if we are to solve the problem we have created with our current patterns of thought (Taylor, Littledyke, Eames and Coll 2009:100). Environmental Education is not a new phenomenon it has evolved swiftly since the Second World War between 1939 and 1945, as exemplified by the number of international conferences and workshops that were held on issues related to the environment and sustainability of land resources. Environmental Education has evolved swiftly since the Second World War between 1939 and 1945, as exemplified by the number of international conferences and workshops that have been held on issues related to the environment and sustainability of land resources. Loubser (2007:39) believes that “the war led to its unprecedented devastation and human suffering, which culminated in an important period of new ideas and planning for a better world”.

Human activities that were detrimental to environmental sustainability led to campaigns and conferences that included the Rio De Janeiro Earth Summit in 1992 and the World Summit on Sustainable Development which was held in Johannesburg, South Africa in 2002.

It follows then that Environmental Education is essential for both rich and poor nations, as evidenced by the 1972 Stockholm meeting for developing Environmental Education which was held in support of preserving natural resources regardless of whether the country is poor or rich. The meeting was crucial as it led to the formation of the field of Environmental Education. Consequently, even a smaller village like Mkhondo has a pivotal role to play in sustaining the environment, regardless of the socio-economic status of its inhabitants.

According to Loubser (2007:43), “since 1992 the field of Environmental Education has been widely influenced by the notion of sustainable development, with educators advocating that Environmental Education should be focused primarily on achieving the goals of sustainable education”. Therefore, harmful human activities such as unacceptable solid waste disposal in Mkhondo can be alleviated by introducing Environmental Education as an extracurricular activity on a sustainable basis.

Moreover, human activities generate massive waste that finds its way into the ground, water, and air every year (Kamara 2006:1). High consumption lifestyles in many villages have major effects on how much domestic waste is produced by modern technology, while little effort is made to bring the same technology to reduce unacceptable waste disposal (Kamara 2006:2). The area of Mkhondo is surrounded by litter on illegal dumping sites, on the roadside and even on street corners (Mkhondo Solid Waste Report 2010). The litter becomes a source of solid waste that degrades the land, pollutes the air, contaminates running water and poses a threat to nearby homesteads next to the Mkhondo River that use water from the river for drinking. Apart from the damage to humans, animals such as cattle feed on the garbage irresponsibly disposed of by the community.

According to the Mkhondo Solid Waste Report (2010), the increasing population in Mkhondo and growing prosperity in the present development patterns will further place strain on the environment. Communities have a better life so that they afford to buy many materials that lead to unacceptable solid waste disposal and land degradation. The unacceptable behaviour is also evident in the school environment. Environmental Education can play an

important role to reduce the impact of unacceptable solid waste disposal on a sustainable basis.

This study presents a clear analysis of the impact of Environmental Education on the prevention of unwanted patterns of solid waste disposal that can be detrimental for future generations. According to Meyer (2004:1) “Education, training, and public awareness are keys to any society moving towards sustainability”. Therefore, learners have a significant role to play in shaping the environment for the future to ensure that present actions do not compromise the sustainability of future resources. Human behaviour can lead to either degradation or sustainability; therefore, learners of today should be the ambassadors of Environmental Education to prepare for their world tomorrow and for other generations to follow.

1.3 PROBLEM STATEMENT

Mkhondo Township has a challenge with a growing trend of unacceptable waste disposal which results in a filthy environment caused by community littering of substances such as plastics, empty bottles, papers and other residues which are harmful to people and animals. Large parts of Mkhondo are becoming untidy. In schools, a lot of waste is generated through littering, which degrades the environment. This is contrary to the principles of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). The question arises: what role does Environmental Education play in protecting land resources from unacceptable refuse dumping that affects environmental resources?

1.4 RESEARCH QUESTIONS

The study was guided by the following research question:

What is the impact of Environmental Education on the way learners preserve land resources from degradation caused by unacceptable solid waste disposal?

The sub-questions of the study:

1. What evidence of change is there in land preservation from the learners after being taught Environmental Education as an extra-mural activity in schools?

2. What impact does Environmental Education have on the way learners behave in the classroom towards the sustainability of land resources?

1.5 RATIONALE AND PURPOSE OF THE STUDY

Research requires knowledge, time, skills, planning, and fiscal resources, while the problem investigated should be important and have a potential payoff (McMillan & Schumacher 2010). Therefore, in this study the research on the impact of Environmental Education in sustaining land resources should provide an important foundation for keeping the environment clean and act as a driving tool in identifying and analyzing the role played by learners and the community at large in sustaining land resources. This should provide a platform for learners to be responsible and play a positive role as they interact with the environment. The study may also stimulate interest in acceptable solid waste disposal so that learners and their parents will realize the importance of Environmental Education in sustaining land resources.

The unacceptable disposal of litter facing the local municipality could be minimised by initiating a study that will raise awareness about the impact of litter in the environment. The study should demonstrate whether learners are practising in the school and in the community what they have learned in Environmental Education in the extra mural activity.

1.6 AIM AND OBJECTIVES OF THE STUDY

The aim of the study is to investigate the impact of Environmental Education on learners with regard to unacceptable waste dumping which causes land degradation in Mkhondo village.

The objectives of this study are:

- To establish whether what has been taught in extra-mural activities about Environmental Education is being practised by learners in school and in the community.
- To evaluate the impact of Environmental Education in schools at Mkhondo.

1.7 DELIMITATION AND LIMITATION OF THE STUDY

The limitation of the study was that learners were observed in a short period and measuring behaviour was not conclusive as learners changed their behaviour because they knew that they were participating in the study. Due to the small sample available for the study, results may not be generalised beyond the specific population; hence, the results of the study are not representative of the entire population.

Due to the large number of potential participants in the study population, the delimitations of the study were that it included 40 learners who completed questionnaires, ten learners who were involved in focus group interviews and eight parents of learners who were interviewed in a focus group. The study was conducted in Mkhondo village, which is a home area for all the participants. Parents who did not have learners who were involved in the study were excluded. Only Grade 12 learners were included in the study. Only those questions approved by the supervisor were used for the study. The results of the study were generalised to only Grade 12 learners and parents of Grade 12 learners who live in Mkhondo village.

1.8 CHAPTER DEMARCTION

This section provides an outline of the organisation of the chapters included in the study.

Chapter 1: This chapter contains an introduction and background of the study. It provides a problem statement and sub-problems are also addressed. The chapter further presents the aims, objectives, delimitations and limitations of the study.

Chapter 2: This chapter contains the literature review that was used to situate the study and in supporting the arguments and discussions in the study. The theoretical and conceptual framework that underpinned the study is also discussed in this chapter.

Chapter 3: Chapter 3 describes the methodology used in the study. The discussion focuses on the design, the interpretive paradigm as well as the research context of the study. Finally, the techniques used to collect data as well as how data was analyzed and interpreted to derive findings are elucidated. The chapter concludes with a discussion of ethics.

Chapter 4: The chapter reports on the outcome of the study. The analysis and discussion of the results are the focus of this chapter. Concepts are built in this section from the data collected.

Chapter 5: The study is synthesized in this chapter. A summary of each chapter, including a summary of results as well as conclusions with reference to the problems postulated, is provided. This chapter summarizes whether or not the objectives of the study have been achieved. The chapter also provides well-argued recommendations for future research.

1.9 SUMMARY

Chapter One has included a short description of the study. The problem statement, research questions, rationale and purpose of the study were outlined while the aims, objectives, delimitations and limitations underpinning the study formed part of this chapter. The chapter concluded with a chapter demarcation and a summary. Chapter two follows with an extensive review of literature and the theoretical framework underpinning the study.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The impact of Environmental Education in sustaining land resources has been closely associated with what has been done concerning issues of sustainability, Environmental Education, land degradation and solid waste disposal. This study utilizes research done in South Africa, in other African countries as well as in other overseas countries. The chapter describes general waste as categorized into ordinary refuse, garbage, swill, rubbish, trash and ashes. Solid waste in this study is classified as refuse and refers to the useless, unwanted, or discarded materials resulting from society's normal activities.

2.2 GLOBAL ENVIRONMENTAL ISSUES ON NATURAL RESOURCES

“Globally nature is viewed as a provider of natural resources, aspects of the natural environment that are critical to satisfying human needs and wants” (Hill, Alan and Woodland 2006: 93). This view of nature as a resource is implicit in the World Commission on Environment and Development (WCED) definition of sustainable development, which focuses on the present and future needs of humankind. According to Hill et al. (93), “nature is also viewed as a fragile natural resource that can be overexploited and degraded, jeopardizing human existence”. The unacceptable waste disposal in Mkhondo has encouraged me to conduct a study on the impact of Environmental Education.

The efficient use of the world’s natural resources forms the basis for the second theme of AGENDA 21, “a global action plan for sustainable development into the 21st century” (BGCI June 1999). The finite resource base of our world is depleted and degraded at an increasingly rapid rate. Altering consumption patterns and containing population growth will reduce some of the demand for these resources. According to Sitarz (1994: 10) “it is essential however that more efficient and environmentally sound methods of utilizing our precious resources be developed”. Moreover, Sitarz (1994) notes that in the past the earth’s seemingly unlimited supply of natural resources and its ability to assimilate waste were taken for granted. The enormous increase in human numbers and activities in this century has placed profound stress on these capabilities. As a result, in 1993 a National Environmental and

Planning Agency was formed to promote Environmental Education activities in support of the sustainability of natural resources (Hill et al. 2006).

Furthermore it must be accepted that there are finite limits to both the earth's resources and the earth's capacity to handle the waste of human society (Sitarz 1994:10). Thomas-Hope (1998) discovered, for instance, that much of the waste produced in Jamaica is disposed of at ordinary dump sites which are not adequately prepared for such disposal. All these sites are unprotected and the authorities only become aware of the danger after damage has been done. This situation is the same as that which is being experienced by the community of Mkhondo.

It is clear that protection of the global resources of land, fresh water, biological and genetic resources and energy must be paramount (Sitarz 1994). Development of the earth's resource base must be accomplished in a manner which raises productivity and meets global demand. Natural resources and living conditions are often the direct casualties of population growth, which has been estimated to have reached seven billion people globally.

Sitarz (1994) also notes that the increase in the world's population and consumption, particularly in the industrialized countries, has stimulated economic growth. The nations of the world now recognize that this globally unsustainable use of the earth's resources has degraded the environment and generated unmanageable amounts of waste and pollution of the land. Apart from the global village, the local village of Mkhondo has been experiencing the same situation of degradation caused by solid waste disposal.

In Jamaica, Environmental Education has been encouraged through both informal means, geared to the general public, and formal means, such as the integration in the primary to tertiary level curricula (Hill et al. 2006). New evidence in empirical social research conducted in Germany has shown that "environmental consciousness and environmental behaviour are miles apart from each other". According to Balderjahn, Mennicken, and Vernette (1998), research findings suggest that Germans appear to be quite environmentally conscious, but most of them are simply paying lip service.

According to Hill et al. (2006), environmental education should not just blindly reproduce the current realities of living with nature but it should alert people to alternate realities and enable them to critically evaluate these realities and make informed decisions as to what the

appropriate interaction with nature should be in their local context. Mkhondo community has to take appropriate action based on local deficiencies in sustainability.

It is not only solid waste that depletes the earth's reserves. In a country such as Guinea, for example, land degradation is caused by oil palm production where fertilizers, pesticides and herbicides and chemical runoff pollute local waterways (Taylor et al. 2009). Oil palm was planted after the removal of a forest. The palm is only productive for two decades and two cycles. Thus in 40 years, less than one human generation, fertile land becomes waste land because of the degradation caused by herbicides, pesticides and solid waste (Taylor et al. 2009:10).

Furthermore, according to Raven et al. (1993:513), "the world generates a great deal of solid waste, which has become an area of concern for the generation". In the United States of America, for instance, every man, woman and child produces an average of 1.6kg of solid waste per day. This results in a total of 160 million metric tons per year. In addition, Taylor et al. (2009: 30) report that "Fiji is developing rapidly and with an emerging middle class, more members of its population are adopting a western lifestyle with its associated patterns of high consumption". The authors add that "these developments are inevitably having an impact on the country's environment in terms of increased waste production and consequently there is a need for effective Environmental Education to help mitigate these problems" (Taylor et al. 2009: 30) Similarly, China generates an estimated 150 million tons of rubbish per year and as much as 400 million tons estimated by 2020. This is in proportion to the healthy economic growth experienced by China (Leon-Guerrero 2011). The quantity of municipal waste generated in the United Kingdom keeps rising year on year, with almost all of the United Kingdom waste ending up in landfill (Jolly 2010). According to Jolly (2010:104) "recent changes in public attitudes towards the environment have led to a fall in the quantity of household waste generated per person and an increase in recycling and composting from 14.4% in 2002 to 37.6% in 2008".

AGENDA 21 raised concerns that environment and trade policies should be mutually supportive. An open global trading system makes possible the more efficient allocation and use of the earth's resources. This will contribute to an increase in production and incomes to a lessening of humanity's demand on the environment. Increased global economic activities

will provide additional resources that are needed for economic growth and development and improved environmental protection. A good environment provides the ecological and other resources needed to sustain growth and will have a positive impact on the natural resources and thus contribute to sustainable development.

Sitarz (1994) argues that communities must be allowed to participate directly in the management and protection of the local resources. The current study therefore incorporated members of the community as they have an important part in managing local resources from degradation. Thomas-Hope (1998) argues that if a municipality like Mkhondo in this study can get its citizens to play an active role in taking responsibility for their garbage it can save large amounts of money spent in collection and disposal. This will also play a role in the fight against land degradation.

2.3 NEIGHBOURING COUNTRIES' ENVIRONMENTAL CONCERNS

South Africa's neighbouring countries such as Lesotho and Botswana have shown increasing awareness of environmental concerns. According to Hill et al. (2006: 125), "Lesotho's constitution of 1993 expresses a commitment to the environment". The policies are designed to enhance the natural and cultural environment for the benefit of both present and future generations. In addition, Taylor et al. (2009:126) state: "Since 1995, when Botswana was declared a middle income country in a United Nations human development report, the economy has grown rapidly. That has resulted in increased pollution from new industries." Furthermore, Botswana has introduced policies aimed at developing a society that is aware of and concerned about the environment and its associated problems, a society which has the knowledge, skills, attitudes, motivation, and commitment to work individually and collectively towards solving current problems and preventing new ones (Taylor et al. 2009).

According to Mapira (2009), a study conducted in Zimbabwe in 2008 in the city of Masvingo showed that the country is faced with different challenges of unacceptable waste disposal. The challenges of waste come from uncollected refuse, transportation and management of waste. Failure by the authorities to collect refuse in Zimbabwe has resulted in urban dwellers dumping it at open sites as well as peri-urban areas, causing land degradation.

Botswana and Namibia are heading towards a major row over the water from the Okavango River. The dispute threatens major economic, political and even military consequences for the two countries and the whole of the Southern African Development Community (SADC) region (Hill et al. 2006). Meanwhile, some of the advanced nations of Europe and America have identified control of global, and in particular African, environmental and natural resources as their particular national challenge and security priority. Underlying all these developments is the potential for violence to increase when states or people affected by natural resource shortages and management policies are unfairly treated, or feel that they are unfairly treated, in the allocation and distribution of resources (White Paper on Environmental Management Policy 1997).

2.4 ENVIRONMENTAL EDUCATION IN SOUTH AFRICA

Environmental Education in South Africa is a response to environmental issues and risks (Taylor et al. 2009). Despite all its natural resources, South Africa is not spared from environmental threats such as pollution, inappropriate waste disposal and erosion. According to the White Paper on Environmental Management Policy published in 1997 , establishing good governance in South Africa

can only be guaranteed if it is based on a sound economic and socio-economic framework that is environmentally sustainable. Equitable access to, and ownership and control of, renewable and non-renewable natural resources by South Africans, black and white, poor and rich, male and female, is critical to our survival as a country. Conservation and sustainable use of these environmental resources and their protection depends on changed behaviour by all individuals, households, and private and public institutions. These changes must affect processes of resource extraction, spatial development, appropriate and clean production, waste minimization and pollution control strategies in order to guarantee a higher quality of life for all.

Although South Africa therefore responded to the threats by signing conventions and agreements such as Global Assessment of Soil Degradation, lack of participation was a concern and it was documented in the 1989 White Paper on Environmental Education (Taylor et al. 2009). The White Paper on Education and Training published in 1995 emphasized that

Environmental Education should form part of an integrated and active approach to learning and must be a vital element of all levels and programmes of education and training.

South Africa is still “faced with a high rate of informal dumping which impacts on local ground water quality and can lead to pest breeding, physical injury to children, air pollution and severe land damage” (Water Research Commission 1996:3). This motivated me to study the community of Mkhondo to determine whether what the learners acquire from school in terms of Environmental Education during extra-mural activity is being practised in their respective environments.

2.5 CONCERNS ABOUT LAND RESOURCES, WASTE GENERATION AND COMMUNITY AWARENESS

i) LAND RESOURCES

According to Sitarz (1994), uncontrolled land use is one of the primary causes of destruction of the land resources. Present land use often disregards the actual carrying capacities and limitations of the land. As the world population surpasses 6 billion, the need to increase food production will place enormous environmental pressure on already taxed natural resources, including the land itself. The problem of soil degradation is the most important environmental problem of many areas in developing countries (Sitarz 1994).

According to Sitarz (1994), poor land and waste management by the increasing global population has led to major environmental problems and the world has to devise some efforts to rehabilitate the degraded landscape. The challenge for sustainability of our resources is to actually help individuals and nations apply environmental management to concrete actions and practices (Janse van Rensburg, Hattingh and O'Donoghue 2002). Sitarz (1994:178) also “believes that a land resource such as soil is basic for human living; degrading land means future generations will not survive”.

ii) WASTE GENERATION

According to the Water Research Council (1996:5) “there is a contrast between waste from developing and developed countries in terms of both generation rates and density”. The waste

tends to be less dense in developed countries, usually ranging between 100kg and 150 kg per cubic metre, as opposed to over 400kg per cubic metre in developing countries. The per capita waste generation rate tends to be higher in developed countries ranging between 1kg and 1.8kg per day, as opposed to developing countries where the range is usually 0.3kg and 0.5kg per capita per day.

iii) COMMUNITY AWARENESS

The case studies conducted by The Water Research Council (1996:18) also “indicated that residents’ concerns regarding waste management issues range from high levels of concern to apathy”. Apathy may be attributable to historically poor service levels and lack of environmental awareness. This stresses the need for education to be recognized as an important part of any service provider’s responsibility. Thus, a study of Mkhondo will aim to fill the information and educational gap.

2.6 SOLID WASTE CONSEQUENCES

Solid waste has become a major consequence of development and modernization, yet some of the greatest challenges to its management are felt most keenly in the developing countries (Thomas-Hope 1998). According to Thomas-Hope (3) “the complexity of the problems such as harmful waste disposed of by the community underlines the necessity for a comprehensive, multicultural approach to tackling it”.

Also, the World Research Council (1996) shows that uncollected solid waste has a potential impact on health both directly and via effects on the drainage system. Possibly the most serious risk relates to its effects on the storm water system. Blockages of the storm water drainage system result in standing water which may be contaminated and which encourages the breeding of mosquitoes and flies with the resultant threat of diseases such as malaria and diarrhoea.

Waste management cannot be limited to dealing with refuse material once it has been produced. The approach must incorporate a proactive dimension in order to reduce not only the amount of waste generated or discarded, but also redirect the minds and behaviour of the population towards a new level of positive participation in maintaining the environment in a

healthy, ecologically protected and satisfactory condition (Thomas-Hope 1998). Thomas-Hope (15) “believes that in local townships the problem of careless waste disposal is often caused by the lack of awareness of the dangers to health presented by the accumulation of refuse”. In crowded communities like Mkhondo, inadequate collection and disposal of refuse can be a major factor in promoting and spreading insect-borne and parasitic diseases such as malaria. If a municipality can convince its citizens to play an active role in taking responsibility for their garbage, it can save money on collection and safe disposal.

In the last two decades there has been a transformation in the way in which solid waste has been dealt with in many countries in terms of 3 Rs; REDUCE, REUSE AND RECYCLE (Thomas-Hope 1998). According to the 3 Rs, Mkhondo learners and the community have an important role in ensuring the reduction, reuse and recycling of solid waste and reducing the unacceptable disposal of waste.

Thomas-Hope (1998) has outlined four factors leading to poor waste disposal: 1) ignorance, where people do not know about the causes of disease; 2) cultural beliefs, such as that the father-in-law cannot use the same latrine as the daughter-in-law or that evil spirits live in the pit latrine; 3) economic constraints, where people cannot afford dust bins; and 4) lack of awareness about the dangers caused by poor refuse disposal.

According to the Water Research Council (1996:3), “Informal dumping can also impact on local groundwater quality while uncollected waste can lead to pest breeding, physical injury, general flooding, land damage and aesthetic problems related to smell and sight”. The problems with standing water transfer into water quality problems in storm water channels, streams and rivers. Waste disposal that ends up in water and eventually in the sea impacts negatively on the ecology of the land. Decaying organic matter and bacteriological activities use oxygen, thereby reducing the amount available for aquatic life. The process of decay leads to the undesirable growth of weeds that affect the quality of water. Plastics have also been identified as a particular problem for river and marine life. “Uncollected refuse has been identified as a significant water pollutant in major runoff studies carried out in Khayelisha, Alexandra and the Hennops River Valley” (Water Research Council 1996:4)

“Land is a physical entity as well as a system of natural resources” (Sitarz 1994). Land resources include the soils, minerals, water, plants, and animals in all their biological and

genetic diversity. All these various elements interact to provide essential actions that maintain the productive capacity of the environment, such as the recycling of wastes and minerals, formation of soils, moderation of the water cycle, and pollination of plants (Sitarz 1994). This complex system provides much of the basic capital and resources on which development is built. It satisfies primary human requirements for food, fibre, and fuel. Land supplies many basic materials for industries and manufacturing, and provides space for human habitation and activities.

Sitarz (1994) mentions that these finite resources cannot easily provide for the rapidly increasing number of people and for the growing intensity of human activities. Intense conflicts over land use are on the rise, among different social and economic interests, between humans and the environment, and between immediate and long-term needs. Current management practices tend to approach these needs in isolation from each other, with the result that important links and impacts are ignored (Sitarz 1994). Pressures on certain land resources are leading to their deterioration and eventual permanent degradation.

The Earth Summit (AGENDA 21) highlighted that poor land and waste management and the increasing use of chemicals, energy, and other resources by an expanding global population estimated at seven billion in November 2011 have led to major environmental problems. Despite increasing efforts to prevent waste accumulation and promote recycling, the quantity of waste generated continues to grow (Sitarz 1994). The extent and nature of urbanization in developing countries have major implications for solid waste management. Thomas-Hope (1998) reports that thirty to forty percent of the population of developing countries is urban, producing a disproportionately high volume of waste, the greatest proportion being 75% of domestic waste. The situation in developing countries is compounded by the unplanned, spontaneous nature of much of the urbanization, the lack of an accessible road network through many sections of the cities, and inadequately managed sewage and waste disposal systems. “The cost of basic waste management in developing countries is high, ranging from 20% to 40% of municipal revenues” (Thomas-Hope 1998:2). The current study therefore focuses on the impact of Environmental Education in sustaining land resources and the role played by different stakeholders in reducing waste disposal.

The Environmental situation in Mkhondo



Figure 2.1 Photo taken by the author in Phola Park section of Mkhondo, dated 14 November 2011

Figure 2.1 shows the behaviour of the Mkhondo community towards the environment. They dump litter that is dangerous to animals and can be a source of insects during summer as the empty bottles will store water that provides perfect conditions for harmful insect breeding and multiplication. According to Thomas-Hope (1998), the social aspect of solid waste is further reflected in the population that derives a livelihood from scavenging at refuse dumping and collection points. This is consistent with the high level of informal economic activity that occurs in developing countries, especially among the poor. Figure 2.2 below shows some boys searching through the waste. Contact with the waste like this will be harmful to not only the boys but also to the entire community.

Endangered future generation negotiating solid waste in Mkhondo

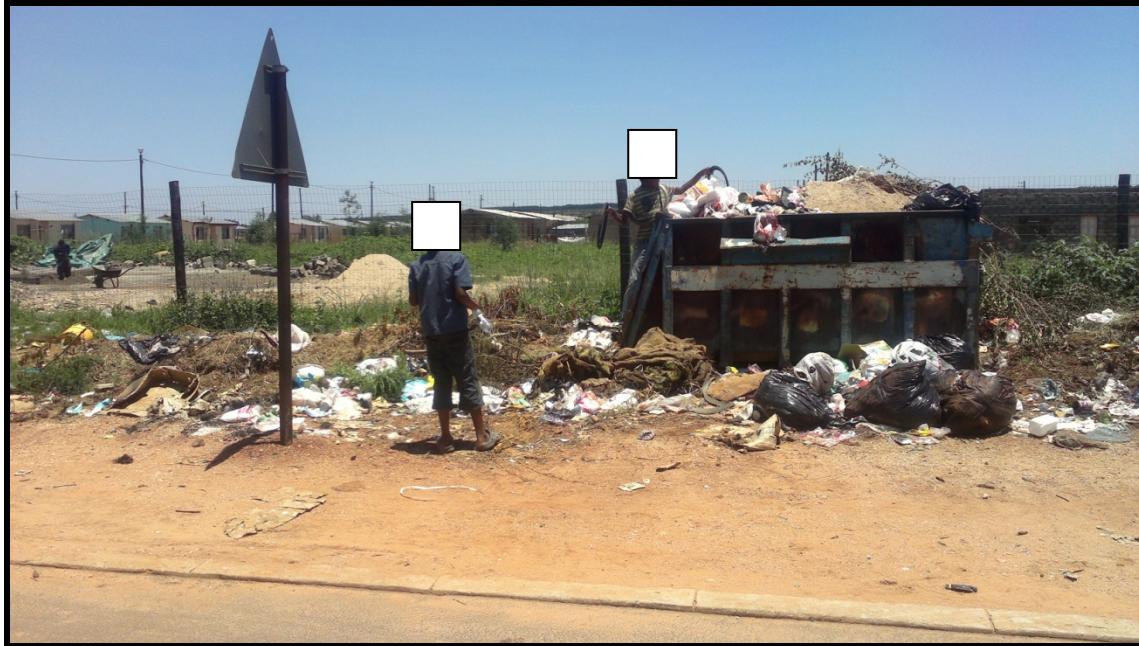


Figure 2.2 Boys helping themselves to uncollected solid waste. Taken on 28 December 2011.

Thomas-Hope (1998:2) comments that “the marginal socio-economic position of many people in the Third World cities makes it difficult for the authorities to achieve behaviour modifications through education”. She further states that in developing countries there is a lack of a culture of co-operation that would produce a disposition for corporate effort.

Thomas-Hope (1998) also notes that the current consequences associated with solid waste lie not only in the increased quantities and greater urban concentrations of the waste generated but also in the varieties of the waste that have to be managed, and in the transnational potential for contamination. Moreover, the complexity of the problem underlines the necessity for a comprehensive, multi-sectoral approach to tackling it. Thomas-Hope (1998) argues that waste management cannot be limited to dealing only with refuse material once it has been produced, but the approach must incorporate a proactive dimension in order to reduce the amount of waste generated or discarded. Furthermore, we need to redirect the minds and behaviour of populations towards a new level of positive participation in maintaining the environment in a healthy, ecologically protected and aesthetically satisfactory condition.

2.7 COLLECTION AND DISPOSAL OF WASTE

The inadequate collection of waste usually leads to improper, even illegal, disposal practices, as Figure 2.3 shows. Garbage is dumped on unoccupied urban land, the sides of roads, beaches, rivers, canals and gullies. Figure 2.3 shows how Mkhondo residents dispose of litter on the roadside. Thomas-Hope (1998) argues that the official methods of waste disposal are not always appropriate. She further highlights that municipal dumps in the cities of developing countries provide major concentrations of open garbage. The spontaneous ignition of gases is common, as is the deliberate burning of material in an effort to reduce the odours from decomposing garbage. Thomas-Hope (1998) also notes that vermin and insects proliferate, livestock roam through the refuse searching for food and people scavenge for materials that can be reused and recycled.

Garbage dumped on the road side next to St Marcia Secondary School



Figure 2.3 Source: Taken by the author in Mkhondo dated 20 January 2012

Thomas-Hope (1998) believes that the population of scavengers generally endangers its own health and safety by collecting from the dump and in turn, scavengers hamper the operation of municipal and other authorities. This situation is evident in Mkhondo as depicted by Figure 2.2. The disposal areas provide sites upon which many of the urban poor depend. This situation and its implication for Mkhondo people underline the challenges of proper solid waste disposal.

In developing countries, there is often a lack of awareness of the dangers to health presented by the accumulation of refuse between the informal settlements. Inadequate collection and disposal of refuse can be a major factor in promoting the spread of insect-borne gastrointestinal and parasitic diseases, such as malaria (Thomas-Hope, 1998). This situation can finally lead to land degradation from unacceptable solid waste disposal.

DISPOSAL SITE PROBLEMS IN MKHONDO

Mkhondo village is facing a mammoth task in waste disposal sites. The local municipality provides metal refuse dumping containers. Instead of the people using the proper dumping procedure, they dispose of the litter in an improper manner. The following attendant problems described by Thomas-Hope (1998) are also experienced in Mkhondo. These problems are:

1. Refuse may be dumped next to the containers and not in them because they are too high for the children who take out the refuse to reach over the sides, or they are not emptied frequently enough. This may also be a major cause of the high levels of degrading waste around the containers. This situation is demonstrated by Figure 2.4 in the case of Mkhondo.
2. Refuse is not taken to the containers by communities, but is discarded (for example by throwing it over the back fence) and accumulates in odd corners. This will later develop into hosts for insects that endanger citizens' health.
3. Refuse-filled containers are set alight, causing air pollution from the poisonous smoke from the burning litter.
4. Moveable containers are overturned to provide shelter for homeless people.

The above problems form part of the background to this study on how environmental education influences the behaviour of the community in protecting land resources from degradation caused by improper solid waste.

SOLID WASTE CHARACTERISTICS AND USAGE

Solid waste leading to pollution is one of the most crucial problems in the world according to Meydan & Akbasli (2011). Unless solid wastes are eliminated in a secure and suitable way, they lead to pollution of underground and surface water, production of insects, emission of bad smells and the spread of carrier germs through various animals (Meydan & Akbasli, 2011).

According to Palabiyik 2001, cited in Meydan and Akbasli (2011), solid waste can be classified in two categories, harmful or dangerous waste and harmless waste. Harmless waste has the potential to become dangerous when care is not taken to stop littering. The authors classify harmless waste as kitchen and food waste, waste of cardboard, paper, ash, metal, glass, plastic and construction wastes. They explain that the longer the period solid waste stays in nature, the more the harm it causes to nature increases. It causes the pollution of water and soil and living things in water suffer as a result. Some plastics could stay in the soil more than 700 years without dissolving. The Government Accounting Bureau (2007) cited in Meydan and Akbasli (2011) outlines that a ton of recycled paper could prevent the cutting down of at least 16 pine trees and when a ton of used printed paper is recycled, at least eight pine trees could have been saved.

Solid waste administration could be classified in five parts, namely production, storing, collecting, transporting and eliminating. Recycling of solid waste as classified by Meydan and Akbasli can be taught in elementary school. For example:

- a) Glass: Pieces of broken glass are highly suitable materials for recycling in the glass industry. It is easier to bring in mostly clean collected glass (Inan, 1997 cited in Meydan and Akbasli, 2011).
- b) Paper-based materials: A rapid increase in the population of the country, improvement in the living conditions, urbanization and the increase in the amount of literacy and development of printing have led to an increase in the consumption of paper as well. Therefore, recycling paper would allow saving water and energy sources as well as protect forests and decrease the level of pollution in the production of paper (Meydan & Akbasli 2011).

- c) Plastic-based solid waste: Solid waste in this category could be turned into raw material again by melting them in order to be used for other purposes such as pots for flowers.

Meydan and Akbasli (2011) note that institutions such as schools and individuals have tasks and responsibilities in creating a clean, healthy and organized environment. The school is a place where basic environment education should be given and regarded as good examples for the society. Therefore, besides air, water, soil and noise pollution, the problem of solid waste should be solved on local and national levels. In Poland, for instance, the implementation of programmes encouraging selective separate collection have not contributed much to the reduction of the amount of recyclable waste deposited in landfills, and the construction of waste treatment facilities has encountered very strong objections from local residents (Grodzinska-Jurczak, Bartosiewicz, Twardowska and Ballantyne 2003). This is due to a lack of consistent and regular community education programmes focused upon waste and methods for its treatment (Grodzinska-Jurczak et al. 2003).

The problem of waste management has arisen relatively recently in developing countries similar to Poland, where there is little history of the implementation of formal or informal community environmental education awareness programmes. The instigation of such programmes is essential to rapidly educate the public and facilitate the development of environmentally friendly community waste behaviour. To be successful, programmes should be designed to engage their target audience in not only increasing their environmental knowledge but their environmental skills, attitudes and behaviour as well. This could be a valuable lesson for waste disposal education in South Africa.

2.8 ENVIRONMENTAL EDUCATION AND SUSTAINABLE ENVIRONMENT

AGENDA 21 (Chapter 36: Section 3) states:

Education, including formal education, public awareness and training should be recognized as a process by which human beings and societies can reach their full potential. Education is critical for promoting sustainable development and improving the capacity of the people to address environmental and developmental issues.

It further outlines that “governments should strive to update or prepare strategies aimed at integrating environment and development as a cross-cutting issue into education all levels” (BGCI June 1999).

AGENDA 21 further states that the strategy in Environmental Education was developed from the 1992 Earth Summit. Chapter 36 reads that “Educational authorities, with the appropriate assistance from the community groups or non governmental organisations are recommended to assist or set up pre-service and in-service training for all teachers, administrators and educational planners”. This has led to the implementation of Environmental Education strategies in most countries.

Environmental Education has a long history, with its roots in Europe in the nineteenth century (Hill et al. 2006). The formation of the International Conference on Environmental Education in 1970 was followed by the United Nations Environmental Programme in 1975. The most influential, according to Hill et al. (2006), was the 1977 UNESCO/UNEP Intergovernmental Conference on Environmental Education. The outcome of this conference, the Tbilisi Declaration (UNESCO/UNEP 1977), was 12 guiding principles on Environmental Education. One of the principles that form a core of the study is enabling learners to have a role in planning their learning experience and providing them with an opportunity for making decisions and accepting their consequences (Hill et al. 2006). The declaration states that Environmental Education should:

- consider the environment in its totality;
- be a continuous life-long process;
- be interdisciplinary;
- examine major environmental issues at scales from the local to the international;
- focus on current and potential environmental situations;
- promote the value of local, national and international cooperation in preventing and solving environmental problems;
- explicitly consider environmental aspects in plans for development and growth;
- enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;

- focus particularly on learners' own community in early years;
- help learners discover the symptoms and real causes of environmental problems;
- emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem solving skills;
- utilize diverse environments and a broad array of educational approaches to teaching and learning about and from the environment with due stress on practical activities and first-hand experience.

According to Sterling (1995), Environmental Education typically challenges existing philosophies and approaches in education. He gives the following examples: Environmental Education

- is multi and interdisciplinary and cross-curricular;
- is lifelong and requires linking outside the institution;
- has an ethical dimension;
- values experiential and participative approaches;
- should lead to action;
- is concerned with complex issues.

Saugier (1994) believes that the future of our planet requires each one of us to change behaviour patterns and adopt new patterns that are compatible with the preservation of our planet. He further states that the future of humanity depends upon the change of behaviour, and we cannot change our behaviour patterns if we are not made to feel responsible for our actions. Saugier (1994:33) also notes that, "because our societies do not encourage us to be careful, we mutilate the environment; such mutilation jeopardizes the society in which we live; if the society wishes to survive, it must therefore make us responsible for our acts and educate us".

Hill et al. (2006) quotes existing ideas about environmental education that were modified in the 1992 United Nations Conference on Environment and Development. Chapter 36 of Agenda 21 (Section: 3) declares:

Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. While basic education provides the underpinning for any environmental and developmental education, the latter needs to be incorporated as an essential part of learning. Both formal and non-formal education is indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness, values, and attitudes, skills, and behaviour consistent with sustainable development and for effective public participation in decision-making. To be effective, environment and development education should deal with the dynamics of both the physical / biological and socio-economic environment and human (which may include spiritual) development should be integrated in all disciplines and should employ formal and non-formal methods and effective means of communication.

These declarations by AGENDA 21 restate the special role education has to play in places such as Mkhondo village in addressing sustainable development and empowering learners in the area.

Taylor et al. (2009) define Environmental Education from the definition developed by the International Union for the Conservation of Nature and Natural Resources (IUCN) in 1971:

Environmental Education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among people, their culture and their biophysical surroundings. Environmental Education also entails practice in decision-making and self-formulating of a code of behaviour about issues concerning environmental quality.

Education is critical for promoting sustainable development and improving the capacity of people to address environment and development issues for achieving environmental and ethical awareness, values, and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision making (Janse van Rensburg et al. 2002).

The Living Planet Report (2000) concludes that the state of the earth's natural ecosystem has declined about 33% over the last 30 years and that the ecological pressure of humanity on the earth has increased by 50%, which is exceeding the biosphere regenerating rate. Despite unprecedented economic growth on a global level, poverty levels are increasing and patterns

of environmental risk are becoming more complex (Janse van Rensburg et al. 2002). This situation is evident in Mkhondo, where areas of unacceptable solid waste disposal are on the increase.

The White Paper on Education and Training (1995) emphasises the need for ongoing Environmental Education curriculum development work. It states that:

Environmental Education, involving an interdisciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of the education and training system, in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources.

In this study, the researcher involved learners to ensure the future and adults to ensure that the present state of environment is conducive for our livelihood.

According to Tilbury, Goldstein and Ryan (2003), Environmental Education aims to prepare the society for practical decision-making and to teach environmentally friendly behaviour. Environmental Education should be a fundamental and integral part of education for all members of society. Modern scientists in both developed and developing countries need Environmental Education in its formal and informal aspects. Knowledge of the environment, its conservation and threats must be integrated with the development of sensitivity to the natural environment and the formation of proper attitudes towards it.

Environmental Education is linked to education for sustainable development, whose objectives, according to (UNESCO 2003), include:

the promotion of values and ethics at different levels in order to make an impact on people's lifestyles and behaviour and to help build a sustainable future. It is an education designed to motivate, equip, and involve individuals and social groups in reflecting on how they currently live and work in making informed decisions and creating ways to work towards a more sustainable world. Furthermore, this kind of education, which is different from the traditional pattern, aims at realizing adaptive management and systems thinking which require creativity, flexibility and critical reflection, ensuring public participation for decisions.

SUSTAINABLE ENVIRONMENT

The World Commission defines sustainable development as development that meets the needs of present generations without compromising the ability of future generations to satisfy their needs (Fien 1993).

Fien (1993) argues that education for sustainability is a process which:

- enables people to understand the interdependence of all life on this planet and the repercussions that their actions and decisions may have both now and in the future on resources, on the global community as well as local environment.
- increases people's awareness of the economic, political, social, cultural, technological and environmental forces which foster or impede sustainable development.
- affirms the validity of the different approaches contributed by Environmental Education, and development education and need for the further development and integration of the concepts of sustainability in these and other related cross-disciplinary educational approaches.

Fien (1993) mentions that a critical theory of education for sustainability,

would be scientific in the sense of providing comprehensive explanations of the environmental condition of the planet and its relationship to contemporary society. It would be critical in the sense of offering a sustained evaluation of the role of contemporary society in causing and continuing environmental decline. And it would be practical in the sense of stimulating teachers, students, and their community to transform their lives and social conditions by fostering in them the sort of self knowledge and understanding of ecological and social process which can serve as the basis for such a transformation.

Furthermore, the environmental challenge has grown from local pollution to global threats and choices. “Sustainable development is about redefining the rules of the economic game in order to move from a situation of wasteful consumption and pollution to one of conservation” (Fien 1993). Furthermore, Sitarz (1994) states that full public participation must be

encouraged to widen sustainable options for households in resource poor areas and research must be conducted to identify traditional methods of production that have been shown to be environmentally sustainable.

However, Sitarz (1994) points out that the economic valuation of natural resources on the sole basis of their extraction and distribution costs has often resulted in inadequate incentives to develop sustainable resource use. The failure to include full environmental costs in the valuation of resources has also led to the over-consumption of resource-based products and ensured environmental degradation. Moreover, Fien (1993) believe that change in human behaviour will come gradually and there is evidence that it is occurring already, but we will not make significant progress until most people come to understand the unsustainable nature of our society. This study hopes to open the mind of the community of Mkhondo about the unsustainable nature of our behaviour towards the environment.

THE SUSTAINABLE DEVELOPMENT MODEL FLOW CHART

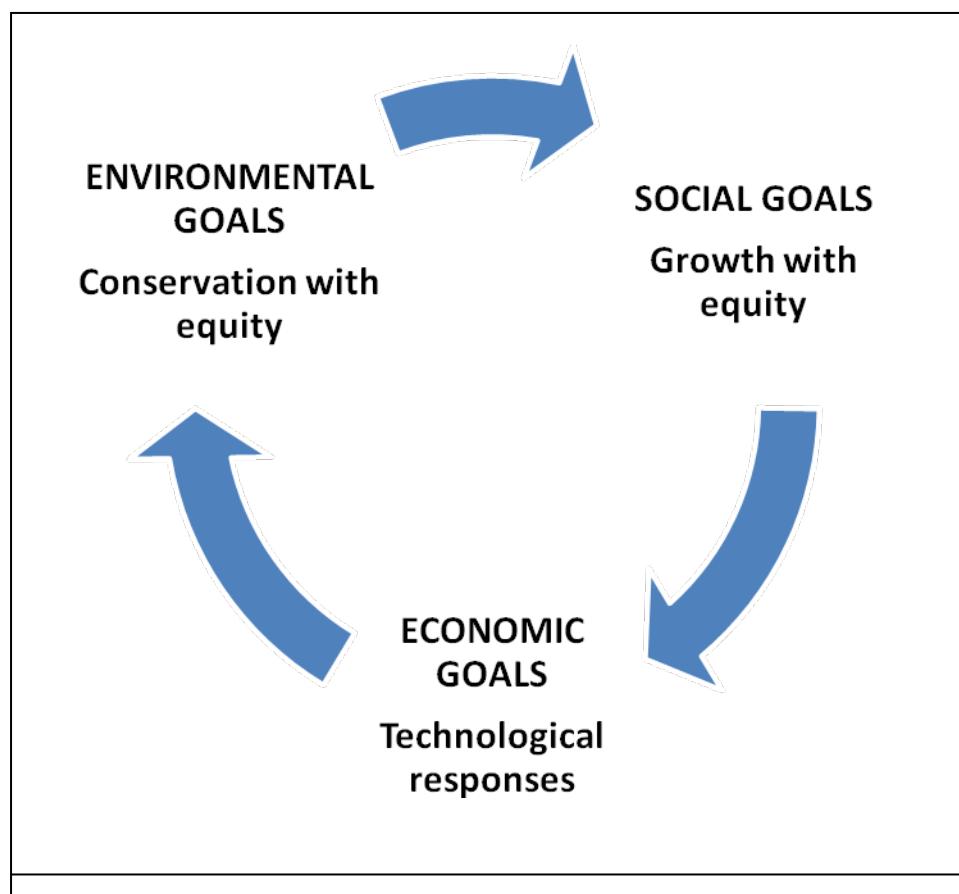


Figure 2.4. Source: Adapted from Sadler (1990, cited in Fien 1993:35)

Sustainability therefore represents a commonwealth of social, economic and environmental goals as shown in Figure 2.4 in which environmental, economic and justice imperatives equally define the parameters of sustainable development (Fien 1993). Figure 2.4 above depicts the interrelationship that exists among the economic, environmental and social goals. These goals play an important role in the impact of Environmental Education as it interacts with social issues that hinder Mkhondo's natural resources. This will finally lead to economic effects that may be negative or positive.

Fien (1993) outline principles for living sustainably that are basics for saving our land from degradation. The four principles that are related to the environment and sustainability are:

- Every human being is a part of the community of life, made up of all living creatures. This community links all human societies, present and future generations, and humanity and the rest of nature. It embraces both cultural and natural diversity.
- Every life form warrants respect independently of its worth to people. Human development should not threaten the integrity of nature or the survival of other species. People should treat all species decently and prevent unnecessary killings.
- Everyone should take responsibility for his or her impact on nature. People should conceive ecological processes and the diversity of nature and use any resource frugally and efficiently, ensuring that their uses of renewable resources are sustained.
- Everyone should aim to share fairly the benefits and costs of resource use, among different communities and interest groups, among regions that are poor and those that are affluent, and between present and future generations. Each generation should leave to the future the world that is at least as diverse and productive as the one it inherited. Development of the society or generation should not limit the opportunities of other societies or generations.

Source: IUCN, UNEP and WWP (1991)

The last principle shows that the present society should use natural resources efficiently for the benefit of future generations as well as other societies. The Mkhondo society should

manage sustainable resources for future utilization and thus promote sustainability in our community.

Janse van Rensburg et al. (2002) mentions that exponential growth in resource consumption and human population seriously jeopardizes the continued existence of a safe, healthy, clean and diverse environment. He further articulates four main pre-requisites for a sustainable society, which are: 1) minimum disruption of ecological process; 2) maximum conservation of resources and energy; 3) a population in which only the losses are replaced; and 4) a social system in which the individual does not feel limited by the first three conditions, but instead enjoys them.

Janse van Rensburg et al. (2002) quotes nine principles for sustainable development that are proposed in caring for the earth that should form the platform of sustainable living. These are:

- Respect and care for the community of life;
- Improving the quality of human life;
- Conserving the vitality and diversity of the earth;
- Minimizing the exhaustion of non-renewable resources;
- Keeping within the carrying-capacity of the earth;
- Changing personal attitudes and practices, in accordance with an ethic for sustainable living;
- Enabling communities to care for their own environments;
- Forming a national framework for the integration of development and conservation; and
- Forming a world alliance to implement sustainability on a global scale.

The South African government's vision for environmental management is stated in the White Paper on Environmental Management Policy in South Africa (1999). To achieve sustainable development, management systems need to address:

- The quality of people's lives, and their daily living and working environments;
- Fair access to land and natural resources;

- The integration of economic development, social justice and environment sustainability;
- More efficient and sustainable use of resources;
- Public participation in environmental governance;
- The custodianship of our environment.

The challenge of implementing Environmental Education for sustainable development is significant. Generally there is a lack of consensus and understanding of the implication of this shift for education (Tilbury, Goldstein & Ryan: 2003), which is translated into unclear goals and weak leadership. The strategies made by the conventions tend to focus more on Environmental Education, and have yet to realistically engage with the changing nature of Environmental Education provision to incorporate multi-sectoral partnerships and the broader goals of sustainability.

The shift away from awareness raising and knowledge management towards education for change and sustainability reflects a greater trend in Environmental Education that has gained increasing support since the Rio Summit. Environmental Education was initially interpreted as a body of knowledge about the environment that needs to be imparted. Tilbury et al. (2003) believe:

that knowledge alone does not lead to action and that educational processes need to be considered. In turn, this has led to engaging people into actions such as waste and recycling activities, tree planting, and supporting the introduction of alternative technology. These activities were not integrated into individuals or organizations involved in these initiatives, and thus they failed to attain significant changes towards sustainability.

In addition, Tilbury et al. (2003) consider the following features to be important for innovative Environmental Education for sustainable programmes:

- Education and communication are interpreted as a participatory process that involves local people and specific stakeholders.
- Education and communication is considered to be more than just awareness raising. It involves capacity building and empowerment of groups and stakeholders through development of knowledge, skills and values.

- Education and communication programmes build rewarding partnerships for change.
- Content or issues go beyond the environment, featuring critical education approaches that reflect social practice and what is sustainable and equitable.

2.9 IMPACT OF ENVIRONMENTAL EDUCATION

Environmental attitudes of young people are crucial as they ultimately play a direct role in providing solutions to near-future environmental programmes (Grodzinska-Jurczak et al. 2003). Furthermore, school environmental programmes, although addressed to students, can also have an impact upon the environmental knowledge, attitudes and behaviour of adults and local community members.

According to Grodzinska-Jurczak et al. (2003), the few studies that have been conducted into the impact of environmental education on Polish children and youth show that the level of environmental awareness is relatively low. Children and young people generally have limited knowledge about the environment and nature, many having incomplete or completely erroneous understanding. The information acquired is mostly factual in nature and students are incapable of attributing causes to effects on natural phenomena in relation to day-to-day application.

Students perceive the beauty of nature and they are not familiar with sustainable environmental behaviour. Learners also do not perceive land resource degradation. The findings of this study will help facilitate improvement that will enhance the role that learners can play as catalysts of environmental change in their families and communities. This will stimulate learners to take action to help solve environmental problems and thereby improve environmental quality. Zavodska and Uhro (2010) believe that knowledge and understanding of the environment are important since a degraded environment means a lower quality of life for all. It is the collective responsibility of all human beings to secure a healthy environment not only for present but also for future generations. Throughout human history, education has been generally recognized as a means of obtaining knowledge that helps humanity make sound and practical decisions in future planning. Education is a process whose ultimate goal is internalization of lifelong learning skills.

The study conducted by Zavodska and Uhoo (2010) shows that a lack of Environmental Education has a negative effect on the present and will affect future generations. People of all ages, especially in rural areas, dump refuse on the streets, roadsides, and around public places. This poses a great challenge in tackling diseases like malaria in third-world countries. The study by Zavodska and Uhoo (2010) recommends that environmental issues should occupy enough space in public discourse and in education programmes.

THREATS OF DEGRADATION TO THE ENVIRONMENT

Tilbury, Goldstein and Ryan (2003) note that Environmental Education must become imperative if we are to preserve the planet for the present as well as the future. “There is no doubt that our environment has been terribly degraded and abused, given the un-abating utilization of mainly non-renewable resources” (Tilbury, Goldstein & Ryan 2003). The authors (2003) further believe that humans are degrading the world’s major renewable resources at a rate ever more greatly exceeding their natural abilities to renew themselves while introducing pollutants into the environment at levels increasing beyond the point at which they can naturally degrade into insignificance.

Zavodska and Uhoo (2010) emphasize that a degraded environment can only offer a degraded quality of life. It is the collective responsibility of every living human being to secure the quality of the environment to sustain and improve upon the present quality of life. Soewu (2004) notes that every person needs to support and contribute towards saving our environment but sharing in the consequences of a degraded environment or the loss of both renewable and non renewable resources is neither preventive nor selective; it affects environmental sinners and saints alike because environmental factors transcend natural and artificial barriers.

Zavodska and Uhoo (2010) comment that there is an irrepressible need for entrenching Environmental Education as a leading approach to solving environmental problems and creating sustainable societies. The poor as well as the affluent are equally vulnerable to environmental damage. Poor and poverty-stricken people, wherever they live, are generally occupied with issues of survival. They lack money, skills and knowledge, and therefore often

over-utilize local resources beyond sustainable levels. They therefore need to be empowered to control their resources and therefore their lives.

Affluent lifestyles of individuals and societies in the developed world also pose a severe threat to the environment. Due to lack of knowledge of environmental consequences, the level of consumption tends to rise and so do resource depletion rates, leading to ever-increasing quantities of waste produced (Zavodska and Uhoo 2010). It follows that Environmental Education must be seen as fundamental not only to residents of poor communities and societies but to all classes and societies, with emphasis on the process and based on the identification of problems and issues by communities and their members.

RESEARCH ON SOLID WASTE

International research findings could be of value to the local situation in Mkhondo. The document by the US Transportation Research Board (2009) defines litter as misplaced solid waste, although different jurisdictions have their own definitions. The Board regards litter as a persistent problem in the United States since at least 1953, as roadside litter increases as motorists dispose of the garbage through windows. The impact of roadside litter and litter collection is staggering; the estimated cost of collecting litter in United States exceeds \$130 million per year. The cost of collecting solid waste increases by 20% per year in the United States (Transportation Research Board 2009).

The Transportation Research Board Report (2009) describes four major approaches to litter (solid waste) control:

- 1) Environmental Education: media and education campaigns to increase awareness and promote attitude and behaviour change.
- 2) Prompting: providing specific instructions of what to do or what not to do (e.g. “Do not litter”).
- 3) Environmental design: planning and designing facilities to encourage appropriate behaviour.
- 4) Consequence control: positive or negative feedback such as incentives for good behaviour and fines or penalties for poor behaviour.

The Transportation Research Board (2009) contrasts the need for an information campaign on littering and pollution in the 1960 to 1980 period versus the needs of today. They note that although the campaign in the 1960 to 1980 period was directed at educating people about littering and raising awareness, today's campaigns must focus on behaviour and attitude change.

Research conducted in the United States by the Transportation Research Board (2009) shows that twice as many males litter as females, and that adults under the age of 35 are twice as likely to litter as people aged 35-49 and three times more likely to litter than those over the age of 50 years. The Transportation Research Board Report (2009) further reveals the following trends and patterns in litter attitudes in studies conducted between 1997 and 2006:

- Litter is considered a problem by the majority of respondents in all of the studies conducted since 1997.
- The majority of studies support the notion that young people are prone to litter.
- The studies further show that respondents who personally litter is between 43% and 52%, according to attitude surveys focused on 18 to 45 years old.

According to the US Transportation Research Board (2009), littering in society is largely based on perceived social norms. People are more likely to litter in areas that are already littered than in areas that are generally litter free. This is because a littered environment reflects a social norm that littering is tolerated, whereas a clean environment reflects a society that is intolerant of littering.

In Germany, environmental aspects have recently lost significance (Balderjahn et al. 1998). Nevertheless, protection of the environment and ecologically conscious consumer behaviour are of growing importance. According to survey results, Germany appears to be environmentally conscious but most Germans are paying lip service (Balderjahn et al. 1998).

The reduction of solid waste disposal requires knowledge about the antecedents of participation like attitudes, beliefs, values or intended behaviour (Balderjahn et al. 1998). The authors state that in order to reduce the amount of solid waste, consumers have three general options, which are:

- to avoid waste;
- to reduce waste;and
- to separate waste.

They found that waste related buying behaviour is focused on the avoidance of waste. For example, consumers can avoid buying products with much packaging. The researchers also recommended that consumers should avoid non-returnable bottles by choosing returnable bottles, thus reducing the amount of solid waste. That would also save them money because it would be economically viable to utilize the same bottle for a longer period. In the end, it would have a positive impact on the waste output in a fixed period.

The recent environmental conventions have been focusing on environmental awareness; however, there is a missing link in the focus on sustainability, which is Environmental Education (Strife 2010). The central goal of Environmental Education is to motivate human engagement and action in resolving environmental problems (Strife 2010). Environmental Education is not only education to inspire environmental stewardship and responsible citizens but also education to protect today's denatured and unhealthy society.

Environmental inequality and environmental health research demonstrate the long-term human health effect that exposure and proximity to environmental pollutants have on minority and low-income populations. The recent focus of environmentalism has become less about how toxins and pollutants affect birds, but rather how they affect humans (Strife 2010).

“As Environmental Education educators, practitioners and researchers should learn from the current trends from the more human-centred approach by shifting attention away from the stale ‘save our trees’ argument to a newer ‘save ourselves’ argument” (Strife 2010:182). Carmago and Shavelson (2009) have revealed that current research and evaluation work on Environmental Education focuses on the use of questionnaires, interviews and surveys in data collection. However, this approach has some major weaknesses in that individuals rate their own environmental attitudes and report on their own environmental behaviour.

Socially critical environmental educators and scholars have argued that Environmental Education has failed in meeting the goal of transforming both individuals and communities to

live sustainably. Hungerford and Volk (1990) cited in Strife (2010:185) argue that “regardless of what we as educators would like to think, we can point to relatively few successes that offset the severity of environmental degradation, and we must stop and evaluate how successful we are in the overall battle to resolve urgently important environmental issues”. The attention to Environmental Education’s failure has resulted in more socially critical approaches that emphasize actively empowering education students individually and collectively to become environmentally responsible citizens (Strife 2010).

Strife (2010:186) continues: “Education for sustainability provides a democratic means of promoting values by placing emphasis on problem solving and critical thinking skills as important ways to encourage students to become engaged environmental citizens and decision makers.” One of the objectives of Environmental Education is to change people’s behaviour and highlight the human and social dimensions of environmental problems and actions. Environmental Education needs a more human/societal approach to find a place in the burgeoning sustainability debate (Strife 2010).

One of the objectives of Environmental Education is to change people’s behaviour and not what they say about their behaviour. Direct measures of actual behaviours are needed to supplement or supplant self-report measures (Carmago & Shavelson 2009).

According to Carmago and Shavelson (2009), general methods used to measure changes in behaviour have focused on learners revealing their knowledge and attitudes, and report on their environmental behaviour, while this study focuses on the impact of Environmental Education in sustaining land resources from the perspective of learners and parents. Some evaluations have found significant changes in student attitudes and knowledge when learners are interviewed through questionnaires. The common ground is the lack of direct observation or collection of information related to actual behaviour; hence, this research project provides direct observation as one of its chosen methods.

Carmago and Shavelson (2009) have noted that since 1970 a number of voices have been raised in favour of providing for a rational development of Environmental Education, notable the Tbilisi Declaration. The UNESCO (1977) document, written by educators and scientists, provided a real focus for Environmental Education. The document outlined educational strategies for the effective resolution of environmental issues, which are as follows:

- Special attention should be paid to understanding the complex relationship between socioeconomic development and the improvement of the environment.
- For the purpose above, Environmental Education should provide the necessary knowledge for interpretation of the complex phenomena that shape the environment, encourage those ethical, economical, and aesthetic values which, constituting the basis of self-discipline, will further the development of conduct compatible with the preservation and improvement of the environment. It should also provide a wide range of skills required in the devising and application of effective solutions to environmental problems.

Volk and McBeth (1997) cited in Carmago and Shavelson (2009) summarize their findings as follows:

Research into responsible environmental behaviour indicates a complex relationship which incorporates attitudes, knowledge, cognitive skills and psychological characteristics. This relationship suggests that it would appear more productive in our society to teach for informed and capable decision makers who foresee consequences of current practices and behaviours from both scientific and societal perspectives, who have the skills to weigh and evaluate the desirability of those consequences, and embrace the opportunity to actively and responsibly participate as citizens in environmental issue solution.

Carmago and Shavelson (2009) also describe an educator as any world citizen who uses information and educational processes to help analyze the merits of the many and varied points of view usually present on a given environmental issue. The environmental educator is not the mediator, specialist or negotiator but a developer of skills and an information analyst who prepares the people from the segment of the population who will participate in environmental decision-making. Furthermore, Jickling (2010) describes individuals, societies, and the environment as interrelated spheres. She also describes education as helping individuals and says that the environment should be taken into account; if not, the education process is incomplete and we remain unfulfilled beings.

Jickling et al. (2010:51) notes that, “from the beginning Environmental Education has been deeply concerned with the relationship between environment and social issues”. Furthermore, special attention should be given to understanding the complex relations between socio-

economic development and the improvement of the environment (Jickling et al. 2009). In addition, Jickling et al. note that Environmental Education in Africa is linked to social issues; similarly, the 2nd World Environmental Education Congress held in Rio de Janeiro in September 2004 reached the same conclusion, namely that Environmental Education is linked to social problems. Moreover, Jickling et al. quotes one survey respondent as saying that “Environmental Education contributes to broadening and strengthening the capability of an individual to view things around him/her in a holistic and balanced way which then contributes to enhancing the socio-ecological understanding and relationships that an individual or a community experiences”.

The study quoted by Jickling et al. (2010) reveal that Environmental Education invites reconnection to the self, to communities, and to the environment through its ability to widen perspectives and strengthen understanding of a wide variety of situations, which contribute to addressing socio-ecological issues, constructive change and eco-development.

Marcinkowski (2010) defines the environment as a place where we live and development is what we do in attempting to improve the place where we live. Many of the development paths of the industrialized nations are unsustainable. The environmental conditions and problems we face require our diligence in understanding and shaping policy, theory, research, curriculum, teaching and learning, and assessment and evaluation into more coherent and holistic plans.

Focht and Abramson (2009) define sustainability as the long-term improvement of human satisfaction with quality of life through a balanced and adaptive stewardship of resources that lie at the human-nature interface, which in turn requires that the systems that provide these resources be maintained in a healthy and resilient condition.

Carrier (2009) defines the primary goal of Environmental Education as developing an environmentally literate society. According to Coyle (2005) cited in Carrier (2009), his study revealed that female participants showed more support for environmental regulations than male participants. The same study also showed that male participants demonstrated greater environmental knowledge than their female counterparts.

Nordstrom (2008) emphasizes that Environmental Education has characteristics of the values of a democratic society and it also improves empowerment and active citizenship. It is aimed for societal reform by reorienting education and facilitating active personal and social change. Sustainability is an important universal goal that education needs to address; UNESCO(1997) has defined the idea of a sustainable future to be one in which people care for one another and value social justice and peace, protect natural resources, and promote appropriate development and a satisfying livelihood for all (Nordstrom 2008). Furthermore, Nordstrom (2008) outlines the main goals and objectives of Environmental Education, which are:

GOALS

- Personal connection to the environment;
- Learning about, through, and for the environment;
- Environmental and political literacy;
- Developing responsible environmental behaviour.

OBJECTIVES

- Compassion for other things;
- Critical awareness;
- Empowerment and active citizenship;
- Individual and societal change.

Potter (2010) defines Environmental Education as increasing public awareness and knowledge about environmental issues and providing the skills necessary to make informed environmental decisions and to take responsible actions. Potter further highlights that one of the goals of Environmental Education is to promote research and evaluation that assesses the effectiveness of Environmental Education in improving environmental quality and student achievement. This goal is fundamental in the current study as it accommodates the evaluation of Environmental Education. Moreover, Short (2010) reveals that new critical thinkers on Environmental Education research have been focusing on evaluation which is based on educational outcomes. Evaluation of the effect on environmental quality linked to actions resulting from Environmental Education efforts will be necessary if this discipline is to

remain relevant in a world facing a century of great challenges in protecting environmental integrity while meeting the needs of our growing and increasingly consumptive population.

Spencer (1903) cited in Short (2010) makes the important point that “the great aim of education is not knowledge but action”. Short therefore recommends that positive participation by young students should not be discouraged, regardless of how insignificant the immediate environmental impact may appear to be. Learners need every opportunity to learn in a context relevant to their personal and societal needs. They need encouragement to act autonomously on what they have learned in a way they determine the best option in solving problems and issues.

2.10 IMPACT OF THE ENVIRONMENTAL EDUCATION RESEARCH PARADIGM

This researcher believes that reality is socially constructed by interaction between the enquirer and the inquired. The research has therefore adopted the constructivist paradigm because of its ontology with many ways of seeing the world; through the course of study, perceptions may never stay the same but will change. In the interpretative/constructive paradigm, there is no objective reality that can be known, but there are multiple realities (Mertens 1998).

Furthermore, Bassey (1999) mentions that the interpretative researcher cannot accept the idea of there being a reality which exists irrespective of people and he sees reality as a construct of the human mind. Stake (1995) also argues that the role of an interpreter is central in the sense that knowledge is constructed rather than discovered. The ontology of the study is socially constructed realities as revealed by Punch (2009).

The study on the impact of Environmental Education in sustaining land resources has accessed different meanings that can be attributed by different people and these meanings are socially constructed to arrive at a particular result. According to Bassey (1999), the descriptions of human actions are based on social meanings and people living together interpret the meanings of each other and these meanings change through social intercourse. Bassey further describes interpretative research as having deep perspectives on particular events.

The epistemology of the study is derived from the basic assumption that knowledge is socially constructed by those in the research process and that the researcher has understood the complex experience from the point of view of the participants (Mertens 1998). As opposed to positivists who believe that the researcher and the researched person are independent of each other, constructivists hold that the enquirer and the enquired person influence each other (Punch 2009). The study is interactive and personal and the values that influence the researcher are made explicit to the researched person, who in this study is represented by learners and parents.

The interpretations of the study are circular, and understanding of the parts leads to the interpretation of the whole. It is a spiral arrangement rather than linear (Punch 2009). The methodology of the study is qualitative and intended to gauge the perceptions of the participants. Questionnaires, interviews and observations were used in the study and applied with the assumption that interpretations of the reality in the research can be achieved only through interaction between and among the researcher and participants.

2.11 SUMMARY

Chapter 2 has discussed the literature review where issues on Environmental Education were explored. These discussions included the global view of Environmental Education, neighbouring countries' environmental concerns, South African Environmental Education, solid waste consequences, land resources concerns, waste generation, Environmental Education and sustainable environment, collection and disposal of waste, impact of Environmental Education and the research paradigm. Chapter 3 will follow with an outline of the research methodology and design.

CHAPTER 3: RESEARCH METHODOLOGY AND DESIGN

3.1 INTRODUCTION

Chapter 3 begins with a description of the overall research approach in the study. The chapter also involves the outline of qualitative research methods, rigour, tools used in the study, population, sample and sample size and pilot procedures. In addition, this chapter contains a discussion of research procedures, ethics, data analysis procedures and data interpretation procedures.

3.2 RESEARCH METHODOLOGY

This study on the impact of Environmental Education in sustaining land resources from degradation in Mkhondo was based on a qualitative research design. Qualitative research is a type of educational research in which the researcher relies on the views of participants, asks broad and general questions, and collects data consisting largely of words from participants (Creswell 2007 and 2008). Creswell further defines qualitative research as a study that begins with assumptions, a world view, and the possible use of a theoretical lens, and the study of research problems inquiring into the meaning individuals or groups ascribe to a social or human problem.

I therefore chose a qualitative research approach as it allows the description of what has been observed and allowed me to learn more about the impact littering has on the environment and whether the respondents' education about the environment changed their perceptions, attitudes and behaviour. Johnson and Christensen (2008) reveal that qualitative research is used when little is known about a topic or phenomenon and when one wants to discover or learn more about it. Respondents are in turn free to express their views without being channelled (Lebeloane 1999). In this way, I was able to communicate personally with the respondents and to discover how they see reality in the real-life situation of Mkhondo village.

Moreover, Atkinson and Delamont (2011) highlight that the qualitative research objective is to gain a broad qualitative understanding of underlying reasons and motivations. According to Creswell (2008), the underlying reasons and motivations are exploratory and involve participants' experience where data emerges from the text of a small number of individuals

while there is a larger meaning of findings when analyzing and interpreting the data. The researcher therefore chose this method in the study of Mkhondo because of the possibilities offered by the different techniques in data collection and analysis of the interpretations of the participants' point of view.

McMillan and Schumacher (2010) outline the characteristics of qualitative research, which are the following:

- a natural setting where behaviour is studied as it occurs. In this case, I was observing learners littering in the classroom.
- direct data collection, where I collected data from learners in the classroom.
- context sensitivity: I collected data from all learners in the classroom to protect individual learners from being victimised during observation.
- rich narrative description, where every detail in the focus group interviews was recorded and used in the analysis of the study.

3.3 RESEARCH PARADIGM

A research paradigm is a perspective held by a community of researchers that is based on a set of shared assumptions, concepts, values and practices (Johnson and Christensen 2012). In this study of the impact of Environmental Education in reducing unacceptable disposal of litter in Mkhondo, I accepted that reality is socially interpreted by interaction between the researcher and the participants.

The research project adopted the interpretative paradigm because of its ontology of many ways of seeing the world and that in the course of study perceptions may never stay the same but will change. In the interpretative paradigm, there is no objective reality that can be known, but there are multiple realities (Mertens 1998). Bassey (1999) also emphasises that the interpretative researcher sees language as a more or less agreed symbolic system in which different people have different meanings. Participants in this study reside in the area of the research site and their perceptions are paramount to the interpretation of the impact of Environmental Education in Mkhondo.

The interpretations of the study are circular and understanding of the parts leads to the interpretation of the whole study. As the methodology of the study was qualitative, The researcher used interpretation to gauge the perceptions of the participants.

3.4 RESEARCH DESIGN

According to Creswell (2008), a case study is an in-depth exploration of a bounded system such as an activity, an event, a process, or individuals based on extensive data collection. The researcher locates the case within a larger context such as geographic, political or economic setting. The study of Mkhondo involved the case of Saint Marcia Secondary School where data was sourced from its learners and parents of the learners.

De Vos, Strydom, Fouche and Delport (2006) explain that a case study may refer to a process, activity, event, programme or individual or multiple individuals. They also point out that exploration and description of a case study take place through detailed, in-depth data collection methods. Furthermore, Johnson and Christensen (2008) mention that in case study research, the researcher provides a detailed account of one or more cases. Thus this study involved focus group interviews, questionnaires and observation methods for such a detailed account of the research site.

Cases are also seen as holistic entities that have parts and that act or operate in their environments. Therefore, I chose a secondary school as a case in the study of Mkhondo. Johnson and Christensen (2012) illustrate this type of case as an intrinsic case study, which is popular in education where the goal of the researcher is to describe a phenomenon such as Environmental Education and to evaluate how effectively it is operating.

Bassey (1999) furthermore illustrates that a case study researcher typically observes the characteristics of an individual unit such as a child, a clique, a class, a school or a community. The purpose of such observation is to probe deeply and to analyze intensively the phenomena that constitute the life cycle of the unit with the view to establish generalizations about the wider population to which that unit belongs. He defines a case study as the examination of an instance in action. I chose the case study because it provided sources of ideas that were used in the analysis and interpretation of the study. I further chose a case

study because it focuses on a smaller unit rather than a larger unit that would need more time and resources for a complete study.

Bassey (1999) describes one of the types of case study as an evaluation case study, which he defines as enquiries into educational programmes, systems, projects or events to determine their worth, as judged by analysis of researchers and to convey this to interested audiences. The case study also provided me as the researcher with the opportunity to interact with the participants and gain more insight about the impact of Environmental Education in Mkhondo.

Flybjerg (2006) identifies the limitations of case study as a research method where one cannot generalize on the basis of an individual case and therefore, the case study cannot contribute to scientific development. Bassey (1999) also highlights academic criticism of case study research, describing such studies as having little basis for scientific generalisation while they take too long to complete and create massive documents. In this case study, forty learners and seven parents participated, and the resultant information will be valid as it will be from different sources.

3.5 RESEARCH SETTING

The research was conducted in the Republic of South Africa in one of the nine provinces, namely Mpumalanga. The researcher is an educator employed by the Mpumalanga Department of Basic Education. He conducted the case study in one of the secondary schools out of three in Mkhondo in the Gert Sibande district. Figure 3.1 shows the schematic flow representation of the research setting.

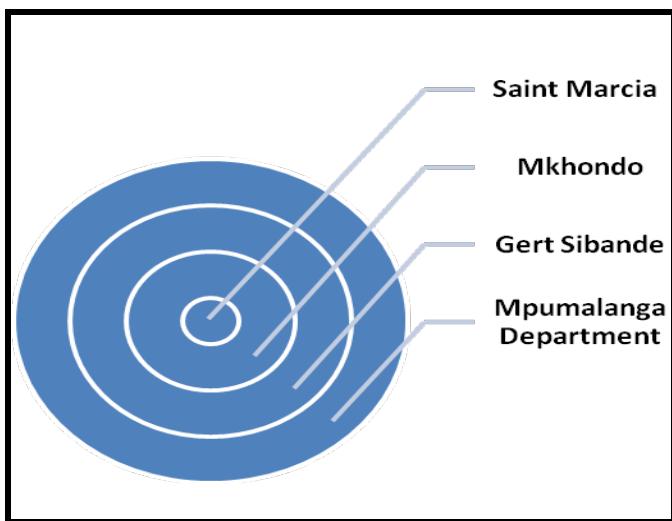


Figure 3.1 Research setting

Study area

The small town of Mkhondo, formerly Piet Retief, is situated on the Assegai River in the extreme South East of Mpumalanga. The town was named after the Mkhondo River. The town was discovered by Piet Retief in 1883 and his descendants were the founders of the original village. The town is surrounded by a location known as Ethandukukhanya (www.pietretief.co.za: accessed on 2011, May 24). I used pseudonyms to describe the school that was studied to protect the identity of the participants.

The Saint Marcia Secondary School is situated at the heart of Mkhondo location. It has learners from Grade 8 to Grade 12 who are residents of the area. The medium of instruction is English. The school comprises approximately 1600 learners who speak Isizulu as their home language. It also consists of about 60 staff members who reside in the area.

Sampling strategies and the sample

The sources of information used by qualitative researchers include individuals, groups, documents, reports, and sites (MacMillan and Schumacher 2010). Purposeful sampling was used for this study so that information-rich participants were sampled. Qualitative sampling as used in this study, in contrast to probabilistic sampling, is the selection of information-rich cases for study in depth (Patton 2002). Qualitative sampling increases the utility of information obtained from small samples. MacMillan and Schumacher (2010) believe that the

power and logic of qualitative sampling is that a few cases studied in depth yield many insights about a topic as it was evident in this study.

The target group comprised forty learners from one of the schools, two Grade 12 classes and seven parents. I chose learners because they form an integral part of the learning environment where they are taught in extra-mural activity how to sustain land resources for future generations. The Saint Marcia Secondary School was chosen from three secondary schools in the location because it was easily accessible to me as the researcher as I am also an educator in this school. I chose two Grade 12 classes among seven because they fully participated in the extra-mural activities concerning Environmental Education.

The learners and the parents are likely to contribute to improper solid waste disposal, thus becoming information-rich participants. Ten learners who showed interest and knowledge after being taught Environmental Education as an extra-mural activity were selected to participate in focus group interviews. Figure 3.2 below illustrates the size of the sample. The observations were done in two Grade 12 classes; the questionnaires were administered to forty Grade 12 learners whilst ten learners took part in the focus group interviews. The learners became information-rich participants. Parents of Grade 12 learners were interviewed in a focus group. Those were parents of the learners who participated in the focus group interviews and they were also involved in the extra-mural activities. Only seven out of ten parents invited were able to be interviewed.

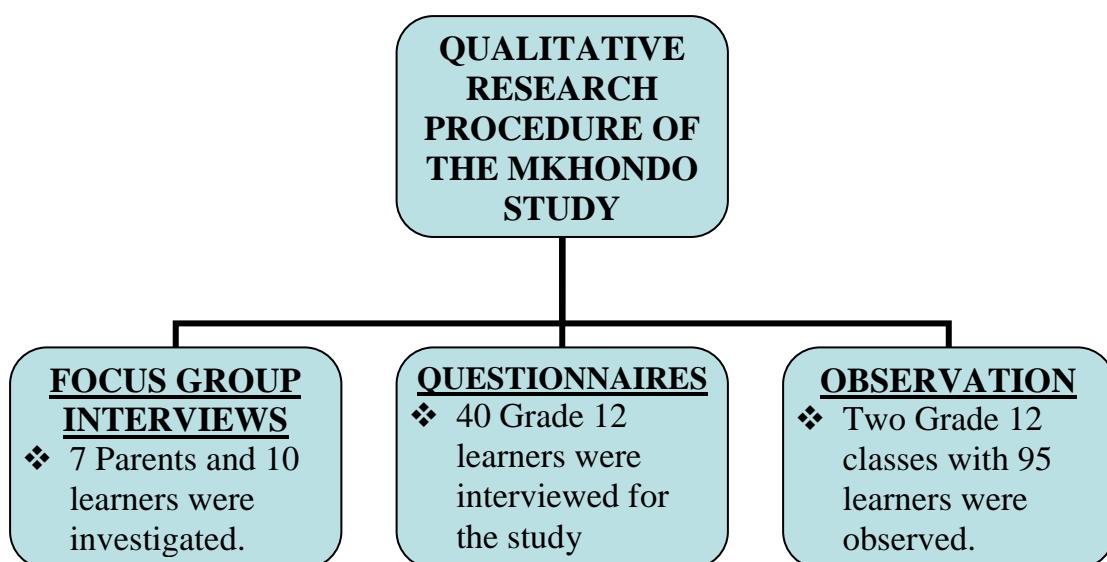


Figure 3.2: The size of the sample

3.6 RIGOUR

Trustworthiness, transferability, reliability, triangulation, credibility

The researcher used a multi-method strategy in the collection of data to ensure that the study was rigorous. These methods involved the use of questionnaires, focus group interviews and observation. I obtained permission from the participants to use videotapes and photographs to record the data for immediate usage in the analysis. According to McMillan and Schumacher (2010), multi-method strategies permit triangulation of data and different strategies may yield different insights on a topic of interest and so increase the credibility of the findings.

De Vos et al. (2006) warn that reliability can become a serious concern for the researcher engaging in participant observation. They further argue that it is impossible to arrange for exactly the same situation in order to reach the same results repeatedly and therefore I ensured reliability in the study by making use of assistance. I obtained assistance from two learners in collecting observation data. The learners observed in this study were not aware that the research was in progress to prevent them from changing their behaviour because they were being observed. Thus the same situation was maintained in data collection.

In my role as researcher, I avoided teaching and preaching during the interviews. I repeated some of the responses from the participants to show attention in the focus groups. I pretended to be confused by some responses to indicate that elaboration was needed. That was done to encourage participants to deliberate more on the issues being discussed.

Extra mural activities performed by learners

The researcher invited the participants to an extra mural event for a week where learners were taught on the importance of keeping the environment litter free. The researcher developed a manual with the assistance of another teacher who was responsible to verify whether the tool will be essential and appropriate for the learners under study. The manual as shown in Appendix 18 outlines the context that were taught to learners in terms of litter definition, kinds of litter, life cycle of litter, effects of litter on humans, monitoring sites of littering and dumping, anti-litter campaigns and consequences of litter.

Pilot study

According to De Vos et al. (2006), a pilot study is one way in which the prospective researcher can orientate him/herself to the project s/he has in mind. Du Plooy (2009) also believes that measurement validity deals with the degree to which the measurement instrument we use actually measures what we intend or claim to have measured. Thus the values of the pilot study include the suitability of the interview schedule or questionnaire, testing and adapting the measuring instruments, determining the number of codes per question, suitability of data collection procedures, variability of the population, involvement of the researcher and analysis of the study and evaluation of the study.

According to Johnson and Christensen (2008), it is necessary to pilot a questionnaire in a preliminary test to find out whether it operates properly before using it in the research. The pilot also serves to note points of confusion, how long it takes to complete the questionnaire, and whether you need to add some information to the study.

Therefore, piloting of the study of Mkhondo was done to determine whether the methodology, sampling, instruments, and analysis were adequate and appropriate. Also, in the study piloting was efficiently done to check whether the questions to be used met the requirements of the study in terms of objectives, aims and purpose. During the piloting process, questions were arranged in order and some were redefined to suit the participants involved. Research ethics were also observed in the piloting stages.

I used six learners for the focus group pilot study. Interaction among participants was evident and learners were able to express themselves freely. The medium of expression was English and the learners were at liberty to deliberate on what they believed was the impact of Environmental Education in Mkhondo.

During the pilot study, questions were pre-tested before they were used in the study to verify whether they were appropriate for the intended participants. The questionnaire was also submitted to the supervisor for verification. The results of the piloting process showed that different questions that had the same responses should be removed from the questionnaire.

Macmillan and Schumacher (2010) mention that interviews should be phrased in the informant's language, not in abstract and social science terms. Therefore, during the pilot study I questioned parents in the focus group interviews using the home language of Mkhondo, which is Isizulu. I solicited the help of an Isizulu teacher to translate the questions into the participants' home language. The questions were then rewritten in the home language because it was obvious that some of the parents were more comfortable in their home language.

The results of the pilot study also showed that some learners had difficulty in understanding the meaning of phrases of the questionnaire as they were seen answering inappropriately and not what was needed by the question. In such instances, the researcher removed those phrases and replaced them with clearer phrases that were understood by the learners. After the pilot process, questions were rephrased and probed to more complete and subtle meanings that could form categories for analysis.

3.7 DATA COLLECTION PROCEDURES/TECHNIQUES

3.7.1 Questionnaires

According to Creswell (2008), a questionnaire is a form of survey design that participants in a study complete and return to the researcher. Johnson and Christensen (2011) define a questionnaire as a self-report data collection instrument that each participant fills out as part of the study. Furthermore, researchers use questionnaires to obtain information about the thoughts, feelings, attitude, beliefs, values, perceptions, personality and behavioural intentions of research participants. As the researcher in this case, I sought to elicit the thoughts, feelings, attitudes, beliefs, values and behaviour of participants through well designed probing questions in the questionnaire.

A well-structured questionnaire was designed to suit all the participants to be interviewed. De Vos et al. (2006) explain that the basic objective of a questionnaire is to obtain facts and opinions about a phenomenon from people who are informed on the particular issue. The impact of Environmental Education study used questionnaires that also sourced information of intentions of learners towards solid waste. Learners were interviewed by completing the questionnaires.

Therefore, the designed questionnaire for the study comprised both closed and open-ended questions. Some questions required responses to indicate whether participants agreed or did not agree with a particular category. Other questions required responses to be indicated in scales. The scales had series of levels that described various degrees of values. The use of scales allows accurate assessment of beliefs and opinions (Macmillan and Schumacher 2010)

Furthermore, the Mkhondo questionnaire shows categories that explore the research in subsections. The predetermined categories formed themes that I used as a guide to questions. Questions with similar categories were grouped together in one theme. This allowed the study results analysis to follow a simple and understandable sequence. The questions on each theme encompassed all the objectives and aims of the study. This also ensured that all aspects of the research were rigorously investigated in a sequential and chronological pattern.

According to MacMillan and Schumacher (2010: 195), “a questionnaire is the most widely used technique for obtaining information from subjects”. A questionnaire has several advantages, such as being relatively economical, having the same questions for all subjects, and ensuring anonymity. The researcher was able to take advantage of the economic use of questionnaires, as all learners were required to answer the same questions.

Completion of the questionnaires was successful because all forty learners were given the task of responding about Environmental Education simultaneously and all questionnaires were collected on the same day of data collection.

3.7.2 Observation

According to Creswell (2008), observation is the process of gathering open-ended, first-hand information by observing people and places at a research site. He adds that observations give the opportunity to record information as it occurs in a setting to study actual behaviour and to study individuals who have difficulty verbalizing their ideas.

Johnson and Christensen (2011:206) also define qualitative observation as “the watching of behavioural patterns of people in certain situations to obtain information about the phenomenon of interest”. They further emphasize that the observer must be unobtrusive so as

to not affect what is being observed. It is an important method of collecting data from people because people do not always do what they say they do. This was evident in the study where observation was done without the learners being aware that they were being monitored to ensure that the data is internally valid.

Naturalistic observation was used as it was carried out in the real world. In this study, the behaviour of children was observed from the classroom. The researcher indirectly observed learners who littered in the classroom after being taught the importance of proper solid waste disposal during extracurricular activities.

The researcher visited the class under investigation from Monday to Friday during break time and after school to observe the number of littered waste in the form of papers, banana peels, plastics, and other visible waste discarded by learners in their classroom. Data was collected indirectly as I was observing the effects of behaviour after it had occurred. The research tools chosen were appropriate in terms of Creswell's (2008) observation that in qualitative research, researchers often choose the process of collecting observation data in a specified school setting. According to McMillan and Schumacher (2010), an observation is a way for the researcher to see and hear what is occurring naturally in the research site.

According to (www.qualitativeresearchapmstudyguide.com) appropriate conditions must prevail in a short time interval to avoid a lag effect where more time is needed for observation to be completed. The observation for the study was done at 11:00 am at break time and after school at 2:30pm for ten consecutive working days to avoid the lag effect. The situations were conducive for data collection because I was able to monitor the behaviour of learners frequently.

According to McMillan and Schumacher (2010), observation has some limitations. First, it is time consuming; however, the researcher was able to allocate enough time for the observation process to be concluded in time. Another limitation of the observation process was assessing too many littered substances thrown by learners. I categorised the types of litter to be observed into papers, plastics, and fruit peels.

3.7.3 Focus group interviews

According to (Creswell 2008) a focus group interview is a process of collecting data through interviews with a group of people. De Vos et al. (2006) adds that focus group interviews are a means of understanding how people feel or think about an issue, product or service. The researcher asks few questions and elicits responses from all individuals in the group. Ten learners were involved in the focus group interviews after the completion of questionnaires by forty learners.

I used interviews for the focus groups because open-response questions provide data on how participants make meaning, how individuals conceive of their world and how they explain or make sense of the important events in their lives (MacMillan and Schumacher 2010). The main advantage of using focus group interviews is that of direct interaction, which allows for a greater depth of information relevant to the topic concerned (Ndungu 2004). I was involved in face-to-face interviews with the focus groups composed of parents and learners respectively. In this study, direct interactions allowed openness and trust among the participants because they were free to voice out their concerns and give advice, where necessary, regarding the study. Through the creation of a social environment in which the group members are stimulated by one another's perception and ideas, the researcher can increase the quality and richness of the data through a more efficient strategy than one-on-one interviews (McMillan and Schumacher 2010). Consequently, I witnessed learners who were at liberty to describe other incidences that were related to littering in the school.

The focus group interview took almost one hour after school as per agreement with the school management team. During the interviews, it was rewarding for me as the researcher to witness learners responding promptly and freely to questions. Some learners went to the extent of giving more information than was asked for. The focus group interviews with learners were productive in terms of the aims of the project.

Focus group interviews of parents followed those of learners. Only seven parents took part instead of the ten parents who were invited for the study. I started each session by acknowledging the effort of the parents in availing themselves for the interviews. Parents expressed their appreciation for my efforts in shaping the future of learners toward keeping their environment litter free. I read out the questions consistently and the parents responded

without any misunderstanding, which could be attributed to the initial piloting of the project. As noted by Creswell (2008), focus group interviews are advantageous when interaction among interviewees yields the best information and when interviewees are similar to and cooperative with one another. They are also useful when the time to collect information is limited and individuals are hesitant to provide information, as was evident in this study.

The focus group interview was captured by a photographer using a video camera and written responses were captured by the researcher after each deliberation. The data collection process is shown in Figure 3.3.



Figure 3.3 Data collection process

3.8 DATA ANALYSIS AND INTERPRETATION

As the researcher in this study, I derived meaning from the data by assuming an inductive stance. I used the data collected from the beginning in the pilot test as well as the information gathered from the literature review to refine the questionnaires. The researcher outlined the facets to be studied by means of the questionnaires in the form of predetermined categories that formed themes that demarcated the ideas to be investigated. The themes enabled me to understand every aspect studied and yielded positive results, which made reporting and interpretation easier. Two key themes then formed the basis for analysis and the interpretation of findings.

In observation, I transcribed the data and analysis followed. Themes were derived from the responses of the focus group interviews that were used in the analysis. The focus group analysis was derived from the interview guide, where transcriptions led to themes, as shown in Figure 3.4.

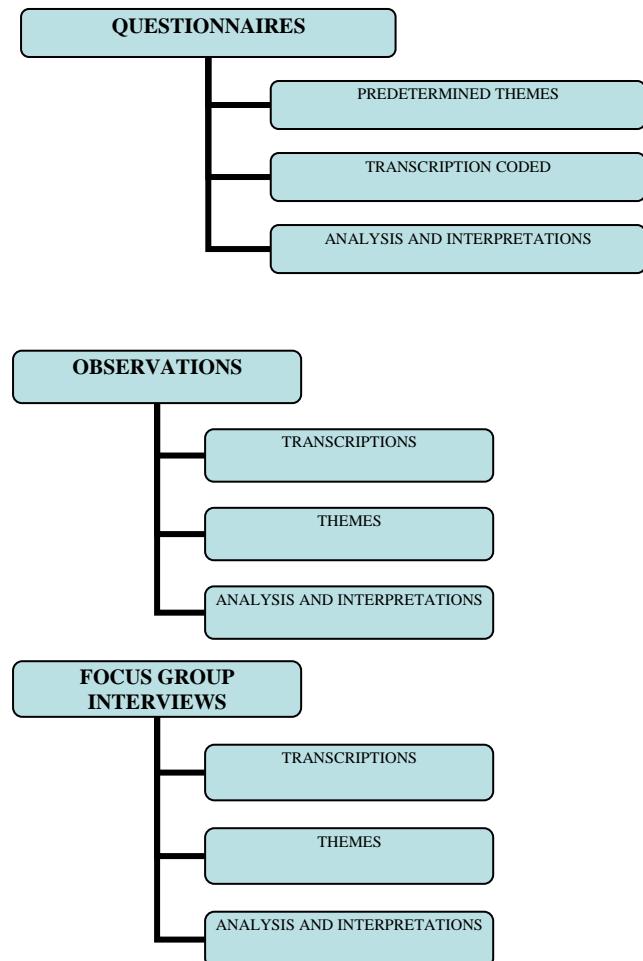


Figure 3.4 Analysis and interpretation

According to Merriam (2001), qualitative research data analysis provides ways of discerning, examining, comparing and contrasting, and interpreting meaningful patterns or themes. The procedure followed in data analysis aims at seeking patterns in the data. Stake (1995) believes that analysis is a matter of giving meaning to first impressions as well as final compilations and qualitative studies capitalise on ordinary ways of making sense. Therefore, data interpretation was done after all analysis had been completed. The available sources of information were used adequately to produce new ideas about the impact of Environmental Education in Mkhondo.

The study was descriptive (Maxwell 1992), as it gave a complete description and analysis of what I observed regarding physical and behavioural events. The study was also interpretative because during the classroom observations I sought to probe and understand the experiences of the research participants from their unique perspective. The participants' discovery and insights made the research special and provided meaningful contributions to the results I present in Chapter 4.

The collection of sources for data analysis was unstructured, in contrast to quantitative research where data collection is structured (McMillan and Schumacher:2010). The study of the Mkhondo community consisted of small numbers of samples, and the nature of data analysis is largely non-statistical, although there are some figures in the research that were revealed to be partially statistical.

3.9 ETHICS COMPLIANCE

According to Johnson and Christensen (2008), research ethics are a guiding set of principles that are to assist researchers in conducting ethical studies. Macmillan and Schumacher (2010) point out that research ethics are concerned with beliefs about what is right or wrong from a moral perspective. All participants were informed about the ethical issues that were followed by the study. The study was approved by the University of South Africa Ethics Committee on 18 April 2013 (See the Appendix 12).

a) Attrition consideration

According to Macmillan and Schumacher (2010), attrition occurs when subjects systematically drop out or are lost in the study. The researcher made it possible for all participants to drop out if they felt uncomfortable or they experienced problems in continuing with the research. In the study, three parents of learners pulled out without notice, which was part of the agreement in the assent form signed by the parents.

b) Full disclosure

I disclosed all important information about the planned research. The purpose and aims of the study were fully outlined in the validity letters sent to participants of the study. There was no deception of the participants; all relevant information was disclosed.

c) Voluntary participation

Participation in the study was not compulsory and participants were not forced or coerced to take part in the research. Learners and parents participated voluntarily. Learners showed enthusiasm about the research process and were willing to take part in both the focus groups and the completion of questionnaires.

d) Informed consent and assent forms

Informed consent is achieved by providing subjects with an explanation of the research, and an opportunity to terminate their participation at any time with no penalty and full disclosure. The consent in the study was obtained by allowing the participants to sign forms that indicate the purpose of the research and consent to participate. Parents and learners signed the consent and assent forms and agreed to adhere to the conditions of the study without any oppression or fear.

e) Risk to participants

The questions asked in the research were friendly and did not offend any participant. The research was risk free as it was conducted during the day and in a neutral environment at one of the schools in Mkhondo. The participants remained anonymous to protect their dignity and in observance of research ethics.

f) Privacy

The privacy of the research participants in the study is protected. Access to participants' responses is restricted. I employed the practices highlighted by Macmillan and Schumacher

(2010), namely anonymity, confidentiality and appropriate storing of data. To ensure anonymity, I did not code the questionnaire given to learners. To ensure confidentiality, I ensured that no one else has access to individual data except my supervisor.

g) Validity

Validity of the research was enhanced by using different methods in collecting data while participants were also informed about the code of conduct of the research. I obtained permission from the relevant authority to conduct research in the school and in the community. The stakeholders involved were the Principal, School Governing Body Chairperson, parents and learners. Credibility, according to Macmillan and Schumacher (2010), refers to the extent to which the results approximate reality and are judged to be accurate, trustworthy and reasonable to the subject being studied; therefore, the results of the study are credible.

Furthermore, the study was presented at a conference for ‘Best of Both Worlds’ for input and recommendations regarding the research approach used. The study was also presented at a conference for Southern African Research in Mathematics Science and Technology Education and its theme was new avenues to transform mathematics, science and technology in Africa

3.10 SUMMARY

Chapter 3 has presented the research methodology and design and discussed the methods used in the study. Furthermore, the chapter has outlined the research paradigm, the design of the study, the research setting, rigour, data collection procedures, data analysis and interpretation methods, and ethics compliance. Chapter 4 proceeds with data presentation and analysis.

CHAPTER 4: DATA PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

The purpose of this chapter is to present, analyze and discuss the findings of the study. The analysis and discussions are the result of the alignment of the theoretical framework, aims of the study, research questions, problem statement and the purpose of the study. The research question, “What is the impact of Environmental Education on the way learners preserve land resources from degradation caused by unacceptable solid waste disposal?” will be answered in this chapter.

4.2 DATA PRESENTATION

Each theme was derived from sub-questions that were answered by the learners on their view of the impact of Environmental Education in Mkhondo. The two themes derived were 1) the importance and role of Environmental Education and 2) the impact of Environmental Education in one of the schools in Mkhondo.

This section provides the integration of focus group interviews, questionnaires and observation data presentation as outlined on the data analysis scheme in Chapter 3

Table 4.1: Data presentation for theme 1: Importance and role of Environmental Education

Theme 1	Category	Characteristics
Importance and role of	Environmental Education in	What is the importance of the Environment? <ul style="list-style-type: none">▪ Learner (FG): It keeps our bodies healthy through food, fresh air that we breathe and source of tourist attraction. (Positive idea)▪ Learner & Parent (FG): Future generations have to benefit from the very same environment for their livelihood. (Prior knowledge)▪ Parent: It gives life to plants that we use to build shelter in the form of houses. (Benefit)▪ Learner (Q): Create jobs such as forestry and we use the environment to grow vegetables. (Benefit)▪ Parent (FG): Animals die from eating plastics and feeding on cans and it is important to

Theme 1	Category	Characteristics
Environmental Education	school and its importance	<ul style="list-style-type: none"> ▪ keep the environment safe to protect such species from being extinct. (Awareness) ▪ Parent (FG): We get vegetables from the gardens and it is important for our learners to take care of the land from degradation. (Awareness) <p>What is the importance of keeping the environment waste free?</p> <ul style="list-style-type: none"> ▪ Learners (FG): Prevention of the depletion of Ozone layer. (Benefits) ▪ Learners (FG): Waste free environment will provide good health for all of us. (Benefits) ▪ Learners (FG): For sustainable natural resources. (Benefits) <p>What is the Role of Environmental Education?</p> <ul style="list-style-type: none"> ▪ Learners (FG): Its role is to prevent degrading of natural resources. (Aware of role) ▪ Parents (FG): Parents involved in the focus group interviews are spreading the importance of environment to learners. (Assistance) ▪ Learners (Q): Encourage learners to keep the classroom clean. (Awareness) ▪ Learners (Q): Teachers should run the campaign on Environmental Education daily. (Negative)

Table 4.2: Data presentation for theme 2: Impact of Environmental Education

Theme 2	Categories	Characteristics
	Initiatives in reducing littering	<p>Unacceptable solid waste disposal reduction initiatives</p> <ul style="list-style-type: none"> ▪ Learners (Q): Need of recycling bins, more education. ▪ Parents (FG): To make environment clean, educate learners about consequences of littering, pick up papers after school. ▪ Parents (FG): Collect waste, make meeting about cleaning, work together educators and learners.

Theme 2	Categories	Characteristics
Impact of Environmental Education	Disposing of litter and sources of litter	<p data-bbox="740 249 1394 339">How do learners dispose of litter before and after Environmental Education?</p> <ul style="list-style-type: none"> <li data-bbox="740 361 1394 428">▪ Learners (Q): Different ways of disposing of litter. <li data-bbox="740 428 1394 473">▪ Human activities that cause litter. <li data-bbox="740 473 1394 541">▪ Learner (Q): Absence of bins causes us to litter inappropriately. (Ignorance) <li data-bbox="740 541 1394 586">▪ Learner (Q): Burn litter at home. <li data-bbox="740 586 1394 653">▪ Learners (FG): Throw it away in street corners, making of compost from litter. <li data-bbox="740 653 1394 720">▪ Learners (FG): Store in plastic bags. (Acceptable) <li data-bbox="740 720 1394 788">▪ Learners (Q): Dogs eat some of the rubbish that we dispose inappropriately.
	Collecting litter in school and at home	<p data-bbox="740 795 1270 884">How often do learners dispose of litter inappropriately at school?</p> <ul style="list-style-type: none"> <li data-bbox="740 884 1394 952">▪ Learners (FG): Continuous disposal of litter after Environmental Education. (Negative impact) <li data-bbox="740 952 1394 1019">▪ Learners (Q): Requirement of free dust bins. <li data-bbox="740 1019 1394 1087">▪ Parent (FG): Bad littering habits as children are not bothered to collect litter. <li data-bbox="740 1087 1394 1154">▪ Learners (Q): Punishment in the form of cleaning the whole school yard after school. <li data-bbox="740 1154 1394 1266">▪ Learners (FG): Posters educating about the importance of environment should be visible at school. <li data-bbox="740 1266 1394 1379">▪ Learners (FG): 15 minutes after break learners should all be grouped to collect papers around the school. <li data-bbox="740 1379 1394 1446">▪ Learners (FG): Encouraging buying green during break time.
	Behavioural changes in learners towards littering	<p data-bbox="740 1455 1251 1545">Behavioural change in learners after Environmental Education initiatives</p> <ul style="list-style-type: none"> <li data-bbox="740 1545 1394 1612">▪ Learner (Q): No change. (negative response). <li data-bbox="740 1612 1394 1680">▪ Learner (FG): Variation in observations. (Negative impact) <li data-bbox="740 1680 1394 1747">▪ Learner (Q): Yes, they seek more clarity about environment. (Awareness) <li data-bbox="740 1747 1394 1814">▪ Learners (FG): Different attitude in focus group. (Negative response) <li data-bbox="740 1814 1394 1882">▪ Learners (FG): All educators should advocate for change in behaviour. <li data-bbox="740 1882 1394 1949">▪ Parent (FG): Plastic bags to be bought for disposal. (Future initiative)

Table 4.3 Symbols and terms for data presentation

Symbol and terms	Description and source
FG	Focus group interviews
Positive idea	Acceptable understanding of Environmental Education
Benefits	Benefits of Environmental Education
Q	Questionnaire
Awareness	Awareness of Environmental Education
Assistance	Help got by learners through parents
Negative	Negative impact of Environmental Education
Ignorance	Ignorance on Environmental Education

4.3 DATA DISCUSSION

In qualitative research are not as readily codified as has been the case for quantitative research. Different data collection methods used in the study represented issues of validity of the study. The use of questionnaire, focus group interviews and observations ensured that the results are trustworthy, reliable and credible.

4.3.1 Importance and role of Environmental Education.

The section discusses the importance and role of Environmental Education, guided by the category Environmental Education in school and its importance. I chose to impart knowledge that I perceived to be relevant and crucial for the participants before the collection of data began. By giving participants knowledge about the environment, I thought their perception would change and thus my observation was conducted to ascertain the impact of Environmental Education in sustaining land resources in Mkhondo. In this study, the following key components were revealed:

- Learners litter more papers and plastics after break and after school than before break.
- Learners were not bothered by the state of the classroom before and after the intervention of Environmental Education.

- Learners showed no concern about the negative impact of disposing of litter inappropriately.
- The littering after the extra-mural activities on Environmental Education showed that they were not concerned about the environment and that there would be a similar pattern at home.
- The initiative of Environmental Education was implemented for a short period of time; hence learners were not acquainted with the responsibility of taking care of the environment and of preventing littering in the school premises.
- The overall finding of this study was that there was a relatively low impact of Environmental Education in reducing unacceptable solid waste disposal at the school; hence the extra-mural activities on Environmental Education did not change the behaviour of the Grade 12 learners who were studied as they continued to litter inappropriately after being taught on how to dispose of litter properly at school.

a) Environmental Education in school and its importance

i) Importance of Environment to learners and parents

During the focus group interview, learners and parents deliberated on their views and understanding of the protection of land resources from degradation caused by improper solid waste disposal.

One learner responded that the importance of environment was that, “It keeps our bodies healthy because we derive food and get oxygen to breathe and in return we breathe out carbon dioxide that is beneficial to plants.” This assertion showed that learners have positive ideas on the importance of the environment. Another point raised by the learners during the discussion was that the environment acts as a source of income for the community as it could be used as a tourist attraction where people would view with admiration the nature of vegetation, animals, rivers and mountains. Learners confirmed the view of Hill et al. (2006) that nature is a provider of natural resources, aspects of the natural environment that are critical to satisfying human needs and wants.

One of the learners further responded to the question about the importance of the environment by saying, “Environment creates jobs when we use the soil to plant and sell vegetables to the community and also it can create jobs for our parents in forestry”. From this response, it was evident that the learners were concerned and had prior understanding of the importance of the environment and its benefit to the places they come from. Apart from this understanding, they also expressed how the environment could enhance their livelihood if it were conducive to sustaining life. Not only is the environment used as the source where food is grown but it also provides job opportunities for the future, such as the example of forestry provided by learners.

“Future generations such as learners have to benefit from the very same environment”, replied one parent in supporting the importance of the environment. The parent understood the negative impact in future if the environment was not kept in a proper manner. Furthermore, nature was viewed as a provider of natural resources, aspects of the natural environment that are critical to satisfying human needs and wants, as Hill et al. (2006) explains. At this particular stage of the interview learners understood the importance of the environment and the land that we live on. They emphasised that without taking care of the current situation in terms of conserving our environment, the future generations would find it difficult to sustain their lives. They showed awareness of the significance of the environment. This instance is supported by the White Paper on Environmental Education that supports taking care of the environment for future usage (<http://www.whitepapersa.co.za> : accessed on 2011, September 15).

I believe that the response of participants to the importance of the environment was vital in determining how environmental knowledge influences their decisions about solid waste disposal in Mkhondo. The belief was guided by the positive response shown by learners as the aim outlined for this study was met. The responses showed that learners interact with the environment and they value the environment as essential and understand that it has to be protected for future generations.

Parents viewed the environment as having a positive impact in their lives in terms of health, jobs, food and protection, as shown in a statement from one of the parents who said, “I think we benefit medicine from trees, food from plants that grow in the environment and protection from bad weather as we build houses using plant materials.” The study also showed that

participants believed the importance of keeping the environment clean lies in the reduction in diseases that may be caused by litter disposed in the wrong place. Some participants believed keeping the place clean would reduce germs and pollution. Keeping the environment clean would also save space for important human activities so that future generations could benefit from land resources that have not been degraded. The research also showed that a clean place is safe for children and healthier for the community.

Fresh air that we breathe should be clean and the environment is important for that because our natural surroundings on earth sustain life. This was one of the reasons the parents realised the significance of sustaining the environment for the future without destroying or degrading the natural resources such as the soil. As Marcinkowski (2010) explains, environmental conditions and problems we face require our diligence in understanding and shaping policy, theory, research, curriculum, teaching and learning, and assessment and evaluation into more coherent and holistic plans.

“New generations can benefit from the environment if trees and other natural vegetation are not destroyed but preserved for use in future by our learners”, said one parent. Furthermore, “Animals die from eating plastics and feeding on cans that are exposed by learners at school and it is important to keep the environment safe to prevent unnecessary death of animals”, replied one parent about the importance of the environment in the school, and showing awareness about limiting unnecessary littering to the environment in school. The above responses by parents during the interviews signify the understanding of improper solid waste disposal in the area as parents are witnessing the extent of unacceptable litter disposal in the environment of Mkhondo. The parents further believed that the environment in the area is under threat and land is degraded by people who litter materials that lead not only to degrading land resources but also result in destroying animals that consume the plastics found in the dumping zones.

“We get vegetables from the gardens”, highlighted another parent during the interviews. The parents and learners see the environment as an essential source of food for families. They believe that land is important to grow vegetables and if degraded it does not only affect their health but also their ways of getting income from selling vegetables that have been grown on

the land. The study also revealed from the response of learners and parents that knowing the importance of the environment is essential in conserving nature and keeping the environment clean. An understanding of the importance of the environment can help in solving problems associated with littering and change the mindset and attitude of learners. Furthermore, according to the learners knowledge of the environment can solve the problems associated with littering and pollution as they would be aware of the consequences of unnecessary littering in the school.

ii) Importance of keeping the environment waste free

According to learners in the study, the importance of keeping the environment waste free is that of sustainable natural resources. Hill et al. (2006) emphasised that the protection of the environment is a lifelong process and the focus should be on current and potential environmental situations. The learners furthermore revealed that keeping the environment waste free would prevent the depletion of the ozone layer that may be caused by frequent burning of litter that has been disposed improperly by learners at school and in the places where they spend their time after school hours.

“Keeping our school premises free from litter promotes good health as few flies and diseases will be able to spread because the environment will be clean”, said one learner when asked about the importance of keeping the environment waste free. As Fien (1993) emphasise, understanding ecological and social processes that can serve as the basis for sustainable natural resources, and keeping the environment waste free will also transform the lives and social conditions of learners.

iii) Role that can be played by Environmental Education

Learners revealed that the role of Environmental Education in the school is to prevent littering and degradation of natural resources: “We know Environmental Education through the extracurricular activities and its main role is to prevent land degradation and provide awareness in keeping the school clean”. When asked about promotional and educational campaigns that could increase school learners’ participation in alleviating dumping of litter in an improper way, the participants responded that billboards could play a role: “I recommend that billboards can be hoisted in the school where young people will be reminded about

keeping the environment clean”. The comment underscored learner understanding of the role that Environmental Education could play in the school and around the area of Mkhondo.

Learners further suggested that signs should be placed on bins and promotions done by environmental specialists to create community awareness in trying to alleviate littering. The learners highlighted that in order to stop littering, community members should gather and collect papers every week so that the young generation would admire the good work done by their elders in the area. “We should gather and collect papers having elders as our role models”, responded one learner.

One parent suggested that private companies should initiate and fund environmental clubs in every phase at the school. “Teachers should encourage us to keep our environment clean every time they enter the class”, noted one learner on the role that could be played by education in the reduction of littering at the school. Some parents agreed that they also encouraged their children for acceptable waste disposal in their homes and that would positively influence their behaviour in their school environment. While some learners believed that Environmental Education during extra-mural activity had played a minor role in the school as some Grade 12 learners understood how to keep the school premises clean, other learners who had participated in the extra-mural activity on Environmental Education were seen discarding their litter at the appropriate place.

A positive role is evident in the school as some learners dump their litter in the waste containers and have an idea of disposing of litter in the appropriate place, as noted by one parent. The learners’ view of the role of Environmental Education seems positive and more needs to be done in order to alleviate unacceptable littering in the school. According to Hill et al. (2006), Environmental Education should not just blindly reproduce the current realities of living with nature but it should also alert people to alternative realities and enable them to critically evaluate these realities and make informed decisions as to what the appropriate interaction with nature should be in their local context.

Some participants acknowledged that they were now aware of the dangers of littering through the study of the impact of Environmental Education in their schools during extra-mural activities. One parent noted that, “More work needs to be done in the schools and the community to prevent learners littering on the environment”. They believed that more work

needs to be done to achieve acceptable levels of a sustainable environment in Mkhondo. The parents believed that the community should combine and work together to keep the environment clean by building parks on empty land, fining offenders who litter, and seeking donations from private companies to buy refuse bags and other necessary equipment to help in reducing littering in Mkhondo.

4.3.2 Impact of Environmental Education

This section deals with theme 2 of the study and its supporting categories, which are disposing of litter and sources of litter, initiatives in reducing littering, collecting litter in school and at home, and behavioural changes in learners towards littering.

i) Initiatives in reducing littering

The research showed that Environmental Education programmes such as stop littering campaigns were run by the learners in Mkhondo. Learners revealed that some teachers played a role toward awareness in keeping the environment sustainable for future generations. However, the challenge for sustainability of our resources is not to justify but to actually help individuals and nations apply it to concrete actions and practices (Janse van Rensburg et al. :2002). Furthermore, the study revealed that there were no environmental societies or organisations in the area practicing or promoting environmental awareness to the community of Mkhondo.

“Not there, but we have a small group as neighbours to try and clean the place to provide awareness to our children on the importance of a litter-free environment”, replied one parent when asked about the availability of environmental societies in the area. The parents were concerned about the degradation of land caused by solid waste disposal in the area in such a way that a few parents decided to form a group that cleaned their area when rubbish was identified. This showed the concern of only very few community members. If replicated by other members, their behaviour would result in the eradication of land degradation in Mkhondo. The research shows that only municipal employees are evident in the area collecting litter in some areas and it is not happening often as people litter immediately after

collection has taken place. This situation is evident at the school under investigation, as learners litter immediately after general workers have collected litter.

Various initiatives for reducing improper disposal of waste in the school and the community emerged from the research with learners in the focus group interviews. Learners realised that people would have good health and land would be sustainable if they reduced littering. One of the ways in which littering could be reduced could be enforcing punishment for learners who were found throwing away papers and plastics in an improper way. One of the respondents argued that offenders should be made an example: they should be forced to clean the whole school at the end of the day. In addition, a respondent felt that “offenders should be allowed to remain and collect papers after school if found guilty of unacceptable littering”.

Fosnot (1996) believe that some learning principles derived from constructivism involve dialogue within the community that engenders further thinking. Therefore, the classroom needs to be seen as a community of discourse engaged in activity, reflection and conversation. During focus group interviews in Mkhondo, learners and parents were engaged in a discussion on the impact of Environmental Education in alleviating littering in the school. Some learners were observed throwing litter in the dust bins, which was seen as a positive sign of the effect of Environmental Education initiatives. The study also showed that in order for the principles of Environmental Education to succeed in all schools in the area, there was a need of recycling bins with labels showing the different kinds of waste to be deposited for future usage.

“Posters showing clean environment campaigns should be visible on the school walls,” suggested one learner. This response showed that posters campaigns in the school could be important to reduce the spread of littering which causes land degradation. Also, buying green should be encouraged during break and vendors should be advised to sell goods that are free from plastics and other items that could lead to degradation of the land. All these initiative confirm Saugier (1994) belief that the future of our planet requires each one of us to change behaviour patterns and adopt new patterns that are compatible with the preservation of our planet.

There is also a lack of education about keeping the land resources sustainable for plants and animals as well as the community. The community is not educated on how to keep the land

clean. Parents believed that the fact that Councillors and the municipality were not involved in and responsible for Environmental Education was one of the reasons the community experienced improper solid waste disposal.

ii) Disposing of litter and sources of litter

The learners revealed that they dispose their litter in different ways such as burning it, throwing litter in open spaces, and leaving the litter next to waste containers. However, some learners proved that Environmental Education had played a minor role in the way that litter was deposited. I observed them depositing their litter in the few dustbins outside the classrooms. They mentioned that the municipal waste collection truck emptied the only waste container one a week.

One of the learners responded: “At home we make compost with the rubbish that we collect from the kitchen”. This assertion showed that some learners and parents were making use of the litter in fertilizing crops. They showed signs of proper disposal of litter in a way that would benefit vegetation as a result of the compost that would be derived from garbage. Furthermore, one parent elaborated on this theme as follows: “We collect bottles and tins for recycling and then reuse plastic bags for future shopping”. From these participants’ responses in the study, it was evident that some of the learners of Mkhondo were aware of the importance of recycling refuse. They sold bottles for monetary rewards and that reduced the spread to dumping zones in the area. The idea of reusing plastic bags when shopping showed that the community was practicing green shopping. This idea could reduce unacceptable solid waste disposal if the majority of the community households could adopt the practice through learners’ involvement.

“I throw away papers and plastics after cleaning the yard at home and we also do not keep a rubbish bin at home”, replied one learner to the question about how they get rid of litter at home. I realised that the study showed that some learners were still negligent and ignorant about keeping the environment waste free as they would throw away papers even after the intervention of Environmental Education. Furthermore, the Transportation Research Board (2009) has revealed that littering in society is largely based on perceived social norms. People are more likely to litter in areas that are already littered than in areas that are generally litter free. This is because a littered environment reflects a social norm that littering is tolerated,

whereas a clean environment reflects a society that is intolerant of littering. Land degradation was not important to some of the Grade 12 learners at that particular time as they continued to dispose of litter on the land and they seemed unaware that their actions now would have a detrimental effect in the future.

The respondents also mentioned that they threw their litter in the streets where animals such as dogs eat from the rubbish. They realised that the fact that the municipality collect the litter once a week influenced more homes to dispose of their waste in the streets. “We burn all the rubbish we collected during the week,” noted one learner. The learner was optimistic that what they were doing was good thing, unaware that it was an unacceptable practice that would pollute the air. Some parents said that they stored the litter in plastic bags and some community members discarded the litter at street corners. The study also revealed that animals such as dogs feed on garbage that has been exposed through improper disposal. The burning, littering and the disposal of waste exposed to animals showed the negative impact of Environmental Education, despite the fact that it had taught some learners how to keep their environment clean. The focus group interviews revealed that the Mkhondo municipality had recently bought a new truck instead of the tractor that had previously been used to collect litter around the community. The respondents noted that even though a truck was available once a week, improper solid waste disposal was still a challenge in the community where learners lived. The learners disposed of litter next to pre-schools, and dead dogs lay unattended for weeks, and that caused land degradation in those areas.

From the responses of the participants, I realized that some learners were still not practising what had been taught in extra-mural activities in terms of keeping the classroom, school and the community clean. Litter was still present in most parts of the school and outside the school area. This showed a negative impact of Environmental Education. The interviews showed that learners continued to dispose of litter incorrectly despite being taught Environmental Education in the school during extracurricular activities.

Sitarz (1994) notes that in the past the earth's seemingly unlimited supply of natural resources and its ability to assimilate waste were taken for granted. Consequently, the enormous increase in human numbers and activities in this century has placed profound stress on these capabilities. In this study, learners believed that the current generation produced more litter than our predecessors because of high population numbers, and degradation was

caused by a lack of discipline in schools where learners were not punished for deliberately throwing papers in the classroom and corridors. As one learner noted, “Proper policies should be implemented for the school so that perpetrators are punished for littering on the school premises”. That showed signs of the lack of behavioural change even though the learners understand the importance of Environmental Education, as learners were unable to prevent unacceptable littering at the school and subsequently in Mkhondo area.

According to Hill et al. (2006: 93), nature is also viewed as a fragile natural resource that can be overexploited and degraded, jeopardizing human existence, and the learners had the same view. Likewise, some of the respondents identified a lack of respect and negligence as the forces driving learners to dispose of waste unacceptably. Furthermore, a participant in the study pointed out that food items bought by learners were in plastic bags and that was the reason learners littered on the school premises. The research revealed that economic advantage is also a cause for land degradation as most learners were able to buy food in paper and plastic bags that later littered the environment.

Learners highlighted that the absence of continuous activities on Environmental Education was one of the causes of land degradation in the community. They believed that all learners, not just a few individuals, should participate in these activities . This showed that the lack of impact of Environmental Education in the study was due to the fact that extra-mural activities were done by only a few Grade 12 learners and not the whole school. Some learners revealed that buying regularly from vendors was the cause of litter and believed that vendors should sell food where packaging should be environmental friendly. The participants realised that over the past years there were few shops who sold products that led to solid waste disposal. Thus, fewer bottles were deposited in the land. Learners realised that now most people were able to buy products that ended up in the streets and were not being recycled. As shown by Taylor et al. (2009:30), “these developments are inevitably having negative impact on the countries’ environment in terms of increased waste production and energy use, and there is a need for effective Environmental Education to help mitigate these problems. Likewise, increase of the amount of waste production has led to more dumping sites in Mkhondo.

When asked who was responsible for generating waste, the learners responded by saying that at school they were the main culprits of littering and in the community, children, parents and the general public played a role in land degradation. Some believed that shops and vendors

were responsible for generating waste in the community. The type of litter evident in the school is plastics, papers, and fruit peels. In the community, tins, papers, plastics, torn clothes and disposable nappies cause the environment to be untidy and degrade the land, making it unsuitable for future generations.

“As learners we litter papers and plastics because we do not care”, mentioned one learner during the study. From this assertion, it was clear that learners believed that they littered papers, plastics, and other waste material due to negligence. The study showed that most learners always littered in the school and in the surrounding community and few rarely littered in the environment. Therefore, protection of the global resources of land, fresh water, biological and genetic resources and energy must be paramount (Sitarz 1994).

Learners revealed that the reason they littered was that the school had hired someone to collect litter and keep the place clean. They also said that the absence of adequate rubbish bins inside the classrooms was one of the causes of disposing of litter irresponsibly. They believed that not being monitored also influenced their bad decision of throwing waste in the environment. The school focused on in the study has a teaching programme that supports keeping the environment clean. It has an environmental committee for learners but they are not visible and do not have clear working plans and support from teachers to initiate their programmes effectively, as one learner mentioned: “We are not fully supported by all teachers in our initiative to reduce littering in the school.”

iii) Collecting litter in school and at home

The response from parents showed that learners’ responsibility in ensuring that litter was properly disposed of was minimal. According to Grodzinska-Jurczak et al. (2003), the few studies that have been conducted into the impact of environmental education on children and the youth show that the level of environmental awareness is relatively low. He adds that children and young people generally have limited knowledge about the environment and nature, many having incomplete and or completely erroneous understanding. The narration below also supports this notion.

“My child is not bothered in disposing of litter at home”, noted one parent. This assertion from one parent revealed that their children were not responsible for disposing of litter

properly. Some members in the community preferred to deposit litter in the pit while others threw their litter in the waste containers that lay idle for months without being emptied. Provision of free dustbins to reduce littering in the area was seen as one of the ways to deal with litter.

I discovered that learners littered next to the road, on streets and next to waste containers, which showed the minimal impact of Environmental Education. Furthermore, the respondents mentioned that in schools litter was deposited on the classroom floors, in paper boxes behind the doors, while few dustbins were found outside the classrooms. The learners highlighted that at home litter was kept in plastic bags and waste bins until being collected by the municipality. If the litter had not been collected by the municipality it ended up in the streets, degrading the land.

One parent noted, “Some children are falling sick after playing with uncollected rubbish”. This comment showed that littering has consequences such as diseases that cause sickness in children. The participants also revealed that littering makes the place untidy. Most respondents revealed that in schools and in the community there were no proper channels available to dispose of litter correctly. The study also revealed that solid waste collection bins were available at school and at home. Learners believed that the availability of waste collecting equipment was evident but inadequate and inefficient for the needs of the environment in the school.

The research showed through interviews that the school could play a role in ensuring that litter is disposed of correctly. Hence, more bins should be available and waste should be collected frequently by the municipality in the waste container that is kept at school. The learners recommended that more waste bins should be made available in most places in the community. Programmes on waste management should be encouraged in the school.

After seeing Learner X littering in the classroom under observation, I asked, “Learner X, why do you throw your paper in class?” Learner X replied, “It’s not me, Sir”. From this response, I concluded that learners were not concerned about littering and at the same time they did not want to be associated with learners who were dirtying the classroom. This incident showed that learners were aware that littering was bad but they did it because of the influence of seeing others in the act.

Grodzinska-Jurczak et al. (2003) believe that the attitudes of young people appear to be crucial as they ultimately play a direct role in providing solutions to near-future environmental programmes. In this study, learners were made aware of the environment through education during extra-mural activity and the interpretations showed that the learners I observed confirmed the constructivist theory where they were now taking control of their situation inside and outside the classroom. Some learners exhibited the required behaviour by depositing papers in the proper manner and thus confirmed behaviourist theory while most were disposing litter inappropriately. This showed a negative response to the principles of the Environmental Education they had received. Furthermore, this study revealed that some learners were seen depositing their papers on the box behind the door in the last week of observation.

v) Behavioural change in learners about litter after being taught Environmental Education

An analysis of the deliberations of the participants reveals that the category of behavioural change illustrates that Environmental Education received a mixed reception. I discovered that even though few learners acted responsibly in disposing of litter at school, their practice still did not adhere to UNESCO's 12 guiding principles of Environmental Education, one of which is to "enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences" (see Chapter 2 Section 2.7).

According to Lambert et al. (1995), schools and organisations change as participants make sense of their work and find challenges and possibilities together. One of the chief myths about change is that it comes from a felt need, a discomfort, and an unbearable pressure that forces us to change. Within communities that foster human growth and development, change seems to be a natural result of constructing meaning and knowledge together. The study of Mkhondo supported Lambert's idea: the community's growth towards the alleviation of littering was a result of constructive meaning making and knowledge. From their responses, the learners' decisions show that education played a minor role in shaping their way of caring for the environment by making good decisions that would have favourable rewards.

One participant, asked about the role played by Environmental Education, responded: “No change, I have seen from my behaviour since being taught Environmental Education at school.” This response showed a negative impact of Environmental Education. Another participant argued that there had been “few changes on my behaviour”. The contrasting views of the respondents in the interviews showed that some learners were practising what had been taught in school while the majority of learners still ignored the guiding principles of Environmental Education that would help them alleviate improper solid waste disposal. Most learners’ behaviour towards littering had not changed since being taught Environmental Education.

The research showed the opposite of unacceptable solid waste disposal: some learners were aware of the dangers of littering and they disposed of their litter in a proper way. The study also found that more environment lessons could be beneficial to eradicate littering in the area. The parents believed that waste containers should not be placed far away from the homes and should be increased in the area. The participants believed that a lack of knowledge about the environment, more shops, a shortage of dustbins and overpopulation were the main driving causes of land degradation in the area. According to the participants, more people with buying power resulted in more people littering in the area. The study also showed that in the first week immediately after break some learners were seen throwing papers on the floor and not disposing of the litter properly. The situation was similar for the second week and changes were seen in the last week of observations. The evidence of papers in the classroom was dominant after school.

The interviews showed that young children were mostly affected by improper solid waste disposal as they were vulnerable, attracted to playing with the litter, and thus contracted diseases and injuries. “Teach our learners about proper disposal,” said one parent. The interview analysis shows that learners have an important role to play in the society; they must be taught how to dispose of waste properly as that will encourage the youth of Mkhondo to take care of the environment. According to the local newspapers (*Excelsior News*: accessed 3 August 2012), the community of Mkhondo in the Richards Bay section were very concerned about the rubbish container that had not been attended to for years. The newspaper further states that some community members interviewed said that they were complaining about the overflowing skip waste bin that reeked badly as it had not been emptied for a long time. The newspaper illustrated that the foul smell from the bin was affecting the nearby primary

school, and children would play with the litter after school, which was unhealthy and unhygienic.

Participants believed that the schools could play an important role in reducing littering and land degradation by the formation of Environmental Education clubs and providing more dustbins. The respondents proposed that learners who were seen littering should be fined by the school. Teachers should be responsible for preventing learners from throwing papers on the school premises and they should set a positive example. Respondents noted that recycling in schools was essential in reducing littering. The schools should facilitate recycling measures and involve all stakeholders. Programmes on Environmental Education should be facilitated frequently to woo more learners and teachers to advocate for natural resource sustainability.

The Transportation Research Board (2009) compared the need for an information campaign on littering and pollution in the period 1960 to 1980 versus the needs of today. They noted that although the campaigns in the earlier period were directed at educating people about littering and raising awareness, today's campaigns must focus on behaviour and attitude change. This study showed that learners' behaviour towards litter since being taught Environmental Education had not changed; they continued to litter papers at school even after being taught proper solid waste disposal procedures. Others sought clarity and even posed questions to parents about disposing of garbage in a proper way and place. "My child asked for plastic to be bought so that we dispose of litter in a proper way", said one parent. The response showed that Environmental Education had played a positive role in some families in the community. The behaviour of some learners exhibited at home showed a positive response to Environmental Education, even though these learners were in the minority.

The study further showed that more learners disposed litter more often after buying their food during break time. The amount of litter is doubled when comparing the data collected in the morning to that collected immediately after school. In the three consecutive weeks observations carried out in two classes (see Chapter 3) varied in results. I believe that the variation in the last week may have been caused by the intervention of Environmental Education as an extra-curricular activity.

From the discussion of data collected from learners it is clear that learners did not fully appreciate the importance of keeping the classroom clean. As the Transportation Research Board (2009) highlight, littering in society is largely based on perceived social norms. They add that people are more likely to litter in areas that are already littered than in areas that are generally litter free. This is because a littered environment reflects a social norm that littering is tolerated, whereas a clean environment reflects a society that is intolerant of littering. Learners observed the actions of others and the study in Mkhondo revealed that they followed what they observed in the classroom, as shown in the research by the Transportation Research Board.

I have concluded that if there were no learners throwing litter on the floor in the form of papers, plastics, papers from sweets and fruit peels, few learners would be littering. Actions of individual learners influence others, as argued by social cognitive theory. According to research by Balderjahn (1998), appear to be quite environmental conscious, but most of learners are simply paying lip service.

4.4 FINDINGS OF THE STUDY

The study showed that some Grade 12 learners grasped minimal knowledge about Environmental Education at school as they continued to litter in the school after being taught how they should dispose of litter properly. Evidence of change was not seen in learners as they were not taking responsibility of garbage at the school. Thomas-Hope (1998:15) “believes that in local townships the problem of careless waste disposal is often caused by the lack of awareness of the dangers of health presented by the accumulation of refuse”. The focus group for learners’ deliberations revealed that the overall impression of the impact of Environmental Education in Mkhondo is that it is not yielding positive results even though some Grade 12 learners had been exposed to its principles.

The respondents realised that media play a role in educating the community about Environmental Education as learners imitated what they saw on an educational channel. Some parents appreciated the role played by the school in educating the learners about Environmental Education, which they deemed had minimal impact. The focus group interviews showed that parents were not doing enough to eradicate dumping of litter in the community. The participants responded that if parents were to take a role in alleviating the

behaviour of improperly disposing of litter in the community, many families would dispose of garbage in the proper place and thus reduce land degradation in Mkhondo. This is in line with Saugier's (1994) belief that the future of our planet requires each one of us to change behaviour patterns and adopt new patterns that are compatible with the preservation of our planet. He further states that the future of humanity depends upon a change of behaviour, and we cannot change our behaviour patterns if we are not made to feel responsible for our actions.

The St Marcia Secondary School in Mkhondo does not have adequate waste containers and the only one has not been emptied for some months. The participants believed ignorance played an important role in degrading the land through improper solid waste disposal. The learners agreed that they discarded papers anywhere in the schoolyard and that behaviour was also exhibited at home during weekends and after school. Some respondents said that a lack of proper knowledge about the environment was the source of litter, which would subsequently lead to land degradation. The above reasons show that the community of Mkhondo lack knowledge about Environmental Education, have a negative attitude towards the sustainability of natural resources, and exhibit unacceptable behaviour towards natural resources.

Some learners revealed that they did not react to any schoolmate seen throwing papers on the schoolyard because they themselves also littered during the day. Some learners had the opposite view: they tried to remind arrogant perpetrators not to litter in the classroom. Some respondents felt insecure and offended when telling their fellow classmates about littering in the school. The learners described their understanding of Environmental Education in their community. They believed it was a way of keeping the classrooms clean and taught people about the environment. Some revealed that Environmental Education provided them with information about the community's environmental affairs.

The participants felt it was essential for Environmental Education to be the role player in dealing with matters affecting land resources in the school and in Mkhondo. They believed that through interviews Environmental Education could have a positive impact if properly executed in programmes of the school. The study also showed that learners were slightly changed by the influence of Environmental Education lessons at school. Some realised that they could now deposit litter in a positive way that encouraged the sustainability of natural

resources in the area of Mkhondo. The participants believed that Environmental Education was the good way to connect the community with the environment they rely on for their livelihood.

The aim of the study was to investigate the role Environmental Education plays in school through learners' involvement with regard to litter. The research method of observation showed that most learners responded negatively in the way they disposed of litter in the classroom. The aim of the study was achieved in this method. Observation analysis showed minimal evidence of change in learners' behaviour after being taught Environmental Education. Learners were seen throwing litter improperly and this answers one of the research questions of this study posed in chapter 1 which said, what evidence of change is there in land preservation from the learners after being taught Environmental Education as an extra-mural activity in schools?. The study showed clearly that the negative impact of Environmental Education outweighs the positive influence in the manner learners dispose of solid waste in the school. The impact of Environmental Education is negative with regard to the way learners preserve land resources from degradation caused by unacceptable solid waste disposal.

4.5 SUMMARY

Chapter 4 has presented the data, and discussed the two themes and major findings of the study. Furthermore, this chapter has revealed that Environmental Education at the school, offered as an extracurricular activity to some Grade 12 learners, did not yield positive results as learners continued to litter papers and other substances that lead to land degradation. The impact of Environmental Education was minimal due to various factors as discussed in this chapter. Chapter 5 will follow with the overall summary, conclusions and recommendations of the study.

CHAPTER 5: SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

5.1 INTRODUCTION

This chapter provides the summary of the findings about the impact of Environmental Education at St Marcia Secondary School. In addition, the chapter discusses recommendations and conclusions based on the data presentation and analysis in Chapter 4.

THE RESEARCH QUESTION AND SUB-QUESTIONS:

What is the impact of Environmental Education on the way learners preserve land resources from degradation caused by unacceptable solid waste disposal?

The sub questions of the study:

1. What evidence of change is there to land preservation from the learners after being taught Environmental Education in schools as an extra-mural activity?
2. What impact does Environmental Education have on the way learners behave in the classroom towards sustainability of land resources in schools?

5.2 SUMMARY OF THE STUDY

The research set out to discover the impact of Environmental Education on the way learners preserve land from degradation caused by unacceptable solid waste disposal. Chapter 1 presented the description of the study such as the background of the study, where studies revealed that human activities were detrimental to the environmental sustainability of natural resources as human activities generate massive waste that finds its way into the ground, as in the case of Mkhondo. The problem statement emerged from a growing trend of unacceptable waste disposal that leads to land being filthy, especially in the area of Mkhondo and in particular in the school investigated. Limitations of the study included that there was not enough time for the observation and data collection and more time was needed in the extra-mural activities so that learners could practice what had been learned over a prolonged period. Delimitations of the study were also discussed in Chapter 1.

In addition, Chapter 1 outlined the aim of the study, which was to investigate the impact of Environmental Education in the school with regard to unacceptable waste disposal causing land degradation. The aim of the study was accomplished and the objectives, namely to evaluate the impact of Environmental Education at St. Marcia Secondary School, were met as learners were taught in extracurricular activity and evaluated in respect of whether they were able to dispose of litter in a proper way.

Chapter 2 presented a literature survey about global and local environmental issues concerning unacceptable littering and its consequences. Studies have revealed that protection of the land from litter must be paramount and Environmental Education has to be encouraged in formal and non-formal settings. The studies further highlighted that Environmental Education should not reproduce the current realities of living with nature but should alternate realities that would enable learners to evaluate these realities and make informed decisions about what is acceptable to sustain land resources. The studies conducted in South Africa showed that a high rate of informal dumping leads to severe land degradation. Studies further showed that in townships careless waste disposal is often caused by the lack of awareness of the health dangers presented by the accumulation of refuse.

The literature review further revealed the extent of land degradation in some parts of Mkhondo and how other areas use Environmental Education as a guiding tool to sustainable living. The authors concluded that the impact of Environmental Education on solid waste can be either positive or negative to the environment and everyone should take responsibility for his or her impact on nature. The studies further revealed that a degraded environment can only offer a degraded quality of life and there is an irrepressible need for entrenching Environmental Education as a leading approach to solving environmental problems such as unacceptable solid waste disposal.

Most studies discussed in Chapter 2 considered litter as a problem that is caused by mostly perceived norms, for instance that people are more likely to litter in areas that are already filthy than in areas that are litter free. The social constructivist paradigm was used in the study as the perceptions about the environment of the Grade 12 learners who participated changed as they interacted with nature. I interpreted the behaviour of learners towards Environmental Education after being exposed to extra-mural activities. Therefore, knowledge

was constructed and understanding was circular as understanding of the parts led to the interpretation of the whole.

Chapter 3 outlined the methods of the study. The method of triangulation was used to collect data with the help of questionnaires, focus group interviews and observation. The focus was on Grade 12 learners and parents of the learners who were involved in the case study because they possessed the characteristics of individual units that were sources of ideas used in the analysis and interpretation of the study. The qualitative research approach in this study aimed to determine whether what had been taught during extra-mural activities on Environmental Education was being practiced by learners at school and in the areas where they come from. The size of the sample and the rigour of the investigation were discussed in Chapter 3. Furthermore, in this Chapter the questions were presented to provide necessary feedback on the impact of Environmental Education to learners. The interviews were video recorded and transcribed for presentation and analysis. The chapter also discussed the methods of analysis and interpretation. Finally, ethical considerations such as attrition, full disclosure, voluntary participation, risk to participants, privacy and validity also formed part of Chapter 3.

Chapter 4 dealt with data presentation and an analysis of the different methods used to collect data. The analyses were derived from the characteristics of the categories that emerged from the two themes in this study. The two themes were the importance and role of Environmental Education and the impact of Environmental Education. The categories derived from the study were Environmental Education in school and its importance, disposing of and sources of litter, initiatives in reducing littering, collecting litter at school and at home, and lastly, behavioural changes towards littering in learners.

5.3 THE FINDINGS ARE SUMMARISED AS FOLLOWS:

i) Learner factor

-  Learners continuously litter more papers and plastics before and after the Environmental Education initiative. The research showed that the Grade 12 learners who were involved in the study continued to dispose of litter inappropriately despite being involved in the Environmental Education programme that aimed at changing

the learners' behaviour in keeping the environment clean. In the school that was the site of the investigation, littering by learners was evident through observation.

- Learners were not bothered by the state of the class before and after the intervention of Environmental Education. During the period of the study learners' attitude towards keeping the environment clean was negative. Most litter was found in the classes that were exposed to the Environmental Education programme.
- Learners showed no concern about the negative impact of disposing of litter inappropriately. Parents revealed that Environmental Education had a minimal influence on their learners and they did not notice drastic changes in their children's behaviour after the intervention of Environmental Education initiatives during extracurricular activities. Environmental Education had a relatively low impact on how learners dispose of litter in the particular school.

ii) Environmental Education factor

- The littering after the extra-mural activities on Environmental Education showed that they were not concerned about the environment and there was a similar reaction at home, as some parents highlighted during the study.
- The initiative of Environmental Education was put into practice in a short period of time, hence learners were not yet fully acquainted with the responsibility of taking care of the environment and alleviating littering on the school premises. The study showed that if more time had been allocated to the programme and most learners were involved, the impact might have been different.

iii) Major findings

- The overall finding of this study was the negative impact of Environmental Education in reducing unacceptable solid waste disposal at school; hence, the extra-mural activities on Environmental Education did not change the behaviour of the particular Grade 12 learners who in the study; they continued to litter inappropriately after being taught on how to properly dispose of litter at school.
- Due to the small number of learners who participated in the programme, those learners who were not involved in the programme overshadowed the overall impact of

Environmental Education and therefore the entire school was experiencing unacceptable solid waste disposal.

iv) Participants' view on Environmental Education

- All stakeholders in the school should be involved in alleviating the unacceptable disposal of solid waste. They have to play an important role in conscientizing learners about the importance of keeping the environment free of litter that can lead to degradation of land resources.
- Environmental Education should not be an extra-mural activity but should be a regular part in the school schedule where every person plays a role in educating the learners on the consequences of disposing of litter inappropriately in the school and even in the places where the learners spend their time after school hours.
- All educators in the school should use Environmental Education as a source of information in promoting a sustainable environment where issues such as ethical awareness, values, attitude, skills and behaviour are consistent with effective and acceptable solid waste disposal.

5.4 CHALLENGES OF THE STUDY

- I was able to conduct the study in one school that was convenient to me due to financial and time constraints.
- Some participants were not conversant in English and the focus group questionnaire had to be translated to the vernacular, namely IsiZulu, to allow proper understanding of the questions asked. Some of the information filters as interpretations differ from the original meaning of the questions and responses.
- Attrition of participants due to various reasons as participation in the study was voluntary.

5.5 RECOMMENDATIONS OF THE STUDY

The findings of the study have resulted in the formulation of the following recommendations that have been suggested in alleviation of unacceptable littering that has a negative impact on the school and subsequently the places where learners live.

5.5.1 Training of stakeholders

- Educators should be trained on Environmental Education and reminded about the importance of keeping the learning environment free from litter that may result in land degradation. Educators will then cascade the information to learners as they are the role models of the younger generation. Manuals on Environmental Education should be developed so that every person has a common idea on how the environment should be sustained for future generations.

5.5.2 School and community awareness programmes

- The school should set aside some days for clean-up campaigns to create learner awareness and help in alleviating littering inside classes and in the school surroundings. For an example, the campaigns should be based in the school and learners should lead the initiatives.
- The programmes of the schools on the environment should be annually reviewed so that learners who complete Grade 12 and serve in the environmental committees are replaced.
- It is evident from the findings of this study that it is worthwhile for the people of Mkhondo to advocate for litter-free environment campaigns with the help of the local government and the spheres of education.
- Environmental Education should be a continuous programme that the school adopts to prevent learners from forgetting the importance of the environment and it should be accessible to all learners regardless of their phase at the school.

5.5.3 Consequence control

- Awards should be presented to classes who keep their environment clean, as that will encourage self-discipline amongst learners. As a form of negative feedback on littering, learners should be fined for poor behaviour.

5.5.4 Avoiding, reducing and separation of waste at school

- More waste bins should be made available in all classes instead of the small buckets that are unable to carry the amount of litter the learners dispose of inside the classrooms.
- REDUCE, REUSE AND RECYCLE, so learners and educators should use the 3 Rs as one of the initiatives to combat littering in the school and in their homes.

5.5.5 Further study

- I recommend that further studies should be carried out on how Environmental Education could be incorporated in the curriculum as an examinable subject in South African schools.

5.6 CONCLUSION

The study of the impact of Environmental Education at one of the schools in Mkhondo was successful as I was able to achieve the formulated aims and objectives. The findings indicate that although learners were taught and made aware of the extent of degradation caused by unacceptable solid waste disposal, positive attitudes and behavioural change towards littering were minimal. The results show that learners responded negatively to Environmental Education and consequently littering continues to prevail in the school.

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APPENDIX 1

Specific themes covered by the impact of Environmental Education study through questionnaires, focus group interviews and observation methods

1. Waste generation. The study showed during data collection the type of waste found and noted by the respondents as predominant in the streets and the schools.
2. Effect of waste on the people. The participants interviewed showed the importance of keeping natural resources sustainable by clearly outlining the visible and invisible effects of solid waste in the community.
3. Waste threats to the environment. The study also showed the deplorable community activities that lead to unwanted sequence of natural land degradation in Mkhondo.
4. Environmental responsible attitudes in the home. The study revealed good and bad attitudes of the community.
5. Waste disposal. The investigation clarified the different methods used for solid waste disposal in Mkhondo.
6. Knowledge, attitude and behaviour. Learners were interviewed in relation to their prior knowledge, attitude and behaviour on impact of unacceptable solid waste disposal in Mkhondo.

APPENDIX 2

THE IMPACT OF ENVIRONMENTAL EDUCATION IN SUSTAINING LAND RESOURCES: THE CASE OF MKHONDO VILLAGE.

QUESTIONNAIRE FOR LEARNERS

Number 1: Waste generation.

1. Do we produce more waste than our parents and grandparents?

YES NO

If yes, why do you think we are producing more waste?.....
.....

2. Are there any changes in the quantity and composition of waste generated during the last 10 years?

YES NO

If yes, name the changes that you have witnessed in the past years in the composition of waste: i).....

ii).....

iii).....

3. Who is responsible for generating waste?

School:

Community:

4. What type of solid waste is evident in your school and community?

School:.....

Community:.....

5. Learners litter papers, plastics, and residues due to negligence.

True Unsure False

6. How often do you litter:

Always

Most of the time

Sometimes

Rarely

Never

7. What is the importance of keeping our Environment clean?

.....
.....

8. Why do learners dispose litter in the classroom, corridors and around the school?

.....
.....

10) Does your school have a teaching and learning programme on keeping the environment clean?

YES

NO

11) Does the school have an environmental committee for learners?

YES

NO

Number 2: Effect of waste on people.

1. How does litter affect the health of people?.....
.....
.....

2. What are the consequences of litter:

Children:

Animals:

Number 3: Waste threats to the environment.

1. Name all kind of waste that is littered by learners and community members which poses a threat to the environment:

.....

.....
.....
.....
.....

2. How do waste destroy the natural resources in Mkhondo:

.....
.....
.....
.....

3. What evidence of change in the community has brought improper solid waste disposal:

.....
.....
.....

4. What activities do you think contribute to improper solid waste disposal?

.....
.....
.....

5. How does litter affect the following?

School:

Community:

Municipality:

Number 4: Environmental responsibly attitudes at home and school.

1. How do you ensure that you keep the Environment clean:

.....
.....
.....

2. What should be done by the community to ensure that littering is reduced in streets?.....
.....

3. What are the causes of littering in the community?

- i).....
- ii).....
- iii).....

4. How can the community reduce littering?

.....
.....

5. Can you elaborate how the school can reduce littering that destroys the land?

.....
.....

Number 5: Waste disposal.

1. Name places where garbage is littered in the community as well in school:

.....
.....

2. Where do you dump your litter properly?

School:

Home:

3. How frequently do you litter in a day?

ONCE

TWICE

THRICE

4. What are the consequences of littering garbage that you know?

i)

ii)

iii)

5. Do you have proper solid waste disposal materials in you school and community?

YES

NO

6. Do you have solid waste collection bins at school?

YES

NO

7. Do you have solid waste collection bins at home?

YES

NO

8. Does the Mkhondo municipality provide proper facilities to collect solid waste?

YES

NO

If yes, What kind of facilities;.....

9. How can the school and community ensure solid waste is properly disposed?

.....

10. How do you think solid waste can cause danger to the environment?

.....

Number 6: Knowledge, attitude and behaviour.

1. Why is the environment exposed to garbage in school and the community?

.....
.....

2. Who should take care of the environment and why?

.....
.....

3. How do you react when a learner litter in full view of the classmates?

No reaction (Why):.....

I react (How):

4. What do you know about Environmental Education?

.....
.....

Number 7: Importance of Environmental Education

1. Give two reasons why Environmental Education might be important in schools towards solving problems associated with littering?

a).....

b).....

3 Is Environmental Education important towards keeping the school and community clean?

YES Why.....

NO Why.....

4 Is what you learned in Environmental Education been replicated in the school and the community? YES NO

Give a reason:

.....
.....
.....

5 What changes has been brought about learning Environmental Education School:..... Comm unity:.....

Number 8: Role played by Environmental Education in the school and community

1. What promotion and educational campaigns do you think can increase public participation in sustaining natural resources in Mkhondo?.....

.....
.....

2. What changes has been brought by Environmental Education in:

a) School:.....

b) Community:.....

3 How does Environmental Education impact on the way you preserve land resources?

.....
.....
.....

4. Environmental Education does not play a role in way learners preserve land resources.

Strongly agree Agree Disagree Strongly disagree

5. Are there any Environmental initiative groups in your school and community?

YES Their role is to.....

NO Give a reason why:.....

Number 9: The resemblance of Environmental Education in the community

1. Indicate how you feel about Environmental Education in dealing with solid waste disposal:

Strongly Essential Essential Not Essential

2. How do you rate the impact of Environmental Education in sustaining land resources?

Very poor Poor Fair Good Excellent

3. What changes did you make in your school and community after being taught Environmental Education?

.....
.....

4. Environmental Education is important in sustaining land resources:

Strongly Agree Agree Neutral Disagree Strongly Disagree

APPENDIX 3
INTERVIEW GUIDE (FOCUS GROUP - PARENTS)

1. What is the importance of Environment?
2. How do you get rid of garbage in your homes?
3. Are your children responsible for disposing solid waste?

YES NO

4. What changes do you notice in your child about litter since being taught Environmental Education?
5. What are the dangers of improper solid waste disposal in your community?

6. Who are mostly affected by improper solid waste disposal in Mkhondo?

7. How often do you dispose litter incorrectly?

8. Do you have Environmental societies in Mkhondo?

YES NO

9. If yes, what is the role of the Environmental organisations that you know?

10. Did Environmental Education influence your child in disposing solid waste in a proper way?

11. Who should be responsible for the Environment?

12. Do you think solid waste can cause any dangers to your health?

13. What dangers do you think solid waste can cause to your health?

14. What evidence of change do you see in your learner concerning environmental issues.

15. How many times does the municipality collect waste?

16. Have any person told you to dispose solid waste in a proper way?
17. How do you dispose garbage when it has not been collected by the municipality?
18. Do you think education can play a role in reducing improper solid waste disposal in Mkhondo?
19. If yes, how do you think education can help?
20. Has Environmental Education played a role in your learner's behaviour towards keeping the environment clean?
21. What role do you play in the community to keep environment sustainable for future generation?

APPENDIX 4
INTERVIEW GUIDE FOR LEARNERS (FOCUS GROUP INTERVIEWS)

1. What is the importance of Environment?
2. How do you get rid of garbage in your homes?
3. Are your children responsible for disposing solid waste?

YES NO

4. What changes do you notice in your behaviour about litter since being taught Environmental Education?

5. What are the dangers of improper solid waste disposal in your community?

6. Who are mostly affected by improper solid waste disposal in Mkhondo?

7. How often do you dispose litter incorrectly?

8. Do you have Environmental societies in Mkhondo?

YES NO

9. If yes, what is the role of the Environmental organisations that you know?

10. Who should be responsible for the Environment?

11. Do you think refuse can cause any dangers to your health?

12. What dangers do you think garbage and refuse can cause to your health?

13. How many times does the municipality collect waste?

14. Have any person told you to dispose solid waste in a proper way?

15. How do you dispose garbage when it has not been collected by the municipality?

16. Do you think education can play a role in reducing improper solid waste disposal in Mkhondo?

17. If yes, how do you think education can help?
18. What role do you play in the community to keep environment sustainable for future generation?
19. Why is keeping the environment waste free so important?
20. How can the school reduce littering in the classrooms?
21. Have any people informed you of the need to put garbage away properly?
22. Do you think educators make a difference to the way you treat litter?

APPENDIX 5

Imibuzo ebhekiswe kubazali

1. Kusho ukuthini ukubaluleka kwemnvelo?
2. Nizithutha kanjani izibi/udodi emakhaya?
3. Izingane ziyayidlala yini indima ekuthuthweni kwezibi emakhaya?

Yebo Cha

4. Imuphi umehluko owubonayo emntwaneni wakho emuva kokufundiswa ngokubaluleka kwemnvelo?
5. Ibuphi ubungozi bokulahla amabhodlela emphakathini?
6. Ibaphi abantu abathintka kakhulu ngoku lahlwa kwezibi ezinamabholdele eMkhondo?
7. Kukangakanani ukulahla kwakh izibi ezindaweni ezingafanele?
8. Ingabe bakhona yini abantu abanakekela imnvelo emkhondo?

Yebo Cha

9. Uma bekhona iyiphi indima noma unsebenzi abawenzayo owaziyo?
10. Ukufundiswa ngemnvelo komntwana wakho kukhona umehluko owaba khona ngokulahlwa kwezibi endaweni efanele?
11. Umsebenzi wabani/wobani ukunakekela imnvelo?
12. Ucabanga ukuthi izibi/udodi ungaba nobungozi enpilweni yakho?
13. Ibuphi ubungozi obubangwa izibi/udodi empilweni?
14. Ibuphi ubufakazi obubonayo ebantwaneni ngokuphatelene nemnvelo?
15. Umasipala uwulanda kawungakhi udodi/izibi enyangeni?
16. Kukhona yini abantu/umuntu owake wakutshela ngokulahlwa kwezibi/kododi ezindaweni ezifanele?
17. Uwulahla kuphi noma uwenza njani udodi uma uMasipala engawulandanga?

18. Ucabanga ukkuthi ikhona indima engadlalwa umnyango wezemnfundo ekunciphiseni izinga lokulahlwa kwezibi ezindaweni ezingafanele?
19. Uma uthethe yebo, iyiphi indlela umnyango wezeMnfundo ongasizangayo?
20. Ingabe ukufundiswa kwabantwana ngemvelo kuwenzile yini umehluko ekugcineni imvelo ihlanzekile?
21. Nguyiphi indima oyidlalayo ekugcineni imvelo ihlanzekile kuze itholwe nayisizukulwane esizayo?

APPENDIX 6 (LETTERS OF REQUEST)

APPENDIX 6.1

Enquiries: Mr. S.B. Msezane P. O. Box 782

University of South Africa Piet Retief

Student No: 44144156 2380

Cell No: 073 354 8165

Fax No: 017 826 2483 09 OCTOBER 2012

Dear Principal

Request to conduct interviews in your school

I humbly request permission to conduct research in your school. The study is focused on the Impact of Environmental Education in sustaining land resources. The aim of the study is to investigate the impact Environmental Education play in schools and community through learner's involvement with regard to improper waste disposal which causes land degradation in Mkhondo.

I am a student at the University of South Africa enrolled for Masters Degree in Environmental Education. About 40 Grade 12 learners will be required to complete a structured questionnaire and 10 learners participate in a focus group interview. Eight parents of few learners will be interviewed at the school using a focus group technique. The programme of the school will not be interrupted and learners will be interviewed after school hours. The school, parents and learners information will be kept confidential. The participation of learners and parents is voluntary and they have the right to withdraw from the study.

I appreciate your sincere consideration to my request.

Yours faithfully

Mr. S. B. Msezane

APPENDIX 6.2

Enquiries: Mr. S.B. Msezane

P. O. Box 782

University of South Africa

Piet Retief

Student No: 44144156

2380

Cell No: 073 354 8165

Fax No: 017 826 2483

09 OCTOBER 2012

The Circuit Manager (Mkhondo)

Dear Sir

Request to conduct interviews in your circuit

I humbly request permission to conduct research at Amadlelo Aluhlaza Secondary school. The study is focused on the Impact of Environmental Education in sustaining land resources. The aim of the study is to investigate the impact Environmental Education play in schools and community through learner's involvement with regard to improper waste disposal which causes land degradation in Mkhondo.

I am a student at the University of South Africa enrolled for Masters Degree in Environmental Education. About 40 Grade 12 learners will complete a structured questionnaire and 10 learners participate in a focus group interviews. Eight parents of learners will be interviewed in the school using a focus group technique. Data collection will be done after school hours to avoid disruption of the normal school programme. The school, parents, learners, and information will be kept confidential. The participants can withdraw from the study voluntarily.

I appreciate your sincere consideration to my request.

Yours faithfully

Mr. S. B. Msezane

APPENDIX 6.3

Enquiries: Mr. S.B. Msezane P. O. Box 782

University of South Africa Piet Retief

Student No: 44144156 2380

Cell No: 073 354 8165

Fax No: 017 826 2483

INFORMED CONSENT FORM (Learners above 18 years)

I humbly request your participation in the research to be conducted in your school. The study is focused on the Impact of Environmental Education in sustaining land resources. The aim of the study is to investigate the impact Environmental Education play in schools and community through learner's involvement with regard to improper waste disposal which causes land degradation in Mkhondo.

I am a student at the University of South Africa enrolled for Masters Degree in Environmental Education. Forty learners will complete a structured questionnaire and 10 learners participate on a focus group interview. Your information will be kept anonymous and you may withdraw from the study if you feel not comfortable. The school and learners information will be kept confidential.

Summary of findings will be available after the dissertation has been completed.

I appreciate your sincere consideration to my request.

Yours faithfully

Mr. S. B. Msezane

APPENDIX 6.4

Enquiries: Mr. S.B. Msezane P. O. Box 782

University of South Africa Piet Retief

Student No: 44144156 2380

Cell No: 073 354 8165

Fax No: 017 826 2483

CHILD ASSENT FORM (Learners below 18 years)

I humbly request your child's participation in the research to be conducted in your school. The study is focused on the Impact of Environmental Education in sustaining land resources. The aim of the study is to investigate the impact Environmental Education play in schools and community through learner's involvement with regard to improper waste disposal which causes land degradation in Mkhondo. I will be glad if your child can form part of the participants.

I am a student at the University of South Africa enrolled for Masters Degree in Environmental Education. Forty learners will complete a structured questionnaire and some of them on a focus group interview. The child's information will be anonymous and she/he may withdraw from the interviews if feels not comfortable. The school, parents and learners information will be kept confidential.

Summary of findings will be available after the dissertation has been completed.

I appreciate your sincere consideration to my request and looking forward seeing your child in the research.

Yours faithfully

Mr. S. B. Msezane

APPENDIX 6.5

Enquiries: Mr. S.B. Msezane

P. O. Box 782

University of South Africa

Piet Retief

Student No: 44144156

2380

Cell No: 073 354 8165

Fax No: 017 826 2483

Approval of Participation by Learners (older than 18 years)

I..... agree to take part in the forthcoming research to be conducted in my school. I have read all the requirements of the consent form and will attend to the requirement of the participation with all my knowledge and truth. I am.....years old and doing Grade.....at

Date:

Signature:

Place:

APPENDIX 6.6

Enquiries: Mr. S.B. Msezane

P. O. Box 782

University of South Africa

Piet Retief

Student No: 44144156

2380

Cell No: 073 354 8165

Fax No: 017 826 2483

Child assent form

I am a parent/guardian ofwho is a learner of the school where the research will be conducted. I agree that she/he takes part in the interviews. Also allow her/him to be video recorded in the study.

Residential address:

Initials and Surname of parent:

Signature of parent:

Date:

APPENDIX 6.7

Enquiries: Mr. S.B. Msezane

P. O. Box 782

University of South Africa

Piet Retief

Student No: 44144156

2380

Cell No: 073 354 8165

Fax No: 017 826 2483

Dear Sir/Madam

Request your participation in the research (Parent/Guardian)

I humbly request your participation in the research to be conducted in your child's school. The study is focused on the Impact of Environmental Education in sustaining land resources. The aim of the study is to investigate the impact Environmental Education play in schools and community through learner's involvement with regard to improper waste disposal which causes land degradation in Mkhondo.

I am a teacher of your child and student at the University of South Africa enrolled for Masters Degree in Environmental Education. You will be interviewed in the school using a focus group technique, where you will be asked questions and video will be used to capture the proceedings.

The school, parents and learners information will be kept confidential. You can withdraw from the study voluntarily.

I appreciate your sincere consideration to my request.

Yours faithfully

Mr. S. B. Msezane

APPENDIX 6.8

Enquiries: Mr. S.B. Msezane

P. O. Box 782

University of South Africa

Piet Retief

Student No: 44144156

2380

Cell No: 073 354 8165

Fax No: 017 826 2483

Confirmation of participation by parents or guardian

I am a parent/guardian ofwho is a learner at Amadlelo Aluhlaza Secondary School. I agree to take part in the interviews. I will also notify the researcher if I will not be part of the interviews.

Residential address:

Initials and Surname of parent:

Signature of parent:

Date:

APPENDIX 7

RESEACH ETHICS CLEARANCE CERTIFICATE



Research Ethics Clearance Certificate

This is to certify that the application for ethical clearance submitted by

SB Msezane [44144156]

for a M Ed study entitled

**The impact of environmental education in sustaining land
resources: a case of Mkhondo village**

has met the ethical requirements as specified by the University of South Africa
College of Education Research Ethics Committee. This certificate is valid for two
years from the date of issue.

A handwritten signature in black ink, appearing to read "Prof CS le Roux".

Prof CS le Roux
CEDU REC (Chairperson)
lrouxcs@unisa.ac.za
Reference number: 2013 APR/44144156/CSLR

18 April 2013

APPENDIX 8

LETTER OF APPROVAL FROM THE CIRCUIT MANAGER



education
DEPARTMENT: EDUCATION
MPUMALANGA PROVINCE

Piet Retief Circuit office
Private Bag X 18
Piet Retief 2380
De Wet Street
Piet Retief 2380
Republic of South Africa
Telephone number: 017 826 2071/2
Fax number: 017 826 3104

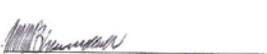
Litiko letembafundo umnyango wefundu Departement van Onderwys umnyango wezemfundo

ENQ : M.B. Mdlalose
TELL NO: 017 826 2071/2

TO : UNISA Ethical Committee
FROM : Mr. M.B. Mdlalose
Circuit Manager (Piet Retief)
DATE : 2013-02-27
SUBJECT : Permission to conduct the study

The circuit manager through the Department of Education grants you permission to Conduct your proposed study. We wish you success in your study and hope it will add value to our learners and the community.

Yours faithfully


M.B. Mdlalose

MPUMALANGA PROVINCE
PIET RETIEF CIRCUIT OFFICE
2013 -02- 27
PRIVATE BAG X18, PIET RETIEF 2380
DEPARTMENT OF EDUCATION

APPENDIX 9

LETTER OF APPROVAL FROM SCHOOL PRINCIPAL

1

Mpumalanga Education Department
St. Marcia Secondary School

1073 Phila Myeni Avenue
Ethandukukhanya
Piet Retief
2380
Tel. /Fax (017) 826 2483

P.O. Box 2515
Piet Retief
2380



SUBJECT : Letter of permission

TO: Mr. S.B. Msezane

Permission to conduct research in the school

In response to the letter of permission, the school management team has duly accepted your request to conduct your study in 2013.

Yours faithfully

[Signature]

Mr. F. Mau (Principal)



APPENDIX 10

LEETER OF APPROVAL FROM SCHOOL GOVERNING BODY (SGB)

1

Mnimalanga Education Department
St. Marcia Secondary School

1073 Phila Myeni Avenue
Ethandukukhanya
Piet Retief
2380
Tel. /Fax (017) 826 2483

P.O. Box 2515
Piet Retief
2380



Subject: Request for interview.

To: Mr. S.B. Msezane

The school allows you to conduct research in 2013 on its surroundings and learners are allowed to be involved in your research if they wish. We hope your research will be rewarding to the school and the community

Yours Sincerely

R. M. Myeni

Mr M. Myeni (SGB)

St Marcia SECONDARY SCHOOL
21 NOV 2012
P.O. BOX 2515
PIET RETIEF, 2380

APPENDIX 11

SCHEDULE FOR DATA COLLECTION

Table: Showing data collection programme.

Date	Type of interviews	Interviewer	Interviewee
4 March 2013 to 15 March 2013	Observations	Researcher and Two assistants	2 Grade 12 Classes
16 March 2013	Pilot test (Focus group)	Researcher	6 Learners
18 March 2013	Pilot test (Questionnaires)	Researcher	7 Learners
19 March 2013	Pilot test (Focus group parents)	Researcher	2 Parents
20 March 2012	Questionnaires	Researcher	40 Learners
10 April 2013	Focus group	Researcher	10 Learners
13 April 2013	Focus group	Researcher and Photographer	7 Parents

APPENDIX 12

TRANSCRIPTS OF THE LEARNERS QUESTIONNAIRES

Category 1		WASTE GENERATION: CHARACTERISTICS
Q1	Line No.	<p>Do we produce more waste than our parents and grandparents?</p> <p style="text-align: center;">YES NO</p> <p>If yes, why do you think we are producing more waste?</p>
	1	<ul style="list-style-type: none"> ▪ No discipline or respect to the environment in terms of keeping our places clean
	2	
	3	<ul style="list-style-type: none"> ▪ Negligence and not taught about proper disposal of waste by our parents
	4	
	5	<ul style="list-style-type: none"> ▪ Buy items that are in plastic and we end up littering the plastic bags on the environment
	6	
	7	<ul style="list-style-type: none"> ▪ We buy lot of things like chips, and eat a lot of school and the plastic and paper containers end up in the schoolyard.
	8	
	9	<ul style="list-style-type: none"> ▪ We lack knowledge about Environmental Education.
	10	<ul style="list-style-type: none"> ▪ Population, lack of knowledge, sell many things in the community, do not care about the environment or consequences of littering
	11	
	12	
	13	<ul style="list-style-type: none"> ▪ Buy regularly now than before so a lot of waste accumulating.
Q8		<p>Are there any changes in the quantity and composition of waste generated during the last 10 years?</p> <p style="text-align: center;">YES NO</p> <p>If yes, name the changes that you have witnessed in the past years in the composition of waste</p>
	14	<ul style="list-style-type: none"> ▪ Fewer shops, less population, plastic bags are expensive,
	15	<ul style="list-style-type: none"> ▪ More solid waste, no fertile soil as we degrade the natural resources.
	16	
	17	<ul style="list-style-type: none"> ▪ No sickness, no bottles and papers that we experience now,
	18	<ul style="list-style-type: none"> ▪ Not buying many things before than now and that will influence more littering in the environment.
	19	
	20	<ul style="list-style-type: none"> ▪ Trucks and burn rubbish, more recycling happens now than before.
	21	

Q3		Who is responsible for generating waste?
	22	<ul style="list-style-type: none"> ▪ School: learners, people at school, learners-throwing papers on the floor and all of us are responsible in generating waste.
	23	
	24	<ul style="list-style-type: none"> ▪ Community: elders, parents and public are responsible for littering in the areas.
	25	
	26	<ul style="list-style-type: none"> ▪ Shops and market in school are responsible for generating waste.
	27	
Q4		What type of solid waste is evident in you school and community?
	28	<ul style="list-style-type: none"> ▪ School; papers and plastics, plastic bottles
	29	<ul style="list-style-type: none"> ▪ Community: tins, papers and plastics, torn clothes, dead dogs, plastics and pumpers
	30	
Q5		Learners litter papers, plastics, and residues due to negligence.
		<input type="checkbox"/> True <input type="checkbox"/> Unsure <input type="checkbox"/> False
	31	<ul style="list-style-type: none"> ▪ true:30 learners false:1 learner unsure:9 learners
	32	
	33	<ul style="list-style-type: none"> ▪ Learners believed that it is true that they litter papers, plastics and residues due to negligence.
	34	
Q6		How often do you litter.
		<input type="checkbox"/> Always <input type="checkbox"/> Most of the time <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely
		<input type="checkbox"/> Never
	35	<ul style="list-style-type: none"> ▪ always:25 learners sometimes:9 learners rarely:3 learners
	36	<ul style="list-style-type: none"> ▪ most of the time:3 learners
	37	<ul style="list-style-type: none"> ▪ Learners believed that they always litter at school.
Q7		What is the importance of keeping our Environment clean?
	38	<ul style="list-style-type: none"> ▪ To reduce diseases, avoid dirt, neat environment and promote health living.
	39	
	40	<ul style="list-style-type: none"> ▪ Promote safe environment, avoid germs and pollution from burning of litter.
	41	
	42	<ul style="list-style-type: none"> ▪ For the next generation to benefit from clean environment
	43	<ul style="list-style-type: none"> ▪ Save spaces for human activities.
Q8		Why do learners dispose litter in the classroom, corridors and around the school?
	44	<ul style="list-style-type: none"> ▪ Know that there is someone working and responsible for

	45 46 47 48 49 50 51	<p>collecting litter.</p> <ul style="list-style-type: none"> ▪ Less knowledge about littering consequences. ▪ Lazy , negligence, careless and not monitored by teachers ▪ Lack discipline and information on proper waste disposal. ▪ Do not care about the importance of cleanliness. ▪ No bins in the classroom.
Q9	52	No question
Q10		<p>Does your school have a teaching and learning programme on keeping the environment clean?</p> <p style="text-align: center;">YES NO</p>
	53 54 55	<ul style="list-style-type: none"> ▪ Yes:30 learners No:10 learners ▪ Learners believed that at the school there are programmes on environment.
Q11		<p>Does the school have an environmental committee for learners?</p> <p style="text-align: center;">YES NO</p>
	56	<ul style="list-style-type: none"> ▪ No:29 learners Yes: 11 learners ▪ Learners at the school have an environmental committee.
Category 2		THE EFFECT OF WASTE ON PEOPLE : CHARACTERISTICS
Q1		How does litter affect the health of people?
	57 58 59 60 61	<ul style="list-style-type: none"> ▪ Causes diseases, pollution, open tins, which are danger to animals. ▪ Causes sickness and air pollution ▪ Spread of germs ▪ Proliferation of mosquitoes and spread of malaria
Q8		What are the consequences of litter:
	62 63 64	<ul style="list-style-type: none"> ▪ children : diseases and they are hurt, eat poisonous substances ▪ animals: digestion problems, death caused by eating plastics ▪ Cause flu and bacteria ▪ Spread of diarrhoea and injuries
Category 3		WASTE THREATS TO THE ENVIRONMENT : CHARACTERISTICS

Q1		Name all kind of waste that is littered by learners and community members which poses a treat to the environment
	65	▪ Plastic, papers and rotten food, dead animals, torn clothes, cans
	66	▪ Tablet and medicine
	67	▪ Used condoms, rotten vegetable, dead animals, old shoes and metal
	68	▪ Hair and pumbers and injection, dead animals
	69	
	70	
Q8		How do waste destroy the natural resources in Mkhondo?
	71	▪ Land is destroyed by soil erosion
	72	▪ Water through contamination, pollution, deforestation, grass is destroyed
	73	
	74	▪ Degrading soil fertility
	75	▪ No place to plant trees
	76	▪ Water pollution.
	77	▪ Plants die and breeding of germs
	78	▪ Chemicals such acid destroys plants
Q3		What evidence of change in the community has brought improper solid waste disposal?
	79	▪ Plants die litter, animals die, do not recycle plastics
	80	▪ More dirt, bad smell, road full of litter is seen at school
	81	▪ Climate change, no dustbins to collect litter
Q4		What activities do you think contribute to improper solid waste disposal?
	82	▪ Less knowledge, throwing papers, strikes,
Q5		How does litter affect the school, community and municipal?
	83	▪ school ; children, dirt, not attractive- not health environment
	84	▪ community : diseases, injuries, global warming, lot of insects and pollution
	85	
	86	▪ municipal : not doing their job, more than manageable, hard to improve
	87	
	88	

Category 4		ENVIRONMENTAL RESPONSIBLY ATTITUDES AT HOME AND SCHOOL: CHARACTERISTICS
Q1		How do you ensure that you keep the Environment clean:
	89	▪ Digging pits and put litter
	90	▪ Do not throw papers where there is no dustbin, collecting papers that you see
	91	
	92	▪ Bury rubbish, put litter in the dustbin, teaching others, lead by example and tell them about the consequences of littering.
	93	
Q8		What the community to ensure that littering is reduced in street should do?
	94	▪ Check at the end of the week whether papers are thrown and pick them, provide bins, put and burn rubbish, billboards next to roads, teach, and put dustbin on each street.
	95	
	96	
Q3		What are the causes of littering in the school and community?
	97	▪ Lack of containers, knowledge, more shops, shortage of garbage by municipality, lack of service delivery and lack of Environmental Education
	98	
	99	
	100	▪ Lack of knowledge
	101	▪ Land pollution, lack of dustbin
	102	▪ Overpopulation
Q4		Can you elaborate how the school can reduce littering that destroys the land?
	103	▪ More dustbin in classrooms and digging pit, burning rubbish, placing garbage containers, environmental education
	104	
	105	▪ Pick papers, donate plastic bags
	106	▪ Environment societies must be formed in all classes, fine learners who litter
	107	
	108	▪ Teachers should be responsible
	109	▪ More learning programme, burn the papers, higher more people
	110	▪ Recycling, reducing products that are harmful

Category 5		WASTE DISPOSAL: CHARACTERISTICS
Q1		Name places where garbage is littered in the community as well as in school:
	111	▪ community: on streets and next to the road, waste container, passage, waste containers, next to roads
	112	▪ school: classroom and out, cardboard at the back of the door., bins ,steps behind doors, dumping sites
	113	
	114	
Q8		Where do you dump your litter properly?
	115	▪ school: dustbin, box
	116	▪ home: plastic bag, hole, waste baskets
Q3		What are the consequences of littering garbage that you know?
	117	▪ disease, untidy place, pollution, kill animals, disease, water pollution, land pollution, diseases, and injuries
	118	
Q4		Do you have proper solid waste disposal materials in you school and community? YES NO
	119	▪ yes:36 responses no:4 responses
Q5		Do you have solid waste collection bins at home? YES NO
	120	▪ yes: 34 no: 6

Q6		Do you have solid waste collection bins at school? YES NO
	121	▪ YES:31 NO:9
Q7		. Does the Mkhondo municipality provide proper facilities to collect solid waste? YES NO If yes, What kind of facilities
	122	▪ Yes:33 No:7
	123	▪ truck, hire people to clean, fetch litter once a week,
Q8		How can the school and community ensure solid waste is properly disposed?
	124	▪ Not littering and burn, provide bins, collect everyday, containers
	125	▪ Programme to be developed, picking any litter they see, monitoring and teaching, put more dustbin, making which may
	126	

	127	terminate those who litter, make sure waste is collected
Category 6		KNOWLEDGE, ATTITUDE AND BEHAVIOUR OF LEARNERS TOWARDS ENVIRONMENTAL EDUCATION: CHARACTERISTICS
Q1		Why is the environment exposed to garbage in school and the community?
	128 129 130 131 132 133	<ul style="list-style-type: none"> ▪ Lack understanding the importance, littering, lot of people, failing to take responsibility ▪ Learners throw litter anywhere and some do not have waste containers ▪ Ignorance by learners ▪ Lack of knowledge and careless by learners.
Q8		Who should take care of the environment and why?
	134 135	<ul style="list-style-type: none"> ▪ Everyone surrounded by the environment ▪ Community at large
Q3		How do you react when a learner litter in full view of the classmates?
	136 137 138 139	<ul style="list-style-type: none"> ▪ No reaction because I also litter ▪ Reaction; tell the person can stop litter. Teaching him to keep the environmental clean ▪ no reaction, (feel offended)
Q4		What do you know about Environmental Education?
	140 141 142 143 144 145 146	<ul style="list-style-type: none"> ▪ How to avoid littering, keep the environment clean, where people are being taught and given ways on how and why it is important for us to keep the environment clean ▪ Give us information on keeping the environment safe. ▪ Promotes social health ▪ Promote clean surroundings ▪ Study of how the environment is essential
Category 7		IMPORTANCE OF ENVIRONMENTAL EDUCATION: CHARACTERISTICS

Q1		Give two reasons why Environmental Education is important in schools?
	147 148 149 150 151 152	<ul style="list-style-type: none"> ▪ Conserve environment, pass knowledge, teach about how to keep the place clean, know how littering is dangerous, pass information to parents, teach to keep environment clean, positive mindset, want learners to teach each other ▪ Reduce pollution ▪ Promote responsible learners.
Q8		No question
Q3		Is Environmental Education important towards keeping the school and community clean?
	153 154 155	<ul style="list-style-type: none"> ▪ yes:39 no:1 ▪ Encourages clean place, reduce land degradation, reduce sickness and educational
Q4		Is what you learned in Environmental Education been replicated in the school and the community? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	156 157	<ul style="list-style-type: none"> ▪ yes:25 no:15 ▪ But not in an acceptable levels.
Q5		What changes has been brought about learning Environmental Education
	158 159 160 161	<ul style="list-style-type: none"> ▪ school: less papers in school, less littering but learners behaviour is not changing that much. ▪ Some learners felt Environmental Education at the school has brought no change.
Category 8		ROLE PLAYED BY ENVIRONMENTAL EDUCATION IN THE SCHOOL AND COMMUNITY
Q1		What promotion and educational campaigns do you think can increase public participation in sustaining natural resources in Mkhondo?
	162 163 164 165	<ul style="list-style-type: none"> ▪ Billboards, educating and providing bins, Environmental Education campaigns, promotions by environmental education specialists, teaching each other, inform, notice papers, walk and collect , have Environmental Education club

Q8		What changes has been brought by Environmental Education in school.
	166	<ul style="list-style-type: none"> ▪ School: Less change is evident.
Q3		How does Environmental Education impact on the way you preserve land resources?
	167	<ul style="list-style-type: none"> ▪ how do we preserve land resources, positive and no longer litter
	168	<ul style="list-style-type: none"> papers and cans, awareness
	169	<ul style="list-style-type: none"> ▪ Environmental Education has made no changes.
Q4		Environmental Education does not play a role in way learners preserve land resources.
		<input type="button" value="Strongly agree"/> <input type="button" value="Agree"/> <input type="button" value="Disagree"/> <input type="button" value="Strongly disagree"/>
	170	<ul style="list-style-type: none"> ▪ disagree: 13 agree:12 strong; 8 strong disagree:7
Q5		Are there any Environmental initiative groups in your school and community?
	171	<ul style="list-style-type: none"> ▪ yes; 25 no:15
	172	<ul style="list-style-type: none"> ▪ To make environment clean, educate learners about consequences of littering, pick papers after school
	173	<ul style="list-style-type: none"> ▪ Collect waste, make meeting about cleaning, work together.
Q6		How can the community combine together and keep their environment clean?
	175	<ul style="list-style-type: none"> ▪ Placing solid waste containers, fine people, building parks.
	176	<ul style="list-style-type: none"> ▪ Demonstration, project, form groups
	177	<ul style="list-style-type: none"> ▪ Donate to buy waste containers
Category 9		THE EFFECT OF ENVIRONMENTAL EDUCATION IN MKHONDO
Q1		Indicate how you feel about Environmental Education in dealing with solid waste disposal:
		<input type="button" value="Strongly Essential"/> <input type="button" value="Essential"/> <input type="button" value="Not Essential"/>
	178	<ul style="list-style-type: none"> ▪ essential:29 strongly essential:11
Q8		How do you rate the impact of Environmental Education in sustaining land resources?
		<input type="button" value="Very poor"/> <input type="button" value="Poor"/> <input type="button" value="Fair"/> <input type="button" value="Good"/> <input type="button" value="Excellent"/>
	179	<ul style="list-style-type: none"> ▪ fair:12 poor: 11 good:15 excellent:8

Q3		What changes did you make in your school and community after being taught Environmental Education?
	180	<ul style="list-style-type: none"> ▪ Teach them about keeping environment clean
	181	<ul style="list-style-type: none"> ▪ Organise rubbish bins
	182	<ul style="list-style-type: none"> ▪ No change made.
Q4		Environmental Education is important in sustaining land resources: <div style="display: flex; justify-content: space-around; font-weight: bold;"> Strongly Agree Agree Neutral Disagree Strongly Disagree </div>
	183	<ul style="list-style-type: none"> ▪ strongly agree:12 agree:25 neutral:2 strongly disagree:1

APPENDIX 13

TRANSCRIPTS OF LEARNERS FOCUS GROUP

Interview schedule(Categories)	Line Number	Response from learners
1. Importance of environment.	1 2 3 4 5	<ul style="list-style-type: none"> ▪ Health, food, tourism and fresh air ▪ Future generation have to benefit from the very same environment. ▪ Life to plants ▪ Create jobs such as forest.
2. Getting rid of garbage in your homes.	6 7 8 9	<ul style="list-style-type: none"> ▪ Burn litter, throw it away in street corners, making of compost, recycling (tins, bottles and plastics) ▪ Use dust bins.
3. Responsible for disposing solid waste.	10 11	<ul style="list-style-type: none"> ▪ They are all responsible for disposing litter at home and school.
4. Changes in behaviour about litter since being taught Environmental Education.	12 13	<ul style="list-style-type: none"> ▪ Few changes are seen. ▪ No change experienced.
5. Dangers of improper solid waste disposal in your community.	14 15 16 17 18 19	<ul style="list-style-type: none"> ▪ Animals feed on litter ▪ Cause sickness, diseases, injuries, proliferation of mosquitoes ▪ Pollution, children eating from rubbish. ▪ Accidents ▪ Block drainage systems
6. Mostly affected by improper solid waste disposal in Mkhondo.	20 21	<ul style="list-style-type: none"> ▪ Animals and children eating the contaminated litter.
7. Disposing litter incorrectly.	22	<ul style="list-style-type: none"> ▪ Frequently, Always
8. Environmental societies in Mkhondo	23	<ul style="list-style-type: none"> ▪ No environment societies in the area.

9. What dangers do you think garbage and refuse can cause to your health?	24 25	<ul style="list-style-type: none"> ▪ Sickness ▪ Air pollution
11 Collection of waste by the municipality	26	<ul style="list-style-type: none"> ▪ Once a week
12. Any person told you to dispose solid waste in a proper way	27 28 29 30 31	<ul style="list-style-type: none"> ▪ Teachers ▪ TV programmes ▪ Radios ▪ News ▪ Products that we buy
13. Disposing garbage when it has not been collected by the municipality.	32 33 34	<ul style="list-style-type: none"> ▪ Dogs eat the rubbish ▪ Throw them away in the area ▪ Burn the litter
14. Role of education in reducing improper solid waste disposal in Mkhondo.	35 36 37	<ul style="list-style-type: none"> ▪ Ignorance from the people ▪ Lead by example ▪ Need for notice boards
15. Role you play in the community to keep environment sustainable for future generation.	38 39 40	<ul style="list-style-type: none"> ▪ Formed groups in the area to collect litter. ▪ Change of behaviour in the way we dispose litter.
16. Importance of keeping the environment waste free.	41 42 43	<ul style="list-style-type: none"> ▪ Ozone layer ▪ Good health ▪ Sustainability
17. School reducing littering in the classrooms.	44 45 46 47 48	<ul style="list-style-type: none"> ▪ Punishment in the form of cleaning the whole school yard after school ▪ Some learners have been seen throwing litter in a proper place. ▪ Schools should have different bins for

	49	recycling purposes.
	50	<ul style="list-style-type: none"> ▪ All educators should advocate for change in behaviour
	51	<ul style="list-style-type: none"> ▪ Posters educating about the importance of environment should be visible at school.
	52	<ul style="list-style-type: none"> ▪ 15 minutes after break learners should be grouped to collect papers around the school.
	53	<ul style="list-style-type: none"> ▪ Encouraging buying food without plastic and paper covers during break time.
	54	
	55	
	56	
	57	
	58	
18. Role of educators in the way you dispose litter.	59	<ul style="list-style-type: none"> ▪ Some educators are not responsible in reducing litter in the schoolyard.
	60	
	61	<ul style="list-style-type: none"> ▪ Few play an important role in reducing litter in the classroom
	62	

APPENDIX 14

TRANSCRIPTS OF PARENTS FOCUS GROUP

Interview schedule (Categories)	Line Number	Response from parents
1. Importance of environment.	1 2 3 4 5 6 7 8 9 10	<ul style="list-style-type: none"> ▪ Fresh air that we breath should be clean and environment should be sustained. ▪ New generation benefit from environment such as trees and should be destroyed such as tree which are in danger of extinct (izinyawo zendlovu) ▪ Animals die from eating plastics and feeding on cans and it is important to keep the environment safe. ▪ Get vegetables from the gardens
2. Getting rid of garbage in your homes.	11 12 13 14 15 16	<ul style="list-style-type: none"> ▪ Municipal comes once (Deposit in pit used as toilet before. ▪ Burn litter. ▪ Store in plastic bags ▪ Throw litter away ▪ Dogs eat some of the rubbish.
3. Responsible for disposing solid waste (Children)	17 18 19	<ul style="list-style-type: none"> ▪ Some responsible and taken to the streets for the truck to collect once a week. ▪ Some not responsible
4. Changes in behaviour of your child about litter since being taught Environmental Education.	20 21 22 23 24 25 26 27	<ul style="list-style-type: none"> ▪ Yes, they seek more clarity about environment. ▪ Different attitude ▪ No change. ▪ Mom where is the plastic to deposit garbage even a young child in grade 9 asked a parent. ▪ Yes she collect papers to keep them safe.
5. Dangers of improper solid waste	28	<ul style="list-style-type: none"> ▪ Sickness

disposal in your community.	29 30 31 32 33	<ul style="list-style-type: none"> ▪ Injuries, bottles ▪ Tins can be host for dangerous animals like snakes ▪ Pills ▪ Taste of rubbish by children.
6. Mostly affected by improper solid waste disposal in Mkhondo.	34 35	<ul style="list-style-type: none"> ▪ Adults and young children ▪ Teach our learners about proper disposal
7. Disposing litter incorrectly.	36 37 38 39 40	<ul style="list-style-type: none"> ▪ New truck ▪ No change (dead dogs) ▪ Next to a crèche they litter ▪ Decided to collect litter because municipality is not responsible.
8. Environmental societies in Mkhondo and their role.	41 42 43	<ul style="list-style-type: none"> ▪ Not there, but we have small group as neighbours to try and clean the place. ▪ Only municipal employees
9. What dangers do you think garbage and refuse can cause to your health?	44 45 46	<ul style="list-style-type: none"> ▪ Sickness and injuries. ▪ Financial when a child becomes sick from contaminating dirt.
10. Influence of Environmental Education in your child's behaviour.	47 48	<ul style="list-style-type: none"> ▪ Small in TV ▪ Small
12. Who should be responsible for the Environment?	49 50 51	<ul style="list-style-type: none"> ▪ All of the community members. ▪ Young children should be taught how to deposit litter.
13. How many times does the municipality collect waste?	52	<ul style="list-style-type: none"> ▪ Once a week.
16. Are your children responsible for disposing solid waste?	53	<ul style="list-style-type: none"> ▪ No

16. Have any person told you to dispose solid waste in a proper way?	54 55 56	<ul style="list-style-type: none"> ▪ No ▪ Councillors are not responsible and the municipal is not responsible
17. How do you dispose garbage when it has not been collected by the municipality?	57 58 59 60	<ul style="list-style-type: none"> ▪ Burn ▪ Pit ▪ Waste containers ▪ Provision of free dustbins.
18. Has Environmental Education played a role in your learner's behaviour towards keeping the environment clean?	61 62 63 64 65 66 67 68 69 70 71 72	<ul style="list-style-type: none"> ▪ Yes and emphases should be done in classroom because they spend lot of time in the school. ▪ Parents should teach others ▪ Parents involved in the focus group interviews are spreading the importance of Environmental Education. ▪ They must be encouraged to keep the classroom clean. ▪ Teachers should be encouraged. ▪ Teachers should run the campaign on Environmental Education.
19. Role of parents in the community	73 74	<ul style="list-style-type: none"> ▪ Teach each other about the importance of environment.

APPENDIX 15

TRANSCRIPTS FOR OBSERVATION OF LEARNERS BEFORE EXTRA MURAL ACTIVITIES ON ENVIRONMENTAL EDUCATION

WEEK	AFTER BREAK (11:00) (Littered substances)	AFTER SCHOOL (14:30) (Littered substances)
1	175	382
8	251	353
3	182	391
AVERAGE	41 per day	75 per day

APPENDIX 16

TRANSCRIPTS FOR OBSERVATION OF LEARNERS AFTER EXTRA MURAL ACTIVITIES ON ENVIRONMENTAL EDUCATION

WEEK	AFTER BREAK (11:00) (Littered substances)	AFTER SCHOOL (14:30) (Littered substances)
1	160	350
8	240	390
3	185	389
AVERAGE	39 per day	75 per day

APPENDIX 17

SAMPLE OF QUESTIONNAIRE RESPONSES FROM LEARNERS

QUESTIONNAIRE NUMBER: 18

THE IMPACT OF ENVIRONMENTAL EDUCATION IN SUSTAINING LAND RESOURCES: A CASE OF MKHONDO VILLAGE.

QUESTIONNAIRE FOR LEARNERS

Theme 1: Waste generation.

1. Do we produce more waste than our parents and grandparents?

YES

NO

If yes, why do you think we are producing more waste? *It is because we buy more things in plastics to eat and we throw away the plastics*

2. Are there any changes in the quantity and composition of waste generated during the past years?

YES

NO

If yes, name the changes that you have witnessed in the past years in the composition of waste: i). *We have rubbish bins*

ii). *There are rubbish pits*

iii). *The cost of plastics reduce waste*

3. Who is responsible for generating waste and how?

School: *Learners throw papers and plastics on break time*

Community: *Community members throw rubbish in streets*

4. What type of solid waste is evident in your school and community?

School: *plastics, papers*

Community: *empty cans, plastic*

5. Learners litter papers, plastics, and residues due to negligence.

True

Unsure

False

6. How often do you litter:

Always

Most of the time

Sometimes

Rarely

Never

7. What is the importance of keeping our Environment clean?

To keep away infections, diseases and also
to keep the world pure

8. Why do learners dispose litter in the classroom, corridors and around the school?

It is because of negligence

10) Does your school have a teaching and learning programme on keeping the environment clean?

YES

11) Does the school have an environmental committee for learners?

YES

Theme 2: Effect of waste on people.

1. How does litter affect the health of people? Litter increases the risk of diseases such as malaria

2. What are the consequences of litter:

Children: Children get injured and fall sick

Animals: It can kill animals when harmful

Theme 3: Waste threats to the environment.

1. Name all kind of waste that is littered by learners and community members which poses a treat to the environment:

.....
.....
.....
.....

2. How do waste destroy the natural resources in Mkhondo:

.....
.....
.....

3. What evidence of change in the community has brought improper solid waste disposal:

.....
.....

4. What activities do you think contribute to improper solid waste disposal?

.....
.....

5. How does litter affect the following?

School:
Community:
Municipality:

Theme 4: Environmental responsibly attitudes at home and school.

1. How do you ensure that you keep the Environment clean:

.....
.....

2. What should be done by the community to ensure that littering is reduced in streets?

.....
.....

3. What are the causes of littering in the community?

- i) ... *lack of knowledge about dangers of littering.*
 ii) ... *negligence*
 iii) ... *lack of knowledge about healthy life style*
4. How can the community reduce littering at home?
They must keep the litter and wait for the truck to transport it.

5. Can you elaborate how the school can reduce littering that destroys the land?
They can add the number of rubbish bins and educate learners.

Theme 5: Waste disposal.

1. Name places where garbage is littered in the community as well in school:
 Community *in the streets*
 School *In the yard and classroom*
2. Where do you dump your litter properly?
 At School: *rubbish bins*
 At Home: *rubbish bins*
3. What are the consequences of littering garbage that you know?
 i) *causes diseases*
 ii) *makes the water dirty in rivers*
 iii) *Litter animals*
4. Do you have proper solid waste disposal materials in your school and community?

YES NO

5. Do you have solid waste collection bins at school?

YES NO

6. Do you have solid waste collection bins at home?

YES NO

7. Does the Mkhondo municipality provide proper facilities to collect solid waste?

NO

If yes, What kind of facilities; Plastics and trucks to collect

8. How can the school and community ensure solid waste is properly disposed?
Educate people about dangers of littering

9. How do you think solid waste can cause danger to the environment?
It can damage the land

Theme 6: Knowledge, attitude and behaviour.

1. Why is the environment exposed to garbage in school and the community?

It is because people continue to litter around

2. Who should take care of the environment and why?

All people because the world is ours, when one litter it affects the next person

3. How do you react when a learner litter in full view of the classmates?

No reaction (Why):.....

I react (How): Tell him/her to pick it up

4. What do you know about Environmental Education?

The education of how to take care of the environment

Theme 7: Importance of Environmental Education

1. Give two reasons why Environmental Education might be important in schools towards solving problems associated with littering?

a) People will know the dangers of littering

b) Littering could decrease domesticity

3 Is Environmental Education important towards keeping the school and community clean?

Why..... because everyone will be aware of littering.
 NO Why.....

4 Is what you learned in Environmental Education been replicated in the school and the community? YES NO

Give a reason:

The rate of rubbish in streets and in school classrooms has decreased.

5 What changes has been brought about learning Environmental Education

School: little littering

Community: little littering in streets

Theme 8: Role played by Environmental Education in the school and community

1. What promotion and educational campaigns do you think can increase public participation in stopping littering in Mkhondo? It is to educate the people about the environment.

2. What changes has been brought by Environmental Education in:

a) School: Learners do not litter

b) Community: The is reduced litter in streets

3 How does Environmental Education impact (affect) on the way you preserve land resources?

It make people to be aware of

*of the things that could damage
the environment.*

4. Environmental Education does not play a role in way learners preserve land resources.

Strongly agree Agree Disagree Strongly disagree

5. Are there any Environmental initiative groups in your school and community?

YES Their role is to.....

Give a reason why: *the are no volunteers who want to be part of it.*

6. How can the community combine together and keep their environment clean?

Set dates to pick litter in surroundings.

Theme 9: The resemblance of Environmental Education in the community

1. Indicate how you feel about Environmental Education in dealing with solid waste disposal (littering):

Strongly Essential Essential Not Essential

2. How do you rate the impact of Environmental Education in sustaining land resources?

Very poor Poor Fair Good Excellent

3. What changes did you make in your school and community after being taught Environmental Education?

We made a rule which orders every one not to litter.

4. Environmental Education is important in sustaining land resources:

Strongly Agree Agree Neutral Disagree Strongly Disagree

QUESTIONNAIRE NUMBER: 30

THE IMPACT OF ENVIRONMENTAL EDUCATION IN SUSTAINING LAND RESOURCES: A CASE OF MKHONDO VILLAGE.

QUESTIONNAIRE FOR LEARNERS

Theme 1: Waste generation.

1. Do we produce more waste than our parents and grandparents?

YES

NO

If yes, why do you think we are producing more waste?
...we eat lot of chips put in plastics
...we have little knowledge.....

2. Are there any changes in the quantity and composition of waste generated during the past years?

YES

NO

If yes, name the changes that you have witnessed in the past years in the composition of waste:
i).beer...waste...not...put...in...bottles.....
ii).more...plastic...containers...are...produced
iii).Plastics...are...not...recycled.....

3. Who is responsible for generating waste and how?

School: ...Students...throwing...papers...on...the...floor

Community: children...elders...throwing...plastic...On...streets,
next...to...roads.....

4. What type of solid waste is evident in your school and community?

School:...papers,...plastics.....

Community: plastics,...papers,...tins.....

5. Learners litter papers, plastics, and residues due to negligence.

True

Unsure

False

6. How often do you litter:

Always

Most of the time

Sometimes

Rarely

Never

7. What is the importance of keeping our Environment clean?

To reduce diseases that may affect our health.....

8. Why do learners dispose litter in the classroom, corridors and around the school?

It is because dust bins eve less and They have little knowledge about littering.....

10) Does your school have a teaching and learning programme on keeping the environment clean?

YES



11) Does the school have an environmental committee for learners?

YES



Theme 2: Effect of waste on people.

1. How does litter affect , the health of people?...people get diseases.....
.....
.....

2. What are the consequences of litter:

Children: They get diseases, they get hurt.

Animals: die some they have diseases.....
digestion problems.

Theme 3: Waste threats to the environment.

1. Name all kind of waste that is littered by learners and community members which poses a treat to the environment:

Plastic, papers, Tins, bottles
to Rotten food stuff

2. How do waste destroy the natural resources in Mkhondo:

Wastes can get dirty and plants
don't grow very well

3. What evidence of change in the community has brought improper solid waste disposal:

plants do not grow very well
Animals die

4. What activities do you think contribute to improper solid waste disposal?

little knowledge, more shops,
less dust bins or litter containers

5. How does litter affect the following?

School: The area look disgusting, students get diseases
Community: more diseases towards people

Municipality: Have more work to clean community
and roads

Theme 4: Environmental responsible attitudes at home and school.

1. How do you ensure that you keep the Environment clean:

by digging pits and put waste and burn it

2. What should be done by the community to ensure that littering is reduced in streets?

by providing more dustbins and posting more billboards next to roads

3. What are the causes of littering in the community?

- i). less littering containers.....
 - ii). lack of knowledge.....
 - iii). more shops.....
4. How can the community reduce littering at home?
by providing more dustbins and digging pits to put waste and burn it.....
5. Can you elaborate how the school can reduce littering that destroys the land?
providing more dust bins and teaching students.....

Theme 5: Waste disposal.

1. Name places where garbage is littered in the community as well in school:
*Community...next to roads and on streets...
 School...class rooms, corridors and outside
*
2. Where do you dump your litter properly?
*At School: dust bins.....
 At Home: in digging pits.....*
3. What are the consequences of littering garbage that you know?
 i) *disseases*.....
 ii) *dirty place*.....
 iii) *effect on the environment e.g. plants..*
4. Do you have proper solid waste disposal materials in you school and community?

YES NO

5. Do you have solid waste collection bins at school?

YES NO

6. Do you have solid waste collection bins at home?

YES NO

7. Does the Mkhondo municipality provide proper facilities to collect solid waste?

YES

NO

If yes, What kind of facilities: *Hire people to clean, put solid waste container*

8. How can the school and community ensure solid waste is properly disposed?

*by not littering, putting waste on solid waste container
and burning it*

9. How do you think solid waste can cause danger to the environment?

people can get injured and diseases

animals can get diseases

Plants cannot grow very well

Theme 6: Knowledge, attitude and behaviour.

1. Why is the environment exposed to garbage in school and the community?

because people throw them

2. Who should take care of the environment and why?

*Everyone, because we are the ones
living and surrounded by the environment*

3. How do you react when a learner litter in full view of the classmates?

No reaction (Why): *because I also litter*

I react (How): ***

4. What do you know about Environmental Education?

*It teaches us on how to take
care of environment as and avoid littering*

Theme 7: Importance of Environmental Education

1. Give two reasons why Environmental Education might be important in schools towards solving problems associated with littering?

a) *Students may have the knowledge
of not littering*

b) To conserve our environment.....

3 Is Environmental Education important towards keeping the school and community clean?

Why...To make our premises to be clean

Why.....

4 Is what you learned in Environmental Education been replicated in the school and the community? NO

Give a reason:

there has been a great change
litter has decreased a lot.

5 What changes has been brought about learning Environmental Education

School: less papers in classrooms and premises

Community: less plastics and tins near roads, on streets

Theme 8: Role played by Environmental Education in the school and community

1. What promotion and educational campaigns do you think can increase public participation in stopping littering in Mkhondo? by posting more billboards next to roads, educating people providing bins next to roads

2. What changes has been brought by Environmental Education in:

a) School: less plastic inside classroom and outside

b) Community: less bottles, tins, plastics..near..roads

3 How does Environmental Education impact (affect) on the way you preserve land resources?

Teach us to preserve our land.

To know the importance of not littering, To keep our country clean.

4. Environmental Education does not play a role in way learners preserve land resources.

Strongly agree Agree Disagree Strongly disagree

5. Are there any Environmental initiative groups in your school and community?

Their role is to... teach people clean streets...

NO Give a reason why:.....

6. How can the community combine together and keep their environment clean?
By placing solid waste container next to roads
educating each other, by setting roles that
if you see someone littering & He/she pays.

Theme 9: The resemblance of Environmental Education in the community

1. Indicate how you feel about Environmental Education in dealing with solid waste disposal (littering):

Strongly Essential Essential Not Essential

2. How do you rate the impact of Environmental Education in sustaining land resources?

Very poor Poor Fair Good Excellent

3. What changes did you make in your school and community after being taught Environmental Education?

I stopped throwing plastics. I send the message to others about not littering.
I warn when a person is littering

4. Environmental Education is important in sustaining land resources:

Strongly Agree Agree Neutral Disagree Strongly Disagree

QUESTIONNAIRE NUMBER: 33

THE IMPACT OF ENVIRONMENTAL EDUCATION IN SUSTAINING LAND RESOURCES: A CASE OF MKHONDO VILLAGE.

QUESTIONNAIRE FOR LEARNERS

Theme 1: Waste generation.

1. Do we produce more waste than our parents and grandparents?

YES

NO

If yes, why do you think we are producing more waste? It is because we do not care about the environment or consequences of disposing waste.

2. Are there any changes in the quantity and composition of waste generated during the past years?

YES

NO

If yes, name the changes that you have witnessed in the past years in the composition of waste:

- i). The air around is getting more and more impure
- ii). Litter is being dumped everywhere
- iii). The rate of germs and diseases caused by impurity of land.

3. Who is responsible for generating waste and how?

School: School children by throwing papers anywhere

Community: All community members by dumping rubbish anywhere.

4. What type of solid waste is evident in your school and community?

School: Kins, bottles, papers,

Community: Kins, bottles, papers, vegetable peels,

5. Learners litter papers, plastics, and residues due to negligence.

True

Unsure

False

6. How often do you litter:

Always

Most of the time

Sometimes

Rarely

Never

7. What is the importance of keeping our Environment clean?

So that we can not cause more germs around us.
and avoid pollution effects like water pollution, air and land pollution.

8. Why do learners dispose litter in the classroom, corridors and around the school?

It is because they don't care about the lane cleanliness
at school and sometimes they don't have anywhere to put their litter.

10) Does your school have a teaching and learning programme on keeping the environment clean?

YES

NO

11) Does the school have an environmental committee for learners?

YES

NO

Theme 2: Effect of waste on people.

1. How does litter affect the health of people? Wild spread of germs through air pollution can lead to damage in respiratory system

2. What are the consequences of litter:

Children: They get sick because they play with the litter

Animals: They eat the rubbish and sometimes they die...

Theme 3: Waste threats to the environment.

1. Name all kind of waste that is littered by learners and community members which poses a treat to the environment:
 ① papers ⑤ vegetable peels
 ② used bumpers ⑥ rotten plants
 ③ Tins and canes ⑦ dead animals
 ④ Bottles ⑧ plastics
2. How do waste destroy the natural resources in Mkhondo:
 ① Some plants die through littering
 ② The land becomes more dirty and makes it possible for breeding of germs
3. What evidence of change in the community has brought improper solid waste disposal:
 ① lot of animals and plants die as they feed on the rubbish
..... and plants don't have enough space
4. What activities do you think contribute to improper solid waste disposal?
 ① Insufficient littering facilities
 ② lack of educational lesson about disposal of litter
5. How does litter affect the following?
School: It doesn't look attractive to others
Community: wide spread of diseases
Municipality: It becomes hard for it to improve / develop

Theme 4: Environmental responsible attitudes at home and school.

1. How do you ensure that you keep the Environment clean:
 ① Littering where you are supposed to litter
 ② Teaching others about good ways of littering
2. What should be done by the community to ensure that littering is reduced in streets? Educating the community about the good results of keeping environment clean and collect papers
3. What are the causes of littering in the community?

- i). Ignorance.....ii).....
- ii). Lack of facilities.....
- iii). Lack of information.....

4. How can the community reduce littering at home?

- a) By buying more recycling bins,
- b) Recycling.....(3) Burning some rubbish.
- c) Reuse some items

5. Can you elaborate how the school can reduce littering that destroys the land?

- a) They avoid buying more equipments which can be used by school children to put their litter.
- b) By introducing lessons which will teach us about environment cleanliness.

Theme 5: Waste disposal.

1. Name places where garbage is littered in the community as well in school:

Community...next to roads.....
School...behind doors, on school premises.....

2. Where do you dump your litter properly?

At School: on rubbish bins.....
At Home: on rubbish pits.....

3. What are the consequences of littering garbage that you know?

- i) More would spread of diseases.
- ii) damage to ozone layer.
- iii) pollution on water, air and land.

4. Do you have proper solid waste disposal materials in your school and community?

YES NO

5. Do you have solid waste collection bins at school?

YES NO

6. Do you have solid waste collection bins at home?

YES NO

7. Does the Mkhondo municipality provide proper facilities to collect solid waste?

YES

NO

If yes, What kind of facilities;.....

8. How can the school and community ensure solid waste is properly disposed?

By making rules which can terminate those who litter

9. How do you think solid waste can cause danger to the environment?

Yes it can pollute the land

Theme 6: Knowledge, attitude and behaviour.

1. Why is the environment exposed to garbage in school and the community?

(i) People don't bother themselves in using waste facilities.

2. Who should take care of the environment and why?

Everyone, because if everyone can stop littering where he/she suspect to litter the environment can be kept clean.

3. How do you react when a learner litter in full view of the classmates?

No reaction (Why):.....

I react (How): I feel very bad angry at the same time.

4. What do you know about Environmental Education?

I know that keeping the environment clean is good for our health.

Theme 7: Importance of Environmental Education

1. Give two reasons why Environmental Education might be important in schools towards solving problems associated with littering?

a) It can help reduce littering.....

b) It can help give people information on why they shouldn't litter.

3 Is Environmental Education important towards keeping the school and community clean?

- Why because it teaches us on keeping the environment clean
 NO Why.....

4 Is what you learned in Environmental Education been replicated in the school and the community? YES

Give a reason:

Because the people of my school and community do not have much information on environment cleanliness.

5 What changes has been brought about learning Environmental Education

School: the school is becoming more clean.

Community: the amount of litter in community is decreasing

Theme 8: Role played by Environmental Education in the school and community

1. What promotion and educational campaigns do you think can increase public participation in stopping littering in Mkhondo? The people of Mkhondo should gather up and have a walk around the area collect the litter and teach the people.

2. What changes has been brought by Environmental Education in:

a) School: improvement of cleanliness of the school!

b) Community: Improvement in litter

3 How does Environmental Education impact (affect) on the way you preserve land resources?

It helps me know what are consequences of littering

I now do not litter anywhere and anywhere
I now never others in teaching about littering

4. Environmental Education does not play a role in way learners preserve land resources.

Strongly agree Agree Disagree Strongly disagree

5. Are there any Environmental initiative groups in your school and community?

Yes Their role is to... keep the land clean and healthy for people

No Give a reason why:.....

6. How can the community combine together and keep their environment clean?

By forming groups or teams which can collect litter or even announce a day when they can have a function where they can walk around the area collect the litter.

Theme 9: The resemblance of Environmental Education in the community

1. Indicate how you feel about Environmental Education in dealing with solid waste disposal (littering):

Strongly Essential Essential Not Essential

2. How do you rate the impact of Environmental Education in sustaining land resources?

Very poor Poor Fair Good Excellent

3. What changes did you make in your school and community after being taught Environmental Education?

I never litter anywhere

I teach others about what I gained from environmental education

4. Environmental Education is important in sustaining land resources:

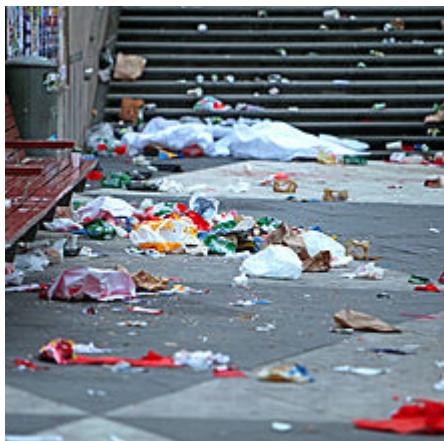
Strongly Agree Agree Neutral Disagree Strongly Disagree

APPENDIX 18

EXTRA CURRICULUM EDUCATIONAL MANUAL FOR LEARNERS

STOP LITTERING IN OUR SCHOOL
COMPAIGN:
SEPTEMBER 2012 EDITED BY
MSEZANE SB:
SOURCE:WIKIPEDIA.COM

SECTION 1



❑**Litter** consists of [waste products](#) that have been disposed improperly, without consent, at an inappropriate location. Litter can also be used as a verb. To litter means to throw (often man-made) objects onto the ground and leave them as opposed to disposing of them properly.

Larger hazardous items such as tires, appliances, electronics and large industrial containers are often dumped in isolated locations, such as National Forests and other public land.

It is a [human impact on the environment](#) and is a serious [environmental issue](#) in many countries. Litter can exist in the environment for long periods of time before degrading and be transported large distances into the world's oceans. Litter can affect [quality of life](#).

[Cigarette butts](#) are the most littered item in the world, with 4.5 trillion discarded annually. Cigarette butts can take up to five years to completely break down.^[1] Statistics in 2003 showed metal/aluminum drink cans as the least littered item.^[1]



Platform of [Strathfield station](#) in Sydney, Australia. Rubbish accumulated over months, perhaps years due to unsustained periods of frequent cleaning

Throughout human history, people have disposed of unwanted materials without fear of retribution, onto streets, roadsides, in small local dumps or often in remote locations.^[2] Prior to reforms within cities in the mid-to-late 19th century, [sanitation](#) was not a government priority. The growing piles of waste led to the spread of disease.

To address the growing amount of waste generated in the United States, the [Solid Waste Disposal Act](#) of 1965 was enacted. In 1976 the Federal government amended the Solid Waste Disposal Act, creating the [Resource Conservation and Recovery Act](#) (RCRA), which requires a “cradle to grave”^[3] approach to the proper handling of potentially hazardous materials. RCRA gives authority to the [Environmental Protection Agency](#) (EPA) to regulate and enforce proper hazardous waste disposal.^[4] Many countries now have laws that require that [household hazardous waste](#) be deposited in a special location rather than sent to landfills with regular refuse. Household hazardous waste includes [paints](#) and [solvents](#), [chemicals](#), [light bulbs](#), [fluorescent lights](#), spray cans, and yard products such as [fertilizers](#), [pesticides](#), [herbicides](#) and [insecticides](#). Additionally, [medical waste](#) generated at home is considered a hazardous waste and must be disposed of properly.

Causes

In addition to intentional littering, almost half of litter on U.S. roadways is now a result of accidental or unintentional litter, usually debris that falls off of improperly secured trash, recycling collection vehicles and pickup trucks.^[5] Population levels, traffic density and proximity to waste disposal sites are factors known to correlate with higher litter rates.^{[6][7][8][9][10]} Government neglect, the inability of governments to remove litter in a timely manner, is also a reason why humans are tempted to litter.^[11]

Illegally dumped hazardous waste may be affected by the costs associated with dropping materials at designated sites; some facilities charge a fee for depositing hazardous material.^[12] Access to nearby facilities that accept hazardous waste may deter use. Additionally, ignorance of the laws that regulate the proper disposal of hazardous waste may have an impact on proper disposal.

According to a study by the Dutch organization VROM, 80 percent of the people claim that "everybody leaves a piece of paper, tin or something, on the street behind".^[13] Young people from 12 to 24 years cause more litter than the average (Dutch or Belgian) person. Eighteen percent of people who regularly cause litter were 50 years of age or older. However, a 2010 survey of littering in Maine, New Hampshire and Vermont in the United States, placed litterers aged 55 and over at less than five percent. The same observational study estimated the overall average of litterers to be 78 percent male.^[10] Nevertheless, automobile [drivers](#) and [recreationalists](#), smokers and youth are specific target groups within many campaigns conducted to keep countries free of litter.^[citation needed] In 1999, research by [Keep America Beautiful](#) found that 75% of Americans admitted to littering the last five years, yet 99% of the same individuals admitted they enjoyed a clean environment.

Negligent or lenient law enforcement contributes to littering behavior.^[citation needed] Other causes are inconvenience, entitlement and economic conditions.^[citation needed] A survey of dumping in Pennsylvania found that the largest number of illegal dumps were in townships without municipal trash hauling.^[14] The same report also cites unavailability of curbside trash and recycling service, shortage of enforcement, and habit as possible causes.^[15] The presence of litter invites more littering.^[16]

Two-stage process model

The two-stage process model of littering behavior describes the different ways in which people litter. The model was proposed by Chris Sibley and James Liu and differentiates between two types of littering: active and passive.^[17]

The theory has implications for understanding the different types of litter reduction interventions that will most effectively reduce littering in a given environment. The theory states that, all things being equal, passive littering will be more resistant to change because of two psychological processes: 1. [diffusion of responsibility](#) that increases as the latency between when an individual places litter in the environment and when they vacate the territory, and 2. forgetting, which is also more likely to occur at longer delays between when an individual places litter in the environment and when they vacate the territory.

Life cycle

Litter can remain either visible for extended periods of time before it eventually [biodegrades](#), with some items made of condensed glass, [styrofoam](#) or plastic possibly remaining in the environment for over a million years.^{[18][19][20]}

About 18 percent of litter, usually traveling through [stormwater](#) systems, ends up in local streams, rivers, and waterways. Uncollected litter can accrete and flow into [streams](#), local [bays](#) and [estuaries](#). Litter in the ocean either washes up on beaches or collects in [Ocean gyres](#).

such as the [Great Pacific Garbage Patch](#). About 80 percent of [marine debris](#) comes from land-based sources.^[21]

Some litter that is collected can be [recycled](#), however degraded litter cannot be recycled and eventually degrades to [sludge](#), often toxic. The majority of litter that is collected goes to [landfills](#).

Effects

Litter can harm humans and the environment in different ways.

Effects on humans



These tires were discarded on the Middle Branch of Baltimore Harbor in this photo from 1973. Tire dumping is still a concern today and could benefit from [tire recycling](#).

Hazardous materials contained within litter and illegally dumped rubbish can [leach](#) into water sources, [contaminate](#) soil and [pollute](#) the air.

[Tires](#) are the most often dumped hazardous waste. In 2007 the United States generated 262 million scrap tires.^[22] Thirty-eight states have laws that ban whole tires being deposited in landfills.^[23] Many of these discarded tires end up illegally dumped on public lands. Tires can become a breeding ground for insect vectors which can transmit disease to humans.^[24] [Mosquitoes](#), which breed in stagnant water, can transmit [West Nile Virus](#) and [Malaria](#). Rodents nest in accumulated tires and can transmit diseases such as [Hantavirus](#)^[24]

When tires are burned they can smolder for long periods of time emitting hundreds of chemical and compounds that pollute the air causing respiratory illnesses. Additionally the residue left behind can harm the soil and leach into groundwater.^[24]



This [bolus](#) from a Hawaiian albatross (either a [Black-footed Albatross](#) or a [Laysan Albatross](#)) has several ingested [flotsam](#) items, including monofilament from fishing nets and a discarded [toothbrush](#). Ingestion of plastic flotsam is an increasing hazard for [albatrosses](#), [Tern Island](#), [French Frigate Shoals](#).

[Visual pollution](#) is a major effect of litter.

Open containers such as paper cups or beverage cans can hold rainwater, providing breeding locations for [mosquitoes](#). In addition, a spark has the potential to hit a piece of litter like a paper bag which could start a fire.

Litter can be hazardous. Debris falling from vehicles is an increasing cause of automobile accidents.^[25] Over 800 Americans are killed each year in debris/litter-attributed motor vehicle collisions.^[26] Discarded [dangerous goods](#), [sharps waste](#) and [pathogens](#) resulting from litter can cause accidental harm to humans.

Litter also carries substantial cost to the economy. Cleaning up litter in the U.S. costs hundreds of dollars per ton, about ten times more than the cost of trash disposal, for a cost totaling about \$11 billion per year.^{[16][27]}

Effects on wildlife

Animals may get trapped or poisoned with litter in their habitats. Cigarette butts and filters are a threat to [wildlife](#) and have been found in the stomachs of [fish](#), [birds](#) and [whales](#), who have mistaken them for food. Also animals can get trapped in the rubbish and be in serious discomfort. For example, the plastic used to hold beverage cans together can get wrapped around animals' necks and cause them to suffocate as they grow. Other instances where animals could be harmed by litter include broken glass lacerating the paws of [dogs](#), [cats](#), and other small mammals, fishing net being caught around the neck of a [seal](#), etc.^[28]

Other effects

Organic litter in large amounts can cause [water pollution](#) and lead to [algal blooms](#).^[29] Cigarettes could also start fires if they are not put out and then discarded in the environment.

Extent of littering even in our Mkhondo Area

Litter is an [environmental issue](#) in many countries around the world. While countries in the [developing world](#) lack the resources to deal with the issue, consumer based economies in the [western world](#) are capable of generating larger quantities of litter per capita due to a higher consumption of [disposable products](#).

Solutions

Litter bins



□ Recycling and [rubbish bin](#) in a [German railway station](#).

Public waste containers or street bins are provided by local authorities to be used as a convenient place for the disposal and collection of litter. Increasingly both general waste and recycling options are provided. Local councils pick the waste up and take it to refuse or recycling. However there are issues with this approach. If the bins are not regularly emptied, then overfilling of bins occurs and can increase litter indirectly. Some local authorities will only take responsibility for rubbish that is placed in the bins, which means that litter remains a problem. People may blame a lack of well-placed bins for their littering. Hazardous materials may be incorrectly disposed of in the bins and they can encourage [dumpster diving](#).

Picking up





Naval Nuclear Power Training Command student volunteers dispose of used tires littering the waterways of Naval Weapons Station Charleston, North Carolina.

Volunteers, sometimes alone or coordinated through organisations will pick up litter and dispose of it. Clean up events may be organised where participants will sometimes comb an area in a line to ensure that no litter is missed. In North America, [Adopt a Highway](#) programs are popular, where companies and organizations commit to cleaning stretches of road. Increasingly, [geocaching](#) is used (see [Cache In Trash Out](#)). In Kiwayu, a Kenyan island, some of the collected litter (flip-flops) is used for making art, which is then sold (see [FlipFlop Recycling Company](#)^{[30][31]}).

Picking up litter can be hazardous. Hazards can include exposure to [dangerous goods](#), [sharps waste](#) and [pathogens](#). As a result, safety equipment is sometimes worn and tools such as litter grabbers (extendable arms) are used.

Container deposit schemes

[Container deposit legislation](#) can be aimed at both reducing littering and also encouraging picking up through local recycling programs that offer incentives, particularly for [aluminium cans](#), [glass bottles](#) and [plastic bottles](#). In New York, an expanded bottle bill that included plastic water bottles increased recycling rates and generated 120 million dollars in revenue to the state General Fund from unclaimed deposits in 2010.^[32]

Litter traps



A Parks Victoria litter trap on the river catches floating rubbish on the [Yarra River](#) at [Birrarung Marr](#) in [Melbourne, Australia](#).

Litter traps can be used to capture litter as it exits stormwater drains into waterways. However, litter traps are only effective for large or floating items of litter and must be maintained.

Monitoring sites of littering and dumping

Increasingly, there have been efforts to use technology to monitor areas prone to dumping. In Japan, a study used [Geographic Information Systems](#) (GIS) to map areas of dumping based on site characteristics.^[33]

Legislation and fines

Some countries and local authorities have introduced legislation to address the problem.

Actions resulting in fines can include on-the-spot fines for individuals administered by authorised officers in public or on public transport or littering from a vehicle, in which the vehicle owner is fined - reported by either responsible officer or third party, sometimes online.^{[34][35]}

Specific legislation exists in the following countries:

- United States - punishable with a more than \$500 fine, community service, or both, as set out by state statutes and city ordinances. All 50 states have anti-litter laws.^[36] Most highways and national parks are punishable with \$1,000 fine or 1 year in prison when they had serious damages.
- United Kingdom - Leaving litter is an offence under the Environmental Protection act 1990. This was extended by the Clean Neighbourhoods and Environment Act 2005 under section 18. It carries a maximum penalty of £2500 upon conviction. However, many local authorities issue fixed penalty notices under section 88 of the Environmental Protection 1990. Often incorrectly known as "on the spot fines", they do not have to be issued on the spot. Nor are they a fine. If an alleged offender does not want to pay a fixed penalty notice, he can have the case heard in the Magistrates Court.
- Australia - no national legislation, although state based environmental protection authorities have laws and fines to discourage littering.
- The Netherlands - Dutch police and local supervisors (known as buitengewoon opsporingsambtenaar, or BOA) fine citizens for throwing away cans, bottles or wrappers onto the street.

Anti-litter campaigns



 The International Tidy Man^[37]

A number of organisations exist with the aim of raising awareness and run campaigns including clean up events. [Clean Up the World](#) is a worldwide campaign.

In the United States there are a number of organisations running anti-litter campaigns. [Keep America Beautiful](#) was founded in 1953. At least 38 states have high profile, government-recognized slogan campaigns, including [Don't Mess with Texas](#); Let's Pick It Up New York; Don't Trash California; Take Pride in Florida; Keep Iowa Beautiful.

In Australia, [Clean Up Australia](#) Day is supported by many major Australian companies, firms and volunteers alike. Anti-litter organisations include [Keep Australia Beautiful](#) founded in 1963 that created the popular "Do the Right Thing" campaign and its Tidy Towns competition became well known being a very competitive expression of civic pride.

[Keep Britain Tidy](#) is a British campaign run by the Keep Britain Tidy environmental charity, which is part funded by the U.K. government.

SECTION 2

What can you do to stop litter?

Consequences of litter

While research indicates that visible roadside litter has decreased by about 61 percent since 1969, litter is still a big, persistent problem. More than 51 billion pieces of litter land on U.S. roadways each year. That's 6,729 items per mile. There are significant, tangible costs to this



litter:

- **Litter cleanup costs** the U.S. almost \$11.5 billion each year, with businesses paying \$9.1 billion. Governments, schools, and other organizations pick up the remainder.
- **Community economy and quality of life suffer.** The presence of litter in a community takes a toll on quality of life, property values, and housing prices.
- **Litter has environmental consequences.** Wind and weather, traffic, and animals move litter into gutters, lawns and landscaped areas, alleyways, and parking structures. Debris may be carried by storm drains into local waterways. Litter that reaches any waterways generally finds its way into our oceans. In fact, more than 80% of the ocean debris is from land-based sources.

Where do people litter?

Individuals litter most on roads and highways and in retail, recreational, and residential locations:

- **Roadway Litter** — Tobacco products, mostly cigarette butts, are the most littered item on U.S. roadways (38 percent). This is followed by paper (22 percent) and plastic (19 percent). Most of the litter on roads and highways is caused by people. Research shows that littering along roadways is generated by the following: motorists (52 percent), pedestrians (23 percent) and improperly covered truck or cargo loads, including collection vehicles (16 percent).
- **Transition points** — These are entrances to businesses, transportation, and other places where items must be discarded before entering. Confection (candy, chocolate, gum, etc.) ranks at the top (54 percent) of what is littered at transition points; this is followed by cigarette butts at 30 percent.
- **Recreational Areas** — Parks, beaches, courts, and open areas where people congregate for leisure activities create lots of opportunities for littering.
- **Retail** — High-traffic locations such as shopping centers, strip malls, and convenience stores can generate packaging litter, and cigarette butts and confection on the ground.

Know Your Trash Facts

Read facts about garbage and the waste industry. How much trash is generated by Americans? How do America's [solid waste management professionals](#) protect our environment and serve our communities? Also get facts about America's recyclables, reliable and renewable waste-based energy and the integration of new technologies to collect and process trash.



We provide an essential service in local communities across the country by protecting the environment and public health.

The efficient and dependable removal of waste is an essential service for keeping our communities clean and society healthy. Imagine if your trash was not picked up!

- America's waste industry successfully manages 250 million tons of household and other municipal solid waste annually (U.S. EPA, "Municipal Solid Waste Generation, Recycling and Disposal in the United States: Facts and Figures for 2010" [EPA Facts and Figures]).
- The average American discards 4.43 pounds of garbage every day (EPA Facts and Figures).
- However, when construction and demolition waste and non-hazardous industrial waste is included, the industry manages nearly 545 million tons of solid waste each year ("Size of the United States Solid Waste Industry," R.W. Beck, Inc. 2001).
- The total volume of solid waste produced in the U.S. each year is equal to the weight of more than 5,600 Nimitz Class air craft carriers, 247,000 space shuttles, or 2.3 million Boeing 747 jumbo jets (Beck).
- If we put all of the solid waste collected in the U.S. in a line of average garbage trucks, that line of trucks could cross the country, extending from New York City to Los



We are generating clean renewable energy from solid waste.

When garbage decomposes in a landfill, it creates gas that contains methane, a reliable and renewable source of energy that if turned into energy, helps reduce greenhouse gas emissions, the high cost of energy, and our dependence on foreign oil.

- As of December 2010, 541 landfill-gas-to-energy projects delivered 305 mmscfd of landfill gas and 1,684 megawatts of electricity to corporate and government users, enough renewable energy to power nearly 1.7 million homes.

The EPA estimates that using methane as renewable, "green" energy instead of oil and gas has the annual environmental and energy benefits equivalent to the greenhouse gas emissions from nearly 18,500,000 passenger cars or sequestering carbon from 20.6 million acres of pine or fir forests. (U.S. EPA, Landfill Methane Outreach Program [LMOP]).

- America's solid waste industry currently operates 86 waste-to-energy facilities that generate approximately 2,790 megawatts of renewable energy per year — enough to power an estimated 1.6 million homes (Energy Recovery Council, 2010).
- An average kitchen-size bag of trash contains enough energy to light a 100-

Angeles, more than 100 times (Beck).



We are a leader in recycling and composting.

We have introduced increasingly consumer friendly and efficient methods of collecting and sorting recyclables to increase consumer participation in recycling, and have spent millions educating consumers on the benefits of recycling.

- America's solid waste industry collected and processed almost 65 million tons of recyclables in 2010, and more than 20.2 million tons of yard and food waste that was composted (EPA Facts and Figures).
- We have helped America reach a national recycling rate of 34.1 percent (EPA Facts and Figures).
- In 2010, nationally, we recycled and composted 85.1 million tons of solid waste. This provides an annual benefit of more than 186 million metric tons of carbon dioxide equivalent emissions reduced, comparable to removing the emissions from over 36 million passenger vehicles (EPA Facts and Figures).
- Some 113,204 cans are recycled every minute nationwide (Aluminum Association).
- There is no limit to the amount of times glass or aluminum can be recycled (National Recycling Coalition).
- Recycling glass instead of making it from silica sand reduces mining waste by 70 percent, water use by 50 percent, and air pollution by 20 percent

watt light bulb for more than 24 hours (Covanta).

- A variety of manufacturing plants, schools, government buildings and other facilities currently are using landfill gas for heating and cooling.
- The solid waste industry currently produces more than half of America's renewable energy, more than combined energy outputs of the solar, geothermal, hydroelectric, and wind power industries (U.S. DOE, Energy Information Administration).



We are an industry that uses science and technical expertise.

Chemists, biologists, geologists, civil engineers, hydrologists, soil experts and others at solid waste companies protect the environment while developing more sustainable waste management practices.

- These experts assist regulators in developing effective regulations to protect the environment.
- We have developed innovative landfill technologies to protect the environment.
- Today's modern, state-of-the-art landfills are sited, engineered, built, and operated and maintained in a safe and environmentally responsible way.
- Technology underpins modern garbage collection and is helping preserve the environment, conserve energy and reduce garbage collection costs.

- [\(Environmental Defense Fund\).](#)
- [Approximately 9,000 curbside recycling programs exist nationwide, up from 8,875 in 2002 \(EPA Facts and Figures\).](#)
- [Every ton of mixed paper recycled can save the energy equivalent of 165 gallons of gasoline \(EPA Facts and Figures\).](#)
- [Recycling steel saves 75 percent of the energy that would be used to create steel from raw materials, enough to power 18 million homes \(Steel Recycling Institute\).](#)
- [Five PET bottles \(plastic soda bottles\) yield enough fiber for one extra large T-shirt, one square foot of carpet or enough fiber fill to fill one ski jacket \(National Recycling Coalition\).](#)



We contribute to our local communities economically and socially, as well as environmentally.

The industry creates some 948,000 jobs, both directly and indirectly and contributed \$14.1 billion in direct and indirect taxes to federal, state and local governments (“Size of the United States Solid Waste Industry, R.W. Beck, Inc. 2001).

We know the neighborhoods, homes and businesses within the communities we serve.

- [We are reliable first responders during natural disasters and crises.](#)
- [Solid waste collection employees help deter crimes, rescue people and act as the “eyes and ears” for local law enforcement.](#)
- [Our companies and employees are active community participants and promote civic goals and goodwill through sponsorships and direct involvement.](#)

Litter Awareness

As we look around our beautiful country we all too often see plastic bottles, cans, glass bottles, polystyrene containers and cups, plastic, paper and a whole lot of other rubbish littering our streets, our parks, alongside our highways, our neighbourhoods, our shopping areas, our rivers and many other places in our environment.

No waste company is can keep a town or city clean when residents litter and dump illegally randomly. If residents join in in cleaning up their environment and then keep it clean, we win because we have a cleaner, safer and more hygienic city or town.

Does it matter if we litter?

With so many other important issues such as crime and violent crime, AIDS, child abuse, joblessness should we care about whether we put our litter in the bin (or

recycle where possible.) Should we care if South Africa and the environment in which we live are kept clean?

YES

It does matter and we should care.

WHY?

Litter is both an environmental and a social issue.

- It's unsightly
- It reduces the aesthetic appeal of public places including streets, parks and waterways.
- It costs the community huge sums of money and time to clean up every year.
- It causes blockages of the drainage system and causes flooding
 - which costs councils millions of rand to repair. This is money that can be better spent on housing and education.
- When it gets into our waterways - rivers, dams and the sea - it can kill aquatic life
 - directly (eg. through choking) and indirectly through its impacts on water quality.
- It decreases oxygen levels when it decays in water.
- It kills rivers
 - and as water is such a precious resource, and we have a limited supply, we need to preserve and cherish our rivers and waterways;
 - which are the lifeblood of the environment. They provide homes for wildlife and plants, water supplies for homes, industries and farms, and places of recreation and enjoyment for us all.
- It can be dangerous to people
 - particularly when it involves items such as broken glass, rust, needles and syringes.
- It can be a fire hazard
 - for example when lit cigarettes are thrown out.
- It harms birds
 - for example they may choke on plastic, chewing gum or any other litter that gets stuck in their throats.
- It breeds rats
 - who carry diseases, destroy and eat crops and food, chew electrical and telephone cables.
- It encourages illness.
- It encourages crime
 - as areas that are not taken care of are seen to be unprotected and therefore easier crime targets.
- It manifests in a culture of disrespect for others and areas that are shared by others
- It diminishes the pride people have in their environment.

- It creates a culture of lack of caring.
- It costs the council a lot more money to clean up the litter than it costs them to empty bins.

Why do people litter?

- They lack self respect - they don't care about themselves and therefore don't think that it's important that they live in a clean environment.
- They lack respect for others - they don't care how their actions and behaviour impacts on others, and therefore don't think about how their littering effects others.
- Lack of respect for the environment - they don't care what the impact of their littering has on the environment in which they live.
- They don't want to take responsibility for cleaning up after themselves and taking care of their environment.
- They are lazy - it's easier to leave their rubbish on the ground, or throw it on the floor than find a bin.
- They think it's someone's job or they think they are creating work. (This is not correct, as so much litter is not collected and it causes environmental problems.)

[**<< Home**](#)





Respect Yourself

Respect Others

Respect the Environment

Imagine it is your turn at home to wash the dishes. Your family doesn't put their crockery and cutlery in the sink, but they leave each item lying around the house. You would need to go around and collect each plate, dish, cup, knife, fork, glass before you can wash the dishes. It's still your job to wash the dishes, only it takes longer and is more effort because no one helps by putting all the dishes in the sink.

Street cleaners and garbage collectors will still have their jobs - even if we don't litter. So let's be respectful and assist by putting our litter in the bin.

**THANK YOU, PLEASE ENSURE
THAT YOU KEEP YOUR SCHOOL
CLEAN AS WELL AS MKHONDO
CLEAN FOR THE PRESENT AND
FUTURE GENERATION**