

**THE DEVELOPMENT AND IMPLEMENTATION OF THE SUSTAINABLE
INTERVENTION STRATEGY FOR SOLID WASTE MANAGEMENT IN PRIMARY
SCHOOLS: A CASE OF NKANGALA DISTRICT, MPUMALANGA PROVINCE**

by

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DECLARATION

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I, Lettah Sikhosana, declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.


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ABSTRACT

The aim was to develop and implement a sustainable intervention strategy for solid waste management. From anecdotal evidence, some schools in Nkangala district across different circuits would be polluted with solid waste, and teaching and learning would continue to take place with no concerns about any environmental issues. This was a clear indication that there were minimal or no solid waste management practices put in place that were sustainable and could serve as a guideline to manage the amount of solid waste generated. I adopted a qualitative interpretative multiple case study design embedded within social constructivism. My study took place in three primary schools under the Kwaggafontein East circuit and Tweefontein South Circuit in Nkangala district, Mpumalanga province in South Africa. School principals, school governing body chairpersons, general workers, food handlers, intermediate phase teachers, and learners in the intermediate phase were purposefully sampled. Data was collected through observations, semi-structured interviews, focus group interviews and a diary. This data shaped the strategy that involved partnerships in primary schools, called the sustainable intervention strategy for solid waste management through partnership (SISS-WMP). A typology approach was used to analyze the data. Based on the findings, I can infer that some participants did not have an adequate understanding of concepts such as the environment, solid waste, and solid waste management. It is recommended that workshops be facilitated in order to educate these participants about what environment, solid waste and solid waste management mean. So that they can have an understanding, knowledge, and skillset as this will assist them to appreciate solid waste management and environmental education. Enormous amounts of solid waste were generated through day-to-day activities, which was disposed inappropriately. It is recommended that the SISS-WMP be implemented for a longer period as the implementation was for a short period of time. Furthermore, studies can be conducted in different contexts such as further education and training bands, circuits, districts, provincially and in different countries across the world, as the results from these different environments could assist in fine-tuning the SISS-WMP.

KEY TERMS: *Solid waste; Solid waste management; Environment; Environmental education; Sustainability.*

IBUZO-BUJAMO

Ihloso yerhubhululo leli bekukuthuthukisa iqhinga elinzinzileko lokulawuleka kweenzibi. Ngokwethulwa kobufakazi obukhona, ezinye iinkolo ezingaphasi kweNkangala distrigi ukuya kwamasekethe ahlukahlukeneko zizokusilaphazeka ngeenzibi, begodu ukufunda nokufundisa kuzokuragela phambili ngaphandle kokukhathalela iindaba zebhoduluko. Lokhu bekuyikomba yokobana ayimvelakancani namkha awekho amahlelo wokukulawulwa kweenzibi anzinzileko angabamhlahlandlela wokulawula inani leenzibi ezikhona. Ngithethe isifundo se-*qualitative interpretative multiple case study design* esibekiswe ngaphakathi kwe-*social constructivism*. Isifundo sami senzeke eenkolweni ezintathu zamabanga aphasi ezingaphasi kwesekethe yeKwaggafontein East neTweefontein South eNkangala district, esifundeni seMpumalanga eSewula Afrika. Abotitjherehloko, abosihlalo behlangano ejamela ababelethi, abasebenzi abasiza eenkolweni, abaphekako, abafundi nabotitjhere bamabanga aphasi bebakhethwe ngehloso yokusampula. Imininingwana beyibuthelwa ngokubona namkha ukuqala, ukuhlungwa nokuhlungwa ngeenqhema nedayari. Lokhu kubumbe iqhinga elinganisa ukubambisana kweenkolo zamabanga aphasi eliliHlelo lokuLamula eliNzinzileko lokuLawuleka kweenzibi ngokubambisana (SISS-WMP) lathonywa belaphumeleliswa ngokwehlelo elibekiweko. Kusetjenziswe indlela yethayipholoji ukubuthelwa imininingwana. Ngemininingwana etholakeleko, ngingarhonona bonyana abanye abahlanganyeli abazwisisi ngokulingeneko ngebhoduluko, iinzibi, nokulawuleka kweenzibi. Kuphakanyisiwe bona kubenesifundobandulo esizokufundisa abahlanganyeli mayelana nokulawulwa kweenzibi ukuze bakghone ukuzwisisa, babenelwazi nekghono elizobasiza bamukele ukulawulwa kweenzibi nefundo yebhoduluko. Likulu inani leenzibi ebelibuthelwa ngemisebenzi yangamalanga, ebelingalahlwa eendaweni ezifaneleko. Kuphakanyisiwe bona ihlelo le-SSIP-WMP liphunyelelwe isikhathi eside ukuze ngikghone ukubona imiphumela efaneleko njengoba belibanjwe isikhatjhana. Kuphakanyisiwe bona irhubhululo yenziwe eendaweni ezahlukahlukeneko, njengemazikweni aphezulu wezefundo, amasekethi, amadistrigi, eemfundeni kanye nemazweni ahlukahlukeneko ephasini mazombe, njengoba imiphumela yeembhoduluko ezahlukahlukeneko ingasiza ukuthuthukisa ihlelo le-SISS-WMP.

AMAGAMA AQAKATHEKILEKO: *linzibi; Ukulawuleka kweenzibi; Ibhoduluko;
sifundo sezeBhoduluko; Ukunzinza.*

UMXHOLO

Injongo yayikukuphuhlisa nokuphumeza isicwangciso songenelelo esizinzileyo kulawulo lwenkunkuma eqinileyo. Ngokusuka kubungqina obungantsonkothanga, ezinye izikolo kwisithili saseNkangala kwiisekethe ezahlukeneyo ziya kungcoliswa yinkunkuma eqinileyo, kwaye ukufundisa nokufunda kuya kuqhubeka kuqhutywa kungekho nkxalabo malunga nayo nayiphi na imiba yokusingqongileyo. Oku bekukho isalathisi esicacileyo sokuba bekukho iindlela zolawulo lwenkunkuma eqinileyo ezingephi okanye azikho ezizinzileyo nezinokuthi zibe sisikhokelo sokulawula ubungakanani benkunkuma eqinileyo eveliswayo. Ndaye ndamkela uyilo lokutolika olusemgangathweni lwesifundo sesifundo esizinziswe kunxibelelwano lwentlalo. Ufundo lwam lwenzeka kwizikolo zamabanga aphantsi ezithathu eziphantsi kwesekethe yaseKwaggafontein East kunye neSekethe yaseTweefontein South kwisithili saseNkangala, kwiphondo laseMpumalanga eMzantsi Afrika. Iinqununu zezikolo, oosihlalo bamabhunga olawulo ezikolo, abasebenzi ngokubanzi, abaphatha ukutya, ootitshala besigaba esiphakathi, nabafundi besigaba esiphakathi baye bathathwa njengesampula ngenjongo. Idatha yaqokelelwa ngokuqwalaselwa, udliwano-ndlebe olulungelelanisiweyo, udliwano-ndlebe lwamaqela ekugxilwe kuwo kunye nedayari. Le datha yakha isicwangciso esibandakanya intsebenziswano kwizikolo zaseprayimari, esibizwa ngokuba sisicwangciso songenelelo ngoncedo oluzinzileyo kulawulo lwenkunkuma eqinileyo ngentsebenziswano (SISS-WMP). Indlela yokuchwetheza yasetyenziswa ukuhlalutya idatha. Ngokusekwe kwiziphumo, ndingatsho ukuba abanye abathathi-nxaxheba khangе babe nokuqonda okwaneleyo kweengqikelelo ezifana nokusingqongileyo, inkunkuma eqinileyo, kunye nolawulo lwenkunkuma eqinileyo. Kucetyiswa ukuba kuququzelelwe iindibano zocweyo ukuze kufundiswe aba bathathi-nxaxheba malunga nokusingqongileyo, inkunkuma eqinileyo kunye nolawulo lwenkunkuma eqinileyo. Ukuze babe nokuqonda, ulwazi, kunye nesakhono njengoko oku kuya kubanceda ukuba baxabise ulawulo lwenkunkuma oluluqilima kunye nemfundo yokusingqongileyo. Izixa ezikhulu zenkunkuma eqinileyo zenziwe ngemisebenzi yemihla ngemihla, ethe yalahlwa ngendlela engafanelekanga. Kucetyiswa ukuba i-SISS-WMP iphunyezwe ixesha elide njengoko ukuphunyezwa bekulithuba elifutshane. Ngaphaya koko, izifundo zinokuqhutywa kwiimeko ezahlukeneyo ezinje ngemfundo ethe kratya kunye namabhendi oqeqesho, iisekethe, izithili, kwiphondo nakumazwe ahlukeneyo

kwihlabathi liphela, njengoko iziphumo ezisuka kwezi meko zahlukeneyo zinokuncedisa ekulungiseni kakuhle i-SISS-WMP.

IMIGAQO ENGUNDOQO: Inkunkuma eqinileyo; Ulawulo lwenkunkuma eqinileyo; Okusingqongileyo; Imfundo ngokusingqongileyo; Uzinzo.

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LIST OF ACRONYMS

3R's:	Reduce, Re-Use and Recycle
ABI:	Amalgamated Beverage Industries
ACI:	Africa Clean-Up Initiative
C2005:	Curriculum 2005
CAPS:	Curriculum Assessment Policy Statement
CCBSA:	Coca-Cola Beverages South Africa
COVID-19:	Coronavirus Pandemic
CSR:	Corporate Social Responsibility
DBE:	Department of Basic Education
DEA:	Department of Environmental Affairs
DEFF:	Department of Environment, Forestry and Fisheries
DHEC:	Department of Health and Environmental Control
EA:	Educator Assistance
EL:	Emthini Learner
EPWP:	Expanded Public Works Programme
ESD:	Education for Sustainable Development
FET:	Further Education and Training
FH:	Food Handler
GET:	General Education and Training
GW:	General Worker
HET:	Higher Education and Training
IWMSA:	Institute of Waste Management of Southern Africa
MEC:	Member of The Executive Council
NAPECA:	North American Partnership for Environmental Community Action
NDM:	Nkangala District Municipality
NGO:	Non-Governmental Organizations
NPO:	Non-Profit Organizations
NQF:	National Qualifications Framework
NWMS:	National Waste Management Strategy
OEA:	Organization of Environmental Education
SAGSP:	South African Green Schools Programme
SANBI:	South African National Biodiversity Institute

SASA:	South African Schools Act
SDGS:	Sustainable Development Goals
SDS:	Social Development Services
SGB:	School Governing Body
SISS-WMP:	Sustainable Intervention Strategy for Solid Waste Management Through Partnership
SP:	School Principal
SWOT:	Strengths, Weakness; Opportunities and Threats
T:	Teacher
TL:	Tjala Learner
UNESCO:	United Nations Educational, Scientific and Cultural Organization
UNSD:	United Nations Statistics Division
VL:	Vuna Learner
WDCD:	What Design Can Do
WESSA:	Wildlife & Environment Society of South Africa
WHO:	World Health Organization

CHAPTER 1: THE TOUR

“If we knew what it was, we were doing, it would not be called research, would it?”

Albert Einstein

1.1. INTRODUCTION

The tour chapter introduced the study's background. It discussed the problem statement, research questions, aims and objectives, rationale, delimitations and concluded with the chapter outline.

1.2. BACKGROUND

Despite repeated efforts by the South African government to manage waste through the establishment of waste rules and public awareness, the problem persists. Even though South Africa is known to be the leader in the waste management sector in Southern Africa, according to Oelofse (2019) the country is still 20–30 years behind European and other industrialized countries in terms of the waste management life cycle.

In 2017, South Africa created more than 42 million tons of rubbish, with just 11 percent being diverted from landfills, and 38 million tons of waste, of which only 7% was reused or recycled rather than being classified as waste, according to the draft 2018 State of Waste Report (Department of Environmental Affairs [DEA], 2018). The Institute of Waste Management of Southern Africa (IWMSA) organized a landfill conference in 2019, during which waste management specialists highlighted that South Africa is running out of landfill space, and that urgent solutions are required to overcome this crisis and efficiently manage waste (Githahu, 2019).

South Africa appears to be drowning in its own waste, which it continues to generate. Furthermore, this was similar to what the President of the Republic of South Africa remarked on March 8, 2019, during the introduction of the Good Green Deeds program in East London. He indicated that that we have evolved into a disposable generation and that we throw litter out onto the streets instead of placing it in rubbish bins (Ngcukana, 2019).

As a result, rather than efficiently managing waste generated, more simplistic solutions are frequently attempted, such as dumping rubbish in unsuitable locations. These findings confirmed that South Africa's waste management debates are in the midst of a crisis, and that waste is a huge environmental issue.

Waste management is critical since it aims to reduce the impact of rubbish on human health and the environment (United Nations Statistics Division [UNSD], 2017). As a result, appropriate activities must be made to control rubbish from the point of origin to the point of disposal. Industrial waste, agricultural waste, commercial waste, and home waste are the four main types of waste. The majority of studies in South Africa focused on household waste, industrial waste, and agricultural waste. Bhagwandini (2013) for example, examined the effectiveness and efficiency of current waste management strategies as well as trends in waste minimization in local municipalities. While Masange (2014) focused on the role of environmental governance in municipal waste management, investigating and evaluating the implementation of waste management rules in local governments. Gumbi (2015) did a study that looked into existing waste minimization and management patterns and practices in local municipalities.

According to the 2019 Basic Assessment Report, waste generation and management in Nkangala District Municipality had a negative impact on the environment (Nkangala District Municipality [NDM], 2019). As a result, an environmental program was developed with the goal of preventing, reducing, or mitigating pollution and minimizing environmental degradation. From anecdotal evidence, these initiatives seem to be fruitless. Furthermore, it is imperative to note that at the National level the South African government has made efforts to manage waste through the development of waste management regulations and public awareness. The National Waste Management Strategy (NWMS) for South Africa enacted waste legislation that is guided and influenced by the waste hierarchy's key elements, such as re-use, recycle, recovery, avoidance, and reduction. It prioritizes the strategic method for waste management in

schools and communities (DEA, 2012a). Yet in general it did not bring observable changes to most schools (Sikhosana et al., 2020).

Similar waste management initiatives have been implemented in Asian schools and have had a positive effect on learners' attitudes toward waste management and the importance of avoiding waste. Their voluntary participation in these initiatives, however, had no effect on how waste is managed in schools (Tangwanichagapong et al., 2017). The strategy was not embraced by the schools. So, it was critical for me to recognize that stakeholders had their own unique realities regarding solid waste management practices. These realities needed to be factored in the development of the strategy so that they can embrace, own it and make it functional.

I adopted a qualitative interpretative multiple case study design embedded within social constructivism. I interpreted stakeholders' perspectives and perceptions on how they shaped solid waste management in primary schools. These stakeholders included school principals, School Governing Body (SGB) chairpersons, general workers, food handlers, teachers and learners, each of whom had their own multiple realities, experiences, views and perceptions as well as interactions about what solid waste and solid waste management practices entails.

With the overarching theoretical framework which is social constructivism which encompasses; multiple realities, experiences, views and perceptions as well as interactions, established. There was a need to contextualize concepts such as; solid waste, solid waste management, developing, strategy and implementing as they shaped how data was collected, presented and discussed. As this contributed towards developing the sustainable intervention strategy for solid waste management through partnership (SISS-WMP).

1.3. PROBLEM STATEMENT

South Africa will have nearly 26 000 schools, 400 000 teachers, and close to 13 million learners in public and private schools by 2021 (Sterne, 2021). These

figures are alarming in light of the amount of waste generated by schools through the use of teaching and learning materials. Common types of solid waste generated by schools include paper, glass, plastics, metal, tetra packs, polystyrene, and e-waste. I observed anecdotally that the global outbreak of the coronavirus pandemic (COVID-19) generated additional waste in schools, including surgical masks, face shields, and gloves.

This created additional challenges for the environment and human health, as some schools improperly disposed solid waste. Additionally, some schools in the Nkangala district across various circuits would be polluted with solid waste but teaching and learning would continue uninterrupted by environmental concerns. This indicated that there were no environmentally friendly solid waste management practices in place that could serve as a guideline for managing the amount of waste generated.

It is critical to note that effective solid waste management practices must still be encouraged, as some schools have implemented only minimal waste management practices. According to South Africa's Constitution Act 108 of 1996, everyone has the right to an environment that is not harmful to their health and well-being and to have their environment protected for the benefit of current and future generations through reasonable legislation (Department of Justice, 1996). Thus, conducting teaching and learning in an unhealthy environment is considered a violation of human rights.

After highlighting all of these, there should be concern about the environmental impact of ineffective solid waste management and rising levels of pollution in schools. The NWMS set a target of ensuring that at least 80% of schools in South Africa implemented waste awareness programs in 2016 (DEA, 2012a). The Coca-Cola Company made efforts in 2018 by hosting nation-wide waste management programs in all South African schools. However, that programme involved only 866 schools, 12,000 teachers, and 700,000 learners (Manyana, 2019).

Amalgamated Beverage Industries (ABI) introduced a school recycling program with the goal of providing solutions in schools, raising awareness and teaching learners about the negative impact of waste and becoming environmentally responsible. This ABI school recycling program drew 400 000 learners from 404 different schools throughout the country (Independent Online, 2015). Additionally, eco-school programs were implemented with the goal of increasing awareness and action regarding environmental sustainability in schools and their surrounding communities, thereby assisting in the education for sustainable development (ESD) process.

Nonetheless, over 10 229 schools in all nine provinces have participated in the Wildlife & Environment Society of South Africa's (WESSA) Eco-Schools programme since 2003, with over 6 000 schools sustaining their environmental projects for a period of 3-12 years, involving over 500 000 learners and 40 000 teachers (Department of Basic Education [DBE], 2016). As a result, it was determined that school-based voluntary participation in these waste management initiatives continues to be a challenge. Mpumalanga province had approximately 2 252 schools, 36 977 teachers, and 1 094 941 learners in 2021 (DBE, 2021).

As a result, one might question whether waste management programs are operational and supported in some of the province's schools, given the WESSA Eco-schools program's and Coca-Cola company's statistics. Africa accounts for approximately 23% of deaths due to avoidable environmental hazards such as inadequate sanitation, poor hygiene, ineffective water resource management, inadequate infrastructure, and atmospheric pollution (World Health Organization [WHO], 2009).

Thus, education could be used to address such issues, as it contributes significantly to ensuring that the younger generation acquires the necessary skills and knowledge for sustainable living (Msezane, 2020). Muzenda et al. (2012) conducted a study that examined the sustainability and expansion of South Africa's current waste generation and management trends. While Niekerk (2014) investigated the level of waste management knowledge,

awareness, and practices in schools, he discovered that waste management practices were minimal.

These findings corroborated those of Msezane and Mudau (2014) who discovered that environmental education has a negligible effect on reducing unwanted solid waste disposal in schools. This exemplified the existence of a fundamental gap in solid waste management. As a result, interventions must be implemented to manage solid waste. Additionally, the amount of waste generated continues to grow into a complex global problem due to ineffective waste management (Comber & Thieme, 2013).

The primary issue in South Africa is that schools generate enormous amounts of solid waste and have minimal or no waste management practices. Therefore, it was imperative that with all the other strategies not bearing sustainable impacts, an alternative be developed which should assist schools in managing solid waste.

1.4. RESEARCH QUESTIONS

My study was motivated by the need to develop and implement the sustainable intervention strategy for solid waste management which I called the SISS-WMP, in primary schools in the Mpumalanga province's Nkangala district.

The study was guided by the following research questions:

1. Why did primary school stakeholders shape solid waste management practices in the way they did?
2. How was the development of the SISS-WMP?
3. How was the implementation of the SISS-WMP?

1.5. AIM AND OBJECTIVES

My study's primary aim was to develop and implement the SISS-WMP in primary schools located in Mpumalanga province's Nkangala district.

The following objectives were established to accomplish this aim:

1. To gain an understanding of stakeholders' perspectives and motivations for shaping school-based solid waste management practices.
2. To identify opportunities in the development of the SISS-WMP.
3. To understand the implementation of the SISS-WMP.

1.6. RATIONALE

There is widespread concern about South Africa's rapid growth in waste generation, and the most concerning factor is a scarcity of land suitable for effectively disposing of such waste (Afrika et al., 2016). Additionally, schools are notorious for generating a large amount of waste with the teaching and learning materials they use on a daily basis (Lober, 2017). The most shocking statistic is that secondary schools generate 22 kg of waste per learner per academic year, while primary schools generate 45 kg per learner per academic year (Recyclenow, 2019).

Nonetheless, it was critical to recognize that the amount of waste generated in schools was not solely determined by the size of the school or the number of learners, but also by the types of activities conducted daily by teachers, learners, and other stakeholders (Rada et al., 2016). Thus, schools must manage their waste generation and waste management practices in order to have a positive impact on the environment and benefit learners through sustainable development.

Additionally, an environmental calendar was created to commemorate World Environment Day, with the goal of increasing environmental awareness and enhancing the Earth's environment (DEA, 2020). Even so, I observed that voluntary participation in such initiatives was at an all-time low. As a result, I investigated whether there were policies in place to guide the management of solid waste in schools. As this may aid in developing a better understanding of

stakeholders' perspectives and motivations for shaping the management of solid waste in primary schools.

Additionally, I observed that a variety of businesses and non-profit organizations (NPOs) would conduct waste management and environmental education awareness campaigns in a variety of schools. However, these initiatives involved a small number of schools for a brief period and lacked consistency. As a result, my research may contribute knowledge and skills to solid waste management in primary schools through the development of the SISS-WMP.

Environmental education has been ineffective because schools have failed to put what they teach into practice (Saylan & Blumstein, 2011). Rather than that, they continued to underinvest in and neglect environmental education, failing to keep up with environmental degradation. As a result of my research, schools may be able to participate actively in waste management initiatives as a means of resolving environmental problems. Furthermore, this may provoke the interest of relevant stakeholders in recognizing the importance of managing the solid waste effectively through the SISS-WMP.

1.7. DELIMITATIONS

The study was conducted in three primary schools in the Kwaggafontein East and Tweefontein South circuits of Mpumalanga province's Nkangala district. However, the study's objective was not generalizability; rather, it was in-depth analysis of the cases to gain a better understanding of how they managed solid waste, which influenced how I developed the SISS-WMP. Furthermore, the biographical nature of the participants did not influence how data was analyzed.

1.8. CHAPTER OUTLINE

The following section contains a chapter outline:

- Chapter 1:** The tour chapter discussed the introduction, background, the problem statement, the research questions, the aims and objectives, the rationale, and the delimitations.
- Chapter 2:** The appraisal of scholarly work chapter reflected on the literature reviewed.
- Chapter 3:** The frame of reference chapter discussed the theoretical and conceptual framework.
- Chapter 4:** The map chapter described the methodology.
- Chapter 5:** In this chapter, phase one data from Emthini primary school (Case 1) was presented and discussed.
- Chapter 6:** In this chapter, phase one data from Tjala primary school (Case 2) was presented and discussed.
- Chapter 7:** In this chapter, phase one data from Vuna primary school (Case 3) was presented and discussed.
- Chapter 8:** The developed SISS-WMP was presented and discussed.
- Chapter 9:** Instantaneous implementation of the SISS-WMP in three primary schools was presented and discussed.
- Chapter 10:** The destination chapter discussed the study's summary, main contributions, shortcomings, recommendations and further studies.

1.9. CONCLUSION

The Tour Chapter discussed the introduction and background before delving into the core issue of my study. It outlined the research questions, aims and objectives for developing and implementing the SISS-WMP in three primary

schools in the Nkangala district of Mpumalanga province. It included a brief discussion of the rationale as well as the delimitations. It concluded with an outline of the chapters. In the next chapter I present the appraisal of scholarly work.

CHAPTER 2: APPRAISAL OF SCHOLARLY WORK

“A successful book is not made of what is in it, but what is left out of it.” - Mark Twain

2.1. INTRODUCTION

The preceding chapter discussed and introduced the study's background. This chapter summarized the scholarly work that served as the foundation. The review of literature aided me in addressing the following research questions:

1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did?
2. How was the development of the SISS-WMP?
3. How was the implementation of the SISS-WMP?

2.2. EMPIRICAL STUDIES

According to the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2021) teachers are critical in informing learners about the environment, climate change, sustainable development, and global citizenship. Numerous studies have been conducted to ascertain teachers' and learners' levels of knowledge and attitudes regarding the environment, environmental education, ESD, and waste management in schools.

Ardoin et al. (2020); Boca and Saraçlı (2019); Alexandar and Poyyamoli (2014) examined the relationship between teachers' and learners' environmental knowledge, skills, attitudes, values, perceptions, and behaviour. These studies aimed to promote and evaluate the effectiveness of environmental education through sustainable development, with the ultimate goal of protecting the environment. According to Debrah et al. (2021) learners demonstrated positive attitudes and awareness toward environmental issues.

Integrating environmental education into the school curriculum continues to be a significant challenge for the majority of teachers (Tovar-Gálvez, 2021). Darmawan and Dagamac (2021) suggested that this issue could be addressed

by incorporating environmental awareness into the curriculum, as environmental literacy could aid in resolving environmental issues. While Hanneman (2013) demonstrated that environmental education has the potential to develop and enhance environmental knowledge, skills, attitudes, and values, this is because there is a short-term positive increase in the number of individuals with good intentions to act responsibly toward the environment.

But, Edsand and Broich (2020) refuted the claim made by Erhabor and Don (2016) when they indicated that there was weak evidence affirming that environmental education can promote a high level of environmental awareness. This was discovered through the process of evaluating the relationship between environmental education and environmental awareness. As a result, there is still a great deal of concern about environmental education and how it is incorporated into the teaching and learning process (Wu et al., 2019; Loubser & Simalumba, 2016).

Researchers conducted several studies on environmental education, ESD, and solid waste management in schools within the context of the South African educational system. Table 1 summarized the seminal work of several of these empirical studies, their findings, and their recommendations. It concluded with a discussion of some of the studies that were influenced by these recommendations.

Table 1 empirical studies (Sikhosana, 2022).

Empirical studies	Findings	Recommendations	Implemented recommendations
Lebeloane (2004) conducted a research that examined the school beautification program as a strategy for environmental management and improvement.	Some of these school's lack environmental policies, environmental teaching objectives, or a time frame for reviewing their environmental activities.	Schools should establish and track proactive measures that can be utilized to better manage the school environment through environmental programs.	The Kanyimba et al. (2009) study was based on the Lebeloane (2004) study, which focused on monitoring and analyzing the progress of an environmental management system's implementation process to determine its effectiveness.
Sethusha (2006) investigated learners' knowledge and understanding of the environment and environmental education in primary school.	The majority of learners were aware of environmental issues. Even though some of them were unable to apply their knowledge and skills to suggest potential solutions that might aid in resolving these issues.	Teachers should be trained in environmental education facilitation, and schools should participate in environmental campaigns to educate learners about the environment.	Sethusha's (2006) recommendations motivated Mandikonzal and Lotz-Sisitka (2016) to develop environmental and sustainability education, which proved to be a viable vehicle for teacher education practices.
Mokhele (2007) investigated how some of South Africa's provinces responded to the	The Mpumalanga Department of Education has limited material and intellectual resources to	Provinces and districts must devise strategies for integrating their natural resources and	This resulted in the Makokotlela (2016) study, which examined the government's effectiveness in

<p>new Curriculum 2005 (C2005), taking into account the opportunity for environmental education.</p>	<p>assist schools in developing their instructional capacity in order to implement new environmental education policies and programs.</p>	<p>environmental education programs with those of other departments.</p>	<p>terms of environmental education.</p>
<p>Rosenberg (2008) conducted an assessment of eco-school programmes and the educational quality in South Africa.</p>	<p>The eco-school programmes had numerous constraints in schools and there was evidence that these programmes have a potential in contributing to the complexity to which many teachers struggle to respond too.</p>	<p>Agencies that work with South African schools should promote environmental education in a way that is cognizant of the difficulties associated with issues of quality.</p>	<p>As a result, Adams (2013) examined strategies that teachers can use to overcome barriers to integrating action-based environmental education into their classrooms.</p>
<p>Carvello (2009) assessed how eco-schools programmes can achieve whole school development and examined the impact through the implementation of sustainable education.</p>	<p>The study established conclusively that the eco-school programme does indeed promote whole-school development through the implementation of sustainable education.</p>	<p>Individuals should be educated about the importance of eco-school programmes through the development and implementation of strategies in various schools.</p>	<p>As a result, Mogren et al. (2019) developed a model of school organization that emphasizes the importance of a whole-school approach to ESD.</p>
<p>Ljunggren (2011) investigated the challenges and opportunities inherent in</p>	<p>Schools implemented recycling programmes, environmental awareness clubs, vegetable</p>	<p>Schools should instill a sense of environmental stewardship and behaviour.</p>	<p>As a result, Sithole (2017) concentrated on promoting a positive learning environment,</p>

environmental education projects in primary schools.	gardens, and school greening as part of their environmental education initiatives.		which facilitated the development of strategies for enhancing learners' performance.
Songqwaru (2012) investigated strategies for assisting Life Sciences teachers in meeting the requirements of environmental and sustainability knowledge discourse.	The majority of teachers lack adequate subject knowledge and are unfamiliar with effective teaching methods for teaching about the environment and sustainability.	Additional research should be conducted to determine the best methods for assisting teachers in acquiring the necessary content knowledge in the context of the environment and sustainability.	Mudaly and Ismail (2016) conducted a study, which focused on teacher development towards acquiring context knowledge of environmental, and sustainability education.
Dube (2012) examined the integration of environmental education and ESD into the Geography subject's curriculum.	The majority of teachers struggle to incorporate environmental education and ESD into their curricula.	Teachers should collaborate because environmental education and ESD fieldwork require an interdisciplinary approach.	This resulted in the development of the Tlhabanelo (2020) study, which examined the most appropriate curriculum framework for promoting environmental education implementation in schools.
Bhagwandini (2013) conducted a similar study, focusing on waste management initiatives.	Rather than developing a framework for enhancing and promoting waste minimization through recycling, traditional waste management strategies such as landfills are viewed as	Additional research should be conducted to gain additional insight into the extent of waste minimization and to determine whether or not the integrated and sustainable waste management	Thus, Beer's (2013) findings indicated that developing a framework has the potential to evolve into a sustainable waste management strategy.

	an effective approach.	goals are being met.	
Venter (2014) compared and evaluated educational programmes offered at zoological institutions with the goal of developing an effective model for zoo-based conservation education.	Zoos have been instrumental in conserving biodiversity and enhancing learners' knowledge of environmental education through their conservation education programmes.	Programs should be sustained over time to encourage learners to acquire knowledge and practice in environmental education and conservation.	It inspired authors such as Zareva-Simeonova et al. (2014) to create informal and formal educational packages for learners visiting zoos to learn about environmental education.
Niekerk (2014) investigated the level of awareness, knowledge, and practices regarding waste management among primary and secondary school learners.	Learners were clearly aware of the issues surrounding waste and waste management practices in their schools and communities.	The South African government should step up studies to better understand children's needs in areas such as waste management.	The suggestions served as the foundation for Msezane's (2014) research, which examined the influence of environmental education on land resource sustainability.
Msezane (2014) investigated the effect of environmental education innovation on learners' perceptions of land resource sustainability.	Learners demonstrated a lack of concern for the harmful consequences of improper waste disposal. Due to the fact that they show a lack of care for the environment both at school and at home,	Additional research should be performed to determine the feasibility of including environmental education as an examinable topic into the curriculum.	Sikhosana et al. (2020) undertook a research to determine how and why senior phase teachers are capable of integrating environmental education or are unable to do so.
Hebe (2015) examined the degree to which environmental	Some teachers in grade R do include environmental themes	Environmental education integration should be prioritized	Swarts et al. (2015) did a follow-up research, focusing on how

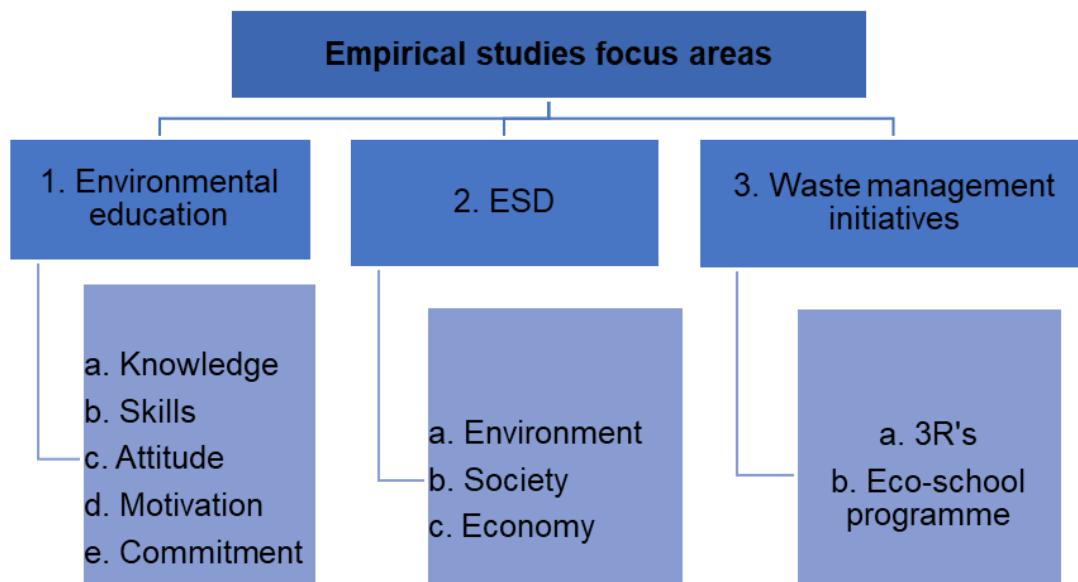
education is incorporated into the teaching and learning process for grade R learners.	into their lessons. This is done, however, in the guise of environmental education, with little or no environmental education in/through/for the environment.	for grade R teachers, who should get training and ongoing, relevant professional support.	teachers may effectively integrate environmental education in stages such as foundation phase (grade R–3).
Buthelezi (2015) wanted to know whether environmental education was available via eco-school programmes.	It has been established beyond a reasonable doubt that certain schools do not implement eco-school programmes. However, some schools have enrolled with this programme but have not been successful.	Eco-schools programmes should be mandatory in all schools, and appropriate persons should be hired to administer, monitor, support, and evaluate the development of such programmes.	Beyond the categories of the influence of environmental policy and the character of school aims and didactics, Pauw and Petegem (2017) analyzed eco-school programmes.
Mawela (2016) investigated the challenges of implementing environmental education initiatives in primary and secondary schools.	Despite the fact that schools have environmental education initiatives, there is still a shortage of competence and competency in handling such projects in schools.	Environmental education programmes in schools should be governed by a policy developed by school administrators, teachers, and members of the SGB.	Mohapi and Netshitangani (2018) on the other hand, discovered that SGB members would inadvertently or consciously delegate their governance tasks and obligations to administrators in order to avoid enforcing regulations.
Makokotlela (2016) examined the efficacy of several	Environmental education programmes are ineffective, and	Teachers should be taught in environmental education in	This resulted in the Chigona (2017) research, which

government ministries' environmental education activities.	there is a shortage of appropriate materials as a result of insufficient subject advisor and teacher training.	partnership with subject advisers in order to incorporate it successfully into teaching and learning.	recommended that long-term planning be implemented to guarantee that subject advisors are sufficiently prepared and equipped to engage in the connected school environment.
Matsekoleng (2017) aimed to help all key parties in planning litter-reduction actions at home and in schools.	Environmental activities may be beneficial in both home and school settings, since they may stimulate learners to engage in littering if addressed via action research.	At the grass-roots level, kids need to be taught about, in, and about the environment.	As a result, Thor and Karlsudd (2020) concentrated their efforts on teaching and promoting environmental awareness activities in order to promote action-oriented environmental education.
Makhubele (2017) examined the waste recycling practices used in primary schools.	The majority of primary school pupils opted to recycle, landfill, burn, or dump their waste in open locations.	Additional environmental research should be undertaken over a longer period of time in order to collect data and monitor recycling behaviours in schools on a continual basis.	This prompted Flanagan (2017) to examine how education may be utilized to promote recycling behaviours and attitudes among primary school learners.
Pholose (2019) assessed the solid waste management practices already in place in schools.	It is still promising to improve waste management practices.	Separation of solid waste policies and enforcement should be created.	According to Chatira-Muchopa and Tarisayi (2019) rubbish should be controlled by sorting and the use of durable, standard,

			and formal waste containers.
Masemene (2020) investigated the components of environmental literacy in teachers and learners with the goal of promoting sustainable behaviour in schools.	There are nominal and functional environmental levels among teachers and learners, as teachers demonstrated a lack of experience in teaching environmental education material, necessary for the development of environmental literacy.	Curriculum reorientation to include environmental sciences as a core topic. Furthermore, schools should have an environmental policy that serves as a guide for sustainable behaviour best practices.	Edsand and Broich (2020) examined the degree to which environmental education in schools may account for diversity in learners' environmental literacy.

Furthermore, a thorough grasp of the link between environmental education, ESD, and waste management activities in South Africa was critical. The focus areas of these empirical research are shown in Diagram 1.

Diagram 1 empirical studies focus areas (Sikhosana, 2022).



Sethusha (2006) conducted research on the evolution of environmental conceptions and environmental education. While Masemene (2020) and Niekerk (2014) focused on environmental literacy, they investigated teachers' and learners' levels of awareness, knowledge, skills, and behaviours in schools. Whereas Hebe (2015); Dube (2012); Mokhele (2007) focused on integrating environmental education into the curriculum and teaching and learning processes.

Buthelezi (2015); Carvello (2009); Rosenberg (2008); Lebeloane (2004) evaluated the implementation and facilitation of eco-school programmes in a variety of schools to guarantee effective waste management and sustainable development. As shown in Diagram 1 in column 3 from a-b above, these are some of the programmes on which these studies concentrated their efforts while evaluating their efficacy in promoting whole-school development. This prompted Pholose (2019) and Makhubele (2017) to evaluate some of these waste management projects in further detail. Makhubele (2017) discovered that

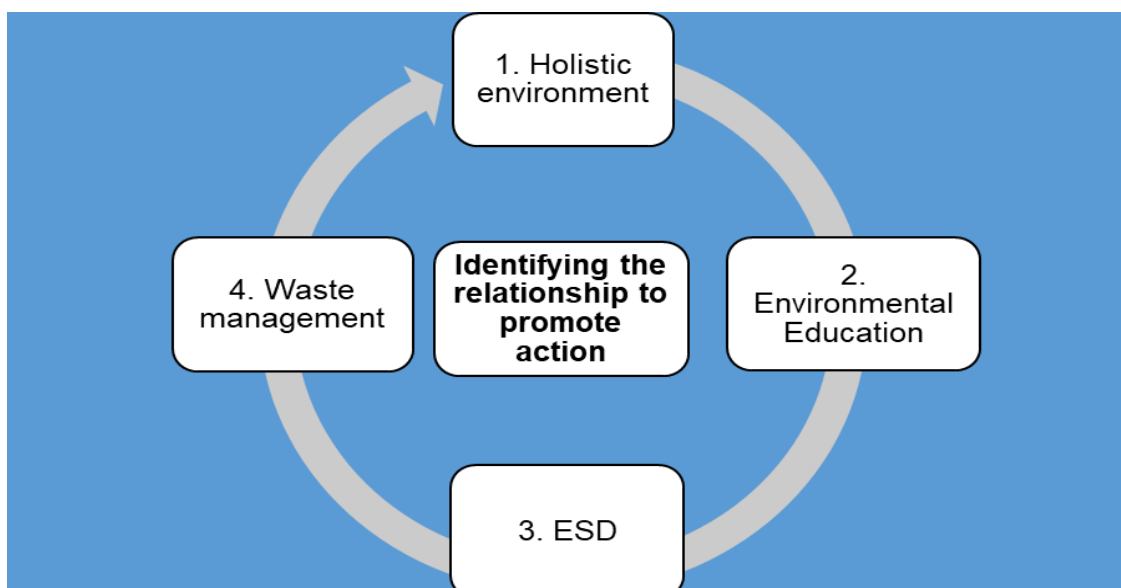
learners preferred to dispose their waste in open locations by dumping and burning it.

While Matsekoleng (2017) highlighted that such problems may be overcome via action research, Pholose (2019) believes that there is still potential for changing the way waste is handled in schools by enhancing existing waste management programmes. As a consequence, Msezane (2014) and Ljunggren (2011) focused on the difficulties and possibilities inherent in school-based waste management programmes. While other studies were done in different government agencies to determine the success of larger-scale environmental education projects (Makokotlela, 2016). As a result, I developed and implemented the SISS-WMP.

2.3. THE CONCEPTS UNDERPINNING THE STUDY

This part included a concise explanation of the themes that guided my research. It established a link between the environment, environmental education, ESD, and waste management in order to encourage environmentally conscious behaviour. The relationship between these notions was summarized in Diagram 2.

Diagram 2 relationship between concepts (Sikhosana, 2022).



With the environment defined as the natural surrounds composed of both living and non-living entities, it is critical to recognize that humanity has evolved into an intrinsic element of the environment. As a consequence, a holistic setting is critical for teaching and learning since it fosters all components of the environment (Modell et al., 2009). This is because a holistic environment seeks to include the whole of the environment in which we live. According to Obong et al. (2010) the holistic environment encompasses all-natural resources such as land, air, and water, as well as visible and invisible aspects that impact an organism's lifelong development.

With the recognition of humanity, their interactions with the environment have had a detrimental effect on the ecosystem and its natural resources (Amasuomo & Baird, 2016). Larsson (2009) stated that as the human population grows, diverse human activities will inevitably have an effect on the ecosystem. This is accomplished by pollution caused by human activity, which is harmful to human health and sustainable development.

To address these obstacles, schools can consider adopting efficient waste management measures. This is to maintain the school and learning environment clean and unpolluted (Janitorial Services Atlanta, 2018). This implies that learners perform better in a clean, favorable atmosphere. As a result, schools' entire environments cannot be disregarded. With environmental education becoming a growing field of study, there has been an increase in public awareness of environmental concerns and the impact of human activity on the environment (Cutter-Mackenzie-Knowles & Edwards, 2013).

This resulted in the establishment of environmental education with the express purpose of addressing these issues. Rada et al. (2016) and Karama (2016) adopted this strategy with the goal of educating folks about environmental concerns while also instilling the necessary behaviours to live a sustainable existence. I agree with this strategy since environmental education is critical for solving global environmental concerns and fostering a broader awareness of the environment across all divisions (Akanji, 2020; Thomas, 2009).

Stevenson et al. (2013) on the other hand, challenged the idea that environmental education is problem-solving focused. They stated that environmental education encompasses more than the process of building learners' problem-solving abilities via conceptualization and comprehension of this idea. According to Orr et al. (2019) environmental education should also include complete lifetime learning, preparing people for life by educating them about the challenges, characteristics, and abilities necessary to enhance and safeguard the environment.

As a result, it's unsurprising that South Africa's DBE envisioned environmental education being incorporated throughout the Curriculum Assessment Policy Statement (CAPS) in order to strengthen ESD. Nonetheless, Rosenberg et al. (2009) demonstrated that environmental education is included in South African schools in an ad hoc manner, since non-departmental programmes and providers are the ones that expose teachers to it. This contributed to the spread of the myth that environmental education could be incorporated solely into scientific courses.

Orr (2020) said that environmental education is not limited to scientific courses but also occurs in official and informal educational settings and interactions initiated by the individual or group. In South Africa, some teachers see environmental education as a viable vehicle for incorporating environmental activities into their general teaching and learning programmes (Le Grange, 2017). It is self-evident that environmental education in schools should give opportunity for learners, teachers, and other stakeholders to engage in activities and behaviours that contribute to attaining sustainable development (Ifegbesan, 2010).

This should increase people' problem-solving, critical thinking, and decision-making abilities, since they will be able to evaluate environmental factors while making judgments (Mbalisi, 2010). Additionally, schools may be able to build efficient and effective waste management techniques. This will not only offer useful data for waste management, but it should also provide a chance for

schools to learn about climate change and environmental legislation, as well as take the required steps to address any environmental concerns.

As a result, Franzen (2018) recommended people to devise a variety of tactics that would assist them in making more informed decisions that will guarantee a sustainable future and environmental literacy. As this will facilitate people's connection to the world and teach them about both natural and constructed ecosystems, poor waste management practices in schools are the primary issue affecting the environment (Toth, 2013). As a result, schools must take appropriate measures to enhance and preserve the environment.

This may be accomplished if ESD is provided in schools, empowering people to make educated choices and take responsible actions to ensure the environment's sustainability. McKeown and Hopkins (2005) demonstrated a link between environmental education and ESD in a research. They emphasized that this connection between these strands of sustainability is based on the environment, society, and economics.

This demonstrates the importance of environmental education, as it may positively contribute to the strands of ESD and ensuring a sustainable future (Seitz, 2002). Barth and Michelsen (2013) concur that ESD has the potential to influence people's actions and behaviours as long as it emphasizes multidisciplinary interactions. As a result, ESD must include opportunities for teaching and learning that foster problem solving, critical thinking, cooperation, creativity, and innovation (Iliško et al., 2014; Goldstein, 2012).

This way, learners would be encouraged to be active participants rather than passive consumers of information in resolving environmental challenges (Filho & Pace, 2016). Participating in environmental concerns may also have a beneficial effect on the management of solid waste in the school setting. Given that the majority of human activities create a significant quantity of waste (Brunner & Rechberger, 2014) the amount of waste generated will have a detrimental effect on not only the environmental quality, but also on human health if it is not handled properly (Lagerkvist & Dahle'n, 2012).

As a result, schools must change their present solid waste management systems to make them more effective, as the waste created in schools is often uniform (Department of Health and Environmental Control [DHEC], 2019). Arazo (2015) said that schools create solid waste in four primary sources: food services, classrooms and offices, resident halls and corridors, and outdoors. Thus, establishing the nature and production of waste should be the first step towards effective solid waste management in schools.

Gumbi (2015) and Demirbas (2011) suggested that in order to manage rubbish successfully, it must be collected, transported, and processed appropriately prior to ultimate disposal. Coker et al. (2015) define waste management as a procedure that treats all materials as a single class with the goal of minimizing negative environmental consequences. This was done to ensure that persons live in a healthy environment, since reckless and inadequate waste disposal may pose health concerns and contribute to environmental pollution.

According to Dayton and Foust (2019) safeguarding the environment, enhancing quality of life, and maintaining economic success require a complex integration of resource management and compliance with government rules and policies. Hence, Joy-Telu and Telu (2017) stated that schools continue to create more interest, thinking, and study as a result of the vast quantity of waste they produce, most of which is discarded as junk. Schools that learn how to manage rubbish successfully not only affect their future, but also have a good impact on the environment and the teaching and learning process.

Maintaining a clean environment may also assist in the learning of necessary information for resolving future environmental issues (Adeolu et al., 2014). Since Griffiths et al. (2016) argue, in order for schools to achieve waste management objectives, they must adopt a whole-school approach, as this is the only way to ensure long-term success, as it requires multiple school stakeholders to modify their waste management behaviours. Thus, it was critical for me to grasp the conceptual basics since they provided a roadmap for developing and implementing the SISS-WMP in three primary schools.

2.4. GUIDELINES FOR THE DEVELOPMENT AND IMPLEMENTATION OF THE SISS-WMP

It was critical for the aim of my research to review publications that detailed the principles to follow when developing a strategy, since this molded the produced SISS-WMP. According to Jackson (2017) and Kaplan et al. (2008) the strategy creation process should consider goals and allocation of resources needed to accomplish them.

To develop and implement the SISS-WMP, I needed to follow the three planning steps outlined below:

Step 1: Identifying existing practices in solid waste management

Step 2: Strategy development

Step 3: Strategy implementation

I began by determining the composition of the solid waste created by primary schools. This brought me to the point of establishing waste management procedures via an examination of how stakeholders in these primary schools shaped their solid waste management practices. This allowed me to investigate the waste management practices used (or not used) in these primary schools. By doing so, I was able to determine the strengths, weaknesses, opportunities, and threats (SWOT) of their solid waste management practices. This data served as the foundation for developing the SISS-WMP and implementing it.

I examined the study's objectives and selected my own key ideas on environmental education. This allowed me to see how the SISS-WMP might look after it was developed. By establishing distinct views and long-term goals, I was able to create a balanced framework for fulfilling the study's aim and objectives. As a result, the developed SISS-WMP key performance areas were regularly monitored, and all stakeholders were informed of the SISS-WMP goals. I acquainted stakeholders with the developed SISS-WMP in preparation for implementation.

A timeline for implementing the SISS-WMP was established. All stakeholders were coached on how to execute the developed SISS-WMP. This also allowed me to assess its efficacy.

2.5. WASTE MANAGEMENT INTERVENTION STRATEGIES FROM FIVE CONTINENTS

This section addressed and evaluated the characteristics of waste management intervention techniques used in schools throughout five continents, namely North America, South America, Asia, Europe, and Africa. Mexico, Chile, China, Germany, Nigeria, and South Africa are from these continents. These countries were selected in order to get a basic grasp of their viewpoints on waste management intervention tactics deployed in schools without focusing on individual regions. In South Africa, however, I opted to explore waste management intervention options applied in the country's nine provinces.

I researched all nine provinces of South Africa, since this was the context for my study, in order to get a thorough knowledge of how schools in various provinces influenced solid waste management.

2.5.1. WASTE MANAGEMENT INTERVENTION STRATEGIES IN NORTH AMERICA

This section analyzed and evaluated the nature of intervention measures for solid waste management in some schools in Mexico.

2.5.1.1 Mexico

Mexico is one of the nations that continues to struggle with solid waste; it is ranked as the second greatest creator of waste, with poor waste management systems that are unable to keep up with the problems posed by solid waste (What Design Can Do [WDCD], 2020). To address this issue, many waste management projects have been proposed and implemented in several schools

around Mexico in order to motivate learners to take meaningful environmental activities.

This resulted in the establishment of several waste management projects, such as rubbish recycling and separation, which were implemented between 2011 and 2012 by the ECO-RETO organization, involving 1.8 million learners and 6 463 schools (Medina & Smith, 2013). One of the greatest impediments to successful rubbish management in certain schools in Mexico is a lack of information about appropriate recycling management (Cardona et al., 2014). Additionally, in Mexico, solid waste is seen as a neglected problem in the education sector by educational and environmental authorities (Organization of Environmental Education [OEA], (2016).

As a consequence, the OEA implemented rubbish recycling to promote environmental education and proper waste management in schools, benefiting just 6 583 learners. This resulted in a dramatic surge in recycling contests in schools, in which learners collected recyclable bottles in exchange for school trip permits and supplies (Maldonado, 2019). Other contests emphasized the design of a school constructed entirely of recyclable materials (Harrouk, 2019). This effort was introduced as one of the measures schools might employ to fight the problem of school-generated solid waste.

Additionally, the North American Partnership for Environmental Community Action (NAPECA, 2019) launched a "Zero Waste at My School" project as part of its solid waste management strategy. This effort aimed to raise learners' understanding of environmental issues and to help schools in implementing required adjustments to their environmental policies (NAPECA, 2019). Organizations such as Earth Day 2020, Earth Day Network Mexico, and Environmental Education Worldwide have increased the number of competitions for learners. This was done with a motive of designing projects that will improve the environmental stewardship of their schools and provide opportunities for environmental education (Weisbrot, 2020).

Despite the fact that Mexico is the second biggest nation in terms of solid waste generation, it was obvious that tremendous efforts were made in different schools to manage and battle waste concerns via the implementation of waste management programmes. However, in a country such as Mexico, a lack of environmental education and awareness, as well as inadequate waste management systems in schools, continue to be significant challenges (Alvarez, 2021).

2.5.2. WASTE MANAGEMENT INTERVENTION STRATEGIES IN SOUTH AMERICA

This section addressed and evaluated the nature of intervention measures for solid waste management in Chilean schools.

2.5.2.1 Chile

Chile's economic expansion has resulted in the creation of difficulties related to the country's rapid rise in waste generation (Rojas et al., 2018). As a consequence, Vásquez et al. (2014) determined that in Chile, the management of solid waste segregated for recycling ranged between 27.98% and 33.18%. As a consequence, efficient waste management systems must be implemented. In 2016, Law No. 20,920, dubbed the Framework Law for Waste Management, Extended Responsibility of the Producer and Promotion of Recycling was enacted (Quiroz, 2016).

This legislation was enacted with the intent of minimizing rubbish creation via the promotion of recycling, reusing, and other environmental stewardship practices in order to safeguard the environment and promote environmental sustainability (Cabello, 2016). As a consequence, different waste management projects have been implemented at various schools around Chile in order to increase public awareness of environmental concerns. Chile's environmental ministry launched a programme at several schools to recycle electronic waste, installing 100 e-waste bins as part of a waste management plan (Bnamericas, 2016).

Another recycling education campaign was launched in 2017 and resulted in a 60% increase in school participation (Mostrador, 2017). Other institutions recycle wastewater generated on-campus to irrigate vegetable gardens and fruit trees (Milesi, 2019). While others launched campaigns on ecology and sustainability, as well as school-wide paper recycling and forestation, with the goal of arming learners with the information and skills necessary to tackle environmental obstacles (Cognita, 2019). Such waste management activities conducted in schools demonstrate that Chile's solid waste management is almost perfect (Bünemann et al., 2020).

2.5.3. WASTE MANAGEMENT INTERVENTION STRATEGIES IN ASIA

This section addressed and evaluated the nature of intervention measures for solid waste management in some schools in China.

2.5.3.1 China

China was designated as the world's greatest producer of solid waste, outpacing all other countries (Huang, 2019 & Chen, 2018). This resulted in the emergence of a number of difficulties and impediments in China. Informal waste recycling and disposal industries began to grow, resulting in major environmental challenges and adverse effects on human health (Wei & Liu, 2012). One of the most significant issues in the school environment happened when it was revealed that close to 500 learners were ill at one of China's schools as a result of rubbish produced (Campbell, 2016).

This situation prompted the introduction and implementation of new policies aimed at assisting with waste management and promoting sustainable growth in China (Zhou et al., 2019). This regulation was implemented by the Shanghai government in 2017, when it adopted a new solid waste categorization policy (Shanghai Municipal People's Congress, 2019). The categorization policy governs rubbish collection, transportation, and disposal based on certain norms. These rules were implemented as a strategy to address China's solid waste management concerns.

China has done research on sustainable waste management and welcomed many environmental non-governmental organizations (NGO) to engage in informal environmental education (Lee et al., 2020 & Jia-nan, 2012). Certain intellectuals developed an increased concern for environmental conservation and an interest in waste management and pollution (Jia-nan, 2012). Efforts have been taken to guarantee that this new policy is implemented effectively. Teachers in different schools have been urged to educate learners on solid waste classification (Shanghai Municipal People's Government, 2019).

To aid with rubbish control in schools, several schools have implemented programmes such as: Plate Waste in School Lunch Programs (Liu et al., 2016). This was because waste from school plates has been a source of worry for the environment and the health of learners. Tangwanichagapong et al. (2017) did a research on school greening activities centered on reducing, re-using and recycling (3R's). They discovered that although such campaigns have a beneficial effect, they have little effect on waste management behaviour. A similar research conducted by Huang et al. (2019) on eco-school programmes found excellent outcomes for the 3R's.

It falls short, however, in terms of waste education, since it does not work to change people' behavioural standards and environmental ethics. Keyue (2019) challenged the assertion by stating that rubbish education has improved, as China just opened its first waste-sorting education center to raise awareness. Additionally, China launched a food waste solution challenge in which several schools competed, with an emphasis on sustainable development, food waste reduction, and environmental protection (Ruixing et al., 2017). According to the academic material reviewed, there were less waste management activities done in Chinese schools. In the absence of such activities, 500 learners were impacted by ineffective rubbish management.

2.5.4. WASTE MANAGEMENT INTERVENTION STRATEGIES IN EUROPE

This section addressed and evaluated the nature of intervention measures for solid waste management in some schools in Germany.

2.5.4.1 Germany

Global rubbish creation continues to increase, resulting in an increase in the amount of solid waste created by humans (The World Bank, 2018). As a consequence, waste management has become a critical issue that must be addressed (Abdel-Shafy & Mansour, 2018). Germany, for example, is well-known as a global leader in waste recycling, recycling more than any other nation (Rogers, 2020 & Gray, 2017). Additionally, it ranked first on the list of the world's best recyclers (Eddy, 2016). It has enhanced its waste management methods to reach a high rate of recycling, low landfill rates, and composting.

This was accomplished by Germany's new Closed Cycle Management Act, which emphasized the transformation of waste management into resource management (Nelles et al., 2016). However, it lags behind when it comes to waste management in the educational setting. According to So et al. (2019) there are little or no cross-curricular waste management activities in the education sector. As the extent to which waste management is covered in schools is entirely determined by the teacher's interests and motivations (Kolbe, 2019).

As a result, Kalambura et al. (2015) recommend that for schools to undertake effective waste management efforts, they should consider educational collaborations with the government, teachers, and NGO's as major environmental groups. As a result, it is critical for schools to raise environmental consciousness, comprehension, and knowledge about waste management in order to conduct successful waste management activities.

2.5.5. WASTE MANAGEMENT INTERVENTION STRATEGIES IN AFRICA

This section addressed and evaluated the nature of intervention measures for solid waste management in some schools in Nigeria and South Africa.

2.5.5.1 Nigeria

According to Ana et al. (2011) waste management in schools has become a major issue. This has resulted in a daily rise in the amount of solid waste created in Nigeria, since plastics and paper were previously regarded to be the most often generated waste products in schools. Coker et al. (2015) suggested that schools are the primary source of solid waste. This prompted several businesses and NGO's in Nigeria to establish rubbish control projects in schools.

Recycling initiatives were launched with the goal of teaching learners about the necessity of waste management and the value of repurposing rubbish to enhance their creative abilities (Eco Africa, 2017). Africa Cleanup Initiative (ACI) cooperated with five schools to execute the "Recycles Pay" initiative. The schools were situated in low-income neighborhoods. The "Recycles Pay" scheme enables learners and parents to pay school tuition using recycled plastic bottles (Iwenwanne & Salaudeen, 2019).

This programme is a successful tool that may be adopted in a variety of countries, communities, and schools to manage solid waste, as people recognized the worth of the waste they create in terms of academic and sustainability advantages to learners. Suleiman et al. (2015) undertook a project in many Abuja schools that promoted rubbish management hierarchy, distributed brochures, and conducted class-to-class lectures to create awareness about waste management. These projects demonstrated that attempts have been undertaken in Nigerian schools to reduce rubbish creation.

According to the Ocean Atlas Report (2017) Nigeria continues to create a huge quantity of solid waste, earning it a spot on the world's top ten list for plastic pollution. This is a difficulty since improper waste disposal adds to disease transmission and pollution of the environment. Individuals' failure to separate, reduce, reuse, and recycle their waste has hampered waste management in several states around the nation (Festus & Ogoegbunam, 2012). This

demonstrated unequivocally that waste management in Nigeria is a serious environmental issue (Ifegbesan, 2010).

As a consequence of inappropriate solid waste management practices, environmental health conditions in Nigeria's less developed countries have deteriorated (Ana et al., 2011). Numerous studies done in Nigeria provided a variety of solutions for overcoming obstacles and implementing good waste management procedures in schools. According to Ifegbesan (2010), people's behavioural attitudes about waste must alter in order to participate effectively in waste management.

Additionally, Ifegbesan (2010) recommended that school administration and the government organize workshops and seminars for teachers and learners to raise awareness of waste concerns and repercussions. While Obong et al. (2010) advised that a curriculum on environmental management be established for Nigerian schools, they urged that it be made mandatory. Sunday and Olufunmilayo (2008) on the other hand, suggested that environmental management would have an effect on the quality of output produced by learners in schools, since there is a strong link between the school and management.

As a consequence, it is critical to ascertain the degree of knowledge and awareness about waste management in schools, as well as the impact of educational programmes in increasing stakeholder engagement in sustainable waste management in schools (Ikhuoso, 2018). This may result in a more conducive school environment for successful teaching and learning, since teachers, learners, and other stakeholders will be encouraged to participate to the school environment's administration.

2.5.5.2. South Africa

This section summarized and examined the type of solid waste management intervention tactics used in schools across South Africa's nine provinces. Table

2 summarized the nature of some solid waste management projects done in schools across South Africa's nine provinces:

Table 2 provincial waste management initiatives in South Africa (Sikhosana, 2022).

PROVINCE	WASTE MANAGEMENT INITIATIVES
Eastern Cape	<p>In 2018, an NPO established a recycling programme in some primary schools in the Eastern Cape province, which was administered by Colchester Recycling Swop Shop. This recycling programme was implemented with the goal of educating learners about the environment and instilling in them a feeling of environmental responsibility. All waste products collected at different schools are swapped for stationery, food, and clothes as part of the waste management plan (Lake, 2018).</p>
Free State	<p>The Free State National Botanical Garden has launched a Biodiversity Education Program and Outreach Greening, aiming to enhance environmental awareness and foster environmental stewardship in some Free State schools. It urged teachers to create curriculum-connected courses that would instill environmental stewardship in learners via school programmes. They developed solutions to maintain the environment by educating teachers and learners about the present state of the environment and human effects (South African National Biodiversity Institute [SANBI], 2020).</p>
Gauteng	<p>Gauteng province launched a series of awareness-raising initiatives and asked schools and community people to engage in waste management programmes in the City of Johannesburg. Among these programmes are the following:</p> <ul style="list-style-type: none"> <li>○ Community environmental awards, which recognized schools and different environmental organizations around the province for their contributions to environmental management concerns. <li>○ Educational awareness initiatives targeting learners have been started.

	<ul style="list-style-type: none"> ○ Clean-up initiatives were launched to urge schools and community people to take ownership of their surroundings by cleaning them (City of Johannesburg, 2011).
KwaZulu-Natal	<p>KwaZulu-Natal was one of the provinces that participated in Coca-Cola Beverages South Africa's (CCBSA) Schools Recycling Programme, which was implemented in a number of the province's schools. This programme was established with the goal of developing a future generation that is responsible and dedicated to preventing rubbish from becoming litter. The objective was to educate learners about the value of the 3R's early on in order to promote a cleaner environment (Manyana, 2019).</p>
Limpopo	<p>In 2017, the Education Member of the Executive Council (MEC), the Deputy Minister of Environmental Affairs, and the Limpopo MEC for Economic Development, Environment, and Tourism inaugurated the South African Green Schools Programme (SAGSP) in 105 schools around the province. This initiative was carried out in primary and secondary schools. The purpose of SAGSP was to increase teacher and learner understanding of the issue of environmental degradation and to promote both the 3R's waste management hierarchy and waste management programmes. The project's objective was to educate the population and encourage the adoption of sustainable techniques of environmental resource gathering in order to leave a legacy for future generations (DEA, 2017).</p>
Mpumalanga	<p>In collaboration with the Eco-School initiative, the Kruger National Park launched an outreach programme in some schools in Mpumalanga province. This outreach program's objective is to:</p> <ul style="list-style-type: none"> ○ Instill in pupils an appreciation for the value of a sustainable lifestyle ○ encourage greening of schools ○ create food gardens on school property; and ○ Raise awareness of waste recycling (siyabona africa, 2020)
North West	<p>In 2016, the North West Department of Rural, Environment, and Agricultural Development set a goal of increasing public</p>

	<p>awareness about the negative effect rubbish has on people's well-being, health, and the environment. As a consequence, the Provincial Rubbish Forum and Environmental Forums adopted a variety of waste management projects in province-wide schools to address waste management concerns. These actions led in the establishment of:</p> <ul style="list-style-type: none"> ○ The province of North West is constructing 43 eco-schools. ○ The creation of five centers for environmental education. ○ Incorporating a lesson on waste management into school curriculum. ○ Interventions with teachers once a month, and ○ Establishment of 200 environmental clubs (Moselakgomo, 2016).
Northern Cape	<p>The Northern Cape Provincial Administration, in collaboration with the Departments of Education and Agriculture, Land Reform, Rural Development, Environment and Nature Conservation, is starting the Love Your School Campaign throughout the province's schools. The purpose of this programme was to inspire learners to act as environmental ambassadors and to help South African residents in developing a better awareness and knowledge of appropriate waste management practices. The Department of Education included an environmental theme into the curriculum with the goal of enhancing environmental learning and action (Abrahams, 2020).</p>
Western Cape	<p>The Department of Solid Waste, in collaboration with the City of Cape Town's Youth Environmental Schools programme and the Western Cape Eco-Schools programme, launched waste awareness programmes in several province-wide schools with the goal of educating teachers and learners about waste management and resource efficiency. In the Western Cape province, a Waste Wise programme was implemented in schools. Their goals and objectives were:</p> <ul style="list-style-type: none"> ○ To increase teacher, learner, and general public awareness of waste. ○ To provide teachers with the tools necessary to increase awareness about the negative implications of ineffective

	<p>waste management in schools, as well as the positive outcomes of successful waste management.</p> <ul style="list-style-type: none"> ○ Providing assistance to schools in the creation of waste reduction programmes and portfolios (Green Times, 2016).
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It was clear that solid waste creation in schools and communities continues to be a significant concern in South Africa, since it results in waste being illegally disposed and littered. Among the difficulties identified by the NWMS were:

- A deficiency in recycling infrastructure,
- A legislative and policy framework that does not aggressively support a hierarchical approach to waste management; and
- As the population rises, the quantity of waste created increases proportionately (dea, 2012a).

Nine provinces throughout the Republic of South Africa undertook a variety of projects in schools with the goal of improving learners' and teachers' perspectives and attitudes regarding solid waste generation and management.

2.6. CONCLUSION

The chapter on the appraisal of scholarly work reviewed literature pertinent to the aim of the study. The next chapter explores the frame of reference and how to use it.

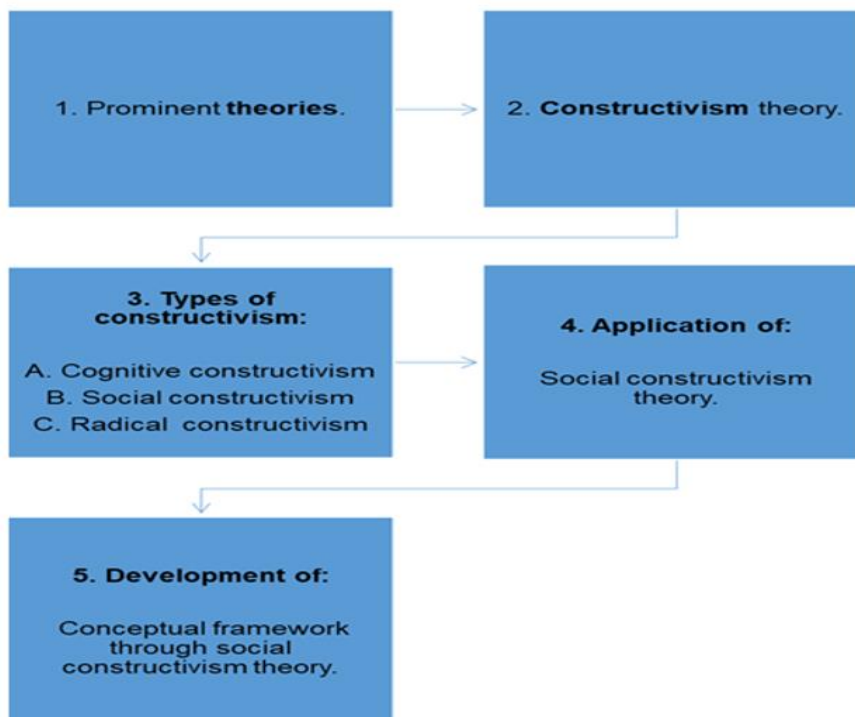
CHAPTER 3: FRAME OF REFERENCE

“Above all, we have to go beyond words and images and concepts. No imaginative vision or conceptual framework is adequate to the great reality.”-Bede Griffiths

3.1. INTRODUCTION

I evaluated the survey of scholarly work on empirical investigations in the preceding chapter. This chapter offered an overview of the frame of reference within which the research was conducted and developed. As a result, it aided in answering the research questions of my study. Diagram 3 summarized the key focus areas of the frame of reference chapter.

Diagram 3 focus areas of the frame of reference (Sikhosana, 2022).



3.2. PROMINENT THEORIES

This section examined and described the following theories; positivism, pragmatism, critical thinking, grounded theory, and constructivism. It examined

each theory's shortcomings in terms of its relevance to my research. Table 3 summarized the ideas, their founding year, and their major proponents.

Table 3 summary of prominent theories, year founded and main thinkers (Sikhosana, 2022).

Theories	Year founded	Main thinkers
Positivism theory	Formulated in 19 th century	Auguste Comte (1798-1857)
Pragmatism theory	Founded in 1870	John Dewey (1859-1952)
Critical theory	Originated in 1930s	Max Horkheimer (1895–1973)
Grounded theory	Originated in 1960s	Barney Glaser (1930) and Anselm Strauss (1916-1996)
Constructivism theory	Founded in 1978	Lev Vygotsky (1896–1934)

3.2.1. POSITIVISM THEORY

Positivism views observation and reasoning as critical tools for understanding human behaviour and thinks that true knowledge may be gained via observation and experimentation (Brundrett & Rhodes, 2013; Henning et al., 2004). Selvan (2017); Green and Thorogood (2004) claimed that positivists believe that there is a single reality that can be accessible via scientific procedures as the researcher becomes an observer of objective reality (Cohen et al., 2006). These scientific procedures include conducting tests that provide objective results that are not susceptible to different interpretations (Kumatongo & Muzata, 2021; Creswell, 2008).

This created a constraint when I evaluated the diverse realities of all stakeholders, since they have disparate ideas and beliefs regarding the solid waste management systems employed in schools. Positivism's objective is to

understand and anticipate human and natural processes (Peca, 2000). This idea is applicable to fields such as social sciences, natural sciences, and physical sciences that need a high number of sample sizes (Bonell et al., 2018; Taylor & Medina, 2013; Crotty, 2003). This hypothesis was inapplicable since it made a claim of certainty (Houghton, 2011).

Furthermore, contrary to positivist theory, I was not concentrating on any one school topic, but on the educational environment as a whole. Positivism theory is associated with quantitative research methodologies, control groups, the use of experimental procedures, and the administration of pre- and post-tests to determine score distribution. While I used a qualitative research approach in which I gathered data via observations, semi-structured interviews, focus groups, and a diary.

Additionally, the theory was inapplicable since positivism thinks that inferences are objective, and conclusions may be drawn as long as the researcher doing the observations is impartial and disengages from their emotions (Johnson, 2009). This was impossible since human behaviour is innate and there is no assurance that it would occur consistently. Positivism accepts things as they are and ignores inexplicable events (Johnson, 2009). This idea was limited in that it stopped me from answering the research questions.

3.2.2. PRAGMATISM

Pragmatism is best defined as a philosophy of truth that is concerned with the relationship between epistemic practices and truth (Capps, 2019). This theory is predicated on the notion that the researcher may provide a compelling argument about the nature of reality, focus, and truth rather than practical understandings about real-world difficulties (Patton, 2005). Pragmatists are more concerned with what works, which detaches pragmatism philosophy from its imperative philosophical underpinnings (Hesse-Biber, 2015). This idea was limited by the fact that my major objective was not only to create but also to execute the SISS-WMP in three primary schools.

As a result, no projections were made of the results. Because pragmatism encompasses both qualitative and quantitative research methodologies (Creswell & Creswell, 2018), it is often connected with mixed-methods research (Morgan, 2014; Creswell & Clark 2011; Johnson & Onwuegbuzie, 2004). Even if pragmatists believe that emphasizing the real world and the practical might drive researchers to choose soft techniques, so ignoring critical distinctions between quantitative and qualitative research (Denzin, 2010). This was not the case, since I used a qualitative research approach to elicit responses to the research questions from stakeholders' perspectives on solid waste management.

While pragmatic philosophy aims to alter the environment via experiments and rejects the experiences of others, it also believes in man's own self-experience (Chakma, 2020). This theory's relevance was restricted in my research because I interpreted the stakeholders' numerous realities, their experiences, perspectives, and perceptions, as well as their interactions within their social environment.

3.2.3. CRITICAL THEORY

Horkheimer's (1930) critical theory is best defined as a socially orientated philosophy aiming at critiquing and altering society as a whole. It aides in the comprehension of how communication is used to oppress and suggests strategies for promoting constructive social change (Foss & Foss, 1989; Fay, 1975). It equips people with the epistemic skills necessary to critically examine, criticize, and destabilize strong social systems (Ho, 2021). This was done with the intention of exposing and criticizing society power systems (Bohman, 2019), in order to release people from their enslaving conditions (Koltonski, 2014; Moiso, 2013; & Horkheimer, 1982).

Additionally, it is possible by delving under the surface of social life and determining what hinders folks from comprehending how the world works (Crossman, 2020). Individuals may then comprehend how they are oppressed and take action to alter oppressive forces (Friesen, 2008). Even while critical

theory lacks the theoretical underpinnings necessary for socially aware research (Larsen & Wright, 1993), this was the case because critical theory was more reliant on social values (Paynton & Linda, 2019). While I drew on the experiences, relationships, perspectives, and perceptions of stakeholders within their social construct. Adopting this theory was a hurdle since I placed a premium on the different realities of stakeholders, but critical theory places a premium on the subjective values that influence communication behaviour.

3.2.4. GROUNDED THEORY

Grounded theory is best characterized by Hussein (2015); Glaser and Strauss (1967) as a means of understanding and conceptualizing data. It gives a way for developing and comprehending a social phenomenon that cannot be accomplished by the use of pre-existing ideas and paradigms (Engward, 2013). Grounded theory is persuaded of the need of investing in social processes that have received little research attention, where there is a vacuum in prior study, and where there is a fresh perspective on known topics that look to be promising (Milliken, 2010). Lehmann (2001) defined grounded theory as a method for gathering and analyzing data in a particular field of study.

It considers causes, contexts, contingencies, consequences, covariance's, and circumstances as factors that aid in the researcher's comprehension of patterns and interactions between them (Boychuk & Morgan, 2004). This was because grounded theorists felt that knowledge about social reality could be gained by monitoring individuals' behaviour and communication patterns. However, this procedure has been called deceptively straightforward (Russell, 2000). As it obscures the researcher's role in data interpretation, as researchers are obfuscated (Bryant & Charmaz, 2007).

This was a barrier since I was intimately engaged in the data collecting and analysis procedures. Additionally, grounded theory generates a large volume of data that might be difficult for the researcher to organize, resulting in time wasted (Myers, 2013; Bryant & Charmaz, 2007). Participants in my study were referred to as stakeholders, which included teachers, learners, school

principals, chairpersons of the SGB, food handlers, and general workers, and the data collection process was guided by the research questions and the study's objective of avoiding the collection of irrelevant data.

Glaser (1992) proposed that in order to avoid deviating from the social process of participants' lived experiences, researchers should gather data via both observation and interviews. I gathered data through observation, semi-structured interviews, focus groups interviews, and a diary. Grounded theory required me to prepare a literature review after data analysis, since grounded theorists considered that reviewing literature before to doing research was unnecessary. However, prior to doing data analysis, I researched the literature to discover and explain the discrepancy between previous studies. This was done in order to prevent contaminating the results (Corbin & Strauss, 2008; Glaser & Strauss, 1967).

3.2.5. CONSTRUCTIVISM THEORY

The nature of my research necessitated the developed and implemented SISS-WMP in three primary schools. This theoretical framework provided as a structure for containing, supporting, introducing, and elucidating why my study's research challenge existed (Gabriel, 2013). On the other hand, the conceptual framework established a logical structure for the ideas and their relationships. This aided me in establishing a connection between the concepts examined in my research and the selected theoretical framework (Grant & Osanloo, 2015).

Vygotsky's (1978) constructivism theory was used to influence the research with the goal of establishing the SISS-WMP and implementing it in three primary schools. While the conceptual framework was developed to identify and characterize the ideas underlying the research challenge (Luse et al., 2012). Constructivism theory guided the study since it was done inside a social environment in which stakeholders interacted with one another. The social milieu was comprised of interactions between school principals, SGB chairpersons, general workers, food handlers, teachers and learners.

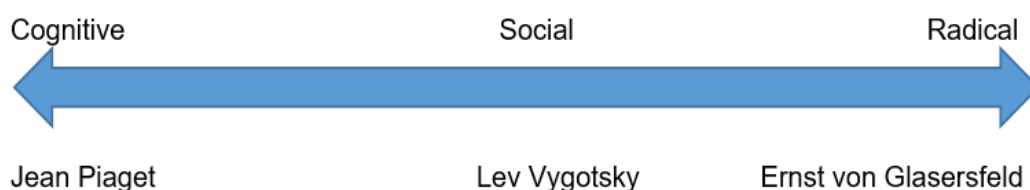
The purpose of using constructivism was to explore how individuals learn via their interactions within a certain social setting (Thomas et al., 2014). Constructivism maintains that learning is an individual process in which people combine information and experiences in unique ways (Finch, 2021). This stated that even when two or more stakeholders were in the same location (environment) and engaged in the same teaching and learning experience, their outcomes/experiences were never identical.

According to Amineh and Asl (2015) constructivism is a synthesis of numerous ideas that have been diffused into a single form that incorporates both individual behaviour and cognitive standards. As a result, constructivism is seen as more than a theory of learning (Applefield et al., 2000). This is because constructivism entails a person building, inventing, producing, and growing their own knowledge and meaning in their social environment (Liu & Chen, 2020).

3.3. TYPES OF CONSTRUCTIVISM THEORIES

There are many varieties of constructivism theories, which may be classified as cognitive, social, or radical constructivism (McLeod, 2019). Cognitive constructivism is founded on Piaget's (1972) work, social constructivism on Vygotsky's (1978) work, and radical constructivism on von Glasersfeld's (1974) work. Doolittle's (2014) constructivist continuum is seen in Diagram 4.

Diagram 4 constructivist continuum (Doolittle, 2014).



According to Piaget (1953) cognitive constructivism is a theory that focuses on humans and how they construct knowledge, with the premise that individuals cannot be given information that they would instantly comprehend; rather, they

must develop their own knowledge. According to Brau (2018) cognitive constructivism places a premium on people' interactions with experiences and ideas in the process of generating new knowledge. Additionally, cognitive constructivism implies that humans actively construct information based on their cognitive architecture (GSI Teaching and Resource Center, 2016).

Individuals create ideas via personal processes and cognitive growth, in contrast to social constructivists, who construct ideas through interpersonal interaction (Katherine et al., 2009). Social constructivism is seen as a subset of constructivism, which accepts the notion that people construct knowledge via their own experiences (Schreiber & Valle, 2013). This was because the stakeholders in my research each provided a unique perspective, and their interactions within their social environment allowed for numerous realities.

Thus, Vygotsky (1978) felt that learning does not occur only inside people, but rather occurs socially and collaboratively as a result of their interactions. Finch (2021) made a similar conclusion, describing social constructivism as a personal construct that allows people to interact. This means that under constructivism, knowledge is actively produced from and transformed by experience, with experience playing a critical part in comprehending and interpreting the meaning (Ardiansyah & Ujihanti, 2018).

While radical constructivism is inspired greatly by cognitive constructivism, it maintains that we form our conceptions and knowledge of the world as individuals (Walshe, 2020). As a result, von Glasersfeld (1984) regards radical constructivism as a mode of knowing that takes a pragmatic approach to issues of truth, reality, and individual comprehension. According to McLeod (2019), radical constructivists think that knowledge is constructed rather than found. Individually produced knowledge informs us nothing about reality; it only enables us to thrive within their surroundings. I embraced social constructivism, considering the study's social environment.

3.4. APPLICATION OF SOCIAL CONSTRUCTIVISM AND THE CONCEPTUAL FRAMEWORK

I developed the SISS-WMP and implemented it in three primary schools using social constructivism theory as the overarching and underlying theory. It was critical to understand how stakeholders thought when developing and implementing the SISS-WMP. These stakeholders included school principals, SGB chairpersons, general workers, food handlers, teachers and learners, each of whom had their own multiple realities, experiences, views and perceptions as well as interactions about what solid waste and solid waste management practices entails.

As a result, I gained an understanding of the techniques being employed in their school setting, and it was this understanding that aided me in developing the SISS-WMP and implementing it in three primary schools. As an interpretivist, I interpreted what I observed from stakeholders based on their experiences, mine, and the studied literature. These interpretations were not one-dimensional but included numerous realities, since each stakeholder had a unique set of perspectives and experiences.

The stakeholder's various realities reflected their overall perceptions of the solid waste management solutions they used. It was general workers' and food handlers' perceptions of what solid waste is and how they dealt with it; it was school principals' and SGB chairpersons solid waste strategies; and it was teachers' perspectives on how to assist learners in comprehending and learning more about environmental education and ESD. The interaction of stakeholders with others is critical for learning in social constructivism (Rannikmäe et al., 2020).

With the overarching theoretical framework which is social constructivism which encompasses; multiple realities, experiences, views and perceptions as well as interactions, established. There was a need to contextualize concepts such as; solid waste, solid waste management, developing, strategy and implementing as they shaped how data was collected, presented and discussed.

Solid waste, in my research, refers to any undesired items that have no intrinsic value other than disposal. The purpose was to investigate how solid waste such as paper, glass, plastics, metal, tetra packs, polystyrene, and e-waste is handled within the framework of a school. Because solid waste is inextricably tied to solid waste management, I was led by the notion of solid waste management when stakeholders expressed their overall experiences with the techniques, they employed to control solid rubbish in their school setting.

Rasmeni and Madyira (2019) defined solid waste management as the collection, transportation, processing, disposal, and monitoring of waste items. Solid waste management, according to the Department of Water Affairs and Forestry (2012) include on-site storage, collection, transport, burning, recycling, and disposal. Solid waste management, in my research, is the act of encouraging waste reduction via the creation of methods to address solid waste management concerns through environmental education and ESD.

Numerous development programmes and research are developed and conducted without sufficient consideration for grassroots needs (Abuiyada, 2018). At the grassroots level, the ideas of solid waste and solid waste management received sufficient attention, since these concepts influenced the development and implementation of the SISS-WMP in three primary schools. Understanding the notion of development may be difficult due to its breadth, since it encompasses social, economic, political, and personal growth (Diale, 2009).

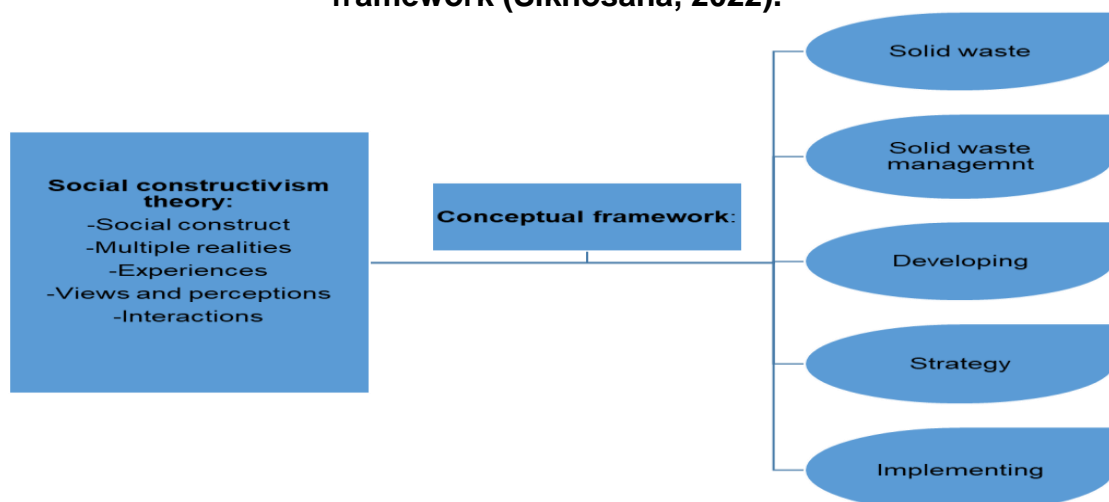
Pearson (1992) thought, however, that the term of development did not correspond to a single social, economic, or political viewpoint. Indeed, it is a wide phrase that encompasses a variety of tactics for social, economic, and environmental change. In my research, development is defined as a process that results in positive changes and advancements in social, physical, environmental, and demographic components. Using solid waste and solid waste management as a foundation idea influenced the development of the SISS-WMP.

According to Fuller (2016) a strategy is a deliberate approach used with the purpose of achieving goals, objectives that are driven by a vision and direction. This was similar to Nickols's (2016) definition of strategy as a complicated network of ideas, objectives, knowledge, perceptions, and expectations that serves as a guide for achieving a given goal. In my research, a strategy is defined as a course of action that is capable of attaining objectives over an extended period of time. As a result, in order to accomplish the study's purpose and goals, the developed SISS-WMP had to be applied.

According to Fixsen et al. (2005) implementation refers to a developed set of actions that must be implemented in a known activity or programme. Durlak (1998) defines implementation as the degree to which a suggested programme is carried out in order to create results for assessment. In my research, implementation refers to the process of carrying out identified methods in order to accomplish the intervention's goals and objectives. As a result of these notions, I was able to frame my research, which centred on the development of the SISS-WMP and its implementation in three primary schools.

Diagram 5 summarized the notions and theories that influenced the conceptual and theoretical framework. The first block of Diagram 5 involved and explored social constructivism theory, which emphasized social constructs, different realities, and the experiences of stakeholders, their interactions, and their perspectives and perceptions. These were informed by the solid waste, solid waste management, and development, strategy, and implementation principles.

Diagram 5 summary of social constructivism theory and conceptual framework (Sikhosana, 2022).



3.5. CONCLUSION

The chapter on the frame of reference offered a concise summary of some theories in research. It explored the theoretical and conceptual framework upon which the research was based and constructed. The next chapter, "The Map," explains the methods of the investigation.

CHAPTER 4: THE MAP

“If the map shows a different structure from the territory represented...then the map is worse than of no use, as it misinforms and leads astray.”–Alfred Korzybski

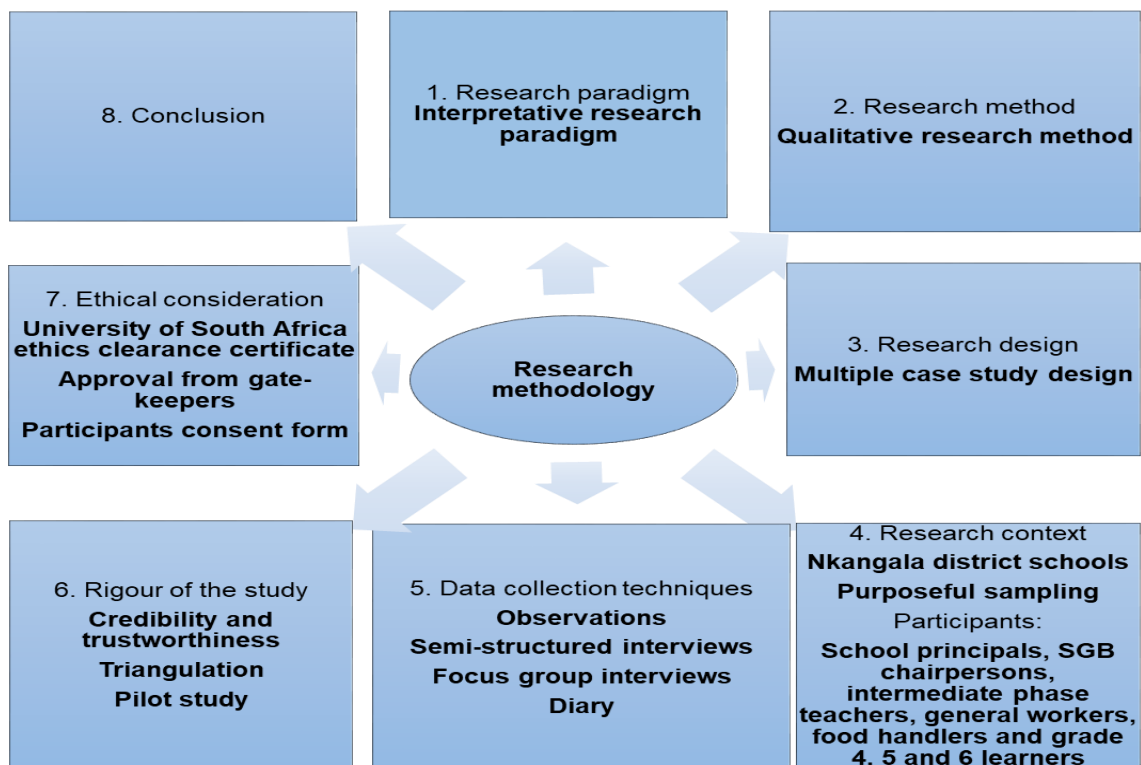
4.1. INTRODUCTION

The preceding chapter discussed the framework within which the study was conducted and shaped. The Map Chapter discussed the methodology employed to address the following questions:

1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did?
2. How was the development of the SISS-WMP?
3. How was the implementation of the SISS-WMP?

Diagram 6 outlined the summary of the key focus areas that the research methodology was based on.

Diagram 6 key focus areas for research methodology (Sikhosana, 2022).



4.2. RESEARCH PARADIGM

The nature of my study adopted an interpretative research paradigm embedded within social constructivism. The interpretative research paradigm enabled me to interpret the multiple realities of each stakeholder and view the world through their experiences and viewpoints towards the developed and implemented SISS-WMP in three primary schools. I immersed myself in their social milieu and observed each stakeholder's behaviour and interactions. This shaped how I saw and thought about all the data I collected, because I believe that there are multiple realities to the truth and that knowledge is socially built (Kivunja & Kuyini, 2017).

4.3. RESEARCH METHOD

I had to collect data directly from each stakeholder in order to have an in-depth understanding of the stakeholder's behaviour, opinions, beliefs, and perceptions about solid waste management practices (Mohajan, 2018; Bengtsson, 2016; Hammarberg et al., 2016; Rosenthal, 2016). This was the reason behind the adoption of the qualitative research method. Hence, there was a need to ask and observe the stakeholders' actions and reasons in terms of what each stakeholder did, how and why they did things the way they did.

As a result, the best method that assisted me in achieving this objective was the qualitative research method (Chafe, 2017). The qualitative research method assisted me in understanding why the stakeholders in primary schools shaped the solid waste management practices the way they did. Furthermore, this was the best method to comprehend the opportunities and challenges in the process of developing and implementing the SISS-WMP. This was possible as qualitative data collection techniques such as observation, semi-structured interviews, focus group interviews, and a diary were used (Sutton & Austin, 2015).

4.4. RESEARCH DESIGN

A multiple case-study design was used as it focused on exploring the real-life multiple bounded systems of each stakeholder in a detailed manner through the use of multiple techniques of data collection (Cresswell, 2013). I focused on three cases, which were made up of three primary schools where data was collected. Each case was treated as a single case as this was not a comparative study because the stakeholder's experiences and knowledge about solid waste management were different. The multiple case study design enabled me to develop a deeper understanding of each case by interacting with and having direct contact with each stakeholder in their social context (Gustafsson, 2017).

4.5. RESEARCH CONTEXT

This section presented the research setting, sampling method, and criteria, as well as the sample size.

4.5.1. RESEARCH SETTING

I conducted this study in the Republic of South Africa, which consists of nine provinces, namely: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West and Western Cape. Figure 1 presents a map of where these provinces are situated in South Africa.

Figure 1 South African map

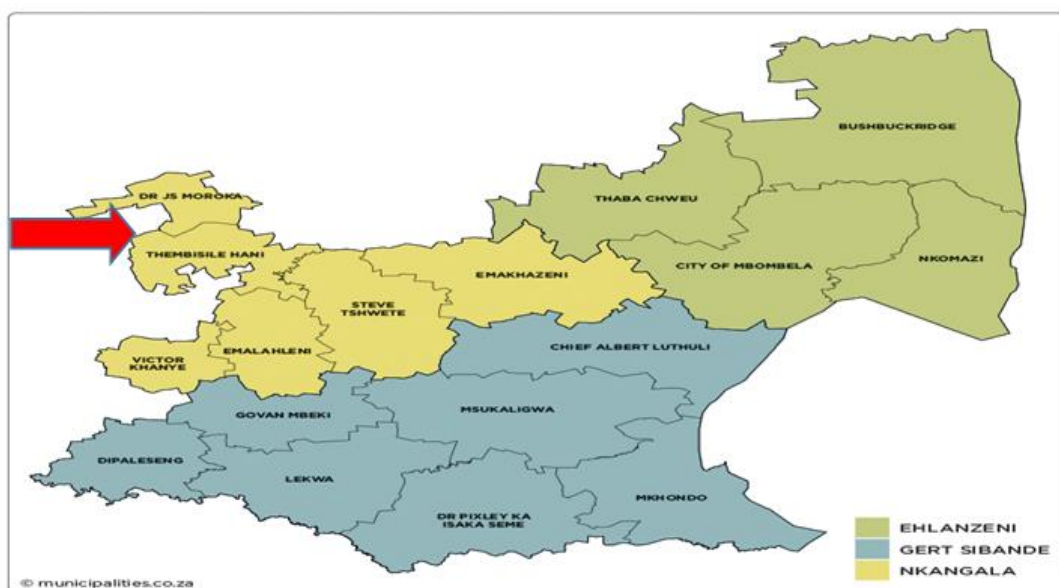


<https://intergate-immigration.com/blog/south-african-provinces/>

I conducted this research in one of the nine provinces of South Africa, which was Mpumalanga province. Mpumalanga is located in the eastern part of South Africa and borders countries such as Mozambique and Swaziland. All nine provinces have their own provincial Department of Education, which consists of districts and circuits. Mpumalanga province is made up of three district municipalities, namely: Ehlanzeni District Municipality, Gert Sibande District Municipality and Nkangala District Municipality. A district is the first level of administrative subdivision within a province (DBE, 2012).

These districts are subdivided into 17 local municipalities, as illustrated in the map in Figure 2 of the setting of the study. A local municipality serves as the third, local and top tier of a local government (South African Government, 2019). My research took place in the Nkangala District Municipality; this district was chosen for convenience and logistical purposes. Nkangala district consists of six local municipalities, namely: Dr JS Moroka local municipality, Emakhazeni local municipality, Emalahleni local municipality, Steve Tshwete Local Municipality, Thembisile Hani local municipality, and Victor Khanye local municipality. My study took place in the Thembisile Hani local municipality, as illustrated by the red arrow in Figure 2.

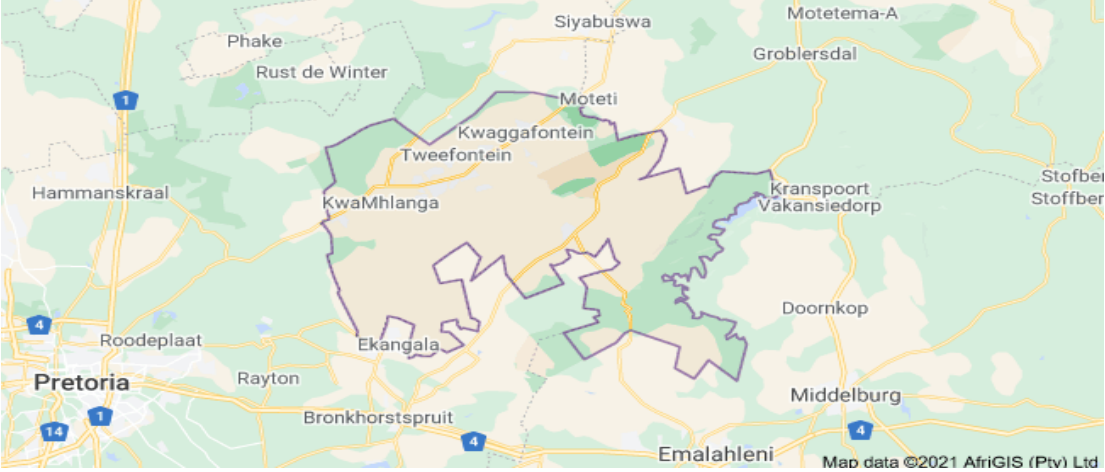
Figure 2 setting of the study



<https://municipalities.co.za/provinces/view/6/mpumalanga>

Thembisile Hani local municipality has a purple bold border line as shown in Figure 3.

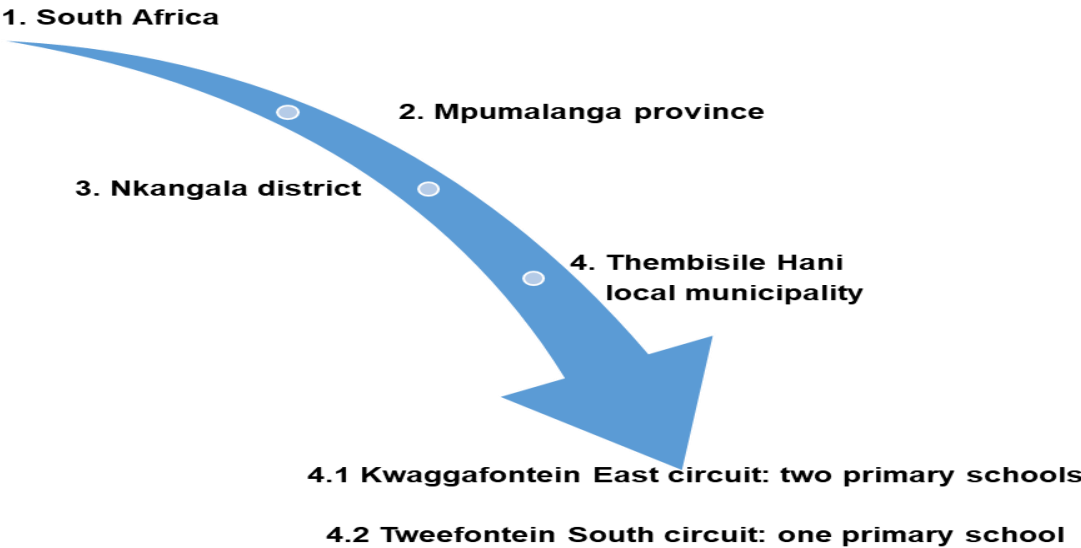
Figure 3 full view of Thembisile Hani local municipality



<https://goo.gl/maps/A3i5FooP4sZgQdtw7>

Thembisile Hani local municipality consists of circuits, whereby a circuit is the second level of administrative subdivision within the province (DBE, 2012). Nkangala District Municipality consists of 20 circuits. My study took place in three primary schools, whereby two primary schools were in the Kwaggafontein East circuit and one primary school was in the Tweefontein South circuit. Diagram 7 presented the summary of the research setting.

Diagram 7 summary of the research setting (Sikhosana, 2022).



The three primary schools in the Kwaggafontein East and Tweefontein South circuits were chosen as they approached environmental issues differently due to their geographic separation. The developed and implemented SISS-WMP was not carried out in a single circuit or school to allay concerns about its feasibility, as the SISS-WMP operated differently in each school. The South African Schools Act (SASA) of 1996 established a national education system, distinguishing between public and private schools.

Independent schools are privately run, whereas public schools are government-run. I conducted this study in three public schools. The decision to conduct this study in a public school was made solely on the basis of my anecdotal evidence. Throughout my teacher education, I was denied access to conduct the pilot study and subsequent research in a number of independent schools. As a result, I was forced to conduct my research in public schools, where obtaining access from gatekeepers was more efficient and less time-consuming than in independent schools.

There are three levels of education that are recognized by the South African National Qualifications Framework (NQF) such as General Education and Training (GET), Further Education and Training (FET) Higher Education and Training (HET) (DBE, 2007). The GET band of education consist of three phases namely: the foundation phase (grade R-3), the intermediate phase (grade 4-6) and the senior phase (grade 7-9). The FET band consist of grade 10-12 schools, public and private FET colleges while HET band comprises of education for undergraduate and postgraduate degrees (DBE, 2007).

My study was conducted under the auspices of GET, and I concentrated exclusively on the intermediate phase. The intermediate phase of education is comprised of grades 4 to 6, and emphasizes academic and technical skills (Basel, 2016). The intermediate phase focuses on teaching learners how to apply their prior knowledge to new concepts in order to develop independence and skills (Basel, 2016). My decision to conduct my research in primary schools with an emphasis on the intermediate phase was based on anecdotal evidence, as I observed that:

- in South Africa, the ideal age for a learner in grade 4 to 6 is between 10 and 12 years old. Thus, I chose this phase because the majority of learners in grade 4 to 6 are young, and some may be unaware of the environmental impact of solid waste.
- the majority of primary schools in the area have tuck shops and street vendors who sell their products to learners during their lunch breaks. As a result, the majority of learners would purchase products packaged in recyclable materials such as plastics, paper, tins, or glass and discard them anywhere in their vicinity.
- the majority of schools have a feeding program in place, where food handlers are hired to prepare meals for learners every day of the week. The food handlers prepared porridge made with maize meal, rice, soya mince, tin fish, cabbage, pumpkin, and butternut, and served it with fresh milk and fruits such as apples, oranges, bananas, and pears.
- during teaching and learning process, learners would cut pieces of paper in the classroom environment that ended up outside the school grounds and they would cease to clean up after themselves because they did not understand their environmental responsibilities.
- there were general workers hired by the SGB or the Mpumalanga Department of Education. These general workers were responsible for maintaining a clean, healthy, and conducive school environment for all school stakeholders.

4.5.2. SAMPLING METHOD AND CRITERIA

I used a purposive sampling method in order to choose stakeholders that contributed to answering the research questions and achieving the aim and objectives. The stakeholders were intentionally selected based on their ability to provide rich information (Palinkas et al., 2015; Robinson, 2014; Suen et al., 2014). This assisted in the development and implementation of SISS-WMP in three primary schools. Purposive sampling seeks out and selects participants

who are knowledgeable or experienced in the phenomenon of interest (McCombes, 2021; Cresswell & Clark, 2011).

I sampled stakeholders purposefully, as this method was less time-consuming, and these stakeholders were selected according to the criteria that I compiled with them in mind. I used the following sampling criteria:

- A. The setting was in Mpumalanga province, Nkangala district, in Thembisile Hani local municipality.
- B. The three selected primary schools were under the Kwaggafontein East circuit and Tweefontein South circuit.
- C. The three primary schools were classified as quintile 1, which means no fee-paying schools.
- D. The three primary schools had a school principal and not a deputy principal nor an acting principal, as the school principal normally has their own long-term strategic plans in relation to whole school development.
- E. Each primary school had an SGB chairperson as a representative.
- F. The three primary schools had one general worker per school.
- G. The primary schools had food handlers that ranged from two to three food handlers per school depending on the number of learners that each primary school had.
- H. The school principal from each of the three primary schools nominated one intermediate phase teacher to represent the phase as they taught across the intermediate phase, which was grades 4-6.
- I. The class teachers of grades 4, 5, and 6 nominated one learner per grade to represent the whole grade, intermediate phase, and the school.

4.5.3. SAMPLE SIZE

I chose three primary schools as setting, each with a school principal, an SGB chairperson, one intermediate phase teacher, one general worker, one food handler, and one learner per grade in grades 4, 5, and 6 using a quintile system. A quintile system is a representative of 20% of a population that is used by the government to determine the maximum amount of wealth that a community can possess in order to qualify for a special government subsidy (Chen, 2021). Within the South African educational system, there are currently five quintiles: quintile 1, quintile 2, quintile 3, quintile 4, and quintile 5 (DBE, 2005). Schools in quintiles 1, 2, and 3 are designated as fee-free, while schools in quintiles 4 and 5 are designated as fee-paying (Grant, 2013). I conducted my research in primary schools classified as quintile 1, as these schools face challenges related to inadequate infrastructure and a lack of school resources (Romero et al., 2018). These stakeholders were chosen for a variety of reasons, including the following:

- School principals and the chairperson of the SGB they were chosen to gain a better understanding of their perspectives and the factors that influenced how solid waste is managed in schools
- General workers were chosen because they were in charge of keeping the school environment clean and waste-free and ensuring that all waste generated was disposed efficiently.
- Food handlers were chosen because they oversaw the feeding scheme department, which prepared food for learners. The food packaging from the food they would cook contributed to the generation of solid waste.
- Grade 4, 5 and 6 learners were chosen as they were most likely to contribute to improper waste disposal and generation in the classroom and on school grounds. Particularly in the morning, during teaching and learning, at lunchtime, and in the afternoon.

- Teachers were chosen based on the phase in which they taught. In this context, it was an intermediate phase without a strong emphasis on the subjects they taught, as my study were school-based rather than subject-oriented.

In short, the sample size consistent of three school principals, three SGB chairpersons, three general workers, three food handlers, three intermediate phase teachers, and nine learners in grades 4, 5, and 6.

THE CASES

This study was conducted in three primary schools. The schools were labeled as cases. Emthini Primary School was involved in case 1, Tjala Primary School was involved in case 2, and Vuna Primary School was involved in case 3. The following section summarizes each of the three cases:

ETHINI PRIMARY SCHOOL CASE 1

Emthini primary school is a rural school that is part of the Kwaggafontein East circuit. The community's socioeconomic status is precarious, as the majority of residents are unemployed. Emthini primary school is a quintile 1 school, which means it is a fee-free paying institution. It has one school principal, eight SGB representatives, 13 teachers, 434 learners, one administrator, one assistant, one SGB-paid general worker, one Mpumalanga Department of Education-paid general worker, two COVID-19 screeners, and three food handlers. Emthini primary school offers grades R to 7.

TJALA PRIMARY SCHOOL CASE 2

Tjala primary school is a rural school that is part of the Tweefontein South circuit. The community's socioeconomic status is precarious, as the majority of residents are unemployed. Tjala primary school is a quintile 1 school, which means it is a fee-free institution. It has one school principal, seven teachers,

272 learners, one SGB-paid general worker, one Mpumalanga Department of Education-employed general worker, two food handlers, one administrator, one volunteer administrator, and two COVID-19 screeners. Tjala primary school offers grades R to 7.

VUNA PRIMARY SCHOOL CASE 3

Vuna primary school is a rural school that is part of the Kwaggafontein East circuit. The community's socioeconomic status is average, with some residents employed and others unemployed. Vuna primary school is a quintile 1 school, which means it is a fee-free school. It has one school principal, eight SGB representatives, 16 teachers, four paid SGB teachers, one volunteer teacher, 633 learners, four volunteered cleaners, three COVID-19 screeners, one learner representative, two volunteered administrators, one general worker, and three food handlers. Vuna primary school offers grades R to 7.

The research setting, stakeholders, and sample size per primary school are summarized in Table 4.

Table 4 research setting, stakeholders and sample size per primary school (Sikhosana, 2022).

	CASE 1: EMTHINI PRIMARY SCHOOL						CASE 2: TJALA PRIMARY SCHOOL						CASE 3: VUNA PRIMARY SCHOOL					
Province	Mpumalanga						Mpumalanga						Mpumalanga					
District	Nkangala						Nkangala						Nkangala					
Circuit	Kwaggafontein East						Tweefontein South						Kwaggafontein East					
Local Municipality	Thembisile Hani						Thembisile Hani						Thembisile Hani					
Phase	Intermediate						Intermediate						Intermediate					
Quintiles	Quintile 1						Quintile 1						Quintile 1					
Stakeholder	School Principal	SGB Chairperson	General worker	Food Handler	Teacher	Learners	School Principal	SGB Chairperson	General worker	Food Handler	Teacher	Learners	School Principal	SGB Chairperson	General worker	Food handler	Teacher	Learners
Sample size	1	1	1	1	1	3	1	1	1	1	1	3	1	1	1	1	1	3

4.6. DATA COLLECTION TECHNIQUES

This section described the data collection techniques that were used towards the development and implementation of the SISS-WMP in three primary schools. I collected data through observations, semi-structured interviews, focus group interviews, and a diary. Qualitative data was collected in two different phases, whereby there was phase one and phase two.

A. PHASE ONE

Phase one focused on developing the SISS-WMP in primary schools through data collected in phase one. Table 5 summarized data collection techniques for phase one that were used to collect data from each stakeholder as marked with

an "X", as well as the research questions that I focused on when collecting phase one data.

Table 5 data collection techniques for phase one (Sikhosana, 2022).

Data collection techniques and stakeholders	School Principals	SGB chairperson	General workers	Food handlers	Intermediate phase teachers	Grade 4, 5 and 6 learners	Research questions
Observations			X	X	X	X	1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did? 2. How was the development of the SISS-WMP?
Semi-structured interviews	X	X	X	X	X		1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did? 2. How was the development of the SISS-WMP?
Focus group interviews						X	1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did? 2. How was the development of the SISS-WMP?

B. PHASE TWO

Phase two focused on implementing the developed SISS-WMP in three primary schools. Table 6 summarized the data collection techniques for phase two that

were used to collect data from each stakeholder as marked with an "X", as well as the research question that I focused on when the SISS-WMP was implemented in these three primary schools.

Table 6 data collection techniques and phase two (Sikhosana, 2022).

Data collection techniques and participants (stakeholders)	School Principals	SGB chairpersons	General workers	Food handlers	Intermediate phase teachers	Grade 4, 5 and 6 learners	Research questions
Observations			X	X	X	X	3. How was the implementation of the SISS-WMP?
Diary	X	X	X	X	X	X	3. How was the implementation of the SISS-WMP?

4.6.1. OBSERVATIONS

Observations took place during phase one and phase two of the data collection process, with the aim of identifying a gap between solid waste generation and solid waste management within the school's context. Phase one observations answered the following research questions:

1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did?
2. How was the development of the SISS-WMP?

For phase two observations, only food handlers, general workers, intermediate phase teachers, and grade 4, 5, and 6 learners were observed. Phase two observation was conducted with the aim of observing the feasibility of the implemented SISS-WMP in three primary schools, which answered the following research question:

3. How was the implementation of the SISS-WMP?

I collected data through observations in order to better understand and observe each stakeholder's roles, actions, and behaviour related to solid waste management in primary schools as they unfolded. I observed only general workers, food handlers, intermediate phase teachers, and grade 4, 5, and 6 learners, as I was interested in their attitudes toward solid waste generation and management. This assisted me to interpret the stakeholder's viewpoints and their actions, as observations were triangulated with semi-structured interviews and focus group interviews (Chiyito et al., 2015).

In phase one, general workers, food handlers, intermediate phase teachers, and grade 4, 5, and 6 learners were observed for the first time prior to developing the SISS-WMP. Prior to conducting observations, it was critical for me to adhere to the World Health Organization's COVID-19 regulations (WHO, 2021). Upon my arrival at each primary school, I was required to:

- Wear my mask properly, covering my nose, mouth, and chin.
- Undergo the covid-19 screening, which was conducted across the three primary schools.
- Sanitize my hands frequently and washed them with soap to maintain proper hygiene.
- Maintain a minimum social distance of 1.5 metres from everyone in the school environment.

I conducted observations in three primary schools on distinct occasions during phase one of data collection to avoid familiarity. I spent three days at Emthini primary school, three days at Tjala primary school, and three days at Vuna primary school conducting observations. Observations were conducted at each primary school from 6:00 a.m. to 15:30 p.m. I began by observing food handlers, general workers, fourth-, fifth-, and sixth-grade learners, as well as intermediate phase teachers.

At 6:00 a.m., I observed food handlers reporting for duty. I chose to observe food handlers in the morning because I was curious about what they did or

what tools they used to prepare food for learners. I was also curious about how they generated solid waste during the food preparation process. I observed them throughout the day in various time slots to determine how they disposed waste generated before they left at 13:00 p.m. I switched from food handlers to general workers at 7:00 a.m. to observe. These observations were made in the morning, immediately following lunch, and in the afternoon.

I oversaw tasks completed by the general worker upon his arrival in the morning. From 10:40 a.m. onwards, I observed how they dealt with waste generated by learners during lunch, which was from 09:50 a.m. to 10:40 a.m. Then, in the afternoon, at 14:10 p.m., it served as a final observation in which I was curious about how they disposed solid waste generated in classrooms and throughout the school environment. Additionally, the intermediate phase teacher and grade 4, 5, and 6 learners were observed on various occasions. They were observed in the morning from 07:30 a.m. until 14:30 p.m.

The purpose of the observation was to ascertain how learners generated solid waste, as well as their behaviour and attitude toward solid waste generation. Learners were observed both in and out of the classroom setting. I observed teachers on how they dealt with waste generation both inside and outside the classroom environment. I was a non-participant observer throughout the observations because the interactions between stakeholders and myself were limited to interactions (Cohen & Crabtree, 2008).

As a non-participant observer, I observed stakeholders' behaviour and actions without participating in their activities but by interacting with them. I observed them without their knowledge, in their natural habitat, to ensure that they did not alter their routines or behaviours. I collected data during observations using the following devices: an audio recorder and a camera. These devices aided in the transcription of events that occurred in these primary schools throughout the data collection process.

Allowing for repeated playback of audio recordings and analysis of photographs taken during observations was extremely beneficial during the triangulation and

data analysis processes. Additionally, observations aided me in comprehending how general workers, food handlers, fourth, fifth, and sixth grade learners, and intermediate phase teachers interacted, as bodily-based behaviour plays a significant role in our social phenomena. I used observation guides to assist me in focusing on the critical aspects that I needed to observe.

I maintained a field notebook and documented all daily interactions in these primary schools, as these field notes provided a rich context for the findings. By examining these observations, I was able to learn more about topics that stakeholders may have been unwilling to discuss during semi-structured interviews and focus group interviews (Bryant, 2015).

4.6.2. SEMI-STRUCTURED INTERVIEWS

Semi-structured interviews were conducted with the aim of interpreting the multiple realities that each stakeholder had in regard to solid waste management in their social context. Conducting semi-structured interviews allowed me to have an in-depth understanding of the stakeholder's social phenomena, views, and experiences from their personal point of view. Semi-structured interviews permitted me and the stakeholders to engage in a discussion that focused more on the research questions and addressing the research problem (DeMarrais, 2004).

These semi-structured interviews were conducted on the fourth day after observations per primary school. This was done with the aim of inferring and triangulating what the stakeholders had said during the semi-structured interviews with what I had observed. Before the commencement of semi-structured interviews, I gave the school principals of Emthini primary school, Tjala primary school, and Vuna primary school a template of time-slots. With these templates, each school principal was given the responsibility of circulating the templates amongst all the stakeholders so that they could indicate the time in which they were available for the semi-structured interviews in order to ensure the smooth running of this process.

Semi-structured interviews were conducted face-to-face with the school principals, SGB chairpersons, general workers, food handlers, and intermediate phase teachers in order to gather information about solid waste generation and solid waste management within their school milieu. Before I conducted the semi-structured interviews, I had to ensure that I adhered to the COVID-19 regulations as stipulated by the World Health Organization (WHO, 2021). Semi-structured interviews occurred in one phase, which was phase one of the data collection process.

Only school principals, SGB chairpersons, general workers, intermediate phase teachers, and food handlers took part in phase one semi-structured interviews. Phase one semi-structured interviews were conducted after observations during the phase of developing the SISS-WMP in three primary schools. Phase one answered the following research questions:

1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did?
2. How was the development of the SISS-WMP?

I made use of an audio recorder to record the interview sessions with consent from the stakeholders to ensure that the data collected was not misinterpreted during the process of transcription and data analysis.

4.6.3. FOCUS GROUP INTERVIEWS

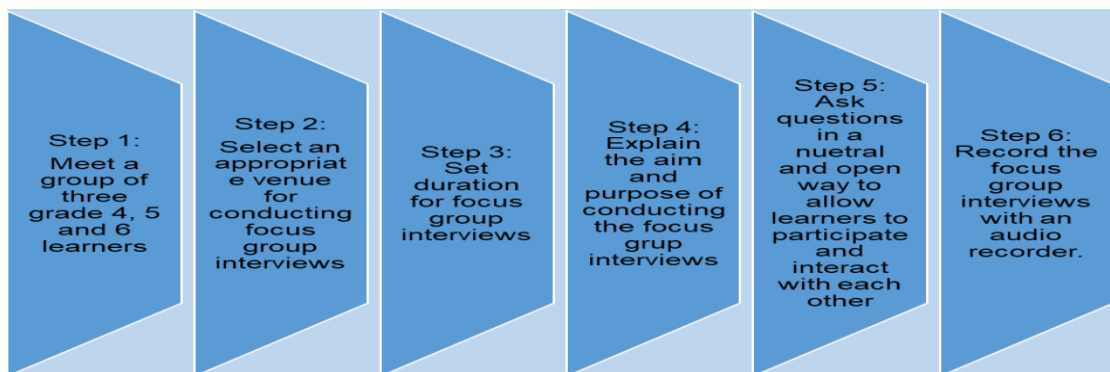
Focus group interviews were carried out with grade 4, 5, and 6 learners during phase one of data collection after completing observations. The focus group interviews were conducted face-to-face. The phase one focus group interviews answered the following research questions:

1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did?
2. How was the development of the SISS-WMP?

I issued a focus group consent/assent and confidentiality agreements to learners to give it to their parents for consent. During the focus group interviews I began by explaining the aim and objectives and their significance in partaking in my study so that they understood what was expected of them. I facilitated the focus group interviews. Questions were asked in an interactive setting to ensure that all learners participated without one being dominant over others. This method allowed learners to talk about all aspects of waste generation and waste management in their classroom and school environment.

Focus group interviews enabled me to understand each learners' thoughts and ideas (Bless et al., 2013) regarding the development and implementation of the SISS-WMP in three primary schools. I had an opportunity to record the conversation amongst learners when they interacted with one another using an audio recording device. Permission was sought from their parents to record the interview session with an audio recorder and permission was granted. This assisted in data transcription and data analysis. Diagram 8 summarized the systematic guide that I used to facilitate the focus group interviews.

Diagram 8 systematic guide for conducting focus group interviews (Sikhosana, 2022).



4.6.4. DIARY

A diary was used as a tool for the purposes of documenting my experiences when the developed SISS-WMP was implemented in three primary schools. A diary refers to a book of entries that is used to record events and information as

they occur (Snowden, 2014). I recorded all the information that contributed effectively to my study. Furthermore, the diary was used during phase two of the data collection process and amongst school principals, SGB chairpersons, general workers, food handlers, grade 4, 5 and 6 learners, and intermediate phase teachers. Its usage assisted in answering the following research question for phase two:

3. How was the implementation of the SISS-WMP?

4.7. DATA ANALYSIS

This section presented the process that I adhered to when analyzing and interpreting collected data.

4.7.1. TYPOLOGY APPROACH

A typology approach was used for the process of data analysis. After collecting data, I organized the data through themes, categories, and codes, which were shaped by my research questions (Hatch, 2002). I did this by immersing myself in the data reading in order to understand the whole set of data before organizing it into categories that are shaped by the themes through research questions. I analyzed and interpreted the data as a single case, whereby each case was classified as Case 1: Emthini primary school, Case 2: Tjala primary school, and Case 3: Vuna primary school.

The process of data analysis commenced by listening to the audio recorder and taking pictures while transcribing the collected data word for word in a word document. I made sure that I replayed the audio recorder while reading the transcribed data to ensure that what each stakeholder said corresponded with the transcribed data. To ensure that the data collected does not lose its original meaning, I did not correct any grammatical errors that were made by the stakeholders.

There were occasions where I had to use the mother tongue language of some of the stakeholders in order to ask questions, as some of these stakeholders did not understand English that well. Those stakeholders made use of their mother tongue languages, such as IsiNdebele, Sepedi, and IsiZulu. In such cases, I made certain that I presented their assertions in their mother tongue languages and translated them into English while paying special attention to ensuring that what was translated retained its original meaning (For example Appendix 16, 17 and 18). Diagram 9 summarized the process that I adhered to when transcribing collected data.

Diagram 9 steps for transcribing qualitative data (Sikhosana, 2022).



4.7.2. DATA PRESENTATION

Data was presented per case with one category in mind to avoid confusion and mix-up data. Themes and categories were shown in the data analysis scheme in Table 7 for phase one and Table 8 for phase two of data collection.

Table 7 phase one data analysis scheme (Sikhosana, 2022).

Theme	Categories
1. Stakeholders shaping the solid waste management practices	1.1 Stakeholders' understanding of solid waste and the environment
	1.2 The nature of solid waste generated
	1.3 Patterns of when solid waste was generated
	1.4 Stakeholders' management of solid waste
2. Opportunities for the development of the SISS-WMP	2.1 Opportunities

Table 8 phase two data analysis scheme (Sikhosana, 2022).

Theme	Categories
3. Implementation of the SISS-WMP	3.1 Shaping
	3.2 Challenges

The views and opinions of each stakeholder were presented in quotation marks. The following are the codes per case and per stakeholder, which were used as pseudonyms in order to protect the identities of all the stakeholders. It also contains the biographical information per case and per stakeholder.

CASE 1: EMTHINI PRIMARY SCHOOL

Table 9 Emthini primary school biographical information (Sikhosana, 2022).

➔ Codes	SP1	SGB1	GW1	FH1
Description				
Stakeholders	School Principal (SP1)	SGB Chairperson (SGB1)	General Worker (GW1)	Food Handler (FH1)
Case 1	1	1	1	1
Gender	Male	Male	Male	Female
Age	49	34	20	59
Highest Qualification /Highest grade	Honours in Educational Management and Leadership	Diploma in Information Technology	National Senior Certificate	Standard 2
Years and/or months at Emthini primary school	10 Months	6 Months	1 Year 5 Months	1 Year 7 Months

➔ Codes	T1	EL4	EL5	EL6
Description				
Stakeholder	Teacher (T1)	Emthini Learner Grade 4 (EL4)	Emthini Learner Grade 5 (EL5)	Emthini Learner Grade 6 (EL6)
Case 1	1	1	1	1
Gender	Female	Female	Male	Female
Age	55	10	11	12
Highest Qualification/ Highest grade passed	B-Tech Education Management	Grade 3	Grade 4	Grade 5
Years and/or months at Emthini primary school	29 Years	4 Years	5 Years	6 Years

CASE 2: TJALA PRIMARY SCHOOL

Table 10 Tjala primary school biographical information (Sikhosana, 2022).

➡ Codes	SP2	SGB2	GW2	FH2
Description ↓				
Stakeholders	School Principal (SP2)	SGB Chairperson (SGB2)	General Worker (GW2)	Food Handler (FH2)
Case 2	2	2	2	2
Gender	Male	Female	Male	Female
Age	56	52	59	36
Highest Qualification/ Highest grade passed	Primary Teacher Diploma	Grade 11	Grade 11	Certificate in Anti-Retroviral Therapy
Years and/or months at Tjala primary school	19 Years 3 Months	4 Years	4 Years	2 Years

➡ Codes	T2	TL4	TL5	TL6
Description ↓				
Stakeholder	Teacher (T2)	Tjala Learner Grade 4 (TL4)	Tjala Learner Grade 5 (TL5)	<u>Tjala Learner</u> Grade 6 (TL6)
Case 2	2	2	2	2
Gender	Male	Male	Female	Female
Age	28	10	11	12
Highest Qualification/ Highest grade passed	Bachelor of Education in Intermediate and Senior phases	Grade 3	Grade 4	Grade 5
Years and/or months at Tjala primary school	2 Years	4 Years	5 Years	6 Years

CASE 3: VUNA PRIMARY SCHOOL

Table 11 Vuna primary school biographical information (Sikhosana, 2022).

Codes	SP3	SGB3	GW3	FH3
Stakeholders	School Principal (SP3)	SGB Chairperson (SGB3)	General Worker (GW3)	Food Handler (FH3)
Case 3	3	3	3	3
Gender	Male	Male	Male	Female
Age	58	37	57	35
Highest Qualification/ Highest grade passed	Honours in Educational Management and Leadership	N4 Electrical Engineering certificate	Standard 10	N4 Financial Management certificate
Years and/or months at Vuna primary school	5 Years	6 Months	16 Years	2 Years

Codes	T3	VL4	VL4	VL6
Stakeholders	Teacher (T3)	Vuna Learner Grade 5 (VL4)	Vuna Learner Grade 5 (VL5)	Vuna Learner Grade 6 (VL6)
Case 3	3	3	3	3
Gender	Female	Female	Male	Female
Age	27	10	11	11
Highest Qualification/ Highest grade passed	Bachelor of Education in Intermediate and Senior phases	Grade 3	Grade 4	Grade 5
Years and/or months at Vuna primary school	3 Years	4 Years	5 Years	6 Years

4.8. RIGOUR

In order to ensure rigour, I considered the following aspects:

4.8.1. CREDIBILITY AND TRUSTWORTHINESS

To ensure credibility and trustworthiness, I performed member checking, whereby the field notes that were taken during data gathering were shared with the stakeholders so that they could rectify any errors that they had identified (Bless et al., 2013). When analyzing the collected data, direct quotations (some of the quotations were translated from isiNdebele, Sepedi, or isiZulu to English for convenience purposes for the reader. Appendix 16, 17, and 18 (which shows how this was done) were used when presenting data collected from the stakeholders. This was done to ensure that I did not misinterpret data that was shared by each stakeholder. So, verisimilitude was ensured (Popper, 1974).

4.8.2. TRIANGULATION

Triangulation was used to enhance rigour (Noble & Heale, 2019). This was done by using more than one technique to collect data from the stakeholders (Kulkarni, 2013). I used observations, semi-structured interviews, focus group interviews, and a diary to strengthen the rigour of the research findings. Therefore, data collected from semi-structured interviews and focus group interviews was corroborated by data collected through observations and a diary.

4.8.3. PILOT STUDY

Prior to implementing the entire study, a pilot study was conducted to identify potential instrument deficiencies and difficulties (Hassan et al., 2006). The pilot study was conducted prior to the main study. As a result, the pilot study's findings were not included in the final study. I conducted the pilot study in Mpumalanga province's Nkangala district, in the municipality of Dr JS Moroka.

I approached the principal of the chosen primary school in the Siyabuswa circuit to obtain permission to conduct the pilot study. When I arrived at the

school, I was informed that the principal had left to take a position at another institution. They were referring to "another school" that was only 200 metres away from the targeted primary school. Upon my arrival, the COVID-19 screeners informed me that the school had been divided into two phases. These phases were early childhood development and intermediate phase, which explained why the school principal moved from school to school.

After being granted permission to see the school principal by the administration clerk, I handed him a copy of my research ethics clearance from the University of South Africa's College of Education, a letter of approval from the Mpumalanga Department of Education to conduct my study in Nkangala District, and a letter from me requesting permission to conduct the research in the school that I had identified. I informed the school principal of the study's purpose and objectives. I informed him of the stakeholders who would be a part of my study.

The school principal was overjoyed; he promised to speak with the targeted stakeholders and verbally granted me permission on the spot, promising that when I returned for observation, he would provide me with a written permission letter. Additionally, we exchanged contact information, and he indicated that he would contact me the next day after speaking with the targeted stakeholders. That, however, did not occur concurrently. I contacted him on my own, and he inquired as to my identity.

I was taken aback when I noticed him saving my contact information, but I informed him and he said I was welcome. It was extremely uncomfortable on the first day of observation because I arrived at the school at 6:00 a.m. and immediately began my observations, which included food handlers, general workers, intermediate phase teachers, and Grades 4, 5, and 6 learners. The atmosphere was not welcoming because the school principal had not informed anyone about my visit; as a result, everyone was unaware of who I was and why I was at the school.

This situation taught me that I should call a few days prior to inquire whether the school principal had informed his colleagues and targeted stakeholders about my visit, as the acting principal requested that I wait for the school principal before continuing with research. I was then introduced; consent forms were obtained from targeted stakeholders, and I observed for three days on various occasions. While conducting observations, I provided the school principal with a time slot template so that he could solicit availability from the targeted stakeholders for semi-structured interviews and focus group interviews scheduled three days after the conclusion of observations.

On the day of the interviews, I discovered that he failed to distribute the timeslot template because the intermediate phase teacher, grade 4, 5, and 6 learners, food handler, general worker, and SGB chairperson were unaware of the interviews. I needed to rearrange the interviews, which was taking significantly longer than anticipated. This incident taught me to manage my own tasks and communicate directly and timely with targeted stakeholders without relying on another person.

Despite the difficulties I encountered at this primary school, I was able to evaluate the efficacy of data collection techniques such as observations, semi-structured interviews, focus group interviews, and a diary with the pilot study's stakeholders. This was done in order to identify potential constraints during data collection.

4.9. ETHICAL CONSIDERATIONS

I obtained approval to collect data through:

- The application for research ethics clearance at the University of South Africa, College of Education Ethics Review Committee was granted (Appendix 1).

- After approval, I requested permission from the Mpumalanga Department of Education to conduct a research in the Nkangala District (Appendix 3). Permission was granted by the district director (Appendix 4).
- Permission was requested from the two primary schools in Kwaggafontein East circuit and one primary school in Tweefontein South circuit as well as the gatekeepers of the school (Appendix 5). It was the school principals who granted me the permission (Appendix 6).
- A letter to request permission to participate was given to the three primary school principals (Appendix 7). The school principals agreed and signed a consent form (return slip) (Appendix 9).
- A letter to request permission to participate was given to the SGB chairpersons per primary school (Appendix 7). The SGB chairpersons agreed and signed the consent form (return slip) (Appendix 9).
- A letter to request permission to participate was given to the general workers at each primary school (Appendix 7). The general workers agreed and signed the consent form to participate (return slip) (Appendix 9).
- A letter to request permission to participate was given to the food handlers (Appendix 7). The food handlers agreed and signed the consent form to participate (return slip) (Appendix 9).
- A letter to request permission to participate was given to the intermediate phase teachers (Appendix 7). The teachers agreed and signed the consent form to participate (return slip) (Appendix 9).
- A letter requesting parental consent for grade 4, 5, and 6 learners to participate was given to learners so that they could give it to their parents or guardians for consent (Appendix 8). The parents signed the consent form (return slip) (Appendix 9).

I adhered to the following ethical principles:

- Informed consent and voluntary participation: All stakeholders were informed about the aim and objectives so that they understood how they would contribute. They were asked to sign consent forms as proof that they understood the scope of my research; they kept a copy of the signed consent form, while I kept the original for the appendices.
- Confidentiality and anonymity: Stakeholders were assured that all the personal information they provided would be protected. Their personal information was not made available to anyone except for myself and my supervisor. As a result, pseudonyms were used when signing the confidentiality forms and throughout the study.
- All stakeholders were informed that they could withdraw from participating without giving any explanation. Hence, participation was voluntary.
- As learners are considered vulnerable populations, informed consent was requested from their parents or guardians as well as the learners prior to data collection.
- Caring and fairness: I ensured fairness and care amongst all stakeholders by treating all stakeholders with dignity and respect.

4.10. CONCLUSION

The Map Chapter discussed the methodology. The next chapter presents and discusses data from Emthini primary school (Case 1).

CHAPTER 5: EMTHINI PRIMARY SCHOOL (CASE 1)

"You cannot buy commitment. It is something that comes naturally. I used to say if you see something wrong, all of us must see that as wrong, and if something is right, we must be able to see that this is right, all of us. Littering is wrong and if it does happen, there must be a mechanism of how to stop it from occurring". -SP1

5.1. INTRODUCTION

The previous chapter "The Map" discussed the methodology. The Emthini primary school (Case 1) chapter presented and discussed data that was collected during phase one. Only elements that led to the answers to the research questions were presented. The following are my research questions which this chapter responded to:

1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did?
2. How was the development of the SISS-WMP?

5.2. DATA PRESENTATION

Data was presented through themes and categories as indicated in Table 12.

Table 12 data analysis scheme (Sikhosana, 2022).

Theme	Categories
1. Stakeholders shaping the solid waste management practices	1.1 Stakeholders' understanding of solid waste and the environment
	1.2 The nature of solid waste generated
	1.3 Patterns of when solid waste was generated
	1.4 Stakeholders' management of solid waste
2. Opportunities for the development of the SISS-WMP	2.1 Opportunities

5.2.1. STAKEHOLDERS SHAPING THE SOLID WASTE MANAGEMENT PRACTICES

This theme was unpacked through the categories as indicated in Table 12.

5.2.1.1 Stakeholders Understanding of Solid Waste and Environment

Having a deeper understanding of key concepts contributes to deepening one's knowledge, understanding, and ability to apply skills needed for a certain task. It was important for me to comprehend how stakeholders of Emthini primary school understood solid waste and the environment, as these concepts shaped their practices towards solid waste management. Their understanding shaped the development of the SISS-WMP. Stakeholders' understanding of these concepts varied. SP1 asserted that: *"Waste is something that has been used, and some of those things can be reused. Something that you do not need any longer. That is how I view, or I see waste"*.

SGB1 had a different understanding of this concept, as SGB1 indicated that solid waste refers to something that is no longer useful unless one does recycling:

"Alright (laughing) ha ha ha. When we talk about waste, we can say it is something that when we look at it at this moment, is no longer useful. It is something that we do not see any use for at all unless we do recycling. Currently, truly speaking, here at school we do not care about our waste. If you go around here, you will see papers all over the place. Do you get me?"

However, GW1 did not hold the same viewpoints as SGB1 because GW1 did not believe that solid waste could be recycled. In fact, GW1 defined solid waste as: *"Solid waste, waste is to ruin. It is something that is ruined, such as papers... Learners eat and throw papers because they will not use them anymore"*. This was related to what was said by T1, who indicated that solid waste referred to the materials that we throw away after using them: *"Waste is materials that... it is materials that we throw away after we have used something that is inside"*.

Even though FH1 could not explain what solid waste was, FH1 had an idea of what could be done with the solid waste that was generated. Hence, FH1 believes that solid waste needs to be collected accordingly and destroyed: *"We say solid waste is too much, we must collect it and destroy it"*. While EL4 and EL5 believes that it is imperative that we keep our environment clean as indicated in the statements: *"To keep our place clean"-EL4* and *"Because we do not want to keep our class dirty"-EL5*. I needed to understand what these stakeholders understood about the concept of environment because it shaped the developed SISS-WMP.

SP1 stated that: *"An environment, I think, is the surroundings where one lives or the surroundings where one is occupying. It can be in the form of a building or a yard where you exist in an environment or where you spend most of your time"-SP1*. SP1's understanding of the environment was similar to T1, EL4, and GW1 as they pointed out that the environment referred to a place around us where people live: *"Environment? It is where we are living"-T1* and *"It is a place around us"-EL4* whereby an *"environment right, is a place where people stay; it is where we live every day. Yes, it is a land where we stay; the environment"-GW1*.

However, that was not the case with FH1, as it was quite difficult for FH1 to explain the concept of the environment. Instead, FH1 showed an understanding of this concept by indicating its importance: *"Eish that is difficult. You see, the environment is where it must be clean. If something is dirty, you clean it"*. This was related to what SGB1 did. Instead of explaining the concept of environment, SGB1 decided to outline the negative effects that a dirty environment could have on one's health. The SGB1 attested to that:

"Like, for example, once the environment is not clean, we become affected health-wise, because when there is dirt where we stay, it is easy to find ourselves infected with a lot of diseases. For example, with COVID, we were told that we must try by all means to ensure that we are in a place that is clean so that it will not be easy for us to get bacteria. It is where you find bacteria developing and the atmosphere and our pollution are affected if our waste is not conducted or the environment is not clean."

5.2.1.2. The Nature of Solid Waste Generated

Knowing the nature of solid waste that was generated at Emthini primary school was very imperative as this gave me ideas for the developed SISS-WMP. The SGB1, GW1, FH1, T1 and EL6 indicated that it was only learners who generated a huge amount of solid waste. The SGB1 asserted that learners were the ones who generated solid waste as they were not willing to learn proper ways of disposing of solid waste:

“Number 1: It is learners. You will find out that they do not want to learn, like, for example, whether the learner is carrying paper or whether there is a dustbin where they can dispose of that waste. Do you understand? Anytime or anywhere, they just drop those papers on the ground. Including when they are in their classrooms, you will find out that they have projects and must cut them. 1...2...3... you will find papers on the floor or when they eat snacks, everything that they have, they just dispose it the way they feel like it”.

What SGB1 said was similar to what I observed during lunch breaks. I saw a number of learners, as seen in Picture A and B, who would eat their snacks and sweets while standing next to the bins provided by the school to dispose solid waste.

Picture A: A learner throwing a snack plastic next to the bin



Picture B: Learners throwing plastics



However, what shocked me was that instead of disposing of the sweet and snack wraps inside the bin, some learners decided to throw away those wraps

outside the bin that they were standing next to. GW1 added that learners were the main solid waste generators as they were not reprimanded at all:

“I think it is the learners. Actually, these learners at Emthini primary school are not reprimanded. You will not just throw papers away on the ground or the floor after eating. These learners are not reprimanded at all, and I do not know if they do such things on purpose or not”.

On the matter of learners not being reprimanded, it was true because during observations, a group of grades 5 learners were given permission to go outside to the toilets. They were given toilet paper by their teacher. Some learners threw that toilet paper away, while others played with it. Their teacher saw them and did not even command the learners to pick up the toilet paper. Picture C and D displayed the aftermath of what transpired when learners did not pick up those toilet papers, as the school was now polluted with toilet papers.

Picture C: Toilet papers in the fence



Picture D: Toilet papers



In the afternoon, I sat with a number of teachers outside the classroom environment. While seated, a huge wind came and blew all the solid waste that was inside the rubbish bin, outside. Teachers saw the papers all over the school yard and next to their classrooms, but none of them said or did anything about this. Learners were also there in the vicinity, but none of them saw it as important to clean up the waste. In fact, it was just business as usual for both teachers and learners. Picture E and F showed what was left after the wind.

Picture E: Full bin and papers inside out



Picture F: Solid waste



FH1, T1, and EL6 were also in agreement with what was said by SGB1 and GW1 when they said learners were the ones that generated solid waste at school. FH1 asserted that: *"It is learners because they eat snacks, they eat sweets, and after doing that, they just throw away these packages on the floor or ground"*. Similarly, to T1 who said: *"Ok, the learners. After they have eaten something, they just throw it away; they do not care whether there is a dustbin or not"*. EL6 agreed to FH1 and T1 assertions as EL6 stated that it was: *"children"*.

It was also important to acknowledge that learners did not only generate the waste that was mentioned by FH1, T1 and EL6. In fact, learners went to the extent of throwing facial/surgical mask anywhere without taking into consideration COVID-19 regulations as displayed in Picture G and H:

Picture G: Face mask



Picture H: Face mask



However, EL4 and SP1 alluded that it was not only learners who were the biggest generators of solid waste in the school. As EL4 indicated, teachers did generate waste. Whereas SP1 highlighted that it was human beings and animals that generated solid waste:

"In a school environment, we have learners, and in our case, we also have animals, as you can see. I think its human beings. Remember, we cook, and out of that, there is waste. Then also, we have what we call the vendors around the school. One way or the other, they contribute because the learners buy from them, and then they eat, leaving a scatter or litter around the school. It is us who contribute more in terms of waste".

EL4 pointed out that teachers were also generators of solid waste. This was so because SP1 did indicate that there was a relationship between teaching and learning activities and solid waste generation. SP1 alluded to that:

"Okay, they do relate in a sense that, for instance, we use books and learners tend to tear pages out of the books and they end up causing waste around the school. Then again, most of the materials that we get come in packages like boxes and those boxes sometimes end up being a waste in the institution. "We have a number of things. We have sanitizer. They come in the package of the containers, and those containers also tend to become waste because, at the end of the day, they are just kept there without any further use, so they contribute to waste".

SP1 further alluded that they also have street vendors at the school who also generate solid waste. This was because EL5 and EL6 asserted that street vendors also sell papers: *"Because they also sell the papers"-EL6* and *"Because they are the ones who come with the papers and the children throw them anywhere"-EL4*. What SP1 said was true because I saw street vendors who would come to Emthini primary school during lunch breaks to sell their products over the school fence. However, these street vendors were not mentioned by SGB1, GW1, FH1, and T1 as solid waste generators.

The products that they sold varied from one street vendor to another, as there were three. They sold products such as snacks, sweets, ice, fruits, mango atchar, vetkoeks, and biscuits, as displayed in Picture I and J:

Picture I: Street vendor's products



Picture J: Street vendor's



Picture K and L depicted the solid waste generated by street vendors after they sold their goods:

Picture K: Plastics on the school yard



Picture L: Bin with solid waste



I observed that food handlers were also solid waste generators as they cooked food for learners on a daily basis for the duration of the number of school days every year. On Mondays, they would cook soya mince, rice, and pumpkin, butternut, or cabbage, depending on which vegetable was available at that time. On Tuesdays it would be brown sugar beans served with maize meal porridge, and on Wednesday they would eat crumbly porridge served with fresh milk, and they would give learners fruits such as oranges, bananas, apples, or pears. On Thursday, they would cook brown sugar beans and samp, served with either cabbage, butternut, or pumpkin.

On Friday, they would cook rice, tin fish served with tomato gravy and cabbage, pumpkin or butternut. Looking back at this menu, one could wonder the quantity of solid waste that is generated by food handlers in their kitchen through the packages that this food came with. Picture M, N, O, and P presented solid waste that they generated in the process of cooking:

Picture M: Milk boxes



Picture N: Food waste



Picture O: Tin fish



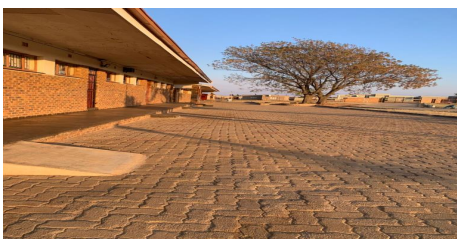
Picture P: Tomato peels



5.2.1.3 Patterns of when Solid Waste Was Generated

Now that the nature of solid waste that was generated at Emthini primary school was established, it was important to look into the patterns of when that solid waste was generated, as this informed the developed SISS-WMP. Hence, I observed the level of cleanliness of the school environment and classrooms in the morning, during lunch breaks, and in the afternoon so that I could have an idea as to when solid waste generation occurred. During observations that occurred in the morning, the school environment was very clean in front, but at the back, the opposite was the case, as it was polluted with solid waste. Picture Q and R presented the school environment in front and at the back upon my arrival in the morning:

Picture Q: The front



Picture R: The back



In the morning, I saw bins full of solid waste, as displayed in Picture S and T. This clearly demonstrated that the solid waste in the bins had not been generated in the morning, but rather was solid waste from the previous day(s).

Picture S: School bin



Picture T: Full school bin



I went to the classrooms, and I noted that the classrooms were clean. However, there were boxes that were used as bins and contained solid waste that was not disposed the previous day as displayed Picture U and V:

Picture U: Classroom



Picture V: Classroom



I realised that food handlers generated a huge amount of waste in the morning as they were responsible for cooking food for learners. The solid waste that was generated by food handlers was milk containers, rice packages, tins, tomato peels, and butternut peels, as presented in Picture W, X, Y, and Z:

Picture W: Milk containers



Picture X: Tins



Picture Y: Butternut peels



Picture Z: Tomato peels



During lunch breaks, I went to the classrooms to see the amount of solid waste that was generated during teaching and learning. I noted that some of the classrooms were dirty. The boxes that they used as bins were full of solid waste accumulated during teaching and learning, as exhibited in Picture A1 and B1:

Picture A1: Box full of waste



Picture B1: Box full of waste



However, SP1 indicated that the solid waste that was generated during the course of the day in the classroom environment was generated during teaching and learning activities:

“Yeah, you see the challenges that one encounters. It is when maybe you indicate to the learners in the classroom that they must not tear out pages from their books. Hence, in most cases, we encourage them to keep the scribbling books to write whatever they want to write there, maybe their homework and stuff like that. But you will find out that at the end of the day, the very same scribbling books end up tearing pages out of them, and the pages end up being waste in the class, scattered all around the classroom. Remember, learners are learners; sometimes they use pages to make different things; they make aeroplanes, they make these nicest hats, but that is creativity, and that is one way in which I can say it is a challenge”.

I proceeded and went outside to see what was happening. I saw a group of learners, as seen in Picture C1, over the fence buying products that were sold by the street vendors. I saw a number of learners who would buy something from the street vendors and, after eating, would throw the packages of what they bought anywhere around the school environment instead of using the bins provided by the school. After buying those products, the school environment would be polluted with solid waste that comes from the products that are sold by the street vendors during lunch, as seen in Picture D1, E1, and F1:

Picture C1: Buying from street vendors **Picture D1: Polluted school**



Picture E1: Polluted school



Picture F1: Polluted school



During focus group interviews, I asked learners why they did not make use of the bins provided as they were next to them during lunch breaks. EL4 and EL5 responded by saying that they do not care: "*We do not care*"-EL4 and "*We want to make the place dirty. We do not care about the people who are cleaning the school*"-EL5. What was said by EL4 and EL5 was evident in the afternoon when I was doing observations. A learner in Picture G1 was seen disposing solid waste that was generated in their classroom inside the bin provided by the school. The solid waste was spilling out of the bin as it was already full, but the learner did not even bother to pick up what had fallen out.

Instead, the learner carried on like nothing happened and went back to the classroom. Picture H1 showed the nature of the school environment in the afternoon. Picture, I1 showed the after effect of the solid waste that was left by

the learner in Picture G1, while Picture J1 displayed the solid waste generated in the classroom after cleaning and ready for disposal.

Picture G1: Learner disposing waste Picture H1: School environment



Picture I1: Solid waste around the bin



Picture J1: Classroom bin



5.2.1.4. Stakeholders' Management of Solid Waste

As soon as I established the patterns of when solid waste was generated at Emthini primary school, it was imperative for me to look into how stakeholders managed that solid waste. I had to find out what it is that they did and how they did things in order to manage the solid waste generated. During observations, I came across the signage for school safety rules, as seen in Picture K1, at the gate, which indicates that littering is prohibited. To mitigate littering as stipulated on this board, T1 indicated that: *"There is a dustbin in every corner, each block"* as seen in the Picture L1:

Picture K1: Signage for school safety rules Picture L1: One of the school bins



The signage for school and safety rules in Picture K1 and the bins in Picture L1 triggered me to ask these stakeholders what it is that they understood about solid waste management and what mechanisms they put in place to interact with the solid waste that they have generated. SGB1's understanding of solid waste management was attached to the concept of recycling, as SGB1 believed that one must recycle in order to keep the environment clean: *"To keep the environment clean, then at the same time we can use waste for recycling. Maybe we go and sell the waste. Then we are able to keep our yard where we work clean"*.

SP1 had an understanding of solid waste management, as indicated:

"I think when we talk about waste management, it is when we find ways of recycling the waste that we find in the school, like papers, and that is what we are doing now, even though it is in the hands of a private person. Initially it was in the hands of the school, but we realized that we were losing in terms of transport in transporting this waste to a place for recycling. So we ended up giving it to a private consultant (a lady) who is selling it. In the afternoon...she is constantly collecting these papers and stuff like that".

Since recycling was in the hands of the school, I had to ask SP1 where they took their solid waste for recycling, as FH1 indicated that it was taken to Witbank. While SP1 points out that: *"We were taking it around Pretoria by then, you can see the distance. Even Witbank, because you hire somebody to take it there. And the money you are trying to generate ends up being consumed"*. SP1 indicated that recycling as a way to manage solid waste was not effective at the school because they had to spend more money on transporting solid waste for recycling instead of generating income from it.

Hence, this led SGB1 to believe that the school's solid waste was not at the level of being recycled: *"It is something like that because we are not yet at a certain level that we can save our waste for recycling"*. What was said by the SGB1 was contrary to what was said by FH1, EL4 and what I observed. This was so because SGB1 indicated that the school was not at the stage for recycling as they did not have large quantities of solid waste. While SP1, FH1, EL4, and I saw that there was a sufficient amount of solid waste to be recycled.

Furthermore, SP1, FH1, and EL4 alluded that there was a woman who collects paper for recycling, the woman whom I saw during observations.

"Yes, there is a woman who picks up papers, then we go and sell them"-FH1 and "They go and recycle the papers"-EL4. During observations, I saw a woman who was also a street vendor during lunch breaks at the school. As seen in Picture A, the woman was classified as the only private person who would come and collect papers in the afternoon for her personal use of recycling. However, what was said by SP1 was contrary to what T1 alluded to. This was so because T1 said that there was a gardener that collected papers only as the school does not have tins.

T1 alluded that: *"No... I do not know, but there is a woman who takes the...not necessarily the tins; we do not have tins; we have papers. So, there is...I do not know what to call her, but there is a gardener that takes the papers for recycling, so we usually give them to her".* T1 statement conflicted with what I observed, as I saw a woman who was also a street vendor at the school and not a gardener, collecting papers only as presented in Picture M1. T1 also said that there were no tins at school, but I saw a small number of tins within the school premises in Picture N1:

Picture M1: Woman collecting papers



Picture N1: Tins



During observations, I had a conversation with one of the food handlers, who indicated that tins were collected by anyone who wished to collect them. Nonetheless, in most cases, there was a learner who took them every afternoon on the days where we cooked tin fish and took the tins to some community members in exchange for R10.00. However, FH1 did not mention

anything about learners collecting tins. In fact, FH1 said that: *"Those tins are collected by some woman that we cook with, then the woman sells them"*.

While conducting observations, FH1 requested the tin of the drink that I was drinking as FH1 said that: *"Ngiyarhereza"* meaning that *"I hustle"*. I gave FH1 the tin after indicating that the tins would be taken along with FH1 in the afternoon. However, the following day, in the morning, I went back to the cooking area and I found the tins still in the bin as seen in Picture O1, meaning that no one came to collect them and the one that I gave FH1 was still in the same place as I left it, as seen in Picture P1:

Picture O1: Uncollected tins



Picture P1: The tin I gave to FH1



I further asked these stakeholders how they managed solid waste generated in classrooms. EL5 asserted that learners threw solid waste generated in the classroom into a big dustbin provided by the school: *"They go and throw them in a big dustbin"*. However, EL6 pointed out that: *"They go and burn the papers"*. Similarly, to SP1, who said that the strategy that they used to dispose solid waste generated was through burning:

"Again, for instance, these small papers and containers of chips and stuff like that, after collecting them, we burn them. We have an area there at the back where we used to burn them. I think that is one way of managing waste around the school".

Picture Q1 and R1 displayed a place where the school burnt down their solid waste:

Picture Q1: Open burning area



Picture R1: Open burning area



This was similar to T1, FH1 and GW1 who asserted that they disposed their solid waste by burning it: *“Some we burn them, those that cannot be recycled we burn them”-T1* and *“The other ways that we can use, we can pick up these papers and burn them in the hole. You can manage them when you do that”-FH1*. Furthermore: *“Uhm sometimes when I pick up papers one by one, I take them back to the dustbin, then when it is full I take them to the hole then I burn them. Then...then if I put them inside the plastic I take them to the kitchen where they cook then they will use them to make fire”-GW1*. This led me to find out on which days, times or occasions did they burn the solid waste generated. SP1 said that:

“It is an everyday activity as you can see we have these cleaners, screeners who are assisting our GA here at school. When he is free from his duty, he would take some plastic or a bag and just pick the papers around the school. It is not something we say Tuesday or because there is waste, but it is almost every day”.

SP1 also indicates that in *“Most cases it will depend as to how quantity that is collected towards picking them, if there is a lot they will burn them or if maybe it is not that much we just keep them inside those sachets until maybe it has accumulated much then we burn it”*. Additionally, SP1 added that they only burnt solid waste depending on the quantity that was available. This was similar to what was said by GW1 and SGB1: *“Once in a while, like when those dustbins are full”-GW1* and *“It depends on the waste available”-SGB1*. Since SP1, GW1 and SGB1 alluded that they burnt solid waste generated, I had to ask what could be the reason behind their decision.

GW1 stated that: *“Eish the thing is sometimes maybe when the wind comes up we do not know, then it will blow away. So we see that it is better when we burn because it will be dirty again”*. Whilst FH1 indicated that: *“When we do not burn the waste, it will be all over the school”*. I was also interested in finding out how they interacted with learners and teacher’s old books. SP1 alluded that the books become outdated as the result they had to give them to learners while others remained at the library as seen in Picture S1: *“Yes they become outdated and we give them to our learners to avoid pulling them, otherwise we do have some extras the surplus that we keep in the library. They are well packed in the library”*.

Picture S1: School library



However, during observations, I saw one big pack containing learners' books. It was in the cooking area. I asked what was happening with the pack of books in the cooking area. One of the food handlers said: *“Oh no la ngiyokutjhisa, ngitjhisa koke mina”* meaning that the **food handler was going to burn the books and everything that could be burnt**. Picture T1 showed the books that I found on the first day of observation; Picture U1 showed the number of learner’s books that I found on the second day; and Picture V1 showed the number of books that were left on the last day of observations.

Picture T1: Day 1

Picture U1: Day 2



Picture V1: Day 3



SP1 further added that:

"And sometimes they do not need to burn some. They must refer to them. Take them to the library. They can still be used if you can check they have some pictures. You tell the learners to cut and paste. Where can I find those? There are books in the library that you can go and check out".

Apart from using books to make fire, FH1 indicated that they used boxes and papers to manage solid waste that was at the school:

"We normally make fire with wood and boxes, but other times those boxes are not always available. With snack wraps, the general worker says, "When he picks them up, he puts them in a plastic bag and throws them in a dustbin. In the morning, we take it out and make fire with it".

FH1 indicated that GW1 was the one who provided them with solid waste. I had to ask the SGB1 as to what was the responsibility of GW1 here at school. SGB1 alluded that: *"Okay number one, those who are responsible, it is GA's as the SGB we assist whereby we see that we can assist, but it is a full-time job of GA."* In the course of observations, I noted that the school was polluted with solid waste across the fence inside and outside. This led me to probe further as to whose

responsibility it was to ensure that the school environment was clean. SGB1 said: *"No, we do it ourselves, but according to law, the municipality said outside the yard, the place belongs to the municipality, they are the ones in charge".*

However, GW1 had a different viewpoint:

"I do maintain. Assume I see a newspaper, a learner, or a street vendor who did not come to clean. I am able to pick up the papers, then maybe if the street vendors came after break, they would leave some papers, I would be able to, too. Maybe when I see a paper, I pick it up, then I put it in a dustbin".

What the GW1 said was similar to what I witnessed as I saw the GW1 cleaning up the school environment as displayed in Picture W1:

Picture W1: GW1 cleaning



GW1 further asserted that if the street vendors did not come and assist with the solid waste that they generated through the products that they sold to learners, it became the responsibility of GW1 to clean up the school. I had to ask what could be the reason behind the street vendors' not cleaning up. GW1 asserted that: *"Eish, they are stubborn. I do not know how many times I went after them. It has been a long time. But some papers outside are supposed to be picked up by those who wear orange overalls. It is them who are supposed to do it".*

I also saw that the street vendors only came and assisted when they felt like it, and they did not pick up solid waste daily after selling. They only did that task when they wanted to. I further probed to find out why, and GW1 said: *"Ahh they*

just doing it because I do tell them that they must do it. In fact, they do not even want to pick up everything. They just want to come here and sell, then leave. They are just doing it for the time being". What was said by GW1 and FH1 led me to ask SGB1 if the street vendors were supposed to clean up the solid waste generated from their products.

The SGB1 indicated that they did request the street vendors to clean up: *"Those street vendors, we did ask them that after selling their products, they must enter the school yard and pick up the waste they have generated so that we can keep this place clean".* Nevertheless, even after the request from the SGB1, the street vendors still continued to clean up the school yard: *"Sometimes"*. When I asked the SGB1 as to what could be the reason behind that, the SGB1 said that it could be because they saw me (SGB1), hence they decided to clean up only the products that they sold.

This was similar to what was said by EL4 and FH1: *"I do not know because today they cleaned up because they saw that I was here. Sometimes they say they will not clean up. They only clean up what is in their eyes"-SGB1 and "Sometimes they only clean the things that they are selling"-EL4.* FH1 added that:

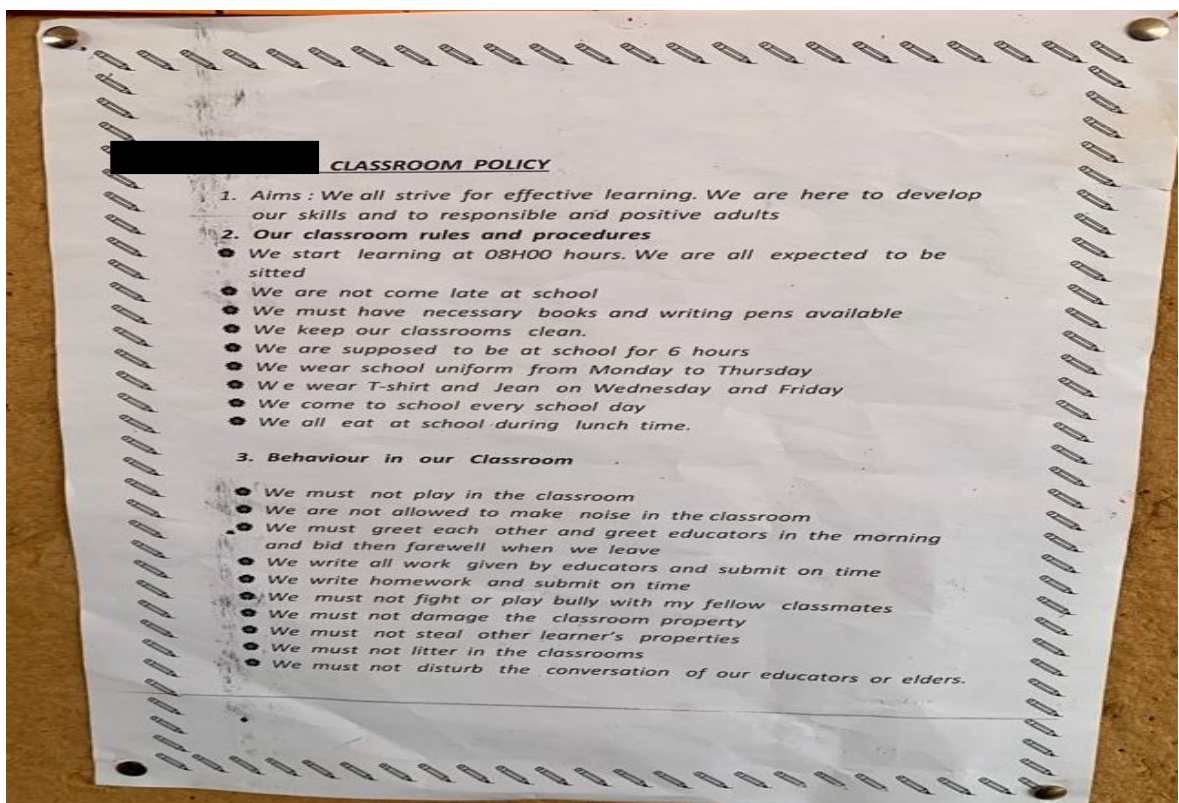
"Yes, they do clean, but then they only clean up the wraps of snacks. As for papers that belong to the school, they will never pick them up because they told themselves that they would be picked up by the person who is employed to do so and it is that person's duty. I have noticed them many times. I even told one of the women that; look at them, they are only picking up the wraps for snacks and sweets. The tissue and papers, they do not pick them up".

However, learners had different viewpoints as to who was supposed to clean up the school. EL4, EL5, and EL6 indicated that it was their responsibility to clean up the waste around the fence: *"Us because they tell us to go outside to pick up the papers"-EL4; "Because we throw the papers"-EL5 and "Because we are the younger ones, we have strong kidneys, and we will not get illnesses"-EL6.* Now that I knew how other people worked with solid waste, I had to ask T1 how the classroom was kept clean during teaching and learning.

T1 said: "I do. If you have used the handout, cutting, or doing something, I will encourage them to go and throw the left-out items in the bin. After the lesson, I also tell them to go around and pick up the papers that are on the floor". Furthermore, T1 asserted that there were classroom rules that learners adhered to as a way to manage solid waste. T1 alluded to this: "There are rules on the board that say do not throw things on the floor if you want to... sharpen a pen, do it inside the bin". EL1 supported what was said by T1 by indicating that there were classroom rules that they had to abide by too.

Amongst those rules, the following one was applicable to all learners: "Do not throw the papers"-EL4. Picture Y1 displayed some of the classroom rules that I saw in the classrooms:

Picture Y1: Classroom rules



T1 further indicated that there were strategies that they adopted in the classroom to ensure classroom cleanliness. T1 asserted that: "I encourage them. I also give them a minute or so every time after seeing a paper and tell them to pick up the papers immediately. Hence, EL4 added and said that: "They tell us to pick up

the paper". Furthermore, SP1 said they have a safety and environmental policy as indicated in the statement below and attached in Appendix 10:

"Yeah, I do think we have a policy that also deals with the safety environment in the school, and when the environment is clean, it is also one way to ensure that the environment is safe. In an unsafe environment, that is where you will find some diseases and stuff like that, but when it is clean, it is safe. Also, picking up papers is one way of ensuring the safety of the environment, so we do have a policy that sticks to environmental safety".

SGB1 supported what was said by SP1:

"Uhm, policies that we had...Yes, we do have them, especially the safety policy that we have to keep our school safe all the time. Yes, we do have a policy, but unfortunately, we have not yet implemented those policies. That is, we proposed that each and every committee have to do a report each and every month, so I think by doing so, the policy of safety can be checked if our yard remains clean. I think it will encourage them also".

5.2.2. OPPORTUNITIES FOR THE DEVELOPMENT OF THE SISS-WMP

5.2.2.1 Opportunities

It was important to look into opportunities that shaped the development of SISS-WMP in primary schools. This assisted me to look into different sets of practices at Emthini primary school that made it possible for me to develop the SISS-WMP. As a result, I had to find out which waste management practices these stakeholders were aware of as this shaped the developed SISS-WMP.

SP1 indicated that if the school could have plastic bins, they would sustain them for a long time: *"I think this is one way of putting the dustbins in the school. As you can see, we do have dustbins in our schools even though they rust and end up becoming waste themselves"*. Furthermore, SP1 added that: *"I am thinking that maybe in the future, if we can get these plastic ones that will last for a period of time"*. This was similar to SGB1, as SGB1 asserted that they had requested the municipality to provide them with yellow bins to use:

"Yes, for example, some do not end up in the bin. So, if they can provide us with a yellow bin, it is big enough for everything, especially like the bottles that we take and throw them there. What we see is that it will not enter into the plastic and so forth because currently we have a hole and when that hole becomes full, it is small, they burn things there, including papers".

SGB1 further alluded that they even proposed for papers to be recycled and have the bin collected by the municipality as it was their responsibility: *"Yes, so we propose that we especially use the papers for recycling since it is the responsibility of the municipality".* In relation to the bins, FH1 had the same suggestion as SP1 and SGB1. FH1 alluded that: *"Maybe we have dustbins where they throw things, and there must be a person who checks if they do not throw things on the ground".* However, regardless of the availability of the dustbins that were currently at school, I noted that not everyone used them. I asked FH1 why? and the response was: *"Yes, but they throw them on the ground because they tell themselves that no one sees them and there is no one checking up on them".* The FH1 response was similar to what was said by GW1:

"Eish, the thing is that these learners do not listen, and they do not have respect, so I normally keep quiet and say nothing, because these learners now when you tell them they answer you back, they think you are their friend. So, I keep quiet, then I go and pick up those papers myself".

T1 further added that most learners only listened to their class teachers and not anyone else: *"They do not all listen; only a few will listen to you. Especially like the young ones because I am their intermediate teacher, and the foundation phase learners will not listen to me because I am not their class teacher. Unless you must be harsh or..."* Even if that was the case, T1 did try and encourage them: *"I go to their teacher and ask them to intervene and let them encourage their learners not to throw papers around because there are dustbins in every corner".* This led me to find out about the challenges that the school experienced when they managed solid waste generated. SP1 asserted that:

"As I have said earlier, we have tried to use recycling to benefit the school, but instead of benefiting the school, we realized that it was more costly to the school because we needed to hire transport, which we must pay for, and with the money we generated out of the waste, you will find out that it is not enough. It cannot even cover the cost of the petrol. You see now? Hence, we stopped, and then gave it to a private person. It was costly for the school".

While SGB1 stated that: *"You find out that you have to travel to Pretoria, and when you look at who is going to Pretoria, you find out that the money you are going to use for transport might equal the money that you are going to get".* SGB1 also added that:

"Alright, number 1 here we blame our municipality because we can report a lot of this there. They do not take it seriously. Like the yellow bin, we reported it last year and, until so far, it was not submitted. Again, things like papers are a challenge that we have as to where we can store them. Then the problem is that there is no place nearby where we can sell them. Do you get me?"

GW1 encountered challenges such as: *"Eish, sometimes these learners throw tissues with blood or mucus and face masks. So, I do not know how I will pick them up because I do not have gloves".* While T1's challenge was different from other stakeholders, as T1 asserted that: *"Uhm, maybe they are careless. Yes, I cannot say they lack information because we tell them every day. We even taught them that there is a dustbin in every class. After eating, you throw it in the dustbin. I cannot say there is a lack of knowledge; it is just carelessness and being lazy".*

I then probed to discover that if the school had funds, would they continue with recycling. The SP1 alluded to that: *"Exactly! For instance, if we could maybe have a recycling area that is near that is not going to cost us a lot to take the waste to that place, then we would still continue to initiate it".* Various stakeholders of Emthini primary school had different viewpoints as to what needed to be done for the school to be assisted. FH1 said: *"Yes, maybe when a person does something wrong, we have to guide them and say, hey, you are not supposed to do that. Let us do things like this so that it can be clean".* T1 added that:

"What can I say? They want to be monitored by these learners. Even with teachers, there is too much laziness. What can I say? Oh, they need monitoring these learners. If you do not monitor them, they will leave the papers the way they are, or they will say its afternoon and they are going home. Then there is a general worker who will pick up the paper".

Nonetheless, the SP1 believes that:

"Let us keep our classrooms clean and discourage littering in our classrooms. We are human beings; you will find out that somebody does not even care... They come to the class and teach, then go, without even looking and saying. But look at the environment that you are in. Can you really, really study in such an environment? You see, now we need to be consistent, which is something I think is a big challenge".

SP1 further alluded to:

"Yaa, there is this mentality... Actually, you have said quite a mouthful. I wonder whether this thing is maybe in the black community or what, because I heard those words, "I am creating job opportunities many times." The person would just throw anything at the mall. This thing, I do not know how to get rid of it, maybe, because sometimes you can even write the rules, but at the end of the day, they will be followed maybe for a couple of days".

Which is why SP1 believes that education is important: *"Haha, education is very important".*

5.3. DATA DISCUSSION AND FINDINGS

The section that follows presented data discussion and findings on how Emthini primary school stakeholders shaped their solid waste management practices.

5.3.1. STAKEHOLDERS UNDERSTANDING OF SOLID WASTE AND ENVIRONMENT

According to Ravindra et al. (2015); Abarca et al. (2013) and Babybonelo (2013) solid waste refers to any materials that are discarded and perceived as no longer useful, which come from various human activities. Similarly, to SP1, as SP1 described solid waste as something that is no longer needed. In a manner that when human beings look at it, they see something that is no longer useful to them, as mentioned by SGB1. Hence, T1, FH1, and GW1 described solid waste as materials that get destroyed and thrown away after using something that was inside.

What was stated by SP1, SGB1, GW1, FH1 and T1 was similar to Leblanc (2020); Abdel-Shafy and Mansour (2018) as they posit that solid waste refers to a range of waste materials that arise from human and animal activities that are regarded as not useful and unwanted anymore. On the other hand, EL4, EL5, and EL6 could not explain the concept of solid waste. Instead of explaining this concept, they dwelled on stating the importance of keeping the environment clean. This led me to find out more about what Emthini primary school stakeholders comprehended about the concept "environment".

SP1 described the environment as the surroundings whereby one lives, occupies or spends most of their time. GW1 described the environment as a place and/or land where people stay and live every day. Similarly, to Sikhosana et al. (2020) they described the environment as natural surroundings as it influences and accommodates all living and non-living organisms. Whereas T1 and EL4 explained the environment as a place that is around us where we live. According to Ward et al. (2013) the environment is the surroundings that influence a specific interest.

Furthermore, what was said by SP1, GW1, T1 and EL4 was related to Kumar et al. (2014) who described the environment as a natural setting that covers physical surroundings that are common to living beings in a manner that includes water, land, air-space and plants. However, EL5 and EL6 could not even attempt to explain what the concept of "environment" entailed. While FH1 perceived the environment as a difficult concept to explain, even after I clarified

using FH1's home language, which was IsiNdebele. Instead, FH1 highlighted the importance of ensuring that the environment is always clean.

As stated by Ahmed and Gambo (2014) FH1 assertions were similar to SGB1, who indicated that if the environment we surround ourselves in is not clean, it results in a negative impact on our health. Hence, SGB1 indicated that it is important to ensure that our environment is always clean and free from bacteria, especially since we are affected by COVID-19. The stakeholders' understanding of solid waste and environmental concepts was different from one stakeholder to the next.

SP1, SGB1, GW1, FH1 and T1 managed to explain what was meant by solid waste, while EL4, EL5 and EL6 could not explain the concept of solid waste. Instead, their explanations were related to the importance of keeping the environment clean. Furthermore, SP1, GW1, T1 and EL4 were able to explain the concept of environment while EL5, EL6, FH1 and SGB1 could not comprehend what was meant by environment.

5.3.2. THE NATURE OF SOLID WASTE GENERATED

According to Ribi et al. (2017), the increase in solid waste that is generated is due to high consumption of products that have materials that are less or more biodegradable. Hence, schools are perceived as one of the biggest generators of solid waste (DHEC, 2019). This was so because the amount of solid waste that was generated in schools did not only come from the classroom activities; it was generated in all indoor and outdoor areas of the school, such as the staffroom, office, canteen, and playground (DHEC, 2019). In 2021, Mpumalanga province had nearly 2 252 schools, 36 979 teachers, and 1 094 941 learners (DBE, 2021).

It was imperative to find out who generates solid waste and how. According to Amasuomo and Baird (2016); Brunner and Rechberger (2014) solid waste is generated by human beings through various activities that they partake in. This was similar to what was said by SP1, as SP1 mentioned that human beings

and animals contribute to solid waste generation. However, that was not the case with SGB1, GW1, FH1, T1 and EL5 and EL6 as they stated that it was only learners who generated solid waste at Emthini primary school. While EL4 indicated that teachers do generate solid waste.

What was said by SGB1, GW1, FH1, T1, EL4, EL5 and EL6 was contrary to what I observed. As I noted, it was not only teachers and learners who generated solid waste but also food handlers and street vendors. This was a clear indication that these stakeholders, except for SP1, were not aware that everyone was generating solid waste inside and outside the school environment. According to Sarkodie and Owusu (2021) the most common types of solid waste that schools generate are paper, card, general waste from rubbish bins, food waste, food packaging, electrical equipment, plastic, and furniture, and glass, sanitary and COVID-19 waste.

Emthini primary school generated solid waste that was similar to the ones mentioned by Sarkodie and Owusu (2021). The nature of solid waste that I saw that was generated at Emthini primary school ranged from papers, old books, boxes, milk containers, plastics (from sweets, ice, atchar, vetkoeks, biscuits and snacks wraps), surgical face masks, toilet paper, plastics, tins, food packages, and food waste (from cabbage, tomatoes, onions, pumpkin, butternut, apples, bananas, oranges, and pear peels). SP1 further added that containers of sanitizers for COVID-19 are part of the waste the school generates as these containers are kept with no further use.

Hence, Sarkodie and Owusu (2021) and Mihai (2020) stated that the COVID-19 pandemic has led to an unusual increase in the amount of medical waste generated in schools. This medical waste consisted of personal protective equipment such as face masks, eye protection, and gloves (Ma et al., 2020). SP1 concluded by indicating that the metal rubbish bins that they are currently using rust and end up as waste themselves. My research has shown that not only did learners at Emthini primary school generated solid waste, as SGB1, GW1, FH1, T1, EL4, EL5, and EL6 said.

In fact, there were various stakeholders involved in solid waste generation on different occasions when they were within the school premises. These stakeholders ranged from food handlers to general workers, school principals, teachers, street vendors, SGB representatives, and other support staff. Hence, SP1 stated that every human being does generate solid waste. Furthermore, I discovered that Emthini primary school generated solid waste such as papers, old books, boxes, milk containers, plastics (from sweets, ice, atchar, vetkoeks, biscuits and snacks wrap), and surgical face masks, toilet paper, plastics, tins, food packages, and food waste (from cabbage, tomatoes, onions, pumpkin, butternut, apples, bananas, oranges, and pear peels).

5.3.3. PATTERNS OF WHEN SOLID WASTE WAS GENERATED

According to DHEC (2019) solid waste in schools is generated throughout the day. At Emthini primary school, solid waste was generated throughout the day and through day-to-day activities that took place. Upon my arrival for observations, the school environment was very clean in front, but at the back, the opposite was the case as the school environment was polluted with solid waste. The amount of solid waste found in the school environment was not generated in the morning, but rather from the previous day(s). I saw rubbish bins full to capacity in the morning. This proved that the solid waste that was in the vicinity was not generated in the morning.

As I took a tour of the classrooms, I noted that many classrooms were clean even though they had bins that contained solid waste that was not disposed the previous day. However, that did not mean that the school did not generate solid waste in the morning because there were food handlers who were responsible for cooking and contributed to solid waste generation through food packages of the food that they would cook at that time. Talsania and Modi (2019) stated that kitchens are known to be major contributors of solid waste in schools. Hence, loja et al. (2014) mentioned that cooking food for learners on a daily basis does increase the quantity of solid waste generated in schools.

SP1 indicated that solid waste at Emthini primary school was generated during the process of teaching and learning activities, as learners would end up tearing papers in class and use these papers to make something creative from them. This relates to Rada et al. (2016) as they asserted that solid waste is generated through teaching and learning. This prompted me to go to the classrooms to see the amount of solid waste that was generated during teaching and learning. I noted that some of the classrooms were polluted with a lot of papers that were torn from the books.

The boxes that they used as bins were full of solid waste accumulated during teaching and learning, which was before lunch break. In the course of lunch breaks, I saw a number of learners who would buy products that are sold by the street vendors over the fence, and after eating, they would throw the packages of what they bought anywhere around the school environment instead of using the rubbish bins provided by the school. This would leave the school polluted with solid waste that comes from the products that are sold by these street vendors during lunch breaks.

I observed a number of learners who would make certain that they did not leave school without cleaning their classrooms in order to follow their classroom rules (UNICEF, 2021). As much as cleaning their classroom was important, this was one of the peak hours whereby the school would generate a huge amount of solid waste, as the school had 16 classrooms that had to be cleaned. During the process of cleaning the classrooms, learners would dispose solid waste from their classroom into the rubbish bins that were provided by the school to use outside. However, that did not assist as the solid waste was spilling out of the bin as it was already full.

Instead of learners opting for another bin, they would just throw the rubbish in the same bin without even bothering themselves to pick it up. What was shocking was that these learners would carry on like nothing had happened. There were patterns in which solid waste was generated at Emthini primary school. For instance, solid waste was generated throughout the day, especially in the morning when food handlers would cook food for learners. During the

teaching and learning process, throughout lunch breaks, whereby learners would buy various products from the street vendors, and in the afternoon when they cleaned their classrooms.

5.3.4. STAKEHOLDERS' MANAGEMENT OF SOLID WASTE

It was significant to tap into what some of these stakeholders understood about solid waste management, as this shaped the developed SISS-WMP. SGB1 mentioned that solid waste management refers to the process of keeping the environment clean while we use the waste that is generated for the purpose of recycling. SGB1's definition was similar to SP1's, who defined solid waste management as a way of recycling waste that was found in schools.

This was related to Rasmeni and Madyira (2019); Rojas et al. (2018); Ahmed and Gambo (2014) as they described solid waste management as a process of collecting, transporting, processing, monitoring, and disposing solid waste materials in an appropriate manner. Hence, managing solid waste in an appropriate manner reduces the negative impact on the environment, human health and contributes towards economic development in order to improve the lives of individuals (Manoj, 2016). According to Nyampundu et al. (2020) there are various approaches that can be adapted in order to manage solid waste, such as collection, storage, treatment, transportation, and disposal of solid waste at the final dumping site.

However, without an effective solid waste management plan, the solid waste generated from human activities has a negative impact on the environment and can result in health hazards (Ahmed & Gambo, 2014). Nonetheless, well-organized solid waste management is perceived as the main prerequisite towards reaching sustainability as it is every one of us that generates solid waste (Sarkodie & Owusu, 2021). This led me to investigate how Emthini primary school stakeholders managed the solid waste that they generated.

They managed their solid waste through the installation of signage for school and safety rules, school safety and security policy (Appendix 10), classroom policies, three metal rubbish bins, open burning of waste, allocation of tasks so

that each stakeholder is aware of their responsibilities and requesting street vendors to clean up the school after selling their products. According to Bojan et al. (2017) it is imperative for schools to have waste management policies in order to be able to reduce the environmental impact of solid waste.

Emthini primary school had a sign for school safety rules, which was installed at the gate, indicating that littering is prohibited. In order to mitigate littering, the school made sure that they installed rubbish bins in every block of the school. The school also had a drafted safety and security policy (Appendix 10). The signage for school safety rules, safety and security policies were significant as they spell out different issues that are related to the school's safety, security, and discipline that one must adhere to when entering the school premises (Mhlanga, 2019).

Hence, Khajuria et al. (2016) asserted that the absence of adequate policies and the lack of environmentally stimulated and enlightened individuals could result in challenges to solid waste management in schools. I discovered that not only did the school have installed a signage for school and safety rules but that each classroom had its own set of rules that had to be followed. These classroom policies provide a solid foundation for a successful and functional classroom while indicating what type of behaviour is accepted and encouraged in the classroom (UNICEF, 2021). Among those rules, littering was prohibited inside the classroom.

This clearly showed that the school and the classrooms did not permit littering at all, but littering was still occurring. This was so because the signage for school and safety rules and classroom policies were not in practice. As a result, the school and classroom rubbish bins were full to capacity with solid waste that was not disposed from the previous days, and littering was the norm regardless of these interventions that were put in place. According to Aksan and Çelikler (2019) recycling knowledge levels have increased, and recycling behaviour has changed positively.

However, that was not the case at Emthini primary school because the school did try to recycle the solid waste that they generated, but it was not continuous,

hence they stopped recycling, as stated by SP1. SGB1 said that the school was not yet at the level whereby they could recycle their solid waste. While FH1 and EL4 alluded to the fact that the school did do some form of recycling. This was similar to what was said by the SP1, who asserted that the school did try recycling, but it was too expensive for them to transport waste to the place of recycling.

Similarly, to Conserve Energy Future (2021) they alluded that the challenges that hinder recycling are high costs related to transporting the collected waste materials to collection areas. Hence, the SP1 indicated that they decided to stop recycling and ended up handing over the recycling project to a private person who is a street vendor as it was not profitable for them. FH1 added that there are tins which are being collected by anyone who wishes to collect them for the purpose of recycling, and there is also a community member who will come and collect food waste.

I discovered that the school did manage solid waste that they generated, but they lacked commitment and patience as supported by SP1. Another way of managing solid waste: SP1, T1, FH1, and GW1 stated that they dispose solid waste through open burning. Open burning is a process whereby all unwanted materials are incinerated due to the large quantities of solid waste available at hand, as stated by Cogut (2016); Hoornweg and Bhada-Tata (2012). However, open burning of waste does not only result in air pollution but also affects human beings, living and non-living things, as stated by Manisalidis et al. (2020) and Vongdala et al. (2019). Hence, SP1 stated that they only burn solid waste depending on the quantity available.

I further probed to discover their reasons behind the open burning of waste. GW1 and F1 alluded to the fact that if they do not burn it, the solid waste will be all over the school environment. However, their reasons were different from those of Cogut (2016) who indicated that open burning is done to reduce the quantity of waste. The most alarming factor is that the school did not only burn solid waste materials that were unwanted anymore. FH1 went to the extent of burning a pack of learner's books that were new and other materials that were on sight for the purpose of making fire.

Whereas SP1 indicated that the old learner's books are being used and stored in the library. However, it was an unfortunate experience as FH1 did not see anything wrong with that. As a result, what was done by FH1 contravened what was stated by the DBE. The DBE (2021) indicated that all old books need to be kept safe and used for reading clubs; donate them to preschools; and donate extra copies of suitable magazines to families. Furthermore, every stakeholder was allocated a task that they were responsible for as a way to manage solid waste.

For instance, it was the responsibility of GW1 to ensure that the school yard was clean as stated by SGB1, while other representatives of the SGB did assist time and again. The GW1 indicated that he maintained the school's cleanliness by picking up papers and putting them in the rubbish bin. SGB1 added that the street vendors contributed to solid waste generation; hence, they took it upon themselves to request them to clean up after selling their products. Nonetheless, that hardly happened because GW1 indicated that these street vendors are stubborn, and they do not clean up the school every day, but they sell their products every day.

They only clean up the school when they see the SGB1. On the other hand, EL4, EL5, and EL6 asserted that it was their responsibility to clean up the solid waste around the fence. Such occurrences clearly indicate that there is no unity as these stakeholders still believe that if a person is hired to clean the school, it is their responsibility to do so and no one else. Emthini primary school stakeholders used various ways to manage solid waste that they generated. The school installed a sign for safety rules, and amongst those rules, littering is banned.

To mitigate littering, the school made sure that they installed rubbish bins in every block of the school. However, not everyone used those rubbish bins. Littering in the classroom was prohibited as stated in the classroom policy, hence they used boxes to dispose solid waste. Recycling was done, but SP1 indicated that they decided to stop recycling and ended up handing over the

recycling project to a private person who is a street vendor as it was not profitable for them. Emthini primary school stakeholders resorted to the open burning of solid waste in order to prevent solid waste from being all over the school premises.

What alarmed me was that FH1 went to the extent of burning a pack of learner's books for the purpose of making a fire for cooking. Furthermore, every stakeholder was allocated a task that they were responsible for as a way to interact with solid waste. For instance, GW1 was the one responsible for ensuring that the school environment was clean. Street vendors had the responsibility of picking up packages of what they sold after lunch breaks. However, they did not do this regularly. They only did this task when SGB1 was on site. Learners had the responsibility of ensuring that they cleaned their classrooms on a daily basis every afternoon.

5.4. OPPORTUNITIES FOR THE DEVELOPMENT OF THE SISS-WMP

5.4.1. OPPORTUNITIES

There were opportunities at Emthini primary school that shaped the development of the SISS-WMP. Amongst those, SP1 suggested that if the school could have plastic bins, they would use them for a very long time. While SGB1 suggested that the local municipality provide them with a skip bin that will be collected by the municipality, this would help the school. However, SP1 assumptions about plastic bins were different from those of Kurt's Rubbish Removal (2021) who indicated that plastic bins have a shorter life span compared to metal bins, which have a longer life span.

Hence, SGB1 stated that they requested a skip bin from the local municipality with no success. SP1 further indicated that the school did try to do recycling, but they failed as it was expensive for them to transport materials to Pretoria and Witbank. Similarly, to Ecavo (2020) who stated that there are many hidden high costs and processes that are associated with recycling, which results in recycling being a challenge. This was contrary to what I observed as I noted a lot of recycling areas which are less than 30 kilometres away from the school

compared to Pretoria, which is more than 97 kilometres away, while Witbank is 92 kilometres away from the school.

Even though SP1 has given up on recycling by handing recycling to a private person, SGB1 believes that there is still hope for recycling their solid waste. For instance, SGB1 said that they even proposed for papers to be recycled and have the skip bin collected by the municipality when it is full as it is their responsibility. SGB1 further said that if the school could have a storage facility for solid waste, they could be assisted as they would recycle their solid waste in large quantities. SAPPI (2016) indicated that recycling assists in reducing littering, pollution, conserving raw materials, alleviating poverty, encouraging community participation, boosting entrepreneurship and creating jobs.

This is so because recycling has been considered an essential strategy towards achieving sustainability by reducing the environmental impact of a product's life cycle (SAPPI, 2016). If learners could be monitored frequently, they might change their behaviour and attitudes towards solid waste generation and littering at school. The change of attitude and behaviour is important as littering has a negative impact on the environment (Ahmed & Gambo, 2014). However, various stakeholders are of the impression that change will not happen instantly.

This was so because GW1 said that there are no resources available to deal with solid waste, learners do not listen when one reprimands them about littering, and they lack respect. While T1 said that learners are careless, lazy, and do not listen to other teachers except for their class teachers, FH1 added that learners pollute because they are under the impression that their behaviour is not being monitored. SP1 suggested that if they had funds to transport materials for recycling, they would definitely continue to recycle. Hence, Mupa et al. (2015) suggest that funding should be pursued in order to provide the necessary resources in short supply.

This will not only assist the school, but it will also protect the GW1 from encountering any diseases. According to Lema et al. (2019) a lack of knowledge about solid waste management contributes to improper solid waste

management. SP1 concluded by stating that consistency, positive mentality, commitment, and education about the environment are the most important key factors that could assist the school in solid waste management. Hence, it is imperative to ensure that measures are implemented in schools in order to raise awareness about the right behaviour towards solid waste management (Rada et al., 2016).

5.5. SUMMARY OF STAKEHOLDERS' PRACTICES AND OPPORTUNITIES AT EMTHINI PRIMARY SCHOOL

Table 13 presents the summary of findings on stakeholders' practices and opportunities at Emthini primary school.

Table 13 Emthini primary school summary of findings (Sikhosana, 2022).

1. STAKEHOLDERS SHAPING THE SOLID WASTE MANAGEMENT PRACTICES	1.1 Stakeholders' understanding of solid waste and the environment Solid waste SP1, SGB1, GW1, FH1 and T1 managed to explain what was meant by solid waste, while EL4, EL5 and EL6 could not explain what solid waste is. Environment SP1, GW1, T1 and EL4 had an understanding of the concept "environment," while SGB1, FH1, EL5 and EL6 could not explain what "environment" is.
	1.2. The nature of solid waste generated Based on my observations, Emthini primary school generated solid waste such as: Papers, old books, boxes, milk containers, plastics (from sweets, ice, atchar, vetkoeks, biscuits and snacks wrap), surgical face masks, toilet paper, plastics, tins, food packages, and food waste (from cabbage, tomatoes, onions, pumpkin, butternut, apples, bananas, oranges, and pear peels). SP1 added containers of sanitizer and metal rubbish bins.
	1.3 Patterns of when solid waste was generated

	<p>I noted that the school generated solid waste during the day-to-day activities that occurred. In the morning, when food handlers were cooking. Throughout teaching and learning in the midst of teachers and learners. During lunch breaks, amongst various stakeholders and street vendors and in the afternoon, when classrooms were being cleaned by learners.</p>
	<p>1.4 Stakeholders' management of solid waste</p> <p>I had to tap into what SGB1 and SP1 understood about solid waste management. SGB1 and SP1 demonstrated an understanding when it came to explaining what solid waste management is.</p> <p>The school managed solid waste through the installation of a sign for school safety rules, school safety and security policy (Appendix 10), classroom policies, three metal rubbish bins, open burning of waste, allocation of tasks so that each stakeholder knows their responsibilities and requesting street vendors to clean up the school after selling their products.</p>
<p>2. OPPORTUNITIES FOR THE DEVELOPMENT OF THE SISS-WMP</p>	<p>2.1 Opportunities</p> <p>The following are the opportunities that shaped the developed SISS-WMP; plastic bins, skip bin from the municipality which must be collected by the local municipality when it is full, a nearby recycling depot, storage for solid waste at school, necessary equipment and resources, funding for transportation, consistency, commitment, positive mentality, and educating stakeholders about the environment.</p>

5.6. CONCLUSION

The Emthini primary school (Case 1) chapter presented and discussed the data that was collected during phase one. In the next chapter, I present and discuss the phase one data from Tjala primary school (Case 2).

CHAPTER 6: TJALA PRIMARY SCHOOL (CASE 2)

“What do you do with the waste after you have collected it? If you do collect it, then what do you do with that waste? Do you recycle it, or do you keep it, maybe or destroy it in some other way?”-SP2

6.1. INTRODUCTION

The Emthini primary school (Case 1) chapter presented and discussed data that was collected during phase one. Only elements that led to the answers to the research questions were presented. The following are my research questions which this chapter responded to:

1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did?
2. How was the development of the SISS-WMP?

6.2. DATA PRESENTATION

Data was presented through themes and categories as indicated in Table 14.

Table 14 data analysis scheme (Sikhosana, 2022).

Theme	Categories
1. Stakeholders shaping the solid waste management practices	1.1. Stakeholders' understanding of solid waste and the environment
	1.2. The nature of solid waste generated
	1.3. Patterns of when solid waste was generated
	1.4. Stakeholders' management of solid waste
2. Opportunities for the development of the SISS-WMP	2.1. Opportunities

6.2.1. STAKEHOLDERS SHAPING THE SOLID WASTE MANAGEMENT PRACTICES

This theme was unpacked through the categories as indicated in Table 14.

6.2.1.1. Stakeholders Understanding Of Solid Waste And Environment

It was imperative to tap into stakeholders' understanding of solid waste and the environment. As these key concepts shaped their practices towards solid waste management at Tjala primary school, which contributed towards the development of SISS-WMP in primary schools. Stakeholders' interpretations of these concepts varied from one to the other. This was so because SP2 defined solid waste as: *"Waste would be...in my understanding, anything that we have used and no longer need, or is no longer useful to us, what remains after we have used some of our resources or programs"*.

SP2's interpretation of solid waste was similar to T2's, who asserted that: *"I think I could say it is uhm... items of property that have been used before and can be used again"*. Whereas SGB2 defined solid waste as: *"Waste is waste, so it is waste"*. However, GW2 and FH2 had a similar understanding of the solid waste concept as they defined it as things that must be thrown away: *"It is to throw away and make everywhere dirty"-GW2* and *"These are the things that must be thrown away; they must go"-FH2*. Whereas TL4, TL5, and TL6 held different sentiments from GW2 and FH2 as they stated that solid waste refers to ruining things.

When I probed to understand what they meant, TL4, TL5 and TL6 said that solid waste was about ruining things. They hinted that they were referring to when people destroy things like food, water, soil, and places. Their understanding and interpretations of solid waste prompted me to tap into what these stakeholders comprehended about the concept environment, as this shaped the developed SISS-WMP. SP2 described the environment as: *"It is our surroundings, the place where you live, where you work, that is your environment"-SP2*. Furthermore, SP2 alluded that there is a relationship between solid waste and the environment, as waste might be detrimental to the environment.

SP2 stated that: *"Yes, I think the environment produces the waste and the waste might be detrimental to the environment itself"*. SP2's interpretations of the environment were similar to SGB2, GW2 and T2 as they indicated that the environment is where people live and an area around us: *"Yes, environment, I heard about it, but... environment, what can I say huh? Where we live is in the environment"*-SGB2; *"It is where we stay as people"*-GW2 and *"Environment is everything around us or an area where we may be living"*-T2. T2 further mentioned that there is a relationship between solid waste and the environment, as human beings are the ones that use things that are acquired from the environment.

T2 asserted that: *"Yes, there is because we obviously use things from around the environment to stand in and they are also dependent on how we use them"*. Nevertheless, that was not the case with TL6 and TL5 as they defined "environment" as how something has been built and a shade: *"It is how something is built"*-TL6 and *"It is a shade like"*-TL5. Whereas FH2 defined the concept of environment as: *"Ya neh environment is environment"*.

6.2.1.2. The Nature of Solid Waste Generated

Having learned how these stakeholders interpreted the concepts of solid waste and environment, they laid the groundwork for determining the nature of the solid waste generated by the school. This led me to find out who generated solid waste, what kind of solid waste was generated and how it was generated. Tjala primary school's SP2, SGB2, GW2, FH2, T2, TL4, TL5 and TL6 indicated that learners were the biggest generators of solid waste at Tjala primary school. This was so because learners were perceived to be the ones in the majority, as said by SP2: *"I think the children are the ones in the majority"*.

Without a doubt, GW2 said it bluntly that learners were the generators of solid waste: *"It is these learners, obviously"*. T2 held the same viewpoints as GW2, as T2 said that it was obvious that due to the responsibility that they have as learners, they used more items that generated solid waste: *"I think it is the learners obviously because of responsibility and the most items that they use are paper, food that they eat, and toys that they play with them. Then in school premises, I*

think the learners too". SGB2 also added that learners were the ones that generated solid waste, especially in their classroom environment, as their classrooms would be polluted with papers: "It is learners. They throw papers, like in a classroom, when we clean, we find torn papers on the floor. Whatever that they take, they just throw it on the floor". FH2 held the same viewpoints as the SGB2 that learners would cut papers in their classrooms and not use the provided bins to dispose them: "It is learners. They cut papers in their classes, they cut and throw them outside. People do not take them to the dustbin. Some throw them even at each other".

What was said by SGB2 and FH2 was similar to what I observed. I noted that when some of the SGB representatives went to clean the classrooms, they would find papers that were torn and lying around the floor, as seen in Picture A and B.

Picture A: Classroom environment



Picture B: Classroom



TL4, TL5, and TL6 supported what was said by SP2, SGB2, FH2, GW2, and T2 by indicating that they were the ones that generated solid waste. TL5 further added that the solid waste that was generated was due to the mischievous behaviour of other learners. Since all these stakeholders indicated that learners were the only solid waste generators, I had to find out how they generated that solid waste. The SP2 said that:

"The waste at the school is mainly paper, so we duplicate tasks and hand them over to the children. After these tasks are written or the papers are used instead of being stored, they may be discarded. Some of the papers are used for paper cuttings, or the children also use magazines to search for pictures,

and after making cuttings, the magazine or the pages of the magazine will be discarded and that forms part of the waste".

What was said by SP2 contradicts his assertions that learners were the only solid waste generators as they were in the majority. SP2 said that there is a relationship between teaching and learning and solid waste generation. This was so because I saw teaching and learning being facilitated by teachers and resulting in solid waste generation due to duplicating activities for learners. SP2 added that: *"Yeah, as we have explained, we duplicate papers and after being used, they form waste"*. I observed T2 duplicating tasks and activities and passing them on to learners, which contributed to the generation of solid waste.

GW2 added that learners generated solid waste by throwing papers and buying sweets: *"Yes, they throw papers, they buy sweets, and they throw papers"*. What was said by GW2 was similar to what T2 indicated when he said that learners would generate solid waste by buying snacks and throwing away their packaging after using what was inside: *"I think every day they use papers and they obviously buy snacks, and after they have used whatever, they obviously throw them away"*. T2 further added that not all solid waste generated by learners came from the school; some products that generated solid waste came with them from their homes.

T2 mentioned that: *"Some of them come with them from home and some of them buy them from the food vendors here at school"*. What was said by GW2 and T2 was similar to what I observed. I saw one street vendor who came to Tjala primary school every morning and during lunch breaks to sell products to learners within the school premises. The products that were sold were mainly snacks, sweets, and chewing gum, as seen in Picture C and D.

Picture C: Street vendor products



Picture D: Street vendor products



The nature of solid waste that was generated from the products that were sold by the street vendor were food packages, such as snack packages and sweet wraps, as displayed in Picture E and F.

Picture E: Solid waste



Picture F: Solid waste



TL4 and TL6 added that after buying from the street vendor, learners would throw food packages anywhere: *"When they finish buying and eating, they throw them on the ground"*-TL4. Moreover, *"They throw papers at the things that they were eating"*-TL6. What was said by TL4 and TL6 was similar to what I observed, whereby I saw learners throwing food packages of the products that they bought from the street vendor anywhere within the school premises, as seen in Picture G.

Picture G: Packages of products bought from the street vendor on the school grounds



Even though some learners disposed solid waste inappropriately, what was alarming was that some learners went as far as using papers in order to put and roll the sherbet powder with papers. Sherbet powder is an old-fashioned favourite sweet for children. These learners bought this powder from the street vendor and used it to create paper sweet cigarettes, as seen in Picture H.

Picture H: Three learners creating a paper sweet cigarette to imitate people who smoke cigarettes:



I also noted that food handlers generated solid waste as they cooked food for learners on a daily basis during school days. Nonetheless, none of these stakeholders mentioned them. On Mondays, the food handlers would cook soya mince, rice, and pumpkin, butternut, or cabbage, depending on which vegetable was available at that time. On Tuesdays, they cooked brown sugar beans served with maize meal porridge, and on Wednesdays, they cooked a crumbly porridge served with fresh milk, and they would give learners fruits such as oranges, bananas, apples, or pears. On Thursdays, they would cook brown sugar beans and samp, served with either cabbage, butternut, or pumpkin.

On Fridays, they cooked rice, tin fish served with tomato gravy and cabbage, pumpkin or butternut. Looking back at this menu, one could wonder the quantity of solid waste that was generated by food handlers in their kitchen, either daily, weekly, monthly, or yearly. In Picture I, J, K, and L displayed solid waste generated from some food packages and food that they cooked.

Picture I: Milk containers



Picture J: Boxes of milk



Picture K: Tin fish and tomato boxes



Picture L: Cabbage peels



6.2.1.3. Patterns of When Solid Waste Was Generated

Since the nature of solid waste that was generated at Tjala primary school was established, I had to find out the patterns of when that solid waste was generated as this shaped the developed SISS-WMP. I conducted observations whereby my focus was on the cleanliness of the school and the classroom environment. These observations were conducted in the morning, during lunch breaks, and in the afternoon so that I could get an idea of when solid waste was generated. Upon my arrival in the morning, the whole school environment was very neat in front and at the back as seen in Picture M and N.

Picture M: The front



Picture N: The back



The solid waste bins and refuse bags were already taken outside by GW2 and were empty. Picture O displayed an empty solid waste bin and Picture P displayed an empty refuse bag.

Picture O: Solid waste bin



Picture P: Refuse bag



I proceeded and went to the classrooms, and all that I saw was neat classrooms in Picture Q and R.

Picture Q: Classroom



Picture R: Classroom



I went to the kitchen where food handlers prepared food for learners. I noted that food handlers were the ones who generated solid waste in the morning through the packaging of the food that they cooked. Some of the solid waste that they generated were tins, maize meal packages, food boxes, cabbage peels, cooking oil bottles, and milk containers presented in Picture S and T.

Picture S: Solid waste by food handlers

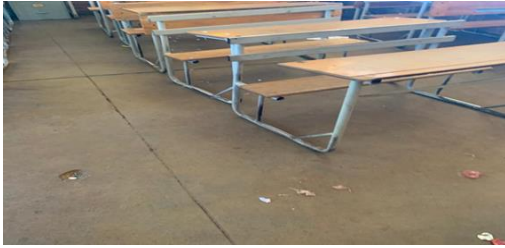


Picture T: Solid waste



During lunch breaks, I went back to the classrooms to observe the nature of solid waste that was generated through the teaching and learning process. I noted that there were sweet wraps on the classroom floor and the boxes that were used as solid waste bins to dispose waste generated in the classrooms were full of papers and plastics as presented in Picture U and V.

Picture U: Classroom during lunch



Picture V: Classrooms bins



After lunch breaks, I observed the school environment to see whether there was solid waste generated outside. I noted that the amount of solid waste that was in the vicinity was not massive as it was only tissues from the refuse bags and a few papers within the school as displayed in Picture W and X.

Picture W: Tissue from the refuse bag



Picture X: Papers on the ground



In the afternoon, I had to go back to the classrooms to see the amount of solid waste that was generated through the teaching and learning process. I noted that classroom boxes, which were used as solid waste bins, were full to capacity, as displayed in Picture Y. While the classrooms were polluted with too much solid waste, as presented in Picture Z:

Picture Y: Bins full to capacity



Picture Z: Polluted classroom



6.2.1.4. Stakeholders' Management of Solid Waste

Now that I presented the patterns of when solid waste was generated at Tjala primary school, I had to find out how these stakeholders managed the solid waste that they generated. My interests were shaped by the need to find out what it was that they did and how they managed the generated solid waste. During observations, I came across two types of bins, namely: the solid waste bin in Picture A2 and the refuse bag in Picture B2. These bins were placed in two school blocks, which were in the front block and the back block.

Picture A2: Solid waste bin



Picture B2: Refuse bag



I asked the GW2 as to what the purpose of placing refuse bags in school blocks was while the school already had a dustbin. GW2 asserted that these two types of bins served different purpose because the pink refuse bags were only meant for the wipes that one uses after washing their hands: *"They use them for wipes there. After washing their hands, I put them in the dustbin"*. What was said by GW2 was similar to what I observed, as I saw that these bins all served a different purpose. I noted that the bin in Picture A was used for all types of solid waste that was generated at this school.

This was supported by TL5: *"I eat, then maybe if the thing that I ate had a paper, when I am done, I put the paper in the dustbin when I go back to class"*. The refuse bag in Picture B2 was used to dispose wipes (tissues) after washing hands. I had to find out when the school started to use these types of refuse bags. GW2 indicated that the pink refuse bags were brought in recently during COVID-19 alongside with the sanitizers: *"The pink plastics came now when they brought things for sanitizing. They came during COVID"*. I further asked if these types of bins

were used frequently. SGB2 said no and they do not know why these bins are not being utilized:

"They do not. We do not know why because... you see, now I am going to clean. I am going to start by collecting their papers before I go to clean in the classroom. I start by collecting papers and putting them in the dustbin. Then when you are done cleaning, you will collect again and put them in the dustbin. So I do not see that they know what the purpose of the dustbin is".

What was said by SGB2 was supported by TL6 and TL4 as they indicated that they would normally dispose papers in their classrooms after eating rather than using the bins provided by the school, which was similar to what I saw: "No. When I am done eating, if the dustbin is too far, I put the paper in my pocket and throw it in the classroom after break"-TL6. Furthermore, TL4 added that: "Me, when I am done eating, I take the paper and run. If I do not see the dustbin, I run. Sometimes the dustbin is not available, then I go to the class and throw that paper there"-TL4. The availability of these types of bins led me to ask these stakeholders what it is that they comprehended about solid waste management, including what it is that they did to manage the solid waste generated.

SGB2 indicated that she heard about solid waste management but she was not concerned about it as she heard that papers would be taken for recycling: "I heard about it but I was not too concerned because I just heard that there is waste management because there is recycling of papers. They are taken to wherever they are taken too, and they recycle them and do something else". I probed to find out why SGB2 was not concerned about solid waste management: "Eish, I am not sure...I do not have a reason as to why I was not interested because I was never into it so much".

Even though SGB2 was not interested in knowing about solid waste management, SP2 had a clue as to what solid waste management is. SP2 said it was about what you do with the waste that you collect: "Uhm, it will be you...What do you do with the waste after you have collected it. If you do collect it, then what do you do with that waste...Do you recycle it or you have it maybe

destroyed in some other way?" SP2 explanation of solid waste was similar to FH2 who indicated that:

"Yes, I heard about it. Let us say a dustbin arrived at school and what was supposed to be thrown away went, including items for recycling, such as cardboard; when there is a person who collects, they collect and recycle. Then tins, there was a person who took them and recycled them. The SGB of the school, even papers, they take them when they do projects for recycling, they take them".

What was said by FH2 was contrary to what she told me during observations, as she indicated that no one came and collected boxes for recycling. In fact, their focus would be on collecting tins and papers. Hence, the boxes were left lying around everywhere, as seen in Picture C2 and D2.

Picture C2: Boxes lying around



Picture D2: Boxes lying around



When I asked the SGB2 as to what would normally happen to the solid waste generated in the kitchen, SGB2 said that:

"Ai with milk boxes I am so sorry, I do not know where they take them too. I am not lying, I do not know because when it comes to feeding scheme, I am not concerned with it, so I do not even know what is happening with the boxes, because what I see is that they put tins aside and vegetable peels aside because there is a person who comes and collects them. Goats eat them right and the soya powder is also kept aside for the person to collect for goats".

FH2 assertions led me to ask SP2 how the school dealt with solid waste that they generated. SP2 and T2 said that they dealt with some of the solid waste generated through burning paper scrubs, storing scripts and recycling papers:

"Generally, with papers, especially paper scrubs, they are burnt and they will also be plastic to a lesser extent, because children's sweets are wrapped in plastic and they are usually littered around the school yard, where they are collected and burnt. With the scripts, especially those from the formal assessment tasks, those which we do not return to children, especially the end of the year script, we still do it our way and we have somebody who does come and collect them for paper recycling"-SP2.

"There are papers that can be recycled, and they are kept in storage, and there are papers that are probably contaminated and cannot be used again... Ya, that is it"-T2.

When I asked how long they would store the formal assessment scripts before they would take them for recycling, SP2 alluded that: *"It will depend on the person who needs the paper because taking them to recycling ourselves is quite expensive around here"*. During observations, I came across a classroom which Tjala primary school used to store the old formal assessment scripts, old learner and teacher books, cleaning materials, bins, chairs, and tables as presented in Picture E2 and F2.

Picture E2: Classroom used as storage



Picture F2: Classroom used as storage



What was said by SP2 regarding transporting papers for recycling was similar to what GW2 alluded that:

"Yes, we did do recycling. We had so much paper here, we filled up plastic bags and filled up a van, and the papers that were left were put inside the

trailer and they left and sold them. When they came back, the papers made R1200.00 and the transport was R500.00".

However, SGB2 said that there were no further follow-ups on the continuation of recycling:

"Yes, I remember last they talked to somebody here at school. They said they talked to this other lady to say there was a person that they spoke to who said they would come and collect, but I did not find out if the person came or not".

These stakeholders did not only recycle papers but there were other ways that they used to manage solid waste, such as tins as mentioned by the SGB2 and FH2: *"Woo with tins, there is a person who collects them for recycling, so there is a person that they store tins for then the person comes and collects them."*-SGB2 and *"There is a lady from SGB. We store tins for her in the other corrugated iron house. We do not throw them away"*-FH2. Whereas food waste was collected by one of the food handlers. Since SGB2 said that they did not follow up on recycling, I had to ask these stakeholders how they managed solid waste generated as recycling was no longer in progress.

GW2, SGB2, SP2, FH2, T2 and TL4 said that they resorted to open burning of solid waste: *"They get burnt"*-SGB2; *"Now, we burn now"*-GW2; *"Uncle burns them in the dumping area, they get burnt"*-FH2; *"I am not sure if it still applies, but I remember last year they took some papers for recycling and burning of unwanted materials like plastics, papers, and boxes"*-T2 and *"I think uncle burns them"*-TL4. What was said by GW2, SGB2, SP2, FH2, T2 and TL4 was similar to what I observed as I saw a dumping area which was used for open burning of solid waste as displayed in Picture G2 and H2.

Picture G2: Area for open burning



Picture H2: Area for open burning



I further probed if open burning of solid waste was a good solution. TL4, SP2, and SGB2 indicated that it was not a good idea. As SP2 said, they had to resort to open burning of solid waste as they had no other option: *"No, it is not a good idea, but you end up burning them because you do not have any other option"*. SGB2 stated that:

"They pick the ones that they pick from the ground, meaning...you know why I say they get burnt? Because you find out that some of them were poured with water, meaning they were not papers that were good for recycling. You can see for yourself that this is waste, and you will not keep waste. There are papers like...you are able to pack them, but those ones when you say you pack them, you will pack them how?"

However, FH2 perceived open burning of solid waste as a good idea as you could use what was left from what was burnt as compost: *"Yes, it is a good idea. Like when you have planted, and you want a good garden, the soil becomes compost and what was planted becomes (She used her hands to indicate that the plants that grow from the compost, flourished)"*. During observations, I noted that the school environment was very clean outside compared to the classroom environment. I had to ask SGB2 as to who was responsible for ensuring that the school environment was always clean. SGB2 stated that it is the responsibility of GW2 and the street vendor to clean as soon as learners enter their classrooms: *"It is the street vendor's responsibility to clean as soon as learners enter their classrooms; it is our GA's responsibility"*.

GW2 supported SGB2's statement by indicating that he does clean the school environment: *"Yes, sometimes I pick them up, sometimes I clean"*. What was said by GW2 was similar to what I observed, as I saw GW2 cleaning the school environment on different occasions, as seen in Picture I2 and J2.

Picture I2: GW2 cleaning the school



Picture J2: GW2 cleaning the school



I had to verify with the SGB2 if the street vendor does clean up after selling the products or not. SGB2 confirmed that the street vendor does clean up. However, during observations, I did not see the street vendor cleaning the school environment as said by the SGB2. Instead, I saw two learners walking around the school with a big plastic bag. I asked some of these stakeholders as to why this was the case. FH2, TL6, and TL5 indicated that those two learners were cleaning the school on behalf of the street vendor in exchange for either R5.00 or snacks up to the value of R5.00.

FH2 further mentioned that the street vendors must clean the school environment after selling, but instead of doing that, the street vendor's task learners to do so in exchange for anything that is being sold or money: *"They said they are given snacks. I think that is how they get paid with snacks because the street vendors must clean their papers when they are selling their snacks. I guess that is her way of paying them"*. TL6 and TL5 added to the FH2 assertion by implying that: *"They were sent. Is not it that they are selling there, so they were sent, and they said they got paid"*-TL6 and *"They take what they want or R5.00"*-TL5.

I asked T2 if he had seen the street vendor cleaning the school environment. T2 said that he had never seen the street vendors cleaning the school environment: *"I do not actually see them, but what they do is task some learners to collect the plastic and papers after they are done selling"*-T2. I noted that after these two learners collected solid waste generated from the products sold by the street vendor, as seen in Picture K2, the solid waste collected by learners was then taken back to the street vendor, who took it with her after selling, as seen in Picture L2.

Picture K2: Learner cleaning up the school



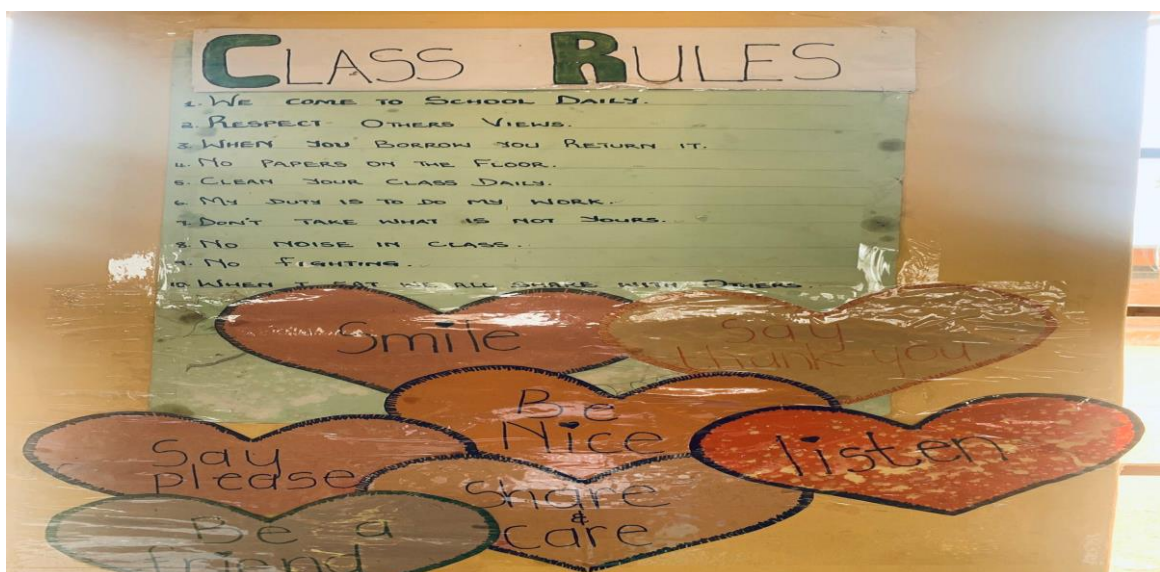
Picture L2: Collected solid waste



Even though SGB2 asserted that it was the responsibility of GW2 and the street vendor to ensure that the school environment was clean. That was not the case with T2, as he alluded that it is actually the responsibility of everyone to ensure that the school environment is clean: *"I think the responsibility lies with everyone. It is the responsibility of the school management, learners, vendors, teachers, and parents"*. What was said by T2 prompted me to find out how he interacted with solid waste generated in the classroom environment. T2 said: *"We have classroom rules. There is no throwing papers on the floor, and when the waste bin in the classroom is full, they must take it out and throw whatever that is inside into the main waste bin"*.

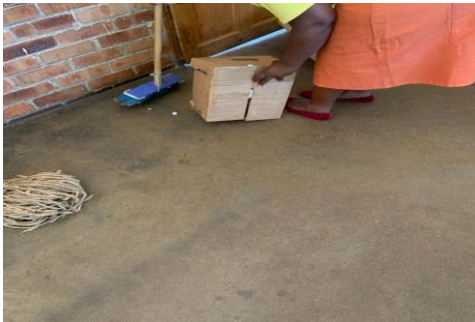
Furthermore, T2 alluded to how he maintained classroom cleanliness during teaching and learning: *"Before I start my lesson, I make sure that they collect all the papers on the floor and throw them in the rubbish bin, the ones that are inside the class and they do not eat, and also, before I go out, I make sure that there is nothing on the floor"*. T2 further indicated that he does not only focus on the cleanliness of the classroom but also outside the classroom environment: *"I do continue doing the same thing. I always encourage them to pick up what is on the floor and throw it in a waste bin, and sometimes I also do the same"*. During observations, I came across the classroom rules that prohibited littering inside the classroom environment in Picture M2.

Picture M2: Classroom rules



I asked TL4, TL5, and TL6 if they did adhere to the classroom rules, as they were also reprimanded by T2. TL4 stated: *"He reprimands us. He says...Pick up the papers and throw them in the dustbin"*. Apart from the classroom rules that T2 had, I also saw a number of women who are the SGB representatives of the school and who came to Tjala primary school in the afternoons to clean the classrooms of the learners, as displayed in Picture N2 and O2.

Picture N2: SGB cleaning



Picture O2: SGB cleaning



I probed to find out if T2 did use the teaching and learning process as a way to manage solid waste. T2 asserted that:

"I sometimes...okay. I think it also depends on the subject matter, but whenever I get a chance, I always encourage them to beware of the dangers that environmental pollution can pose to our lives and share tips with them, advise them on how to deal with the challenges because there is recycling and there is management of waste".

6.2.2. OPPORTUNITIES OF THE DEVELOPMENT OF THE SISS-WMP

6.2.2.1 OPPORTUNITIES

It was crucial to investigate the opportunities that shaped the developed SISS-WMP. This assisted me to look into different sets of practices at Tjala primary school that made it possible for me to develop the SISS-WMP. I had to find out which waste management practices the stakeholders were aware of, as this shaped the developed SISS-WMP. SP2 mentioned that there were no waste management initiatives that he was aware of: *"In our area, no"*. As I continued to

ask if the school had ever implemented waste management initiatives, SP2 said: "No".

However, during semi-structured interviews, SP2 indicated that they had tried recycling but had stopped. This led me to wonder if recycling was not part of waste management initiatives. SP2 alluded to that: *"Yes. It is not part of...maybe I cannot say it is part of a waste management initiative or campaign because it is something which happens rarely, very occasionally"*. SP2 further alluded that the process of recycling was not continuous because the person who would come and collect papers for recycling would complain about quantity, and as the school, they would not get too much share after issuing those papers to that person:

"The person who comes and collects the papers may complain that we do not produce as much as would give them a profit, so they become accustomed to just coming to collect the paper, which may be less than 100 KG. We do about 10% and usually the 10% will be less than R50.00".

Since SP2 indicated that recycling was not continuous, GW2 stated that they resorted to open burning of solid waste because they had tried recycling: *"We burn because there are no other ways that we can use because we have tried recycling"*. However, T2 does not think that open burning of waste is a good idea, as T2 said that it causes environmental issues such as pollution: *"I do not think it is a good idea because they can also be used in a different form. They can also be recycled or used and it can also cause environmental challenges like air pollution"*.

FH2 also supported SP2 and GW2 statements by indicating that they did try recycling, but it was not continuous: *"Yes, they did try papers...They took them from the files, then they took them to where they took them to recycle...It ended there, meaning maybe they are still gathering others so that maybe they will go back. Because they took all of them"*. However, that was not the case with T2, as he alluded that the waste management practices he was aware of, are the ones which are under the municipality: *"Yes, there are because I think it is under the municipality...there are people who collect waste for recycling and there are people who collect bottles and cans for recycling. It helps because it reduces land pollution"*.

This was similar to TL6 and TL5, who stated that there were waste management initiatives that they were aware of, such as recycling. TL6 and TL5 said: *"Recycling is starting something from scratch"-TL6 and "A cool drink bottle when they are done drinking, they sell it to other people and so on"-TL5*. Since the school did try recycling, I had to find out if there were any policies that shaped their solid waste management practices. SP2 indicated that there was no policy directed at the environment: *"There is no policy which is only directed at the environment; we do not have that"*.

Correspondingly to SP2 as the SGB2 alluded that the school did not have policies that shaped their solid waste management practices: *"Uh, environment no. We did not do it because of the SGB, meaning the policies that we work with. They are policies that have been done before, so you continue with those policies"*. When I inquired as to the reason for the school's lack of policies that shaped their waste management practices SP2 stated that: *"Maybe because in the code of conduct, especially the code of conduct of the learners, we speak about cleanliness and the cleanliness of the environment"*.

While SGB2 said that they have never thought of drafting policies: *"You can, but we never thought that we could do the one for waste management"*. Nevertheless, I was given the school policy and I discovered that there was a section that addressed the importance of keeping the environment clean (Appendix 11). I asked SP2 if they had challenges with the amount of solid waste generated at Tjala primary school. SP2 indicated that there were no challenges: *"Fortunately, we do not have hazard waste. I would not say that we have any health problems because of waste"*.

T2 alluded that the challenges regarding solid waste generation and management were discipline amongst learners: *"In a classroom, there are not so many challenges, but outside the classroom, sometimes comes with challenges. Not all learners are disciplined, and I think it lies with the discipline that the other learners have and other learners do not have"*. This was similar to what was said by GW2 when he asserted that not all learners were disciplined: *"Yes, you can reprimand"*

them, but they are not the same. There are those who do not care, but most can be reprimanded".

However, FH2 said that they did reprimand learners who would dispose solid waste anywhere in the school environment: *"We do not let them be, we reprimand them. Is not it that we did not come here for cooking because there is too much to look after? Even when they fight, we come and stop the fight".* T2 further added that to overcome the issues of discipline in solid waste management, he tried to talk to them about the negative impact of solid waste generation: *"I tried to talk to them individually and make them understand about the dangers that they cause to the community as well, not only the school and also their lives and health risk".*

During observations, I noted a number of learners who would discard solid waste while they were next to the bin. I asked TL4, TL5, and TL6 as to why that was the case. They asserted that it was due to laziness, being inconsiderate and tiredness: *"No, they say they are lazy"-TL4; "They are not considerate"-TL6 and "Some of them say they are tired because they wake up very early in the morning (laughing)"-TL5.* I further asked TL4, TL5, and TL6 about the cleanliness of their school environment. TL4 indicated that the school environment was not clean. This was the case because some learners would not adhere to the classroom rules, which would pollute the classroom environment.

They indicated: *"Because learners like to throw papers on the floor"-TL4 and "They like to cut papers and throw them on the floor, and they make noise"-TL5.* GW2 mentioned that one of the challenges that he experienced when he had to dispose solid waste was the windy weather conditions, as they would prevent him from burning solid waste. GW2 said: *"I do have a problem. Maybe you will find that there is wind and I will not be able to burn it. I have to leave it".*

Hence, T2 indicated that it is important for teachers to teach learners about the environment: *"Yes, it is very important. Because it will assist them to understand and help them to become engaged in the process of reducing land pollution and environmental pollution, and also train them to deal with it in a better way".*

6.3. DATA DISCUSSION AND FINDINGS

The section that follows presented data discussion and findings on how Tjala primary school stakeholders shaped their solid waste management practices.

6.3.1. STAKEHOLDERS UNDERSTANDING OF SOLID WASTE AND ENVIRONMENT

Solid waste is defined as all discarded solid materials from industrial, household, health care, constructional, agricultural, institutional, and commercial sources (Ziraba et al., 2016). Similarly, GW2 and FH2 defined solid waste as items that must be discarded. Thus, Amasuomo and Baird (2016) argued that solid waste refers to any waste that people would consider fit for disposal. According to Amasuomo and Baird (2016) solid waste is materials that humans no longer require. This view was similar to SP2, who described solid waste as anything that has been used which is no longer needed and useful to us.

T2 added that solid waste is items of property that have been used before and can be used again. Similarly, with Schneider and Ragossnig (2014) they added that solid waste items are the important first step towards reusing them again. SGB2 could not explain what solid waste is. Instead of explaining this concept, SGB2 translated solid waste into her home tongue language, which in this concept it is Sepedi. TL4, TL5, and TL6 explained solid waste as a process of ruining things. This was the case with the concept of environment, as TL4, TL5 and TL6 could not explain what environment is.

Whereas SP2 described the environment as our surroundings, the place where one lives and works. Similarly, to SGB2, GW2, T2 and FH2, who described the environment as a place where people live in which consists of everything around us. Hence, Obong et al. (2010) added that the environment is our surroundings, which is made up of all the natural resources that influence the development of an organism's lifespan. SP2 indicated that there is a relationship between solid waste and the environment because the

environment produces waste and the waste that it produces might be detrimental to the environment itself.

T2 added that the relationship between these concepts is shaped by human beings as they use and depend on things that are around them. Hereafter, Wanamaker (2018) indicated that the interrelated concepts form the basis of human decisions and actions towards the environment. As a result the Tjala primary school stakeholders' understanding of solid waste and environmental concepts varied from one stakeholder to the other. Even though SP2, GW2, FH2, GW2 and T2 managed to explain what was meant by solid waste, SGB2, TL4, TL5 and TL6 could not explain this concept. Furthermore, my research found that SP2, SGB2, FH2, GW2, and T2 had an understanding of the concept of environment, whereas TL4, TL5, and TL6 did not.

6.3.2. THE NATURE OF SOLID WASTE GENERATED

According to SP2, SGB2, GW2, FH2, T2, TL4, TL5 and TL6 learners were perceived as the biggest generators of solid waste at Tjala primary school. SP2 added that learners are the ones generating solid waste because they are the ones in the majority. However, Rada et al. (2016) refuted this claim by indicating that the waste that is generated in schools does not only depend on the size of the schools or the number of learners. As well as the types of activities that are carried out day-to-day by teachers, learners, and other various stakeholders (Rada et al. 2016).

This was similar to what was said by T2, as he said that solid waste is generated by learners through the responsibilities that they have and that they use paper a lot within the classroom environment. Hence, schools are known to generate a huge amount of waste with the teaching and learning materials that are used on a daily basis (Lober, 2017). It was evident that it was not only learners who generated a huge amount of waste at Tjala primary school. In fact, there were a lot of stakeholders who were involved in the production of solid waste at different times when they were inside the school.

Those stakeholders ranged from food handlers to general workers, school principals, administrators, teachers, street vendors, SGB representatives, and other support staff. However, they were not mentioned by SP2, GW2, SGB2, FH2, T2, TL4, TL5 and TL6 as their focus was on learners. Furthermore, I found out that Tjala primary school generated solid waste such as papers from duplicating tasks, magazines, old books, boxes, milk containers, cooking oil bottles, plastics from sweets and snacks packages, wipes (tissues), plastics, tins, food packages, and food waste (from cabbage, tomatoes, onions, pumpkins, butternuts, apples, bananas, oranges, and pear peels).

6.3.3. PATTERNS OF WHEN SOLID WASTE WAS GENERATED

Kuffour (2020) suggested that cooking food in bulk could minimize the amount of waste generated in schools and also demotivate learners from buying food from outside during breaks. Nevertheless, that was not the case at Tjala primary school, as solid waste was generated in the morning through cooking food for learners. Furthermore, learners continued to buy products that were sold by the street vendor regardless of the feeding scheme that was made available to them. According to Ravenelle (2018) schools generate a large amount of solid waste, and one major source of solid waste in schools is cafeterias, where learners buy and eat breakfast and lunch daily.

This was similar to what I observed at Tjala primary school, where I saw a number of learners generating solid waste through the products that they bought from the street vendor in the morning and during lunch breaks on a daily basis. I noted that the school would generate a large amount of solid waste through activities that took place during the teaching and learning process. This is so because, amongst all the contributors of environmental waste, schools are known to be the highest solid waste generators due to their day-to-day activities (Joy-Telu & Telu, 2017).

There were patterns of when solid waste was generated at Tjala primary school. In this case, solid waste was generated during the day-to-day activities that took place. In the morning, when food handlers were cooking for learners,

throughout the teaching and learning process, in the morning and lunch breaks when learners bought products that were sold by the street vendor, and in the afternoon, when some SGB representatives cleaned learners' classrooms.

6.3.4. STAKEHOLDERS' MANAGEMENT OF SOLID WASTE

Understanding what these stakeholders knew about solid waste management was critical because it shaped the developed SISS-WMP. SGB1 stated that solid waste management refers to what individuals do with the solid waste that they have collected, whether they recycle or destroy that solid waste. Similarly to Jha et al. (2020) and Mishra et al. (2014) they defined solid waste management as measures put in place in order to control the generated solid waste, such as transferring, processing, storing, and disposing it.

However, not everyone is interested in the management of solid waste due to ignorance and lack of awareness of environmental issues (Jha et al., 2020). This was similar to what was said by SGB2, who indicated that as much as she heard about solid waste management, she was not interested and concerned. Even though plastics are considered to be half of the global plastic waste, which leads to the rapid growth of plastic (Ncube et al., 2021). Tjala primary school used plastic refuse bags as a way to manage solid waste generated. GW2 stated that these plastic refuse bags were being used to dispose wipes after washing hands.

Nonetheless, GW2 was not aware that these plastic refuse bags had the potential to create an enormous amount of solid waste if they were disposed inappropriately (Thomas et al., 2019). Tjala primary school did not only resort to plastic refuse bags, they also used waste bins to manage the waste that they generated. GW2 alluded that these waste bins served a different purpose from plastic refuse bags, as the bins were meant for the disposal of solid waste generated within the school premises. The use of these waste bins was not effective as GW2 would still find solid waste within the school premises when he was cleaning the school environment.

This was similar to Rosenthal and Linder (2021) as they alluded that waste bins were perceived to be less convenient. However, DiGiacomo et al. (2018) refuted this claim by indicating that using waste bins can motivate people to recycle the solid waste that they have generated. Hence, the SP2 and GW2 took it upon themselves to recycle the solid waste that was generated at this school as a way to manage the solid waste generated. Even though recycling is considered a way to create a sustainable environment, there is still a need to reduce solid waste, pollution, and preserve resources that are valuable (Rosenthal and Linder, 2021).

Nonetheless, that was not the case at Tjala primary school, as SP2, T2, SGB2, GW2 and FH2 stated that the school stopped recycling due to transport costs and that some solid waste was contaminated. This was similar to DiGiacomo et al. (2018) as they alluded that recycling can backfire, especially if the recyclable materials are contaminated. Cho (2020) added that the contaminated materials can prevent other materials from being recycled. As a result, Tjala primary school discontinued recycling and resorted to open burning of solid waste, as supported by SP2, GW2, FH2, SGB2, T2 and TL4 as a way to manage solid waste generated.

According to Cho (2020); Abdel-Shafy and Mansour (2018) incineration is one of the most common ways of handling solid waste generated. However, TL4, SP2, and SGB2 stated that open burning of solid waste was not a good option, but it was the only option available at their disposal. FH2 had a different view point, as she mentioned that open burning of solid waste is a good way to fertilize the soil and to use it as compost. Yet, Ziraba et al. (2016) indicated that it is still difficult to compost and recycle. Another person at the school, SP2, said that they kept formal assessment scripts as a way to deal with waste because the school could not keep recycling because of transportation.

This was similar to what was discovered by Ferronato and Torretta (2019); Abdel-Shafy and Mansour (2018) as they asserted that transportation, collection, storage, and the final disposal of solid waste continues to be a challenge when it comes to solid waste management. Even though food

packaging has developed to be a key aspect of successful food industries (Imam, et al., 2012) that was not the case at Tjala primary school. Food handlers and street vendors were amongst those who generated a huge amount of solid waste from food packages. Such solid waste was generated from cooking and the distribution of products that were being sold (Abdel-Shafy and Mansour, 2018).

In most cases, materials used for food or product packages are meant to protect, preserve, and reduce their negative impact on the environment (Robertson, 2018). However, at Tjala primary school, food packages increased the negative impact on the environment. This prompted me to find out how the food handlers managed solid waste from food packages. FH2 and SGB2 alluded to the fact that they stored tins for one of the SGB representatives who would come and collect them. FH2 added that the food waste is collected by one of the food handlers and the rest of the solid waste ends up in the dumping area for open burning.

While the street vendor used money or some of the products that were being sold to compensate learners who would clean up solid waste generated around the school premises from the products she sold. I had to find out how T2 interacted with solid waste generated in the classroom. T2 indicated that there are classroom rules that learners are expected to adhere to. TL4, TL5, and TL6 stated that they do adhere to the classroom rules and T2 is always there to reprimand them if the rules are not adhered to. Hence, classroom rules are considered an important part of classroom management as they are easy to implement as they focus on preventing challenging behaviour that might occur (Alter & Haydon, 2017).

Tjala primary school stakeholders used various ways to manage solid waste that they generated. The school made use of plastic refuse bags and waste bins. They implemented recycling, but recycling was not continuous due to expensive transportation, hence they stopped. As a result, they resorted to storing all written formal assessment tasks in a vacant classroom. Furthermore, food handlers stored tins for some of the SGB representatives who would come

and collect them. While the food waste was collected by one of the food handlers.

Responsibilities were also assigned to different stakeholders. For instance, it was the responsibility of the general worker to ensure that the school environment was clean. While the street vendor was expected to clean up the school after selling her products to learners. However, that was not the case with the street vendor, as she assigned learners to clean the school on her behalf in exchange for money or products that she sold. There were also SGB representatives who would come to school every afternoon to clean classrooms. These classrooms had rules about how learners should manage solid waste that was made in the classroom.

6.4. OPPORTUNITIES OF THE DEVELOPMENT OF THE SISS-WMP

6.4.1 OPPORTUNITIES

There were opportunities at Tjala primary school that shaped the development of the SISS-WMP. Amongst those, SP2 indicated that there were no solid waste management initiatives that he was aware of or let alone implemented at the school. The SP2 assertions led me to look into various solid waste management initiatives that schools could implement, which are the 3R's (Indonesian Waste Platform, 2013). Tjala primary school has implemented recycling as a solid waste management initiative. However, SP2 did not see recycling as part of a solid waste management initiative or a campaign, as it happened occasionally and was discontinued.

SP2 added that the process of recycling was not continuous because the person who would come and collect solid waste for recycling would complain about the quantity of solid waste. Hence, there is a need for the continuous establishment of educational campaigns on environmental education at grass root level to encourage sustainable waste management behaviour in schools (Matsekoleng, 2017; Kwailane et al., 2016). Furthermore, SP2 stated that the school did not generate a lot of income from the recycled solid waste as they

would get 10% while the remaining 90% went to the person who collected the solid waste.

This was a clear indication that the Tjala primary school's voluntary implementation of the recycling initiative did not change their solid waste management practices as it was not continuous (Tangwanichagapong et al., 2017). T2 indicated that most solid waste management initiatives are under the municipality as he has seen people who would collect solid waste for recycling purposes. This was similar to what was stated by TL5 and TL6. This led Flanagan (2017) to look into how education can be used to help young people in primary schools improve their recycling habits and attitudes.

Edsand and Broich (2020) investigated the extent to which environmental education at school can explain variation in the environmental literacy of learners at a school level. Hence, the GW2 and FH2 said that the school resorted to open burning of solid waste as there was nothing that they could do since they tried recycling and stopped. According to Cogut (2016) open burning of solid waste has a negative impact on the environment as it releases different types of toxic pollutants into the air and can also worsen water pollution, soil pollution and food contamination.

Hence, Patil et al. (2014) suggest that when one chooses open burning of solid waste as an alternative, they should consider aspects such as the quantity of solid waste generated, site location, and the heat of combustion of waste. SP2 alluded to the fact that the school did not have a policy that was directed at the environment as the code of conduct for learners speaks about the cleanliness of their surroundings. However, SGB2 refuted SP2's assertions and mentioned that there was no policy that shaped their solid waste management practices and they never thought that they could draft one by themselves as most policies are readily available.

According to Mawela (2016) school principals, teachers, and SGB members should develop policies on environmental education projects in schools. However, this is not always the case, as SGB members will inadvertently or

intentionally delegate governance roles and responsibilities to principals in order to avoid enforcing policies (Mohapi & Netshitangani, 2018). T2 and GW2 and FH2 stated that not all learners were disciplined, especially when it came to their actions and behaviour in relation to solid waste that they generated. TL4, TL5, and TL6 added that laziness and being inconsiderate led most learners to be mischievous when reprimanded.

Barth and Michelsen (2013) were of the view that environmental education can provide individuals with an opportunity to change their actions and behaviour towards the environment. Hence, TL2 stated that it is important to teach learners about the environment as it will assist them to understand and be engaged in the process of reducing environmental pollution. Similarly, to Thor et al. (2020), who stated that it is important to focus on teaching and fostering environmental awareness activities for action-oriented environmental education. By doing so, all stakeholders will be encouraged to be active participants in solving environmental issues rather than be passive consumers of knowledge (Filho & Pace, 2016).

6.5. SUMMARY OF STAKEHOLDERS' PRACTICES AND OPPORTUNITIES AT TJALA PRIMARY SCHOOL

Table 15 presents the summary of findings on stakeholders' practices and opportunities at Tjala primary school.

Table 15 Tjala primary school summary of findings (Sikhosana, 2022).

<p>1. STAKEHOLDERS SHAPING THE SOLID WASTE MANAGEMENT PRACTICES</p>	<p>1.1 Stakeholders' understanding of solid waste and the environment</p> <p>Solid waste SP2, GW2, FH2, GW2 and T2 managed to explain what was meant by solid waste, SGB2, TL4, TL5 and TL6 could not explain this concept.</p> <p>Environment SP2, SGB2, FH2, GW2, and T2 had an understanding of the concept of environment,</p>
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	<p>whereas TL4, TL5, and TL6 did not.</p>
	<p>1.2 The nature of solid waste generated</p> <p>Based on my observations, Tjala primary school generated solid waste such as:</p> <p>Papers from duplicating tasks, magazines, old books, boxes, milk containers, cooking oil bottles, plastics from sweets and snacks packages, wipes (tissues), plastics, tins, food packages, and food waste (from cabbage, tomatoes, onions, pumpkins, butternuts, apples, bananas, oranges, and pear peels).</p>
	<p>1.3 Patterns of when solid waste was generated</p> <p>Solid waste was generated in the morning when food handlers are cooking, during teaching and learning amongst teachers and learners, during lunch breaks by different stakeholders and street vendors, and in the afternoon when classrooms are being cleaned.</p>
	<p>1.4 Stakeholders management of solid waste</p> <p>I had to tap into what SGB2 and SP2 understood about solid waste management. SGB2 was not interested in knowing about solid waste management while SP2 had a clue as to what solid waste management meant.</p> <p>Solid waste was managed through putting solid waste bins and refuse bags in school blocks; recycling; storage; teaching and learning; classroom rules; learners' code of conduct; open burning of waste; allocation of tasks so that each stakeholder knows their responsibilities; having SGB representatives clean the classroom; and requesting street vendors to clean up the school after selling their products. However, that task was conducted by learners in exchange for R5.00 or products that were worth R5.00</p>

<p>2. OPPORTUNITIES IN THE DEVELOPMENT OF THE SISS-WMP</p>	<p>2.1 Opportunities</p> <p>The following opportunities shaped the development of the SISS-WMP; discontinued recycling, there are no policies drafted by the SGB, expensive transportation for recycling, lack of discipline amongst learners, teaching learners, solid waste management initiatives are mostly under the local municipality.</p>
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6.6. CONCLUSION

The Tjala primary school (Case 2) chapter presented and discussed the data that was collected during phase one. In the next chapter, I present and discuss phase one data from Vuna primary school (Case 3).

CHAPTER 7: VUNA PRIMARY SCHOOL (CASE 3)

"My understanding is that the waste should be taken somewhere, either to be recycled, to be reused, or maybe to be used in a formal compost. I mean, if something can be used to make compost, it can be taken for recycling. I think that way we can manage them properly". -SP3

7.1. INTRODUCTION

The previous chapter discussed and presented data that was collected at Tjala primary school (Case 2) during phase one. The Vuna primary school (Case 3) chapter presented and discussed data that was collected during phase one. Only elements that led to the answers to the research questions were presented. The following are my research questions which this chapter responded to:

1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did?
2. How was the development of the SISS-WMP?

7.2. DATA PRESENTATION

Data was presented through themes and categories as indicated in Table 16.

Table 16 data analysis scheme (Sikhosana, 2022).

Theme	Categories
1. Stakeholders shaping the solid waste management practices	1.1 Stakeholders' understanding of solid waste and the environment
	1.2 The nature of solid waste generated
	1.3 Patterns of when solid waste was generated
	1.4 Stakeholders' management of solid waste
2. Opportunities for the development of the SISS-WMP	2.1 Opportunities

7.2.1. STAKEHOLDERS SHAPING THE SOLID WASTE MANAGEMENT PRACTICES

This theme was unpacked through the categories as indicated in Table 16.

7.2.1.1. Stakeholders Understanding of Solid Waste and Environment

Having acquired a deeper understanding of key concepts enables one to deepen their knowledge, understanding, and ability to apply skills needed for a certain task. It was imperative for me to understand how the stakeholders of Vuna primary school comprehended the concepts of solid waste and the environment, as these concepts shaped their practices towards solid waste management. Furthermore, how they understood these concepts influenced the development of the SISS-WMP. I had to tap into what Vuna primary school stakeholders understood about the concept of solid waste. SP3 explained solid waste as:

"Solid waste uhm, okay, if I am not mistaken, maybe you are talking about anything physical that can be touched and handled that can be classified as waste material, like papers, tins of fish, milk containers, and all those things, and I think my understanding will be along those lines".

SGB3 had a different perception of this concept, as SGB3 explained that solid waste mainly focuses on maintaining the cleanliness of the school in such a manner that waste generation is avoided:

"Obviously, the waste is affecting our lives. That is why it is very important to maintain the cleanliness of the school. In general, it should not be that the environment is dirty or polluted. We must always take care of this environment inside and outside of school. The way I understand waste, it is something that is needed at a particular point in time. So that is why, whatever the way, we must try by all means to avoid waste and keep the tidiness of the school clean".

What was said by SGB3 was similar to what GW3 indicated when solid waste was explained as a way of keeping the environment clean: *"Because it is important that we stay in an environment that is clean"*. However, FH3 had a different view point from SGB3 and GW3, as FH3 alluded that solid waste refers to when the yard is polluted with papers: *"Waste is when there are papers all over the yard"*. T3 had a different viewpoint on this concept, as T3 described solid waste as anything that is no longer useful and must be thrown away: *"Waste...I see it as something that has no use when people are done with whatever they were doing with it"*.

What was said by T3 was related to what was said by VL5 and VL6 when they explained solid waste as something that was no longer useful and needed to be thrown away after being used: *"It is to throw things away because some of them are not useful anymore"*. Moreover, VL6 indicated that: *"According to me, waste are things that have been thrown away that have been used"*. VL4 could not explain the solid waste concept. Furthermore, GW3 emphasized the importance of staying in an environment that is clean in order to be protected from contracting any diseases:

"It is important that we stay in a clean environment because if it is not clean, we will get infected with things that are not right. You will find that some of those things are diseases, and the environment must be clean because there are papers and other things you see, so it is important that we clean the environment".

The emphasis that was made by SGB3 and GW3 about staying in a clean environment led me to find out what the Vuna primary school stakeholders comprehended about the concept of environment. SP3 defined environment as an area that includes the atmosphere: *"Environment is simply the area surrounding our area in any form, including the atmosphere"*. While SGB3 had a different understanding of this concept, as SGB3 explained the environment as a place that is around us: *"In actual fact, the environment itself is the place around us and it must be taken care of"*.

The SGB3 explanation of this concept was similar to T3 and VL5 as they explained the environment as our surroundings: *"Environment is our surrounding"*-T3 and *"It is what surrounds us"*-VL5. Meanwhile, GW3, FH3, and VL6 described the environment as a place where we live: *"The environment is a place where we stay as people"*-GW3; *"Okay. Yes, what can I say... the environment is where we live in"*-FH3 and *"It is like a place where everyone is sitting and like a country for everyone"*-VL6. However, VL4 could not explain the environment.

7.2.1.2. The Nature of Solid Waste Generated

Knowing the nature of solid waste that was generated at Vuna primary school was vital as this gave me ideas for the SISS-WMP that I developed. The SP3 asserted that the whole school community was the one that generated enormous solid waste at Vuna primary school: *"It is the whole school community, the learners throwing out papers around, and the papers that we are using they become a waste if not properly handled"*-SP3.

This was related to what was asserted by SGB3 when he indicated that solid waste was generated by human beings as the environment involves human beings, which cannot be separated from waste:

You see, when you are speaking of waste, you are generally speaking about what you cannot separate waste from the environment or nature. And again, you cannot separate the involvement of a human being. Sometimes what generates the so-called waste in our environment involves a human being.

Sometimes it is our fault or sometimes it is the way we behave in relation to what we call the environment, because in actual fact, as human beings, at some point we do generate waste in all environmental sectors, including at school. If you can check the environment of children, sometimes we are doing this thing of educating our people about the so-called environment. If we start now protecting the environment, first we must speak about the environment. It is where we are going to understand where the waste is coming from. Nature has a way of taking its course, and as you can see, we have been approaching spring for the past few months, if I may put it that way. We had a lot of dust and everything. Most wasteful products are controlled by nature, in particular when this pollution enters into the system. It is here that we find ourselves polluting the school with the waste from outside. So, in summary, our involvement as a human being is also contributing to waste and the environment”.

What was said by SP3 and SGB3 was similar to what I observed. I saw an alarming amount of solid waste within the school premises, from which I can infer that it was generated by human beings. The nature of solid waste generated by human beings which I saw at Vuna primary school ranged from papers, plastics, broken old plastic chairs, alcohol bottles, boxes, tins, cattle horns, glasses, take-away containers, steel, baby diapers, surgical face masks, cloth masks, and old plates. The whole school itself was not different from a dumping zone, as seen in Picture A, B, C, D, E, F, G, and H:

Picture A: School's solid waste



Picture B: School's solid waste



Picture C: School's solid waste

Picture D: School's solid waste



Picture E: School's solid waste



Picture F: School's solid waste



Picture G: School's solid waste



Picture H: School's solid waste



What alarmed me was that this enormous solid waste was within the school premises, and next to the school fence were houses that belonged to the community members. The perspectives of GW3, VL4, and VL6 differed significantly from those of SP3 and SGB3. This was so because GW3, VL4, and VL6 alluded to the fact that learners and street vendors are the main solid waste generators:

"I can count learners, but even street vendors at other times when they think I do not see them. Sometimes, other times, it happens that you find the principal is not here, and they rush to exit the gate while they come here with their papers. They rushed to run away until the principal called a meeting for them. I do not know if it was last year or what. They rush to dispose rubbish and say: "Ah, he is there, the uncle will clean up what...what..." you see? They are in a hurry to leave and leave things the way they are because they are not scared of anyone here. When the principal is not around, they should

look after one another, but they look at what the other person is doing. Maybe in the end, the place will be dirty because the other one is focusing on what the other is doing. They say: "Hai, I will not pick up this or I am not selling this." It is them that I see that bring in so much dirt, but people who cause so much dirt are learners because they just throw anything and everything, even if we put a dustbin, but ahh, they ignore them, they just throw because they buy something from a street vendor, and then after that, you find snacks packages all over the place"-GW3.

"Usually they come from the street vendors"-VL4.

"It is the learner's ma'am. When they are done buying, they do not throw inside the dustbin; they throw on the ground and maybe when we bump into teachers; they make us pick papers"-VL4.

"It is the children of the school, mostly us, because we do not listen to the teachers, sometimes we throw things, and there are a lot of rubbish bins, but we always throw them on the floor"-VL6.

What was said by GW3 and VL4 in relation to the street vendors' being solid waste generators was similar to what I saw during observations. I noted that street vendors would come to school in the morning and during lunch breaks to sell various products to learners. The products that they sold varied from one street vendor to another, as there were two. They sold products such as snacks, sweets, ice, fruits, mango atchar, vetkoeks, and biscuits, as displayed in Picture I:

Picture I: Some of the products sold by street vendors



VL6 further added that street vendors were also part of solid waste generators:

“There are like these ladies who come here at school to sell us some things, and we also buy them. It is either because of papers and the plastic in which we eat our chips, or some of them throw food because they feel like school food is not treating them well. Some of them throw food because they sometimes eat ice cream and just throw it on the floor”.

This was similar to what was asserted by VL6 as FH3 was of the opinion that street vendors are the main solid waste generators because: *"The street vendors do cause a lot of solid waste because they are selling and learners they eat all over. They do not eat at the same place. Obviously, papers will be all over the yard"*. Picture J and K displayed the nature of solid waste that was generated by the street vendors.

Picture J: solid waste by street vendors



Picture K: Solid waste



Nonetheless, T3 and VL5 stated that learners were the solid waste generators as they would go against the rules and eat in class, while others would dispose solid waste inappropriately: *"The learners eat in class, which is against the rules, and dump their empties on the floor. They also do paper cutting without anyone's instruction. They just cut papers and throw them on the floor"*-T3. Furthermore, *"Learners, when they are done eating, they throw it away on the ground and not inside the dustbin"*-VL5. What was alluded to by VL5 was similar to what I observed as I saw a lot of solid waste that was disposed inappropriately by learners during lunch breaks.

Some learners went to the extent of disposing solid waste outside the bin instead of using the bin provided by the school, as presented in Picture L and L1.

Picture L: Disposed solid waste

Picture L1: Disposed solid waste



What I observed was similar to what was asserted by VL6, as VL6 stated that: *"It is us, like every time we do papers or eat in class, we always throw them on the floor, not in the dustbin"-VL6*. Furthermore, VL4 and VL5 added that within the classroom environment, it was always boys who generated solid waste: *"It is the boy's ma'am, they do not listen...when we have free period, we sit in class and place, then they start fetching things from the dustbin and throwing them at us"-VL4*. Similar to what VL5 stated: *"It is boys. They say there is no one who will control them, so they do as they please in the class"-VL5*.

I also observed that food handlers were also solid waste generators as they cooked food for learners on a daily basis for the duration of the school year. On Mondays, they would cook soya mince, rice, and pumpkin, butternut, or cabbage, depending on which vegetables were available at that time. On Tuesdays they would cook brown sugar beans served with maize meal porridge, and on Wednesdays they would cook crumbly porridge served with fresh milk, and they would give learners fruits such as oranges, bananas, apples, or pears. On Thursdays, they would cook brown sugar beans and samp, served with either cabbage, butternut, or pumpkin.

Then on Fridays they cooked rice, tin fish served with tomato gravy and cabbage, pumpkin or butternut. Looking back at this menu, one could wonder the quantity of solid waste that was generated by food handlers in their kitchen.

7.2.1.3 Patterns of When Solid Waste Was Generated

Now that the nature of solid waste that was generated at Vuna primary school was established, it was significant to look into the patterns of when that solid waste was generated, which informed the developed SISS-WMP. For this

reason, I observed the level of cleanliness of the school environment and classrooms in the morning, during lunch breaks, and in the afternoon so that I could have an idea as to when solid waste was generated. During observations that took place in the morning, the school environment was not inviting at all. There were certain places that were clean, while others were very dirty and polluted with so much solid waste found within the school environment.

As soon as I entered the school premises in the morning, I saw a big circle made of steel from old school desks, bricks, and old car tyres, which was surrounded by beautiful plants that the school planted. However, this beautiful landscaped garden was very dirty and polluted with so much solid waste, as seen in Picture M and N.

Picture M: Polluted garden



Picture N: Polluted garden



As I proceeded with my observations in the morning, I noted that there was so much difference between what I saw in the landscaped garden and what I saw across the school blocks, as the school blocks were very clean in the morning, as seen in Picture O and P.

Picture O: Clean school blocks



Picture P: Clean school blocks



In the morning, I saw dustbins full to capacity with solid waste, as displayed in Picture Q and R. This clearly demonstrated that the solid waste in the dustbins

was not generated in the morning but rather from the previous day(s), as shown in Picture Q and R.

Picture Q: Full school dustbin



Picture R: Full school dustbin



I went to the back of the school and noticed that the solid waste was worse than what I saw in the landscaped garden. This was so because the school environment was very dirty at the back and polluted with solid waste. What I saw at the back was shocking, as the place looked like a dumping site. Another thing that shocked me was that this solid waste was on the school grounds, as shown in Picture S and T.

Picture S: School at the back



Picture T: School at the back



In the morning, I went to the classrooms to see if they were clean, and I saw that the classrooms were cleaned up and there was no solid waste onsite, as seen in Picture U and V.

Picture U: Classroom



Picture V: Classroom



During observations that occurred in the morning, I realized that there was solid waste such as boxes, plastic bottles, and maize meal packaging in their cooking area. However, the solid waste in Picture W and X was brought into this cooking area in the morning by the food handlers.

Picture W: Collected solid waste



Picture X: Collected solid waste



I continued with my observations during lunch breaks, whereby I went back to the classrooms to see the amount of solid waste that was generated during the teaching and learning process. VL4 stated that the classroom environment was always clean during lunch breaks: *"During the break, we eat outside, and the classrooms do not become dirty. But boys, they would come into the classroom and hide there because they run after each other outside and beat up one another. They hide in the classroom"-VL4.*

However, during classroom observations, I came across boxes that were used as bins, full to capacity with solid waste, as displayed in Picture Y, to the extent that some learners threw solid waste into the window security bars, as seen in Picture Z.

Picture Y: Box full of solid waste



Picture Z: Solid waste on window Security bar



Nonetheless, SP3 indicated that the solid waste that was generated during the course of the day in the classroom environment was generated during teaching

and learning activities. This was so because SP3 alluded that there is a relationship between teaching and learning and solid waste generation:

"Yes, it does. For example, it can only not generate waste if we can utilize it. If maybe we could follow the old curriculum that we did, because in our case, we did environmental studies. We did environmental studies in which we were taught about the environment itself, so this present government did not accommodate that, or maybe they included them in other subjects, but it is not as visible as it was, but all the papers, materials, and everything that the learners are in classes can contribute to waste."

I continued and went outside to see what was happening during lunch breaks. Learners would buy products from the street vendors and then they would go and play with the school bin, as it is not stationary but swingable, instead of disposing solid waste inside the bin. Some learners, after eating, would throw the packages of the products that they bought anywhere within the school environment instead of using the bins provided by the school. After buying those products, the school environment would be polluted with solid waste that comes from the products that are sold by the street vendors during lunch, including surgical face masks, as seen in Picture A3, B3, C3, and D3.

Picture A3:

Learner swinging a bin



Picture B3:

Polluted school environment



Picture C3: Polluted school

Picture D3: Polluted school



During focus group interviews, I asked learners if they made use of the bins provided by the school during lunch breaks. VL6 indicated that most learners they did not feel like going to the bins, while VL5 alluded that some learners would eat then after eating they would throw away the packaging of the product anywhere: *"Mostly all of us besides the teachers, because some of them do not feel like going to the rubbish bins"*-VL6. Furthermore, *"It is children who eat right and when they are done eating, they throw away. Some take their lunchboxes and throw them away, even bottles of drinking juice they just throw away"*-VL5.

Picture E3 and F3 exhibited the nature of the school environment in the afternoon, while Picture G3 and H3 exhibited the solid waste generated in the classroom after cleaning, which was also disposed in the school bin.

Picture E3: School environment



Picture F3: School environment



Picture G3: Classroom bin



Picture H3: School bin



7.2.1.4 Stakeholders' Management of Solid Waste

As soon as I established the patterns of when solid waste was generated at Vuna primary school, it was vital for me to look into how stakeholders managed that solid waste. I had to find out what it is that they did and how they did things in order to manage the solid waste generated. During observations, I came across the signage for school safety rules, as seen in Picture I3 at the gate, which prohibits littering. To combat littering, I noted that the school had four dustbins across the school premises, as seen in Picture J3.

Picture I3: Signage for school safety rules



Picture J3: school dustbins



The above signage for school and safety rules and the bins prompts me to ask Vuna primary school stakeholders what it is that they understood about solid waste management and what measures they put in place to manage solid waste that they have generated. SP3 indicated that solid waste management refers to a process whereby solid waste is taken somewhere for the purposes of recycling and reusing:

“My understanding is that the waste should be taken somewhere, either to be recycled or to be reused, or maybe to be used in a formal compost. I mean, if something can be used to make compost, it can be taken for recycling. I think that way we can manage them properly”.

GW3 had the same understanding as SP3, as GW3 defined solid waste management as something that can be recycled:

“It is something that can be... recycled here... I do not know because with these papers they want to recycle full pages and not in piece pieces but plastics. Maybe if it was possible to recycle them because within the environment of the school I normally see around the environment full of

plastics and what...what you can see that...that...it is dirty. Normally, I see Secunda and Mbalenhle even when I am at home...When I look around, they threw all the plastics away. It is dirty in that place. I even count that the municipality that is dirty with plastics all over the place and plastic takes time to be decomposed”.

SGB3 had a different viewpoint from SP3, as SGB3 alluded to the fact that solid waste management focused more on controlling than managing:

“Okay, so As I have said before, we cannot control the changing of...I think we cannot detail the situation where, in particular, nature takes its course in the environment, but we can control if we could start earlier, particularly in schools, educating our children on how to manage waste products that are not needed, things that are not good for our health. I believe we should begin by educating everyone about what waste products are and how they affect our lives. Because generally, something that could be wasteful contains many differences, because at some stage you will find bottles that have chemicals and other stuff, so it needs everyone to come to the centre and give a basic on how we can educate ourselves, including children, at an earlier stage. It is not mainly about managing but about controlling. I think education at this point is the most important thing. That is where we need to start”.

While T3 emphasized that solid waste management had to do with finding ways to stop littering: *"I think...I think it has to do with the stopping of littering and being against littering, that a person when they eat something or carry something, they do not just throw it anywhere because there are dustbins. They should make use of those bins".* While VL6 perceived solid waste management as a process of managing less waste: *"To manage the least amount of waste in the world, the whole country".* However, VL4 and FH3 could not explain what solid waste management referred to: *"No ma'am"-VL4 and "I heard about it"-FH3.*

Furthermore, VL5 defined solid waste management as a way of throwing away things that are no longer useful: *"It is when people throw away things such as bottles, they do not recycle them, they throw them away. Even papers from school that were used, they throw them away. Even shoes, some of them, they throw them away along with clothes".* Since SP3 implied that solid waste management had to do

with recycling and reusing, I had to ask how they managed the solid waste that they generated as a school. SP3 stated that they did a little bit because the SGB of the school was the one that came up with recycling, which was also not properly managed. For that reason, SP3 did recycling for personal benefit:

"A little bit we do, although we do not have a proper system, but the SGB came with a recycling process, but I am saying it is not well managed. I can show you there is a box of papers, and when this box is full, I take it home and then the next time...I always have this box and when I have enough quantity, I take them to recycling, then I get money".

What was said by SP3 that he did recycling for personal benefit was similar to what GW3 stated, as GW3 indicated that the school did try recycling. However, it was done for their own personal benefit: *"It did happen, but now you will find out... let us say they take papers like these ones and they go and sell them for their personal use. It is not that I am snitching on them"*. I further probed to SP3 to find out if recycling was implemented for the school. However, SP3 stated that it was but there was a private company that would come and collect solid waste for recycling and they would be given a certain percentage as a school:

"Yes, several times we did. We had somebody, I think it is a private company, came to pick up the papers from us. Then that person would come and give us a certain percentage of income and take the papers away. That is the first one. The other one, it was even outside the school, learners would meet and collect waste boxes. I do not remember if it was of Joko or Five Roses or something".

When I asked what happened to recycling, SP3 said that: *"it was only implemented in the form of a competition, and those who collected more would be rewarded in one way or the other. So, we had something like that"*. However, SGB3 refuted what was asserted by SP3 that the SGB of the school was the one that introduced recycling at Vuna primary school, because SGB3 put it bluntly that the school did not have any recycling program available:

“That is a good point because sometimes in the current economic conjunction of our country, something that is wasteful becomes a way of life for other people. We do not have any policies or any recycling programs here at school, but as much as we are going to come up with the strategies to deal with the issue of adopting environmental policy, it is when maybe everything will be packaged on the same call, then we deal with everything. You are correct, not all wasteful products are waste. Sometimes in our society, we have noticed old grannies usually utilize this opportunity, in particular the recycling project where they get things that are dumped down then they take them for recycling. So it is where we need to engage ourselves, as the SGB to come into the same corner to give a full package as to how we are going to deal with...when we deal with policy related to environmental waste”.

What was said by SGB3 was similar to what FH3 asserted, as FH3 stated that she does not remember the school implementing recycling; she was only aware of other schools' practices: *"I do not remember, but I know other schools do that; they take old books and put them in a van"*. T3 further added that she was not sure if the school had implemented solid waste management practices:

"I am not sure about the school, but I am having my own way. Usually when learners come to class, especially after break, they get in class late and before they get in, they make sure that the environment around the class is clean. They pick up papers and everything as a form of discipline".

T3 added that she is only aware of a vehicle that goes around the community picking up solid waste: *"I am only aware of the vehicle that picks up waste"*. During observations, I saw a door that was in between the two school blocks as presented in Picture K3. Inside that door was a passage filled with old textbooks stored inside, as seen in Picture L3. I then engaged myself in a conversation with GW3 and asked what the purpose of the locked passage was. GW3 said that it was where they stored old textbooks and other cleaning materials.

Picture K3: Locked passage

Picture L3: Passage used as a storage



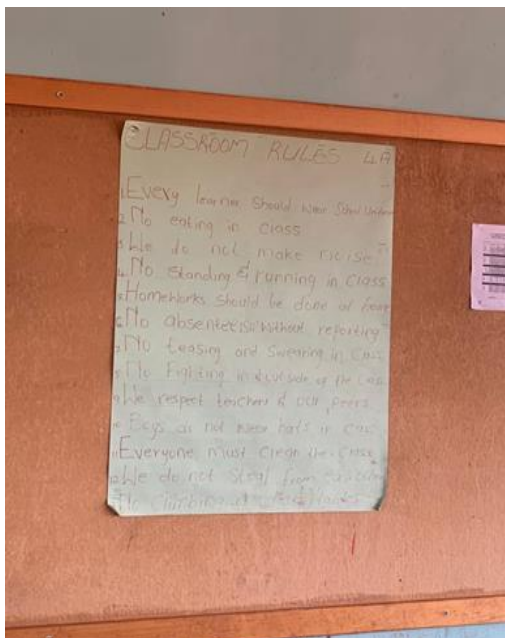
I asked SP3 what happened to the textbooks that I saw in the locked passage. The SP3 stated that those textbooks were supposed to be collected by the circuit office: *"The focus was only on paper, not old textbooks. According to the arrangement, we need to inform the circuit office so that the office can come and pick them up"*. I asked the SP3 if the school had any environmental policies that they adhered to. SP3 said that they are aware of any policies and that even if the school did have one, it was not effectively implemented: *"We do not have but we are aware of such policies and even if we might have them, we are not effectively using them. That is the weak part of the whole thing. Then also not taking it seriously"*. What was said by SP3 was similar to what SGB3 asserted, as SGB3 stated that they did not adopt any policies, but it was something that they were considering:

"No. So far we have not adopted any policies, but moving forward, I think it is one of the points that needs to be considered since we have been dealing with other policies that need financial intervention. For example, in the past week we have been dealing with financial policies, safety policies, and enrolment and admission policies. No, I think because everyone is to come to a space where we understand the meaning of wasteful relating to the environment, we will consider adopting the policy because, when we enter the school, I even refer this to the principal, the school is not clean. Look at all the papers that are surrounding the school. Can we have a program at least to deal with this kind of situation if it needs be? I am referring to the children, those who are late are let for some sort of punishment (picking up papers) and that will assist. To answer your question, for now, we did not adopt any policy related to the environment and waste".

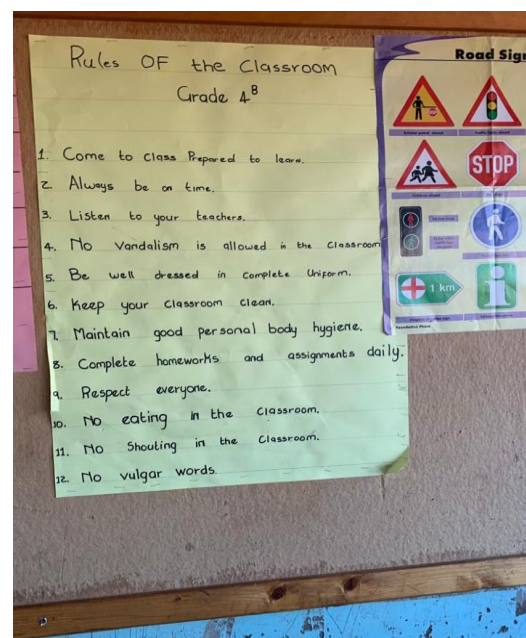
SGB3 further added that the drafting of policies was in the pipeline: "Yes, it is still in the pipeline because our intervention is not guided by the policy. Let us prioritize cleaning up the school, but I think it is in the process and we must adopt it". However, during semi-structured interviews with the SP3, I requested the school safety policy to see if there was anything or nothing that guided their solid waste management practices. I came across a classroom policy as seen in Picture M and N, as well as in Appendix 11. I had to find out if T3 had any policies that governed how they managed solid waste in the classroom.

T3 stated that there are classroom rules in place: "Yes. The first one is no eating in a classroom, because when you are going to the classroom, the papers that you find on the floor usually have sweets, snacks, and other stuff. So there is no eating in the classroom and also no littering. We make use of the bins". During observations, I came across the following classroom rules as a way to combat solid waste generation in a classroom. Amongst those rules, it was stated that classrooms must be kept clean at all times, as seen in Picture M3 and N3.

Picture M3: Classroom rules



Picture N3: Classroom rules



To ensure that learners adhered to the classroom rules, I saw boxes next to the door that were used as dustbins, as presented in Picture O3 and P3.

Picture O3: Boxes used as dustbins Picture P3: Boxes used as dustbins



However, not all learners utilized these dustbins as a way to manage solid waste as mentioned by VL4 and VL5. This was so because some would use the dustbins while others would not:

"No ma'am, I do not litter in the classroom. You see, ma'am, when we play by throwing papers on each other, when the teacher comes in, the teacher makes us pick up. When the teacher is not in, we usually clean up, but when we tell boys to clean up, they say they do not want to because we were playing together"-VL4.

"No, I will take it to the dustbin"-VL5.

When I probed to find out what it was that teachers did when learners did not adhere to the classroom rules, VL5 and VL6 stated that some teachers would reprimand them: *"They say we must pick them up and put them in a dustbin"-VL5* and *"some teachers, but mostly all of them, because some of our class teachers, other teachers do not worry about that. The teacher always tells us to pick them up, then we pick them up. The other teachers will find papers and tell us to do it again, so we do it again"-VL6.* While T3 alluded to the fact that she instructed learners to pick up solid waste in the classroom before she began with teaching and learning:

"Each time I enter into a classroom, I instruct all the learners to pick up everything that does not belong on the floor, and then I have to pick them up and throw them in the bin. There are boxes in each and every class, which is used for waste when learners can put everything that they are not using or should not be on the floor. So each time I enter into a classroom, I tell the learners: "The classroom is dirty and we are not pigs, right? Let us not be in a messy classroom" and then the learners pick up everything that is still on the floor".

During observations, I came across a small house container which was situated next to the food handler's kitchen, as displayed in Picture Q3. The small house container had a lot of boxes, milk containers, maize meal packages, buckets, and a bin which were stored inside, as displayed in Picture R3.

Picture Q3: Small house container



Picture R3: Solid waste stored



I had to ask FH3 as to how they managed solid waste that was generated through cooking food for learners on a daily basis. FH3 alluded to someone collecting tins and food waste every Friday, with the boxes being stored inside the small house container and used to make fire for cooking purposes:

"With those tins, there is a small house there behind the kitchen. We put them there, and peels. We put them inside the dustbin, so there is a grandfather who usually comes every Friday to request to fetch food waste, and then he takes it. With tins, there is a woman who requested the street vendors to take them. With milk boxes, we make fire with them, and we make sure that we store them in the small house".

However, during observations, I did not see anyone coming to collect tins or food waste on Fridays as alluded to by FH3. Nonetheless, food handlers were seen making fire with the solid waste stored in the small house container as displayed in Picture S3 and T3.

Picture S3: Making fire with milk boxes **Picture T3: Making fire with boxes**



Seeing that Vuna primary school had enormous solid waste around the school premises, the school provided dustbins and in the classroom there were boxes which were used as dustbins as presented in Picture U3 and V3. It was imperative for me to find out how these stakeholders managed solid waste.

Picture U3: Solid waste



Picture V3: Solid waste



FH3 said that GW3 would normally collect the solid waste and burn it: *"That solid waste, uncle would collect it, he takes the dustbin and empties it where he dispose solid waste, then he burns it because it is usually papers only"*-FH3. What was said by FH3 was similar to VL5, VL6, and VL4 assertions as they stated that: *"The women that work in the kitchen would sweep, then put everything in the dustbin, and from the dustbin, the waste goes to a dump in Kwagga A"*-VL5; *"We throw it into another big dustbin, but I do not know where the dustbin can goes because every time we check the dustbin is so clean"*-VL6 and *"Ma'am, after school, before it is after school, we usually pick up papers, then we dispose them inside the box, then to the dustbin"*-VL4.

VL5, VL6, and VL4 assertions prompt me to find out what happened to the solid waste that was disposed inside the classroom boxes and the school dustbins. VL5 and VL6 stated that they burnt them while others were packed for the dumping station: *"They normally burn them at the back while others are packed and taken to the dumping station"*-VL5 and *"They do burn them. They have this fire thing;*

actually, they do it on the sand and then they burn all the papers"-VL6. However, VL4 stated that she did not know where the solid waste ended up as they would find dustbins empty every day when they came to school.

"There I do not know. But every day when we arrive here at school, we find the dustbins empty"-VL4. Even though at first VL4 began by stating that she did not know what happened, VL4 further added that GW3 would dispose solid waste by burning it, as stated: "They burn papers. Uncle would usually take them from the dustbins with too much paper, then dispose them and burn them"-VL4. What was stated by FH3, VL5, VL6 and VL4 was similar to what T3 stated: "Uncle takes it and burns it"-T3. During observations, I noted that GW3 would collect solid waste from the bins that were full and burn what was collected every morning, as presented in Picture W3 and X3.

Picture W3: GW3 collecting solid waste



Picture X3: GW3 burning solid waste



I had to find out from GW3 that what was said by FH3, VL5, VL6, VL4 and T3 about the open burning of solid waste was indeed something that was practiced by GW3. GW3 confirmed their assertions: *"I burned them but before we had I dug a whole and they said "no, do not dig that hole anymore because a learner fell inside the hole" and they said that I must not dig that hole because learners push each other inside that hole"-GW3. I probed further to find out when the incident happened whereby a learner was pushed inside a hole that was dug for the purposes of disposing solid waste.*

GW3 stated that it occurred between the years of 2010 and 2012: *"Yes, they pushed a learner inside that hole, so at the end of that hole, I am not sure between 2010 or 2012, I did not do it, so I burned those papers on the flat surface"-GW3. I requested GW3 to show me a place where the hole was situated. Picture Y3*

showed a place where a learner was pushed inside a hole, which was now a flat surface covered with bricks and concrete.

Picture Y3: A place where a hole was situated



When I asked if there was no other way other than the open burning of solid waste, FH3 stated that they burn them as they can see that they will be blown away by the wind and the school environment will be polluted with solid waste: *"I think they burn them because they can see that the wind will blow them away and it will be dirty all over the place, so it is better when they burn them"*-FH3. I probed to find out if open burning of waste was a good idea as a way to manage solid waste. SGB3 stated that it was a good idea as it was part of the solutions that they have since, at the present moment, there are no people responsible for solid waste and they do not have any policy:

"Uhm, yes. It is part and parcel of the solution. It depends on what kind of waste it is, but for example, if at school you find yourself having a lot of things, obviously, that might require the EPWP (Expanded Public Works Programme) staff to come and collect it for any reason, but I think the burning of waste products, particularly papers, is the solution. I think for now, since we do not have any people responsible for the waste and since we do not have any policy related to waste environment, I think it is the solution to collect them together and burn them".

VL6's viewpoints were similar to SGB3, as VL6 said that open burning of solid waste was a good thing. However, problems emerged when the polluted air affected people's health: *"I think it is a good thing, but what the problem is that when they burn things the oxygen goes up and gets people killed. That is why the things that*

happened here at school only remain at school"-VL6. What was said by SGB3 was similar to what GW3 stated, as GW3 alluded that open burning of solid waste was the only solution as there were no other solutions at hand:

"There is no other way because even the recycling people need full paper like this because small pieces they do not want and you find out that there are plastics and snack packages and other things you see".

While T3 indicated that she did not know if open burning of solid waste was a good idea as it caused air pollution: *"Yoh, I do not know, but burning causes air pollution. I do not know if they do not, then what will they do?"-T3. It was imperative for me to find out who was responsible for ensuring that the school environment was clean and conducive. SGB3 stated that it was the responsibility of everyone to ensure that the school remained clean as the school belongs to society. However, the school also has a general worker responsible for ensuring that as alluded by SGB3:*

"Let me start by saying that the school belongs to everyone; it belongs to society. I think it is the responsibility of all of us to make sure that the school remains clean, but for justice, we must, as the SGB, be able to appoint people who will take care of the school on behalf of the large society. Yes, there are people who are responsible for cleaning in the school. We also have a grounds man who deals with the groundwork, but to be brief, it is our responsibility at large as a society".

VL4 and VL5 had the same viewpoints as SGB3 as they stated that GW3 was the one responsible for the cleanliness of the school: *"Uncle does help the women who clean up, and uncle would normally work across the whole school before he would burn papers"-VL4 and "Uncle normally cleans up"-VL5. What was said by SGB3, VL4 and VL5 was similar to what GW3 stated as that he was the one responsible for ensuring that the school environment was clean. However, GW3 has now given up as the school does not want to hire a person to assist him:*

“Yes, I try to make the school clean. Let us say, maybe you find that in the classrooms. I try to clean them up, but I will not blame the whole school. As I see sometimes, I do not know if I can say that a school like this is big enough to have only one person who will do that. You know, it is possible that there could be a competition between us. I can also see that if I am not only cleaning in front where they are looking, maybe there is someone else you see. So maybe you find out that you check and you check haa, in a way that even though I am telling the truth, ever since I arrived here I have been working very hard, telling myself that someone would come and assist, but they did not. I was shocked when five years passed”.

During the conversation I had with GW3 while conducting semi-structured interviews, GW3 stated that he now cleans where people spend most of their time as he knew that the school would never hire a person to assist him and he was also waiting for retirement:

“They will never hire a person. I also do not want to involve myself. I only focus on that maybe where they check, then I will go and clean up there. The work becomes too much and I will not clean up here and go to clean up there. Then they say: "He is busy cleaning up here; why does he not clean up there, where they check? I also become busy where there are a lot of people”.

What was stated by GW3 was similar to what I observed, as I saw GW3 cleaning up in front rather than at the back. There were also times when he would just have conversations with other teachers while the school environment was dirty instead of cleaning it up as displayed in Picture Z3.

Picture Z3: GW3 engaging in conversations instead of cleaning the school



During observations, I saw street vendors who would come to the school in the morning and during lunch breaks to sell their products. Moreover, these street vendors were also deemed as one of the solid waste generators at Vuna primary school. As a result, I had to ask who was responsible for ensuring that the solid waste generated by their products was managed. SGB3 stated that they gave these street vendors a responsibility to take care of the environment by cleaning up after selling their products:

"No, no no. Since we have found ourselves in a situation of COVID-19, there was a time as the SGB we decided to put on hold, especially the program whereby the street vendors have to come inside the school. We totally shut down those opportunities for them, and they have been at home, but now, because of the situation in our economy, we resolved that they must come back to school. But when we did so, we told them they must maintain the rules of COVID-19 and we also gave them the responsibility to take care of the environment. The place that they are utilizing must always remain clean. It should not be an issue where someone would just sell the product and after that, they just go back home. If the area is not well or properly cleaned, especially around the space that you are utilizing, let them clean that space, even after the business day. Let them clean the space that they are in. Because it cannot be that you are selling things that are packed but eventually understand the child that after opening they just sit, it is the responsibility of street vendors to engage themselves in the same situation. Let them assist the school by cleaning".

Similarly, to FH3 who alluded to the fact that the street vendors do clean up but they only clean up where they were selling:

"They do clean, they do pick up papers, but it looks like they were told that when they are done selling they should pick up papers, but they will not pick up across the whole yard because I think that learners are too many as some would show up here while others show up there. They are just picking up where they sell their products".

T3 stated that street vendors did clean up all the time, but she was not aware to what extent: *"They do it all the time, but I am not sure to what extent because after break they pick up papers. I do not know if they pick up their papers or even further papers are blown away by wind, so I do not know where they end up when they pick them up"*. VL4, VL6, and VL5 further added that the street vendors did clean up, but the focus was only on the products that they sold: *"The street vendors do clean up"*-VL4; *"Mostly I think they pick up everything"*-VL6 and *"They clean up some but not all of them. They clean up packages of the products that they sell"*-VL5.

FH3 added that the street vendors would only focus on cleaning up solid waste generated from the products that they sold: *"They pick up what they sell just like a packet of snacks or sweets, and when they are done, they dispose them in the kitchen, then in the morning we make fire with them"*-FH3. What was said by VL5 and FH3 was similar to what I observed. During observations that occurred on different occasions, I noted that street vendors would only focus on the products that they sold at that time. This was so because the solid waste that I found in the morning would still remain there after lunch breaks, even after they had cleaned up. This was presented in Picture A4, B4, C4, D4, and E4.

Picture A4: School environment before street vendor's arrival



Picture B4: Street vendor's cleaning



Picture C4: Street vendor's Cleaning



Picture D4: School environment



Picture E4: School environment



During observations, I saw a group of educator's assistants (EA's) who were also responsible for ensuring that the classrooms were cleaned every afternoon, as displayed in Picture F4 and G4.

Picture F4: EA's cleaning classrooms **Picture G4: School environment**



7.2.2. OPPORTUNITIES FOR THE DEVELOPMENT OF THE SISS-WMP

7.2.2.1. Opportunities

It was imperative to look into opportunities that contributed towards the development of SISS-WMP in primary schools. This helped me to look into various sets of practices at Vuna primary school that made it possible for me to develop the SISS-WMP. As a result, I had to find out which waste management practices these stakeholders were aware of, as this shaped the SISS-WMP that I developed. SP3 indicated that the only solid waste management practices that he was aware of was recycling and nothing else: *"Except for recycling, we do not have any"*.

This led me to wonder if the school did try to do recycling. GW3 asserted that: *"It happened before, now you will find out...Let us say they take them like these ones"*

and they sell them for themselves, not to say that I am snitching on them (Laughing)". I had to find out what challenges SP3 encountered in regard to solid waste that the school generated. SP3 alluded to the fact that they were unable to manage the solid waste as some of the solid waste was from the community itself:

"Ya there, we have got a lot of challenges because we are completely unable to manage them; I think it is a matter of awareness or education because even if we put signs at the school saying, "No littering" and all that stuff, the learners will still ignore it." So one can start to even blame the community outside because the very same community is able to come and dump around the school. Behind the toilet, they usually come and dump their things there, then we organize the municipality to come and remove them. After a few days, they will come and dump it again, so this littering and other thing is born from the community".

This was similar to what was said by GW3, as GW3 indicated that the challenges with solid waste emerged from the community itself and the local municipality also played a role:

"It starts at home and with the environment. It affects all of us. For instance, maybe I do not see properly. As you have counted, you go all over and find that ey... I also suspect that the municipality here because they should hire women to clean up these plastics. Maybe they do not have a way as to how they will recycle them and where they will take them, because I can see cardboard and papers that it is ya ya ya. But these plastics make the environment dirty in a bad way".

Furthermore, GW3 added that the waste that was situated at the back of the school within school premises belonged to the community:

"It looks like it is a community because it becomes worse to the extent that a member of SGB...you see that fence? One SGB member, but I think he is no longer there because he was the one who had connections with the municipality. The waste was the size of this door. It is next to the fence. The dumping zone. Some people relax there also. So, he talked to the municipality

and they came with that thing and they cut and cut with their caterpillars because the waste was now falling inside the school yard".

However, FH3, VL5, VL4 and VL6 refuted what was said by SP3 and GW3 by indicating that the solid waste at the corner within the school premises did not belong to the community but belonged to the school itself and was generated within the school environment: *"I think that waste comes from inside, meaning that they are from the school, because I saw in the morning when I was on my way here, I said, eish, they threw at the fence, so there was wind yesterday"-FH3; "It is learners during lunch and after school that they throw away"-VL5 and "Ma'am, a lot of people, they play soccer there, they eat there, they throw away there and leave the place like that"-VL4.*

Furthermore, VL6 stated that: *"It is us. We are the ones who are supposed to pick these papers because we are mostly the ones who always throw the papers away, and some of them are not even real papers; some of them are just nappies".* During observations, I saw an enormous amount of solid waste at the back of the school, situated in a corner within the school premises. Next to the school fence, there were houses, as seen in Picture H4.

Picture H4: Solid waste within the school premises



T3 indicated that this solid waste came from the school and the community:

"I believe they are also from the community; as you may have noticed in recent days or months, it has been very windy, so there are papers that we do not know about that do not belong to the school and are inside the yard; thus, they are not only from the school but also from the community".

When I probed further about the origin of the solid waste that I saw at the corner situated within the school premises, SP3 alluded that:

"Ya, there are those that come from the community, especially in this corner. If you move around South, you will see the hip of soil. It is not basically soil, it is the things that are dumped by the community and they keep on piling and piling. They can even go higher than the school fence. There was once we picked up pills that looked like drugs or something, then we took them and threw them away".

Since SP3 said that some of this solid waste belonged to the community, I had to ask SGB3, as they also represented the community as a whole, whether the EPWP members did try to intervene and deal with solid waste that was generated by the community that ended up within the school premises. SGB3 stated that EPWP did not, as they only focused on the community itself and not the school:

"To be honest, we have never noticed any EPWP members around the school assisting with picking up those wasteful products. We usually notice the EPWP at homes on Thursdays, where usually the trucks and the members are there to assist, but at school it is still an issue that needs to be addressed because we have never seen any members of the EPWP cleaning up the school or the space that is around outside the school".

This was similar to what was said by VL5, VL4 and VL6: "No, they did not"-VL5; "No. Not here at school, but I have heard about it a lot from some people on TV. Some children always try to help the environment, the animals in the oceans. They always try to pick up all of the things and all of the papers so that the animals do not get sick and die"-VL6. However, SP3 and GW3 assertions were different from what was alluded to by SGB3, VL5, VL6 and VL4 as SP3 stated that EPWP from the Royal Council and from the municipality only came once to the school and assisted with the solid waste that was within the school premises. From henceforth, they never returned to the school as mentioned by SP3:

"It came once. We have got three types of EPWP's. There is this by the Royal Council. They once came to the school and spent a few days cleaning the whole school inside and outside. Those of EPWP municipal related, I think they came once and did the same thing. Maybe if they could do it on a regular basis".

This was similar to what was said by GW3 as he stated that EPWP only came once at school:

"They did come... this year, no. When they come, they do clean up and it becomes beautiful. Even there, they burn everything, but this year I do not know if it is COVID or what. When they came, they made the whole place beautiful. They cleaned up. You will see this place is beautiful, but they are now gone. They only came once a year".

What was recommended by SP3 regarding the EPWP members coming to school to assist with solid waste management was related to what GW3 suggested:

"It takes a long time, like years, so, if they are able to, or the municipality or anything, there should be people who are hired to go around cleaning up papers and plastics around the whole place because others end up in oceans and end up killing fishes because of those plastics. You see, for them to recycle, I do not know how they will recycle them because they take, let us say, those litres and recycle them, but a plastic from a shop is a type of plastic that needs a way for it to be recycled because there are too many containers, they are too many all over the place".

GW3 further added that even though the municipality can hire people, the school will not do the same and hire someone to assist GW3. Since SGB3, VL5, VL6, and VL4 claimed that they never received any assistance from EPWP to deal with the solid waste they produced. As a result, GW3 stated that they had no other strategies in place, hence they resorted to open burning of waste: *"There is no other way because even the recycling people need full paper like*

this because small pieces do not want them and you find out that there are plastics and snack packages and other things you see".

GW3 further added that he encountered numerous challenges when he resorted to open burning of waste as the school was also at high risk of ending up burning:

"The challenges that I normally face are that I am very busy and I leave a fire burning there, and then learners come and make more fire at the same place where I left the fire burning, and then you hear them later saying, "Did you see what uncle did on that fire?" Sometimes you find out that one day they will do more fire and maybe the school burns or something because the fire will be there while they go to the toilet. When they go to the toilet, some learners will pick up papers and continue burning them".

However, T3 refuted what was said by GW3 as T3 stated that she did not know whether open burning of waste was a solution as she did not know what else could be done if they did not do open burning of waste: *"Yoh, I do not know, but burning causes air pollution. I do not know if they do not, then what will they do?"* This led me to probe further to find out the importance of teaching about solid waste management. T3 alluded to the fact that it is imperative to teach about solid waste:

"Yes, I think it is very important because a dirty environment is not attractive and it does not seem to be professional in somebody. Just imagine having professionals from up there from any departmental office coming to the school and the school is very dirty with papers and stuff. It will be like there is no discipline or proper management of the school, so I think it is very important to teach learners about such things".

When I asked T3 about challenges she encountered when she had to promote solid waste management in the classroom, she stated that learners would not listen; instead, they would just blame one another:

"Some refuse to pick up papers, saying they are not mine, even though they are next to that person. It is not mine. It is not me who was eating here and then some of them just do not listen. I tell them to stand up and pick up the papers and they just do not do anything".

I asked learners during the focus group interviews as to why they generated solid waste in their classroom and did not utilize the bins provided. VL6 and VL5 stated that it was because some of their classmates were lazy: *"Some of my classmates are so lazy that they cannot even go to the dustbins and throw the papers away"-VL6* and *"They do not want to, they say they are lazy"-VL5*. When I probed to find the reasons behind what was asserted by VL6 and VL5 in relation to the learner's laziness and them not utilizing the provided bins, T3 indicated that learners do that to provoke teachers: *"I do not know, but then somehow I think some of them do it to provoke the teachers"-T3*.

This led to some teachers deciding to keep quiet when learners continued to dispose solid waste inappropriately, as stated by VL5. T3 stated that she does not think that learners were aware of the negative impact that their actions had on the environment: *"No, I do not think they were aware. Especially those ones in intermediate and seniors; they did not grow up to such, but they understand. If only they were told the impact that it has, they are only told to "do not do this." I do not think they are aware"-T3*. Hence, SGB3 emphasized the importance of talking about the environment as people continued to ignore it:

"I think it is important that we talk about the environment because it is something that we, as people, are ignoring. Because we have been alluding that most SGBs at schools are not even aware of environmental policies or if they are not there at all, so this is kind of ignorance that we are talking about. It may be that day by day we get congested from someone who is going to conscientize on how we develop policies related to the environment. Maybe that is where it is going to start because...but if there is a paper or something that is documented as policy, then we have a reason for accountability. Now most SGBs must start to gain because I ask on purpose because I can see that here at school we do not have but I can see that here at school the way you check you see that our schools we have abandoned this direction,

particularly in the school and many schools. Sometimes if there is a free period at school, I do not know if free periods are still there in many schools but this direction of latecomers just uses that 15 minutes to pick up papers and put them somewhere for them to be burnt. There is another solution that we should take on, and that one would be more useful if there was a policy that happened, but thanks”.

While SP3 and T3 requested suggestions that could be implemented in order to manage the amount of solid waste generated at Vuna primary school: *“If I was to ask you a question, it would be, what can you recommend we do? What can we do? Especially to manage a small scale of removing dirt around the school so that we are able to manage it”.* Whereas T3 inquired:

“Since you are asking those questions, is there anything that you might do for the school maybe? Since I mentioned that they burn papers and it causes air pollution, (Is there a way you could assist us with this?) Do you have any suggestions of what we can do after he has implemented that strategy? Because usually the principal would say that if the learners only knew that it was I the principal who does not want papers, they would only respect him, so I think involving the other teachers will also help. I did say it was only the learners, even teachers. I am not pointing any fingers, but I would come into the classroom and there was a teacher busy with cutting and pasting and right where the teacher was there were papers, and obviously not the learners' papers”.

7.3. DATA DISCUSSION AND FINDINGS

The section below presented data discussion and findings on how Vuna primary school stakeholders shaped their solid waste management practices.

7.3.1. STAKEHOLDERS UNDERSTANDING OF SOLID WASTE AND ENVIRONMENT

Solid waste refers to any unwanted solid materials that are generated from commercial, residential, or industrial activities in a certain area (Manoj, 2016).

Similarly, T3, VL5 and VL6 define solid waste as anything that can no longer be used and must be thrown away. Leblanc (2020) and Mishra et al. (2014) described solid waste as something that is useless and consists of waste and discarded materials from day-to-day activities. SP3 and FH3 defined the concept of solid waste by highlighting examples that are associated with solid waste. They mentioned examples such as tins, papers, and milk containers.

These examples were similar to what was stated by Cayumil et al. (2021) as the main solid waste contributors, namely: paper, plastic, cardboard, glass, food waste, metals, hazardous waste, wood, and packaging waste. Furthermore, SGB3 and GW3 could not explain what solid waste is. Instead of explaining solid waste they deliberated on solid waste management. This was so because SGB3 and GW3 stated that solid waste mainly focuses on maintaining the cleanliness of the school in a manner that waste generation is avoided. In this situation, their statements were very direct about waste management, not waste itself.

However, it was not the case with the concept environment, as SGB3, GW3, SP3, FH3, T3, VL5 and VL6 displayed a better understanding of what the environment is, while VL4 could not comprehend anything about the concept of environment. SP3 defined "environment" as an area that includes the atmosphere around it. This was similar to Larsson and Aissa (2019) as they described the environment as a complex of elements which form a framework through their inter-relationship, setting, and mankind's living conditions. Whereas, SGB3, GW3, FH3, T3, VL5 and VL6 described the environment as our surroundings and a place where we live as human beings. Their explanations of the environment were similar to Roba (2012) as they explained the environment as what surrounds us, which consists of all living and non-living things. Furthermore, the environment is perceived as a necessity for the survival of mankind (Mulenga, 2019).

Vuna primary school stakeholders' understanding of solid waste and environmental concepts was different from one stakeholder to the next. T3, VL5 and VL6 managed to explain what is meant by solid waste, while SP3 and FH3

highlighted examples of solid waste. However, that was not the case with SGB3 and GW3 they could not explain what solid waste is. Instead of explaining solid waste, they dwelled on solid waste management definition. Furthermore, SGB3, GW3, SP3, FH3, T3, VL5 and VL6 had an understanding of the concept of environment, while VL4 could not comprehend what was meant by environment.

7.3.2. THE NATURE OF SOLID WASTE GENERATED

According to Ahmed and Gambo (2014); Taiwo (2009) solid waste is mainly generated by human and animal activities that end up being disposed because they are useless and pose a negative impact on the environment. This was similar to what was alluded to by SP3 and SGB3 as they stated that the whole school community and/or human beings were the main generators of solid waste at Vuna primary school. GW3, VL4, FH3 and VL6 refuted SP3 and SGB3 claims by stating that learners and street vendors were the main contributors of solid waste. While T3 and VL5 indicated that learners were the only solid waste generators.

Which was similar to DHEC (2019) as they stated that schools, learners, and teachers are deemed to be the highest contributors of solid waste. However, Cayumil et al. (2021) indicated that schools are the typical waste generators as they contribute solid waste such as paper, food waste, cardboard, plastics, wood, glass, metals, yard waste, and packaging waste. The nature of solid waste that I saw that was generated at Vuna primary school ranged from papers, plastics, broken old plastic chairs, alcohol bottles, boxes, tins, cattle horns, glasses, take-away containers, steel, baby diapers, surgical face masks, cloth masks, and old plates.

What is alarming is that solid waste such as plastic, bottles, papers, and cans is not biodegradable. As a result, they cannot be broken down through organic processes (Ahmed & Gambo, 2014). Hence, countries like Chile prohibit plastic use (Cayumil et al., 2021). It was not only learners who generated a huge amount of waste at Vuna primary school. In fact, there were various

stakeholders involved in solid waste generation on different occasions when they were within the school premises. Those stakeholders ranged from food handlers, general workers, school principals, teachers, street vendors, SGB representatives, and other support staff. However, they were not mentioned by GW3, VL4, FH3, VL6, T3 and VL5 as their focus was on learners and street vendors.

The nature of solid waste that was generated by these various stakeholders at Vuna primary school were papers, plastics, broken old plastic chairs, alcohol bottles, boxes, tins, cattle horns, glasses, take-away containers, steel, baby diapers, surgical face masks, cloth masks, old plates, milk containers, cooking oil bottles, plastics from sweets, snacks, packages, wipes (tissues), plastics, food packages, food waste (from cabbage, tomatoes, onions, pumpkin, butternut, apples, bananas, oranges, and pear peels).

7.3.3. PATTERNS OF WHEN SOLID WASTE WAS GENERATED

According to Mun (2019) solid waste is mainly generated as a consequence of geographic, social impact, and seasonal variables. However, that was not the case at Vuna primary school. Even though the school was already polluted with solid waste upon my arrival for data collection. I noted that the school generated solid waste throughout their day-to-day activities that took place during the teaching and learning process on a daily basis. Similarly, to Rada et al. (2016) they stated that solid waste generated in schools does not depend on the size of the school but on the day-to-day activities that are carried out as well as the habits of both staff and learners.

Amongst those day-to-day activities that occurred, one of those was food handlers, who were responsible for cooking for learners in the morning. I noted that food handlers generated a lot of solid waste through cooking in the morning on a daily basis. This was similar to Iloja et al. (2014) as they mentioned that cooking food for learners or contracting a catering service increases the quantity of solid waste generated in schools. Furthermore, Iloja et al. (2014) stated that more solid waste was generated during lunch breaks. This

is similar to what I observed, as I noted that solid waste was generated during lunch breaks as learners bought products that were sold by street vendors.

Furthermore, more solid waste was generated in the afternoon when classrooms were being cleaned by the EA's on behalf of the learners. This solid waste reflected the amount of teaching and learning materials that were used by teachers and learners during the teaching and learning process, as it was mainly paper compared to food waste (Lefadola et al., 2018).

There were patterns when solid waste was generated at Vuna primary school. In this case, the school was already polluted with solid waste upon my arrival for data collection. Furthermore, I noted that the school generated solid waste during the day-to-day activities that took place. In the morning, when food handlers were cooking food for learners. Throughout the teaching and learning process and during lunch breaks when learners buy products that are sold by the street vendors. Also, in the afternoon, when EA's cleaned classrooms for learners.

7.3.4. STAKEHOLDERS' MANAGEMENT OF SOLID WASTE

It was imperative to grasp what these stakeholders understood about solid waste management, as this shaped the developed SISS-WMP. SGB3 stated that solid waste management refers to a process whereby solid waste is taken somewhere for the purposes of recycling and reusing. Similarly, to Ahmed and Gambo (2014) they stated that solid waste management focuses more on the process of reduction, recycling, reusing, collecting, transporting, handling, transforming, and disposal of solid waste. However, SGB3 said that solid waste management is more about controlling waste than managing waste.

This was similar to what was asserted by Mishra et al. (2014) as they indicated that solid waste management is mainly associated with the discipline of controlling the generation of solid waste. Accordingly, with Manoj (2016) solid waste management was defined as a process that is aimed at eliminating or

reducing solid waste through disposal, processing, monitoring, and collection as solid waste impacts the environment and human health in a negative way. It is imperative to understand that without having efficient and effective solid waste management practices to manage solid waste generated from human activities, it can result in a health hazard and a negative impact on the environment (Ahmed & Gambo, 2014).

As a result, Vuna primary school stakeholders interacted with solid waste that they generated in various ways through signage for school safety rules, dustbins, recycling, storage, small house containers, open burning of solid waste, digging a hole, classroom rules, collection of solid waste, and assigning responsibilities. Vuna primary school used the signage for school safety rules as one of the ways to prohibit littering and interact with solid waste generation. This signage served as a code of conduct that everyone who enters the school premises needs to adhere to (Mhlanga, 2019). Vuna primary school had steel and plastic dustbins made available across the school premises.

The usage of dustbins is perceived as one of the most efficient ways of keeping the environment and reducing solid waste as the dustbins can be used for the purposes of reducing the quantity of solid waste and recycling (Youth for Sanitation, 2016). As a way to manage solid waste, recycling is considered one of the 3R's strategies for solid waste management (Manoj, 2016). GW3 stated that Vuna primary school stakeholders did recycling for their own personal gain, which was also confirmed by SP3. Furthermore, SP3 stated that the SGB did try to do recycling to benefit the school, but it was not successful as it was not properly managed.

However, SGB3 put it bluntly that the school did not have any recycling program in place, while T3 mentioned that she was not aware if the school did implement recycling or not. Elemile et al. (2018) stated that the implementation of recycling tends to be ineffective if it is not executed properly, regardless of the high volume of solid waste that can be recyclable.

SP3 added that there was a private company that came to Vuna primary school to collect solid waste for recycling whereby the school would be given a certain percentage of what was acquired from recycling, and that this was done in the form of a competition. This was similar to one of the solid waste management programmes that were hosted by the Coca-Cola Company in 2018. However, only 866 schools, 12 000 teachers, and 700 000 learners participated in that programme (Manyana, 2019). Vuna primary school had two types of storage for solid waste.

The first storage was built through the school passage that separates the classroom blocks, which consisted of old textbooks that must be collected by the circuit office as stated by SP3. The second storage was the small house container, as stated by FH3, which contained a lot of boxes, milk containers, maize meal packages, buckets, and a bin which was stored inside. According to Nathanson (2020) having storage for recyclable solid waste assists in reducing insect infestations, bad odours, and rodents. FH3, VL5, VL6, VL4, T3 and GW3 stated that open burning of solid waste was one of the practices implemented by the school to manage solid waste generated.

SGB3, VL6, stated that open burning of solid waste was a good idea as it was part of the solution that they had as there were no people responsible for solid waste except for T3, who did not hold the same sentiments. This was similar to Nathanson (2020) who stated that open burning of solid waste is one of the most efficient ways towards the reduction of solid waste quantity even though it leads to greenhouse gas emissions. GW3 indicated that another strategy that was used to manage solid waste was digging a hole in order to dispose solid waste inside the hole. However, it was not sustainable as a learner was pushed inside the hole. As a result, they had to close that hole.

This clearly indicates that digging a hole was not effective because it was not controlled and monitored (Vongdala et al., 2019). Furthermore, this incident not only affected learners but served as a burden for solid waste mismanagement (Ferronato & Torretta, 2019). I had to find out from T3 if there were any policies that governed how they managed solid waste in the classroom. T3 stated that

there were classroom rules in place and boxes were used as bins. According to UNICEF (2021); Alter and Haydon (2017) classroom rules are imperative as they govern the behaviour of every learner in such a manner that they are also able to take responsibility for their own actions.

This led me to find out who was responsible for ensuring that the school environment was clean. SGB3 stated that it was the responsibility of everyone, while VL4 and VL5 alluded that it was the responsibility of GW3, which GW3 confirmed. Furthermore, FH3, T3, VL4, VL6, and VL5 added that street vendors were also responsible for ensuring that they cleaned up after selling their products. This was similar to what I observed as street vendors were seen picking up packages of only the products that they sold. While EA's would clean the classrooms on a daily basis in the afternoon. FH3 further added that there were people who would come and collect tins and food waste every Friday. Hence, collection of solid waste contributes towards minimizing the environmental impact (Glavič & Lukman, 2007).

Vuna primary school stakeholders used numerous ways to manage solid waste that they generated. The school had a sign for school safety rules. Among those rules, littering is prohibited. To mitigate littering, they had a number of steel and plastic dustbins which were made available for everyone within the school premises. However, not everyone utilized those dustbins. Recycling was done in the form of a competition, but it was not continuous. As a result, the stakeholders of Vuna primary school decided to do recycling for their own personal benefit as it was not managed properly before.

They also had two types of storage, which were used by the school to store old books, while another type of house container storage was used for solid waste generated by food handlers. Since Vuna primary school could not manage the enormous solid waste that they generated, they resulted in the open burning of solid waste to dispose it. GW3 also stated that they once dug a hole for the purposes of solid waste disposal, but they had to close it down after a learner was pushed inside that hole. The classrooms had rules that shaped how

learners had to manage solid waste and they used boxes as bins to dispose that solid waste. However, not all learners adhered to those rules.

Furthermore, everyone was assigned the responsibility of ensuring that the school environment was clean. For instance, GW3 was the one responsible for ensuring that the school environment was clean, street vendors had the responsibility of picking up packages of what they sold after selling, and the school had EA's who would clean all the classrooms for learners on a daily basis in the afternoon.

7.4. OPPORTUNITIES FOR THE DEVELOPMENT OF THE SISS-WMP

7.4.1. OPPORTUNITIES

There were opportunities at Vuna primary school that shaped the development of the SISS-WMP. Amongst those, SP3 indicated that the only solid waste management initiatives that he was aware of were recycling and nothing else. Schoeman and Jiyane (2021) mentioned that limited information and insufficient knowledge about other solid waste management practices are the contributing factors to solid waste generation. Even though recycling is perceived as one of the important solid waste management practices as it prevents pollution, saves money, reduces the amount of solid waste that ends up in landfills, reduces greenhouse gas emissions, and enables products to be utilized to their full extent (Koop, 2021).

That was not the case at Vuna primary school, as GW3, T3 and SP3 indicated that they did try to do recycling, but it was not sustainable. This was so because SP3 alluded that they encountered challenges as there were no proper systems in place, which led them to be unable to manage some of the solid waste as it was not from the school alone but the community as well. This clearly indicates that recycling requires time and effort from individuals in a manner that it should be implemented for moral behaviour rather than economic behaviour (Chan & Bishop, 2013).

FH3, VL5, VL4, VL6, SP3, and GW3 stated that the enormous solid waste within the school premises belonged to the school as well as the community itself. This proved beyond reasonable doubt that people in various communities still believed the notion that there were people who would clean up after them, as it was the responsibility of the local governments to clean up solid waste that they generated (CENN, 2021). GW3 further added that even though the local municipality can hire people, the school will not do the same and hire someone to assist him with cleaning up the school.

Since SP3 said that some of this solid waste belonged to the community, I had to ask SGB3, as they also represented the community as a whole, whether EPWP members tried to intervene and deal with solid waste that was generated by the community that ended up within the school premises. According to the Department of Public Works and Infrastructure (2018) EPWP focuses on employing people to work on various projects that are aimed at improving their local environment. SGB3 said that EPWP did not help the school because they only cared about the community and not the school.

However, amongst the EPWP environment and culture sector programmes is waste management, with contributing sector departments being the municipalities with the waste management units under the Department of Public Works and Infrastructure (2018). As a result, the school resorted to open burning of solid waste as they had no other option to manage the solid waste they generated as stated by GW3. However, Ferronato & Torretta (2019) are against the open burning of solid waste, as they allude that it should be something that is avoided at all cost.

Hence, Rada et al. (2016) suggest that it is imperative to educate learners about the importance of environmental issues and how to combat them, because instilling the right behaviour at school also benefits their families. However, that was not the case at Vuna primary school as T3 stated learners were not willing to listen to teachers. As a result, some teachers resorted to keeping quiet. Furthermore, T3 stated that learners are not aware of the negative impact that their actions have on the environment. This was so

because VL5, VL4 and VL6 stated that no one came to teach about solid waste management, which is the reason why most learners do not use the bins provided for them, as they would be considered lazy as stated by VL6 and VL4. Hence, the SGB3 emphasized the importance of talking about the environment as people continue to ignore it. Some stakeholders had insufficient knowledge about other waste management practices except for recycling. Even though recycling was implemented, it was not sustainable. There were no proper systems put in place to manage solid waste as indicated. The school had enormous solid waste within and around the school premises, which was generated by the school as well as the community. The EPWP members only came to assist in cleaning up the school once, and they never came back again.

The school resorted to the open burning of solid waste as they did not have any other options to manage their solid waste. Learners are lazy to pick up litter, there is a need to educate everyone about the environment, there is also a perception that the school cleanliness lies on the hands of the general worker. Table 7.7.1 presents the summary of findings on stakeholders' practices and opportunities at Vuna primary school.

7.5. SUMMARY OF STAKEHOLDERS' PRACTICES AND OPPORTUNITIES AT VUNA PRIMARY SCHOOL

Table 17 presents the summary of findings on stakeholders' practices and opportunities at Vuna primary school.

Table 17 Vuna primary school summary of findings (Sikhosana, 2022).

<p>1. STAKEHOLDERS SHAPING THE SOLID WASTE MANAGEMENT PRACTICES</p>	<p>1.1 Stakeholders' understanding of solid waste and the environment</p> <p>Solid waste</p> <p>T3, VL5 and VL6 managed to explain what is meant by solid waste, while SP3 and FH3 highlighted examples of solid waste. However, that was not the</p>
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	<p>case with SGB3 and GW3 they could not explain what solid waste is. Instead of explaining solid waste, they dwelled on solid waste management definition.</p> <p>Environment</p> <p>SGB3, GW3, SP3, FH3, T3, VL5 and VL6 had an understanding of the concept of environment, while VL4 could not comprehend what was meant by environment.</p>
	<p>1.2 The nature of solid waste generated</p> <p>Based on my observations, Vuna primary school generated solid waste such as:</p> <p>Papers, plastics, broken old plastic chairs, alcohol bottles, boxes, tins, cattle horns, glasses, take-away containers, steel, baby diapers, surgical face masks, cloth masks, old plates, milk containers, cooking oil bottles, plastics from sweets, snacks, packages, wipes (tissues), plastics, food packages, food waste (from cabbage, tomatoes, onions, pumpkin, butternut, apples, bananas, oranges, and pear peels).</p>
	<p>1.3 Patterns of when solid waste was generated</p> <p>The school was already polluted with solid waste upon my arrival for data collection. Furthermore, I noted that the school generated solid waste during the day-to-day activities that took place. In the morning, when food handlers were cooking food for learners. Throughout the teaching and learning process and during lunch breaks when learners buy products that are sold by the street vendors. Also in the afternoon, when EA's clean classrooms for learners</p>
	<p>1.4 Stakeholders' management of solid waste:</p> <p>I had to tap into what SP3 and SGB3 understood about solid waste management. Both SP3 and</p>

	<p>SGB3 demonstrated an understanding when it came to explaining what solid waste management meant.</p> <p>The school managed solid waste through the installation of a signage for school safety rules, metal and plastic bins, recycling, and storage; open burning of solid waste; digging a hole; classroom rules; boxes used as bins; assigning responsibilities to various stakeholders; and requesting street vendors to clean up the school after selling their products.</p>
<p>2. OPPORTUNITIES IN THE DEVELOPMENT OF THE SISS-WMP</p>	<p>2.1 Opportunities</p> <p>The following are the opportunities shaped the developed SISS-WMP; insufficient knowledge about solid waste management practices, recycling was not sustainable, no proper systems were put in place to manage solid waste, the community and the school continued to generate solid waste, EPWP cleaned up the school once and stopped, resorted to open burning of waste, learners are lazy to pick up litter, there is a need to educate everyone about the environment, there is also a perception that the school cleanliness lies on the hands of the general worker.</p>

7.6. CONCLUSION

The Vuna primary school (Case 3) chapter presented and discussed the data that was collected during phase one. In the next chapter, I discuss and present the developed SISS-WMP.

CHAPTER 8: THE DEVELOPED SISS-WMP

“Alliances and partnerships produce stability when they reflect realities and interests.”-

Stephen Kinzer

8.1. INTRODUCTION

The previous three chapters presented and discussed the findings of stakeholder practices and opportunities. This chapter discussed and presented the developed SISS-WMP. The SISS-WMP was shaped by the findings of stakeholder practices and opportunities at Emthini primary school, Tjala primary school, and Vuna primary school during phase one of data collection. The SISS-WMP was developed and implemented for the purpose of phase two, which answered the following research question:

3. How was the implementation of the SISS-WMP?

8.2. RATIONALE FOR THE SISS-WMP

According to Abdel-Shafy and Mansour (2018) the management of solid waste continues to be an ongoing challenge across the world. One of the objectives of solid waste management is to reduce the impact of solid waste materials on the environment and human health in order to support economic development and enhance the quality of life (Leblanc, 2020). This objective laid a solid foundation for the development of the SISS-WMP. The aim of the SISS-WMP was driven by the goal of ensuring that solid waste in primary schools is managed in the most effective and efficient way.

In order to achieve this aim, the implementation of the SISS-WMP was done through partnerships with relevant internal and external stakeholders as well as business enterprises in order to keep costs as low as possible while preventing solid waste build up. By so doing, the SISS-WMP could ensure that solid waste generated in primary schools is subjected to 3R's where possible while imparting knowledge for ESD.

It is imperative to acknowledge that waste management in South Africa is governed by the Department of Environment, Forestry and Fisheries (DEFF), which formulated a mandate from Section 24 (Environment) of the Constitution of the Republic of South Africa (Act 108 of 1996), which stipulated that everyone has the right to-

- A. an environment that is not harmful to their health or wellbeing.
- B. have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that:
 - I. prevent pollution and other degradation.
 - II. promote conservation and secure, ecologically sustainable development and the use of natural resources while encouraging justifiable economic and social development.

To fulfil this obligation, the DEFF established legislation, policies, programmes, and strategies such as the National Environment Management: Waste Act 59 of 2008 and the National Waste Management Strategy of 2011. However, the NWMS encountered challenges such as:

- A. absence of recycling infrastructure
- B. a regulatory and policy environment that does not actively promote the hierarchy of waste management.
- C. an increasing population results in a high volume of waste generation (DEA, 2012a).

These legislations and NWMS challenges shaped the developed SISS-WMP in such a manner that the SISS-WMP also accommodated and met some of the commitments of the Sustainable Development Goals (SDGs) 2030 as stated by the United Nations (2015).

8.3. NATURE OF SOLID WASTE

It was imperative to look into the nature of solid waste generated in these three primary schools, which were my cases, in order to categorize them according to

the examples of solid waste, ways in which solid waste was dealt with, and types of solid waste, as this shaped the SISS-WMP. I focused on solid waste, which was waste such as paper and card waste, plastic waste, metals, tins, glass and ceramics.

8.3.1. SUMMARY OF FINDINGS THAT SHAPED THE SISS-WMP

Table 18 presented the summary of stakeholders' practices and opportunities that shaped the developed SISS-WMP. It outlined the examples of solid waste, ways in which solid waste was dealt with and types of solid waste at Emthini primary school, Tjala primary school and Vuna primary school.

Table 18 stakeholder's practices and opportunities that shaped SISS-WMP (Sikhosana, 2022).

Numbering	Examples of solid waste	Ways in which solid waste was dealt with in three primary schools	Types of solid waste
1	Papers	Open burning	Recyclables
2	Old books	Storage	Recyclables
3	Plastics	Open burning	Recyclables
4	Plastic packaging	Open burning	Recyclables
5	Boxes	Open burning	Recyclables
6	Milk containers	Open burning	Recyclables
7	Surgical and cloth face masks	Open burning	Non-recyclables
8	Toilet papers/Tissues	Disposed	Non-recyclables
9	Tins	Collected	Recyclables
10	Containers of	Storage	Recyclables

	sanitizers		
11	Food waste	Collected	Recyclables
12	Glasses (Alcohol bottles)	Disposed	Recyclables
13	Broken old plastic chairs	Disposed	Recyclables
14	Cattle horns	Disposed	Non-recyclables
15	Baby diapers	Disposed	Non-recyclables
16	Old stainless-steel plates	Disposed	Recyclables
17	Take away containers	Open burning	Recyclables

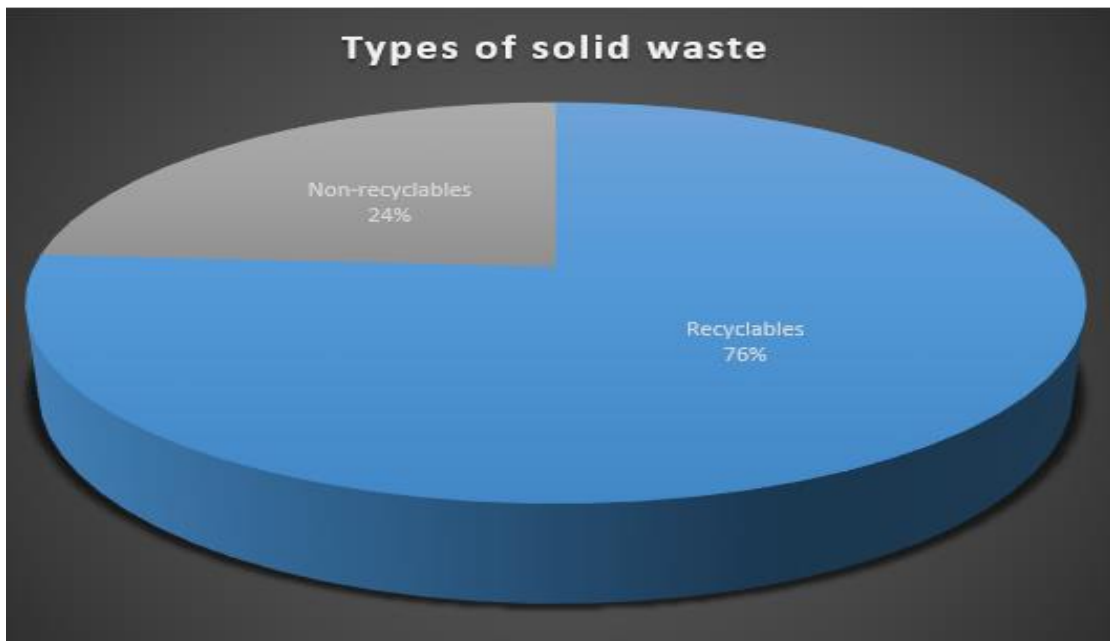
Figure 4 displayed how solid waste that was generated at the three primary school was dealt with. Based on Table 18, of all the 17 examples of solid waste, seven of these examples, which equalled 41%, were dealt with through open burning, six of these examples, which equalled 35%, were disposed, two of these examples, which equalled 12%, were stored, and two of these examples, which equalled 12%, were collected by different members of the community, as presented in Figure 4.

Figure 4 solid waste management (Sikhosana, 2022).



Figure 5 represented the type of solid waste that was recyclable, which equalled 76%, and the solid waste that was non-recyclable, which equalled 24%, from three primary schools.

Figure 5 types of solid waste (Sikhosana, 2022).



The above findings shaped the SISS-WMP as it showed which types of solid waste must be a priority for the purposes of solid waste reduction and prevention.

8.4. THE SISS-WMP

The SISS-WMP was enshrined on the opportunities available from these primary schools. These opportunities emanated from the challenges that led these primary schools' stakeholders to manage the solid waste the way they did. There was a need to replace metal bins with plastic bins as they were exposed to rust. Furthermore, a skip bin was necessary for non-recyclable solid waste which would be collected by the local municipality. There was also an opportunity to request the EPWP to assist with solid waste management in the schools. A nearby recycling depot would assist by reducing transportation costs.

It was also essential to have a storage for solid waste at the school for the recyclable solid waste. It was also imperative for the internal stakeholders to be educated about the environment as they showed that they do not understand concepts such as environment, solid waste and solid waste management. This was also going to address their thinking that solid waste management in school premises is for the general workers only. The strategy would not have been complete without the significant role by the internal stakeholders, which would demand consistency, commitment and positive mentality from them.

Consequently, the SISS-WMP involved the internal and external stakeholders which were:

- Solid waste management representatives
- The division for social development services (SDS) in the local municipality
- Business enterprises
- The internal stakeholders

In the next section I discuss the purpose of each stakeholder in the SISS-WMP.

8.4.1. SOLID WASTE MANAGEMENT REPRESENTATIVES

Establishing a working relationship with the local authorities and/or waste management organizations and/or representatives was important. As these representatives play a critical role in the development of knowledge and skills among individuals in order to ensure sustainable environmental behaviour and development (Georgiou et al., 2021). The stakeholders of these three primary schools had less awareness of environmental issues, negative environmental attitudes, and a lack of practical education that shaped their practices towards solid waste management.

This shaped the SISS-WMP as there was a need to raise awareness and teach various stakeholders in these primary schools about solid waste management through environmental education as it was the essential strategy towards raising awareness amongst people. Hence, to bridge the knowledge gap amongst people about solid waste management, environmental sustainability education must be incorporated into schools and at all levels (Debrah et al., 2020). In this case, representatives of solid waste management were able to get involved at both the district and local level.

During the implementation of the SISS-WMP, the various stakeholders in these primary schools were expected to invite solid waste management representatives to their schools either from the district and/or local municipality level. Based on my anecdotal evidence, I noted that these representatives would only raise awareness about environmental issues once a year during World Environmental Day. This was done of their own accord, voluntarily, and not because they were invited by schools.

The benefits of establishing a working relationship with these local authorities and/or waste management organizations/representatives could result in a positive impact. As the stakeholders of the schools will not have to wait for World Environmental Day to be capacitated about the importance of sustaining the environment through solid waste management. Furthermore, if everyone is reached, there could be awareness campaigns, outreach programs, and environmental benefits.

8.4.2. DIVISION FOR SDS IN THE LOCAL MUNICIPALITY

Establishing a sustainable partnership with the local municipality was imperative for the SISS-WMP because of the SDS that the local municipalities are obliged to offer the communities at large. According to the Constitution of the Republic of South Africa, 1996, Chapter 7 of the Local Government Section 153 outlines the development duties of municipalities. It is the duty and responsibility of the local municipalities to structure and manage their administration, budgeting, and planning processes to give priority to the basic needs of the community and to promote the social and economic development of the community.

While the objectives of local government are stated in Section 152 of the Constitution of the Republic of South Africa, 1996, they are:

1. To provide local communities with democratic and accountable government;
2. To ensure the long-term provision of services to communities;
3. To encourage social and economic growth;
4. To promote a safe and healthy environment; and
5. To encourage the involvement of communities and community organizations in matters of local government.

The intervention of the local municipality in this case was through the supply of skip bins in these primary schools. So that solid waste that was classified as non-recyclable and could not be subjected to recycling anymore could be disposed in the skip bins. These were collected by the local municipality when they were full. The benefit of supplying the skip bins in these primary schools should result in solid waste reduction, as the amount of solid waste in the schools' dumping sites could be reduced and removed from sites. The skip bins also encouraged zero tolerance of open burning of solid waste.

This was so because the 41% of solid waste that ended up in open burning in these primary schools could decrease to 0% as 24% of the non-recyclables should be disposed in the skip bins. To ensure the sustainability of this

intervention, the local municipality was responsible for the collection of the skip bins in these primary schools. Furthermore, the skip bins were subjected to regular monitoring and maintenance to ensure that there was no cross contamination.

In order to achieve the objectives of the local government, the South African government introduced the nationwide EPWP. The EPWP has an environment and culture sector with a programme that focuses on waste management that is facilitated by municipalities within the waste management units (Department of Public Works and Infrastructure, 2018). Hence, it was imperative for the local municipalities to deploy some of the EPWP members in schools as a way to put the environment and culture sector programme into practice. The deployment of EPWP members in schools was shaped by the amount of workload that the general workers had, which they failed to maintain.

As for the amount of solid waste within these schools' premises, some of the solid waste was generated by the community members who surrounded these schools. Deploying EPWP members once every term in schools should contribute towards maintaining the cleanliness of the school environment, minimizing risks associated with solid waste generation and enhancing environmental practices that are sustainable.

8.4.3. BUSINESS ENTERPRISES

The element of utilizing the services offered by various business enterprises as part of SISS-WMP was shaped by the need to implement a sustainable recycling programme at a school level. The rationale behind this intervention was based on anecdotal evidence that numerous environmental programmes were introduced by various businesses in schools. However, these programs were not sustainable because these businesses only implemented them as part of their corporate social responsibility (CSR) projects on a one-time basis.

For instance, efforts were made by one of the beverage companies in 2018 by hosting nation-wide waste management programmes in all schools in South

Africa. However, only 866 schools, 12 000 teachers, and 700 000 learners participated in that programme (Manyana, 2019). This clearly indicates that the target that was set by the NWMS in 2016 to ensure that at least 80% of schools in South Africa participate in waste management programmes was not met (DEA, 2012a). Furthermore, the ABI initiated a recycling programme in schools; however, it only attracted 400 000 learners from 404 schools across the country (Independent Online, 2015).

This clearly shows that schools' voluntary participation in these solid waste management initiatives continues to be a challenge. 76% of solid waste generated in these three primary schools was classified as recyclables. However, if these primary schools continued to wait and depend on various businesses to come to them and introduce various solid waste management programmes when they wished to. They may continue to wait for a very long time while solid waste that can be recycled continues to pile up at the dumping sites. Other solid waste ends up in open burning, which leads to health hazards and affects the environment in a negative way.

Therefore, utilizing the services offered by these various business enterprises as part of SISS-WMP could assist these schools to implement sustainable recycling programmes at a school level, which will be facilitated by the schools. This was implemented through requesting supplies of recycling bins in order for these primary schools to facilitate their own recycling programmes, requesting the same businesses to collect the recyclable materials and/or to provide them with transportation of materials for recycling.

However, if the frequent collection or transportation did not materialize, then requesting storage containers or materials that could be used to build a storage could contribute in a positive way as the recyclable materials get stored until the quantity is big enough for recycling. Twelve percent of solid waste generated in these primary schools ended up in storage. However, this percentage could increase if these schools are provided with containers for storage. To sustain the storage containers, the responsibility lay in the hands of

the stakeholders to inspect them regularly to ensure that they were maintained and that they were in a condition that was appropriate for their usage.

By providing these primary schools with recycling bins, recyclable material collection, transportation, storage containers, or materials for building storage, they can not only contribute to solid waste being recycled, reduced, or reused. However, this intervention should be sustainable as stakeholders' attitudes towards solid waste management would change in a manner that they could be encouraged to look for other ways that they could implement to reduce the amount of solid waste generated in schools, as now they will have the resources to do so.

8.4.5. INTERNAL STAKEHOLDERS

Establishing a committee for solid waste management that had the SGB, teachers, general workers, food handlers and learners as representatives of the whole school was imperative. This was so because the committee that would be established by these stakeholders should be shaped by the needs of these three primary schools which in this context was managing solid waste that they have generated. The committee for solid waste management in these three primary schools should be responsible for the following:

- Drafting a policy that shapes solid waste management.
- Raise awareness about environmental education.
- Introduce solid waste management programs.
- Ensure that the school environment is free from solid waste.
- Report to the school management (school principal and the SGB).

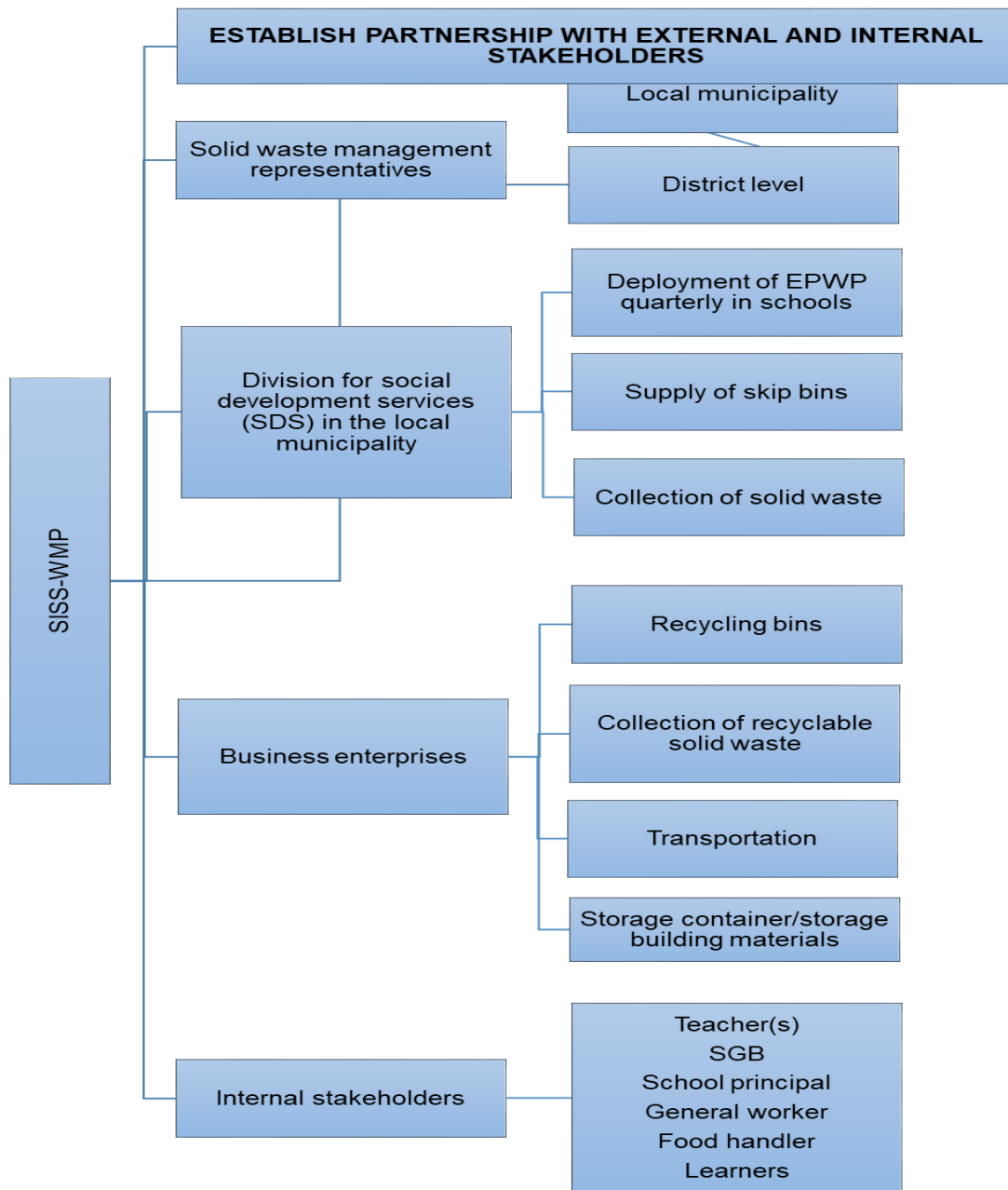
A significant contribution should be made towards the whole school's development by establishing a committee for solid waste management in these primary schools. Whereby this committee could enhance stakeholders' knowledge, skills, attitudes, participation, and values towards the environment. They should contribute towards the development of a sense of responsibility

and teamwork amongst each other in order to sustain and improve the environment.

8.5. THE DEVELOPED SISS-WMP

Diagram 10 presented the developed SISS-WMP.

Diagram 10 SISS-WMP (Sikhosana, 2022).



8.6. THE SDGs THAT SHAPED THE SISS-WMP

The SISS-WMP was responsive to the SDGs; hence, it accommodated and aimed at meeting some of the SDGs as stated by the United Nations (2015) as part of the 2030 Agenda for sustainable development. Table 19 presented some of the SDGs and how they shaped and contributed towards the development of the SISS-WMP.

Table 19 SISS-WMP contribution through SDGs (Sikhosana, 2022).

SUSTAINABLE DEVELOPMENT GOALS	SUSTAINABLE DEVELOPMENT GOALS	CONTRIBUTION OF THE SISS-WMP
Goal 1: No poverty	End poverty and hunger everywhere.	Through creating green opportunities of 3R's to benefit both the schools and learners who come from disadvantaged backgrounds.
Goal 2: Zero hunger	End hunger, improve nutrition, achieve food security, and promote sustainable agriculture.	By promoting the use of food waste into compost in order to start or enhance the school's vegetable and fruit gardening initiatives.
Goal 3: Good health and well-being	Promote the well-being of everyone and ensure that there are healthy lives.	By promoting healthy living among various stakeholders through the reduction of solid waste that contributes to health hazards and poses a negative impact on the environment and its habitants.
Goal 4: Quality education	Ensure inclusive, high-quality education and promote lifelong learning by making opportunities available to all.	By ensuring that there is efficient communication amongst solid waste management representatives and school stakeholders to ensure effective operation of solid waste management. This should improve stakeholders' attitudes and knowledge by teaching them about the causes and challenges of solid waste and highlighting the importance of solid waste management to

		ensure sustainable development.
Goal 11: Sustainable cities and communities	It creates communities and cities that are safe, inclusive, resilient and sustainable.	By supporting and promoting the development of the community in such a manner that the community members' actions and attitudes towards the environment do not harm the environment.
Goal 12: Responsible consumption and production	Make sure that there are production patterns and sustainable consumption patterns.	By ensuring that there is consistency and continuity towards promoting recycling, reusing and reducing the amount of solid waste in schools to sustain the environment.
Goal 17: Partnerships to achieve the goal	Support the means of implementation and rejuvenate the global partnership for sustainable development.	By formulating partnerships with various stakeholders and business enterprises in order to support and promote solid waste management practices that are implemented by schools to ensure sustainable development.

8.7. CONCLUSION

This chapter presented and discussed the developed SISS-WMP. In the next chapter, I present and discuss the Instantaneous Implementation of the SISS-WMP.

CHAPTER 9: INSTANTANEOUS IMPLEMENTATION OF THE SISS-WMP

"They were positive as if they were waiting for us to call them, even though after we talked with them, only three or four days passed, and the skip bin arrived."-SP2

9.1. INTRODUCTION

The developed SISS-WMP was presented in the previous chapter. This chapter presented and discussed the findings of the instantaneous implementation of the SISS-WMP at three primary schools. The developed SISS-WMP was implemented for the purpose of phase two which answered the following research question:

3. How was the implementation of the SISS-WMP?

9.2. EMTHINI PRIMARY SCHOOL

Data was organized using the following theme; implementation of the SISS-WMP which was unpacked using the following categories; shaping and challenges.

9.2.1. DATA PRESENTATION: SHAPING

Having developed and implemented the SISS-WMP in primary schools, it was vital to have a sense of how the SISS-WMP affected the management of solid waste. During observations that took place in phase two, which happened during the instantaneous implementation of the SISS-WMP, I saw changes in how Emthini primary school stakeholders shaped their management of solid waste. For instance, SP1 and SGB1 replaced their old metal dustbins represented in Picture A, which SP1 referred to as becoming rubbish themselves, with the new plastic bins illustrated in Picture B:

Picture A: Old metal dustbins



Picture B: New plastic bins



GW1 stated that SP1 and SGB1 were requested to buy the plastic bins for the school: *"We told the principal to change the dustbin because we had metal dustbins, so we went to the office and talked about them, and then they bought them"*-GW1. I asked T1 as to when did the SP1 and SGB1 bought the plastic bins. T1 and EL5 indicated that they were bought after I came to school and talked to them about solid waste management. FH1 stated that ever since the arrival of the new plastic bins, there have been changes regarding the cleanliness of the school environment: *"Ever since the arrival of the new dustbins, I saw a lot of changes, the school is clean"*.

This was similar to what SP1 alluded to: *"Yes, but anyway, let us first say that we are impressed. At least you managed to help us make improvements here and I believe that there will still be more changes"*. Furthermore, I noted that the school environment was clean and free from solid waste, as presented in Picture C and D:

Picture C: Before



Picture D: After



This led me to find out how the SISS-WMP shaped their practices for solid waste management. SP1 stated that they had to involve EA's in order to assist with solid waste management: *"Now since we have EA's and more GW's, we are trying at least for the school to look clean and be visible that this is a school"*. SGB1 added that they decided to include the strategy within an existing committee:

"Let me indicate that we do have a committee and an SGB sub-committee. We decided to merge them and include this strategy because there are many and we will not find time to manage all of them if we introduce another committee, so we merged them".

GW1 stated that SP1 and SGB1 as members of the school safety committee encouraged them to go to class every Monday morning before the commencement of the lessons to remind learners to make use of the dustbins and reduce littering: *"Every Monday we tell them to dispose papers inside the dustbin. They do listen to the rules now because they seem changed as they do not throw papers away".* Even EL4 concurred: *"We throw in the red dustbin now".* I had to ask FH1 as to what happens to the recyclable materials that comes from the food packages. FH1 stated that they now focus on recycling tins as a team as the learner does not collect them anymore: *"I take them and I give them to the women that we cook with, we recycle them together as it also reduces transport costs".*

As part of the implementation of the SISS-WMP, the SGB1 and SP1 had to contact the SDS within their local municipality in order to request skip bins, the collection of skip bins, as well as the deployment of EPWP quarterly at Emthini primary school. SGB1 indicated that the local municipality agreed to provide the school with the skip bin, which they would deliver and collect when it was full: *"I phoned the assistant manager; it just rang with no response. I phoned again. She said she would provide us with one bin, and she noted the name of the school down".*

Furthermore, business enterprises were contacted and SGB1 requested that they provide the school with recycling bins, collection of recyclable materials, and/or transportation. SGB1 stated that these solid waste management providers supplied them with a positive consideration:

"They said I must send an application to their email address. The application must reflect as many details about the school and its scope of recycling program as possible, total number of learners, school name, school location, and principal input, then they will take things from there".

The proposal letters that were sent to business enterprises by SGB1 are attached in Appendix 29.

9.2.2. DATA DISCUSSION AND FINDINGS: SHAPING

GW1 felt it was critical to propose that the SP1 and SGB1 purchase plastic bins for the school as they do not rust, as a means to facilitate solid waste management. Even Gayanthika et al. (2019) emphasized the significance of bins, describing them as the optimal option for waste management. According to Viljoen et al. (2021) dustbins does not only help decrease solid waste and aid the environment; they also improve the aesthetics by providing a convenient location for individuals to dispose their solid waste. This was similar to what FH1 and EL4 indicated when they stated that there had been improvements to school cleanliness as a result of their usage of the new plastic bins.

What FH1 and EL4 mentioned was consistent with what I witnessed as numerous stakeholders used the new plastic bins easily in a way that helped favourably to keeping the school and classroom environment clean. Furthermore, FH1 mentioned that they now recycle tins as a team amongst food handlers. This means that the food handlers have taken this approach to manage solid waste. Additionally, they assert that this will reduce transport costs which is also alluded to by Wheat et al. (2019).

SP1 said that they were forced to engage EAs to assist with waste management in order to keep the school looking clean and distinguishable as a school. This demonstrated unequivocally that collaborating to finish a job increases productivity (Middleton, 2022). SGB1 continued by stating that they chose to include the SISS-WMP into an existing committee to ensure efficient management and that they will alter policy to reflect such. For the committee to be effective, Pholose (2019) proposed that committees be backed up with policies to ensure their effectiveness.

SGB1 contacted the local municipality's solid waste management company to request skip bins and recycling bins, as well as collection and/or transportation

of recyclable materials. The local municipality's SDS offered to provide, but the solid waste management businesses wanted a letter of proposal from Emthini primary school. The proposal letter succinctly stated and articulated the school's requirements of the solid waste management firms (Frits, 2020). It was the provision of recycling bins, the collection and/or transportation of recyclable items in this context as a means of dealing with solid waste management (Manoj, 2016).

From the data presented and its discussion, the internal and external stakeholders had a role to play. Internally, the SGB1, SP1, FH1, GW1, EL4, EL5 and EL6 performed their roles in one way or the other. Externally the SDS also came on board. The following justifies my inferences:

- They purchased new plastic bins to replace the metal bins which were rusting.
- The school yard and classrooms which were dirty before the intervention were now clean.
- The food handlers undertook to recycle the waste they generated as a team.
- EA's also added man power in maintaining the school's cleanliness.
- The SISS-WMP was merged into the existing committee to make it effective.
- The division of the SDS in the local municipality which manages waste and the EPWP programme promised to give them skip bins.
- Business enterprises that offer services in the area where the school is found responded and promised to give them the recycling bins.

However, it is fair to indicate that the SISS-WMP is largely anchored on the role of the internal stakeholders and if they do not perform it could lead to challenges as outlined in the next section. Yet even if the internal stakeholders do what is expected of them it is not a guarantee that external stakeholders would agree to their requests.

9.2.3. DATA PRESENTATION: CHALLENGES

There were challenges at Emthini primary school when it came to the implementation of the SISS-WMP. SGB1 stated that they were unable to get hold of the solid waste management representatives at the district level and within their local municipality to come to school and raise awareness and teach them about solid waste management: *"I called the district and the municipality, the phone just rings"*. SP1 indicated that they also called a warehouse to request building materials for the storage, but the telephone was on voicemail: *"I called the warehouse but it was on voicemail"*. SGB1 suggested that he will go to the warehouse as it was nearby, but he did not go. When I asked why SGB1 stated that: *"I did not get a chance."*

SGB1 informed me that he had to contact another company and request that they supply the school with the container for storage purposes. However, SGB1 alluded that the response from the container company was negative: *"I phoned the company and they said they sell it. If we want a donation, we must ask the government and he hung up"*. I asked about the progress in regards to the deployment of EPWPs at the school, SGB1 said he forgot to ask the SDS in the local municipality to deploy the EPWPs when he asked for the skip bins: *"Ey I forgot about those ones"*.

A few weeks later, I contacted the SP1 to enquire about the progress regarding the implementation of the SISS-WMP. The SP1 mentioned that: *"The SGB chairperson is the one who has a report, did you try to contact him?"*. I told SP1 that I had contacted the SGB1, but his cell phone was switched off. SP1 then gave me SGB1's alternative contact details. I called SGB1 and he answered. I then asked about the progress regarding any developments in relations to the implementation of the SISS-WMP. SGB1 stated: *"Ey, I am a bit busy now. I will arrange a day to report back, let us say the following day in the morning"*. I went to Emthini primary school the following day; however, SGB1 was nowhere to be found and his cell phone was switched off. I called for a period of two weeks, but SGB1 never got back to me to give me a brief report about SISS-WMP implementation.

During observations, one of the notable concerns that I noted at Emthini primary school was how the dumping site for open burning of solid waste escalated compared to when I collected data for phase one in Picture E and during phase two of the implementation of the SISS-WMP in Picture F:

Picture E: Before



Picture F: After



When I asked what could be the reason behind these enormous changes, GW1 mentioned that when the new plastic bins were full, they would dispose the solid waste in the new dumping site where they dug a hole for the open burning of solid waste: *"We dug a hole, we throw away papers, then when it is too much, we burn them"*. EL6 concurred.

9.2.4. DATA DISCUSSION AND FINDINGS: CHALLENGES

The SGB1 and SP1 could not get through to the solid waste management representatives at the district level and local municipality as the phones rang unanswered. This was a disappointment in terms of the SISS-WMP as the solid waste management representatives were supposed to teach them about solid waste management. However, this was not surprising as Ntuli (2020) alluded that local municipalities' operators usually do not answer calls.

Furthermore, SGB1 contacted the business enterprises to request a storage container to store the recyclable materials. However, he was informed that he must contact the government. This was shocking because most businesses are motivated to give donations as they reduce the tax that they are supposed to pay to the South African Revenue Services (SARS, 2021).

The SISS-WMP can only be effective when all stakeholders play their roles. In this case the SGB1 did not perform all that was expected of him. At Emthini primary school SGB1 was nowhere to be found when he had to report back on the progress made in relations to the implementation of the SISS-WMP. For example, he was supposed to contact the SDS in the local municipality to request EPWP deployment at the school. On the other days he would indicate that he had forgotten. Even Mohapi and Netshitangani (2018) indicated that SGB members unintentionally or intentionally shift their governance roles and responsibilities to principals to avoid implementing policies.

It is also imperative to reflect that this school did not completely change its previous ways of managing waste. I noted that the school still disposed the solid waste in a hole and burning it. GW1 mentioned that when new plastic bins were full he was informed to dig a hole and dispose the solid waste and burn it. However, Vongdala et al. (2019) indicated that digging a hole was not effective because it was not controlled and monitored. Even though open burning was done to reduce quantity of solid waste it has a negative impact on the environment as it releases different types of toxic pollutants into the air and can also worsen water pollution, soil pollution and food contamination (Cogut, 2016).

From the data presented and discussed on the category of challenges one can infer that the implementation of the SISS-WMP was not totally effective in this school. The following supports my assertions:

- There was lack of response from the solid waste management representatives at the district and local municipality level.
- Unsupportive behaviour from the business enterprises.
- Internal stakeholders not performing their roles.
- Lack of appreciation and embracing of the SISS-WMP.

9.3. TJALA PRIMARY SCHOOL

Data was organized using the following theme; implementation of the SISS-WMP which was unpacked using the following categories; shaping and challenges.

9.3.1. DATA PRESENTATION: SHAPING

Having developed the SISS-WMP in primary schools, it was imperative for me to have an idea of how the implemented SISS-WMP shaped the management of solid waste at Tjala primary school. During observations that took place in phase two, which occurred during the instantaneous implementation of the SISS-WMP, I noted changes in how Tjala primary school shaped their management of solid waste. As part of the SISS-WMP, SP2 and SGB2 had to contact the SDS in the local municipality for the purposes of requesting a skip bin, collecting the skip bin, and deploying EPWP quarterly at the school.

The SP2 stated that the SDS in the local municipality was contacted and the response from the SDS was positive: *"They were positive as if they were waiting for us to call them, even though after we talked with them only three or four days passed and the skip bin arrived"*. I asked SP2 if they had requested the SDS to deploy the EPWP quarterly at the school. SP2 stated that: *"No, we did talk about that. They said they would give me answers, but they were positive"*. Picture A and B displayed the skip bin supplied by the SDS in the local municipality:

Picture A: Skip bin



Picture B: Skip bin



I noted that the stakeholders had already started using the skip bin. Furthermore, the school environment was indeed inviting, as displayed in Picture C and D:

Picture C: School environment



Picture D: School environment



This led me to find out how the SISS-WMP shaped their practices for solid waste management. GW2 stated that the skip bin that was supplied by the local municipality assisted him to stop the open burning of solid waste: *"Yes, there is a huge difference because now I do not burn things anymore since the bin arrived"*. What was said by GW2 was similar to what T2 stated:

"The learners are responsible for waste management things and its stuff that is more responsible compared to what it was before. There are new strategies that have been developed to keep the waste management thing going and we now have a new bin that makes it easier for us to collect and keep all the waste that we find, that we create around the school yard or in the classroom as well. They are actually more cautious now about dealing with waste because we find fewer papers on the floor in the classrooms and less waste material around the school yard, and I can also see that there is a difference."

The FH2 added that: *"Learners do clean up after themselves now, and they put everything in the box, and when there are late comers, the SGB2 makes them pick up papers across the school yard, so the difference will be there"*. Similar to TL5 and TL6 as they stated that: *"They make us pick papers when we are late."*-TL5 and *"Principal told us to use the dustbin every day."*-TL6.

T2 further mentioned that SP2 did have a meeting with the staff in order to deliberate on other strategies to manage solid waste:

"I think the next phase is going to be about sorting out materials. Like the principal mentioned in our staff meeting, we have to sort out materials and maybe have plastics on the side, papers, bottles, boxes, and they will be taken in for recycling and then yah yah. I think that the next phase is because that is the only thing that has not happened for now. But when it comes to cleanliness, it is always proper and I also dealt with issues of the sports field at the ground because it was a mess during the athletics that we hosted. I spoke to the principal and suggested that I take one class at least to assist in the afternoon. I think in 35 minutes we were done"

Furthermore, SP2 indicated that the safety committee of the school was delegated to facilitate the future communication of the strategy implementation: *"But I gave the task to the safety committee, although I said the most initial calls will be done by me and maybe SGB, but they will communicate with the safety committee in the future".*

9.3.2. DATA DISCUSSION AND FINDINGS: SHAPING

As part of the SISS-WMP implementation, SP2 contacted the SDS in the local municipality and requested a skip bin from them. The response from the local municipality was positive as they delivered the skip bin and also assured the SP2 and SGB2 that they would collect it all the time when it is full. During observation, I noted that the skip bin was indeed delivered at Tjala primary school and various stakeholders ensured that they used the skip bin effectively for disposal of solid waste. GW2 stated that the skip bin that was supplied by the local municipality helped him to stop the open burning of solid waste. However, Rosenthal and Linder (2021) did not think this is a good approach as it is less convenient as it increases the contamination of the recyclable materials in the skip bin.

T2 stated that learners were now responsible for waste management compared to what it was before. There were new strategies that had been developed to keep the waste management going. This clearly indicated that solid waste management knowledge levels had increased and behaviour had changed positively (Aksan and Çelikler, 2019). T2 added that the new bin made it easier

for them to collect and keep the waste. Even Nyampundu et al. (2020) concurs solid waste needs to be collected and stored. According to Manoj (2016) recycling is considered one of the 3R's strategies for solid waste management. This led SP2 to host a meeting with the staff members in order to deliberate on other strategies such as recycling in order to manage solid waste, which will be facilitated by the safety committee of the school.

From the data presented and discussed on the category of shaping one can reflect that even though the SISS-WMP involves internal and external stakeholders, in this case the internal stakeholders were more prominent. The following supports my assertions:

- Internal stakeholders changed their behaviour towards solid waste management. For instance; learners were now disposing solid waste in boxes provided for them in the classrooms; the school principal shared with the staff members other waste management strategies provoked by the SISS-WMP; the skip bin encouraged zero burning of solid waste as the GW2 does not burn solid waste anymore but dispose it in the skip bin; and a school safety committee was assigned with the responsibility of solid waste management.
- The SDS in the local municipality supplied them with skip bin and assured them that they would collect it when it is full.

It follows then that it seems as if the SISS-WMP to be effective, the internal stakeholders need to perform their roles efficiently or there will be challenges with implementation as outlined in the next section.

9.3.3. DATA PRESENTATION: CHALLENGES

There were challenges at Tjala primary school when it came to the implementation of the SISS-WMP. The SGB2 stated that the district office did not answer the phone. While the local municipality said that they would get back to her when SGB2 requested the representatives within the local

municipality to come to school and teach them about solid waste management: "They did not answer and the municipality said they would call me but I am still waiting". I had to ask the SP2 whether there had been any progress made in relation to contacting the business enterprises to request the supply of recycling bins, collection, transportation, containers for storage and/or storage building materials. SP2 mentioned that:

"No, we have not called them yet. I said, "Let us start with this one of the skip bins, and while we are handling that one and seeing that we have a skip bin, we can start contacting the outstanding ones to see how they can help us." We have an upcoming meeting with the SGB, so we will talk about this and share ideas before we can begin calling those businesses"

9.3.4. DATA DISCUSSION AND FINDINGS: CHALLENGES

The SGB2 stated that they contacted the district, but they did not answer the phone while the local municipality said that they would call them back, which they did not (Ntuli, 2020). While SP2 stated that the business enterprises were not contacted.

From the data presented and discussed on the category of challenges it should be indicated that the implementation of the SISS-WMP was not without faults. The following supports my assertions:

- The solid waste management representatives at the district and local municipality level were contacted however, they did not answer their phones.
- The business enterprises as suggested by SISS-WMP were not contacted by SP2.

It is prudent to postulate that these challenges emanated from the inactivity of the internal stakeholder. Furthermore, it was also the external stakeholders who did not respond to the call.

9.4. VUNA PRIMARY SCHOOL

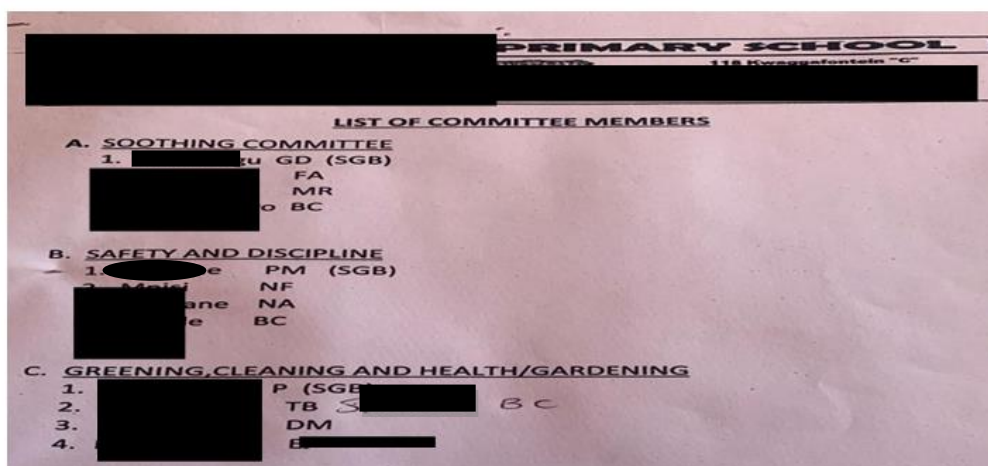
Data was organized using the following theme; implementation of the SISS-WMP which was unpacked using the following categories; shaping and challenges.

9.4.1. DATA PRESENTATION: SHAPING

Having developed the SISS-WMP in primary schools, it was imperative for me to have an idea of how the implemented SISS-WMP shaped the management of solid waste at Vuna primary school. During observations that took place in phase two, which occurred during the instantaneous implementation of the SISS-WMP, I noted changes in how Vuna primary school shaped their management of solid waste. As part of the SISS-WMP, it was suggested that a committee that focuses on solid waste management at the school be established.

T3 stated that they managed to establish a committee called "Greening, cleaning, and health/gardening": *"There is a committee for safety and there is a new committee for greening and gardening that is responsible for making sure that the school is clean"*. SP3 added that the established committees must be fully functional: *"School committees need to be functional and report back to the SGB so that waste is managed collectively here"*. Picture A presented the committee members for the greening, cleaning, and health/garden was established by the school.

Picture A: committee for greening, cleaning and health/gardening



As stated by the greening, cleaning, and health/gardening committee, T3 stated that every teacher who facilitated a school assembly in the morning had a responsibility to remind everyone to use the bins provided when disposing solid waste: *"When you hold an assembly, you are supposed to remind learners to use the bins"*. This was similar to what was said by FH3 and VL5: *"They tell them at assembly."*-FH3 and *"during assembly, they talk to us about dustbins."*-VL5.

I also noted that the school environment was clean compared to phase one of data collection, as seen in Picture B, D, and F, which were taken during phase one of data collection and Picture C, E, and G, which were taken during phase two of the implementation of the SISS-WMP:

Picture B: Before



Picture C: After



Picture D: Before



Picture E: After



Picture F: Before



Picture G: After



This led me to find out how the SISS-WMP shaped their practices for solid waste management. GW3 stated that they cleaned up the whole school with

the help of EA's: *"We cleaned up with the EA's"*. Similar to SP3, FH3 and T3 as they stated that GW1 received assistance from EA's and other GW's towards ensuring that the school environment was always clean as stated: *"We now have a lot of EA's that help us."*-SP3; *"There are assistants that helped."*-FH3 and *"Uncle now has people who offer assistance and even the street vendors now clean every day after selling their products ever since the school principal called them into order."*-T3.

SGB3 further added that the SISS-WMP provoked a lot of ideas regarding the management of solid waste at Vuna primary school:

"So, the letter must be submitted so that we are able to reflect on your research again because the issue of cleaning campaigns, parents, and stakeholders must be presented as well, so that we provoke ideas because we mentioned cleaning campaigns that need parents' commitment. Maybe once a week or two weeks we clean up. If it were possible, we could have a campaign that is recycling, like tins, which must be separated from waste. That is the only way we are going to approach the program, but your research is smooth now because it provokes many ideas now and usually it is possible."

9.4.2. DATA DISCUSSION AND FINDINGS: SHAPING

As part of the SISS-WMP implementation, Vuna primary school stakeholders had to establish a solid waste management committee. T3 stated that they managed to establish a committee called "Greening, cleaning, and health/gardening" that is responsible for making sure that the school environment is clean. SP3 added that the established committees must be fully functional and report to the SGB. Mawela (2016) recommended that school principals, teachers, and SGB members develop a policy on environmental education in schools. Hence, it is imperative for schools to have waste management policies in order to be able to reduce the environmental impact of solid waste (Ferronato & Torretta, 2017).

T3 indicated that they also ensured that they reminded learners during assembly every morning to make use of the available dustbins in order to reduce littering. This contributed to the positive change in attitude and behaviour towards littering as stakeholders were now aware of the negative impact that solid waste has on the environment (Ahmed & Gambo, 2014). I noted that the school environment was very clean. SP3, FH3, and T3 stated that it was GW3 and the EA's that cleaned up the whole school. This indicated that stakeholders were encouraged to be active participants in solving environmental issues related to solid waste (Filho & Pace, 2016).

SGB3 further added that the SISS-WMP provoked a lot of ideas, such as establishing a cleaning campaign with parents to manage solid waste at Vuna primary school. This was similar to Thor and Karlsudd (2020) who stated that it is important to focus on teaching and fostering environmental awareness activities for action-oriented environmental education.

From the data presented and discussed on the category of shaping, it should be indicated that the implementation of the SISS-WMP was deliberately executed by the internal stakeholders. Their thinking was that they need to take their time with consultative processes. I can then infer that in terms of the internal stakeholders its implementation was effective. The following supports my assertions:

- A "greening, cleaning, and health/gardening" committee was established.
- Stakeholders changed their behaviour towards solid waste management as teachers used assembly to encourage learners to stop littering and reminding them to utilize the bins made available for them.
- EA's assisted GW3 with cleaning up the school.
- SGB3 recommended a cleaning campaign involving parents be implemented.

9.4.3. DATA PRESENTATION: CHALLENGES

There were challenges at Vuna primary school when it came to the implementation of the SISS-WMP. Before the implementation of the SISS-WMP, SP3 stated that they wanted to inform the parents first: *"The SGB organized a parents' meeting and we are going to include your strategy in the agenda."*-SP3. SGB3 stated that they did not contact any of the stakeholders as they wanted to do things in a professional way and also informed the parents during the parents' meeting about the implementation of the SISS-WMP:

"No, we did not contact anyone because we want to do it very professionally such that it looks like it comes from the school SGB and we give our recommendations. Maybe you can present them from one to five. Then we request a big bin from the municipality. We also request the members of the EPWP that they should avail themselves and that the municipality provide service from this program of EPWP at least once a month." If they are able to provide one or two EPWP to the community, it means it is possible to also help schools. Now we have a process of doing that. Then again, we are going to meet as we are going to prepare for the parents' meeting, which is scheduled for this week. So, the letter must be submitted so that we are able to reflect on your research again."

During observations, one of the notable concerns that I noted at Vuna primary school was that they moved the dumping site for open burning of solid waste into a different place and it had enormous solid waste compared to when I collected data for phase one, as seen in Picture H, which was before, and Picture I, during phase two of the implementation of the SISS-WMP:

Picture H: Before



Picture I: After



I asked GW3 as to why they moved the dumping site for open burning of waste from where it was before. GW3 stated that teachers requested for it to be moved to a different place as the open burning site was next to the classes and the polluted air affected the teacher's health in a negative way:

"We moved there because the teachers said it was next to the classes. There was a teacher. Whenever we burned papers, she would tell me to go and stop the fire because she was suffering from asthma and sinuses. Unfortunately, she is no longer with us. She passed away last year. She was a vice principal".

9.4.4. DATA DISCUSSION AND FINDINGS: CHALLENGES

SGB3 stated that they did not contact any of the stakeholders as they wanted to do things in a professional way and inform the parents during the parents' meeting, which resulted in partial implementation of the SISS-WMP. Even though they indicated that they want to consult external stakeholders professionally they still continued with their old practices of open burning of solid waste.

Incineration is one of the most common methods of dealing with solid waste (Cho, 2020; Abdel-Shafy & Mansour, 2018). Hence, this approach was still evident at Vuna primary school which resulted in a negative impact whereby it affected the health of the deputy principal who has now passed on. This was a clear indication that open burning of waste does not only result in air pollution but also affects human beings, living and non-living things (Manisalidis et al., 2020; Vongdala et al., 2019). As a result, Patil et al. (2014) propose that when choosing open burning of solid waste as an alternative, one should consider factors such as the amount of solid waste generated, the location of the site, human beings, and the heat of waste combustion.

From the data presented and discussed on the category of challenges it should be indicated that the implementation of the SISS-WMP was partially implemented. The following supports my assertions:

- The SDS in the local municipality, solid waste management representatives at the district and local municipality level, and the business enterprises were not contacted. The SGB3 presented the SISS-WMP to the SGB representatives of the school. However, there were questions that they could not respond to. As a results they invited me to come and clarify the questions which were posed to them. After this discussion the SGB3 indicated that they will do consultations with all the other stakeholders of the school to appraise them about the SISS-WMP. However, due to the instantaneous nature of the implementation what resulted from the consultations and way forward was not factored in this study. But it should be factored in future research.
- Vuna primary school continued with the opening burning of solid waste regardless of the negative impact it had on the deputy principal who passed on.

From the above assentation's it could be concluded then, that for the SISS-WMP to be effective the internal stakeholders need to embrace it and make it a living strategy.

9.5. CONCLUSION

The Instantaneous Implementation of the SISS-WMP chapter, presented and discussed the implemented SISS-WMP in three primary schools. The next chapter, presents, The Destination.

CHAPTER 10: THE DESTINATION

“Research is to see what everybody else has seen, and to think what nobody else has thought”. –Albert Szent-Gyorgyi

10.1. INTRODUCTION

The previous chapter presented and discussed findings of the instantaneous implementation of the SISS-WMP in three primary schools. The Destination chapter presents the answers to the research questions, main contributions, and shortcomings and concluded with the recommendations.

10.2. RESEARCH QUESTIONS

My research was guided by the need to develop and implement a sustainable intervention strategy for solid waste management in primary schools. This was prompted by anecdotal evidence from observing some schools in the Nkangala district of the Mpumalanga province. Teaching and learning would place amidst the polluted environment with no concerns of its effects. Furthermore, there was minimal or no waste management practices in these schools. The following research questions guided the research:

1. Why did the stakeholders in primary schools shape the solid waste management practices the way they did?
2. How was the development of the SISS-WMP?
3. How was the implementation of the SISS-WMP?

Below are the answers to the research questions:

10.2.1 Why did the stakeholders in primary schools shape the solid waste management practices the way they did?

It was imperative for me to comprehend how stakeholders of Emthini, Tjala and Vuna primary schools understood the concepts of solid waste and the environment, as these concepts shaped their solid waste management

practices. The stakeholders' understanding of solid waste and environmental concepts was different from one stakeholder to the other, as per primary school.

At Emthini primary school, some stakeholders indicated that solid waste is materials that gets to be destroyed and thrown away as they are no longer useful. While some stakeholders could not explain the concept of solid waste since they indicated that it is important to stay in a clean environment. Furthermore, some stakeholders indicated that environment is our surroundings whilst others could not explain what it is.

At Tjala primary school, some stakeholders indicated that solid waste are materials that needs to be thrown away which are no longer needed whilst others can be used again. While some stakeholders could not explain what it is but simply translated it into their home language. Others mentioned that solid waste is like wasting food. Furthermore, some stakeholders explained environment as a place where people live which consists of everything around them whilst others could not explain what it is.

At Vuna primary school, some stakeholders explained solid waste as anything that can no longer be used which must be thrown away whilst some stakeholders' simply highlighted examples of solid waste. Furthermore, some stakeholders instead of explaining solid waste, they stated that it focuses on maintaining the school cleanliness. With regards to the environment, some stakeholders explained the environment as our surroundings and a place where we live as human beings, while others could not explain what it is.

In these three primary schools the stakeholders were aware of the type of solid waste that they generated. Now that the nature of solid waste that was generated in these three primary schools was established, it was important to investigate the patterns of when that solid waste was generated. All these primary schools generated solid waste during the day-to-day activities that occurred. In the morning, when food handlers were cooking. Throughout teaching and learning during school time. During lunch breaks, amongst

various stakeholders and street vendors. As well as in the afternoon, when classrooms were being cleaned.

These three primary schools attempted to manage solid waste using wrong methods such as open burning of waste. Even though they had the installation of signage for school safety rules, school safety and security policy (Appendix 10, 11 and 12), classroom policies, three metal rubbish bins, these did not deter the generation of solid waste in the school. Moreover, Tjala primary school had the following unique approaches to manage solid waste; refuse bags in school blocks, recycling, storage, integrating environmental education during teaching and learning, but these still did not deter the generation of solid waste in the school. Vuna primary school even tried to use the digging of a hole and boxes used as bins in the classroom but still, these did not deter the generation of solid waste in the school.

Their approaches to solid waste management was not surprising as it was based on their understanding of what environment is, solid waste and solid waste management. Not all stakeholders from these schools understood these concepts or the significance of solid waste management. Consequently, these stakeholders generated enormous solid waste continuously without effective solid waste management practices. With these many commonalities on how they understood what environment is, solid waste and solid waste management, it was a good micro foundation for the development of the SISS-WMP.

10.2.2. How was the development of the SISS-WMP?

The development of the SISS-WMP was enshrined on the opportunities available from these primary schools. These opportunities emanated from the challenges that led these primary schools' stakeholders to manage the solid waste the way they did. There was a need to replace metal bins with plastic bins (**business enterprises**) as they were exposed to rust. Furthermore, a skip bin (**SDS in the local municipality**) was necessary for non-recyclable solid waste which would be collected by the local municipality. There was also an

opportunity to request the EPWP to assist with solid waste management in the schools **(SDS in the local municipality)**. A nearby recycling depot would assist by reducing transportation costs **(business enterprises)**.

It was also essential to have a storage for solid waste at the school **(business enterprises)** for the recyclable solid waste. It was also imperative for the internal stakeholders to be educated about the environment **(solid waste management representatives)** as they showed that they do not understand concepts such as environment, solid waste and solid waste management. This was also going to address their thinking that solid waste management in school premises is for the general workers only. The strategy would not have been complete without the significant role by the internal stakeholders, which would demand consistency, commitment and positive mentality from them.

Consequently, the SISS-WMP involved the internal and external stakeholders which were solid waste management representatives from the district and the local municipality; the division for SDS in the local municipality; business enterprises and internal stakeholders such as teachers, SGB representatives, school principals, food handlers, general workers, and learners.

10.2.3. How was the implementation of the SISS-WMP?

Table 20 presented how the implementation of the SISS-WMP was.

Table 20 implementation of the SISS-WMP (Sikhosana, 2022).

EMTHINI PRIMARY SCHOOL
<p>The internal and external stakeholders had a role to play. Internally, some stakeholders performed their roles in one way or the other. Externally the SDS also came on board. The following manifested:</p> <ul style="list-style-type: none">• They purchased new plastic bins to replace the metal bins which were rusting.• The school yard and classrooms which were dirty before the intervention were now clean.

- The food handlers undertook to recycle the waste they generated as a team.
- EA's also added man power in maintaining the school's cleanliness.
- The SISS-WMP was merged into the existing committee to make it effective.
- The division of the SDS in the local municipality which manages waste and the EPWP programme promised to give them skip bins.
- Business enterprises that offer services in the area where the school is found responded and promised to give them the recycling bins.

However, it is fair to indicate that the SISS-WMP is largely anchored on the role of the internal stakeholders and if they do not perform it could lead to challenges as outlined below. Yet even if the internal stakeholders do what is expected of them it is not a guarantee that external stakeholders would agree to their requests.

The implementation of the SISS-WMP was not totally effective in this school because:

- There was lack of response from the solid waste management representatives at the district and local municipality level.
- Unsupportive behaviour from the business enterprises.
- Internal stakeholders not performing their roles.
- Lack of appreciation and embracing of the SISS-WMP.

TJALA PRIMARY SCHOOL

One can reflect that even though the SISS-WMP involves internal and external stakeholders, in this case the internal stakeholders were more prominent. The following happened:

- Internal stakeholders changed their behaviour towards solid waste management. For instance; learners were now disposing solid waste in boxes provided for them in the classrooms; the school principal shared with the staff members other waste management strategies provoked by the SISS-WMP; the skip bin encouraged zero burning of solid waste as the GW2 does not burn solid waste anymore but dispose it in the skip bin; and a school safety committee was assigned with the responsibility of solid waste management.
- The SDS in the local municipality supplied them with skip bin and assured them that they would collect it when it is full.

It follows then that it seems as if the SISS-WMP to be effective, the internal stakeholders need to perform their roles efficiently or there will be challenges with implementation as outlined below.

It should be indicated that the implementation of the SISS-WMP was not without faults. The following manifested:

- The solid waste management representatives at the district and local municipality level were contacted however, they did not answer their phones.
- The business enterprises as suggested by SISS-WMP were not contacted by SP2.

It is prudent to postulate that these challenges emanated from the inactivity of the internal stakeholder. Furthermore, it was also the external stakeholders who did not respond to the call.

VUNA PRIMARY SCHOOL

It should be indicated that the implementation of the SISS-WMP was deliberately executed by the internal stakeholders. Their thinking was that they need to take their time with consultative processes. I can then infer that in terms of the internal stakeholders its implementation was effective. The following manifested:

- A "greening, cleaning, and health/gardening" committee was established.
- Stakeholders changed their behaviour towards solid waste management as teachers used assembly to encourage learners to stop littering and reminding them to utilize the bins made available for them.
- EA's assisted GW3 with cleaning up the school.
- SGB3 recommended a cleaning campaign involving parents be implemented.

It should be indicated that the implementation of the SISS-WMP was partially implemented because:

- The SDS in the local municipality, solid waste management representatives at the district and local municipality level, and the business enterprises were not contacted. The SGB3 presented the SISS-WMP to the SGB representatives of the school. However, there were questions that they could not respond to. As a results they invited me to come and clarify the questions which were posed

to them. After this discussion the SGB3 indicated that they will do consultations with all the other stakeholders of the school to appraise them about the SISS-WMP. However, due to the instantaneous nature of the implementation what resulted from the consultations and way forward was not factored in this study. But it should be factored in future research.

- Vuna primary school continued with the opening burning of solid waste regardless of the negative impact it had on the deputy principal who passed on.

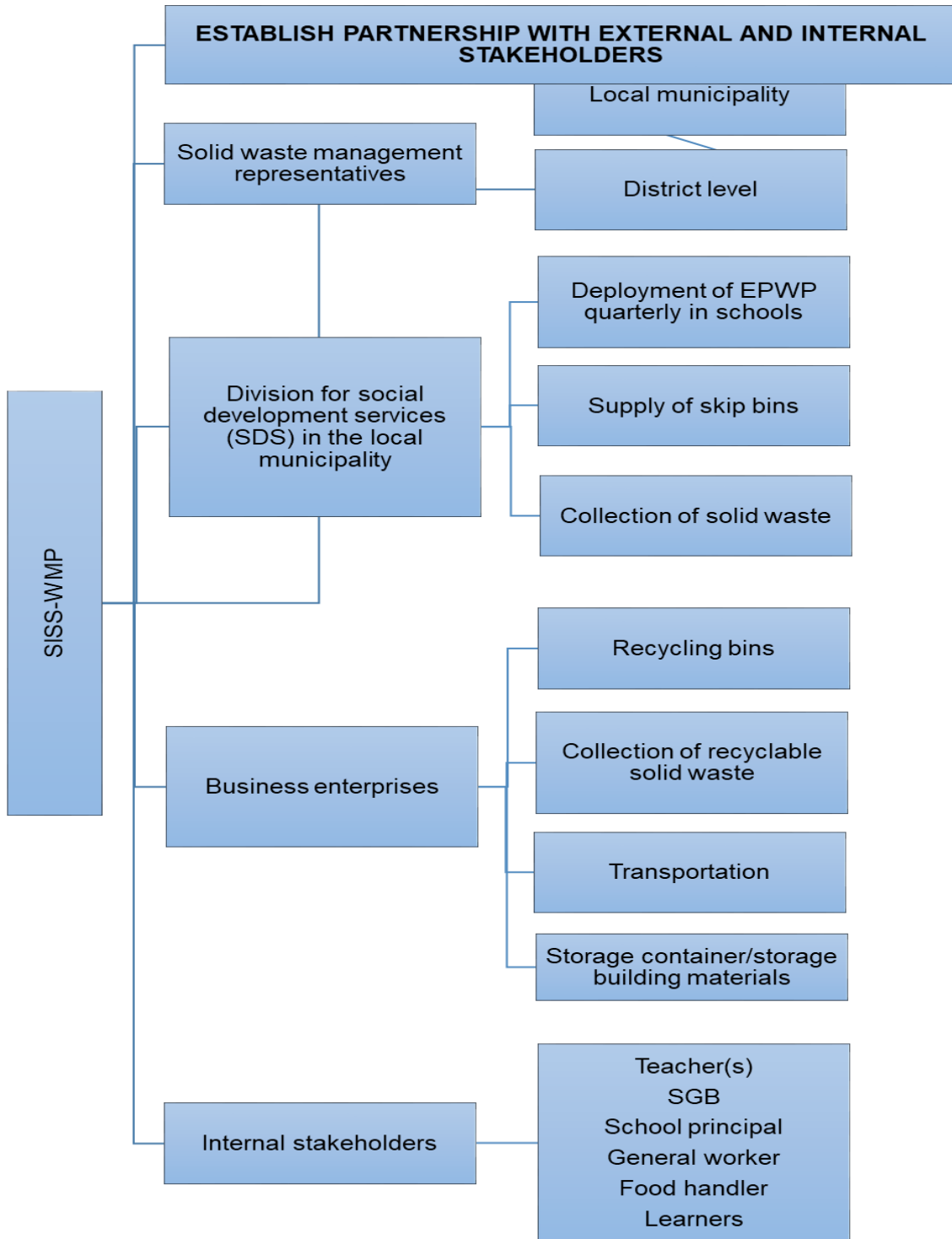
From the above assentation's it could be concluded then, that for the SISS-WMP to be effective the internal stakeholders need to embrace it and make it a living strategy.

10.3. MAIN CONTRIBUTIONS

The waste management initiatives from various countries across the world involved internal stakeholders and external stakeholders such as government, teachers and learners. Some of these initiatives were promulgated as laws and regulations and some required voluntary participation. Generally, intervention strategies in South Africa were not sustainable and they were more of competitions. The developed strategy in this study which is the SISS-WMP differs from all the other strategies as it has its micro foundation from the understanding of concepts such as environment, solid waste and solid waste management by stakeholders. Moreover, the SISS-WMP (Diagram 11) focused on establishing partnerships with relevant internal and external stakeholders to manage solid waste. It is also a voluntary initiative.

This was done with the aim of ensuring that solid waste in primary schools could be managed at a low cost and in the most effective and efficient way. By so doing, the SISS-WMP could assist in ensuring that solid waste generated in schools is reduced, reused, and recycled where possible while imparting knowledge about solid waste management.

Diagram 11 the SISS-WMP (Sikhosana, 2022).



The SISS-WMP focused on establishing partnerships with external and internal stakeholders such as solid waste management representatives, a division for SDS in the local municipality, business enterprises, and internal stakeholders for establishing a committee for solid waste management in schools.

Establishing a working relationship with the local authorities and/or waste management representatives could assist in educating stakeholders in schools about solid waste management and the importance of sustaining the environment.

Furthermore, establishing a sustainable partnership with the local municipality was imperative towards the development of the SISS-WMP because of the SDS that the local municipalities are obliged to offer the communities at large. The intervention of the local municipality in this case was through the supply of skip bins in schools so that solid waste that was classified as non-recyclable and could not be subjected to recycling anymore could be disposed in these bins, which would be collected by the local municipality when they are full.

The benefits of supplying the skip bins in these primary schools should be solid waste reduction, as the amount of solid waste in school dumping sites could be reduced and removed from sites. The skip bins would also discourage burning of solid waste. Furthermore, within the local municipalities, there is an EPWP focused on waste management that is facilitated by municipalities within the waste management units (Department of Public Works and Infrastructure, 2018). The EPWP's could be deployed to schools to facilitate the management of solid waste.

Deploying EPWP members once every term in schools should contribute towards maintaining the cleanliness of the school environment, minimizing risks associated with solid waste generation and enhancing environmental practices that are sustainable.

The element of utilising the services offered by various business enterprises as part of SISS-WMP was shaped by the need to implement a sustainable recycling programme at a school level. The rationale behind this intervention was based on anecdotal evidence that numerous environmental programmes were introduced by various businesses in schools. However, these programs were not sustainable because these businesses only implemented them as part of their CSR projects on a one-time basis.

Therefore, utilizing the services offered by these various business enterprises as part of SISS-WMP could assist these schools to implement sustainable recycling programmes at a school level, which will be facilitated by the schools themselves. This can be implemented by requesting supplies of recycling bins in order for them to facilitate their own recycling programme, requesting the same businesses to collect the recyclable materials or providing them with transportation to transport these materials.

By establishing a committee for solid waste management in these primary schools, a significant contribution could be made towards the whole school's development. Whereby this committee will enhance participants' knowledge, skills, attitudes, participation, and values towards the environment. In order to keep and improve the environment, they could help each other develop a sense of responsibility and work together as a group, which would help them.

There were challenges in relation to the developed and implemented SISS-WMP such as internal stakeholder not contacting external stakeholders and external stakeholder's not responding to calls and some responding negatively. The challenge of the uncontactable external stakeholders could be resolved by visiting their offices. Therefore, the SISS-WMP is not being presented as alpha and omega of all the strategies but as an alternative strategy that is open to refinements. Moreover, it could serve as a micro foundation base for sustainable solid waste management approaches.

10.4. SHORTCOMINGS

My focus was on three cases from which their findings may not be generalized but helped in the development of the strategy which could be implemented anywhere. Furthermore, the advantage of using three cases offered in-depth analysis of each case.

10.5. RECOMMENDATIONS

This section presented the recommendations:

- Some participants did not have an adequate understanding of the concepts of the environment, solid waste, and solid waste management. Therefore, it is recommended that workshops be facilitated in order to educate these participants about these concepts. Understanding of these concepts should enhance appreciation of solid waste management and environmental education.
- Stakeholders from primary schools generated enormous amounts of solid waste through their day-to-day activities, which was disposed inappropriately. Therefore, it is recommended that the SISS-WMP be implemented for a longer period of time so that I can see if it can give the desired expectations, as the implementation of the SISS-WMP in this study was for a short period of time.
- The developed SISS-WMP was only implemented in three primary schools under the Kwaggafontein East circuit and Tweefontein South circuit in Nkangala district, Mpumalanga province. Therefore, it is recommended that the starting point of implementing the SISS-WMP be in the two circuits where these schools came from, that the SISS-WMP be presented to the circuit managers, and for them to appoint an environmental education practitioner to disseminate this information to all the schools from the two circuits to adopt the developed SISS-WMP in order to see its influence on a larger scale.
- The developed SISS-WMP showed that it is the duty and responsibility of the local municipalities to structure and manage their administration, budgeting, and planning processes to give priority to the basic needs of the community and to promote the social and economic development of the community. Therefore, it is recommended that local municipalities from these schools assist schools within their municipality with solid waste management as these schools are within the communities that they serve. The results that will come from them could also be shared with other local municipalities.

10.6. FURTHER STUDIES

- I focused on a specific band, which was the GET. Therefore, it is recommended that further studies be conducted in different contexts such as FET band, circuits, districts, provincially and in different countries across the world, as the results from these different environments could assist in fine-tuning the SISS-WMP.

10.7. CONCLUSION

The Destination chapter presented the summary of the development and implementation of the SISS-WMP in three primary schools. It discussed the main contributions and the shortcomings. It concluded with the recommendations.

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APPENDICES

APPENDIX 1: ETHICS CLEARANCE CERTIFICATE



UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2021/06/09

Ref: 2021/06/09/51994186/17/AM

Dear Ms L SIKHOSANA

Name: Ms L SIKHOSANA

Student No.: 51994186

Decision: Ethics Approval from
2021/06/09 to 2026/06/09

Researcher(s): Name: Ms L SIKHOSANA
E-mail address: 51994186@mylife.unisa.ac.za
Telephone: [REDACTED]

Supervisor(s): Name: PROF. AV MUDAU
E-mail address: mudauav@unisa.ac.za
Telephone: 012 429 6353

Title of research:

THE DEVELOPMENT AND IMPLEMENTATION OF THE SUSTAINABLE INTERVENTION STRATEGIES FOR SOLID WASTE MANAGEMENT IN PRIMARY SCHOOLS: A CASE OF NKANGALA DISTRICT, MPUMALANGA PROVINCE.

Qualification: PhD ENVIRONMENTAL EDUCATION

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2021/06/09 to 2026/06/09.

*The **medium risk** application was reviewed by the Ethics Review Committee on 2021/06/09 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached.
2. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.



University of South Africa
Pretter Street, Midrand, Johannesburg, City of Tshwane
PO Box 392 UNISA, 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

3. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
4. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
5. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
6. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
7. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
8. No field work activities may continue after the expiry date **2026/06/09**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

*The reference number **2021/06/09/51994186/17/AM** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Kind regards,



Prof AT Motlhabane
CHAIRPERSON: CEDU RERC
motlhat@unisa.ac.za



Prof PM Sebate
EXECUTIVE DEAN
Sebatpm@unisa.ac.za

APPENDIX 2: PROOF OF REGISTRATION



2348

SIKHOSANA L MISS
P O BOX 911-283
ROSSLYN
0200

STUDENT NUMBER : 51994186

ENQUIRIES TEL : 0861670411
FAX : (012)429-4150
eMAIL : mandd@unisa.ac.za

2021-05-07

Dear Student

I hereby confirm that you have been registered for the current academic year as follows:

CODE	PAPER	S NAME OF STUDY UNIT	NQF crdts	LANG.	PROVISIONAL EXAMINATION EXAM. DATE	EXAMINATION CENTRE (PLACE)
Proposed Qualification: PHD (EDUCATION) (90019)						
Study units registered without formal exams:						
TFENE01		PhD - Education (Environmental Education)	**	E		

You are referred to the "MyRegistration" brochure regarding fees that are forfeited on cancellation of any study units.

To avoid cancellation of your registration or examination entry and forfeiting your minimum initial payment, you must submit the following to the Registrar (Academic) by return of mail:

204 A copy of the transcript of your complete academic record(s), issued by the Registrar of the university/s previously attended by you.

Your attention is drawn to University rules and regulations (www.unisa.ac.za/register).

Please note the new requirements for reregistration and the number of credits per year which state that students registered for the first time from 2013, must complete 36 NQF credits in the first year of study, and thereafter must complete 48 NQF credits per year.

Students registered for the MBA, MBL and DBL degrees must visit the SBL's ESONline for study material and other important information.

Readmission rules for Honours: Note that in terms of the Unisa Admission Policy academic activity must be demonstrated to the satisfaction of the University during each year of study. If you fail to meet this requirement in the first year of study, you will be admitted to another year of study. After a second year of not demonstrating academic activity to the satisfaction of the University, you will not be re-admitted, except with the express approval of the Executive Dean of the College in which you are registered. Note too, that this study programme must be completed within three years. Non-compliance will result in your academic exclusion, and you will therefore not be allowed to re-register for a qualification at the same level on the National Qualifications Framework in the same College for a period of five years after such exclusion, after which you will have to re-apply for admission to any such qualification.

Readmission rules for M&D: Note that in terms of the Unisa Admission Policy, a candidate must complete a Master's qualification within three years. Under exceptional circumstances and on recommendation of the Executive Dean, a candidate may be allowed an extra (fourth) year to complete the qualification. For a Doctoral degree, a candidate must complete the study programme within six years. Under exceptional circumstances, and on recommendation by the Executive Dean, a candidate may be allowed an extra (seventh) year to complete the qualification.

BALANCE ON STUDY ACCOUNT: 0.00

Yours faithfully,

Prof M S Mothata
Registrar

0108 0 00 0



University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

APPENDIX 3:
**LETTER TO REQUEST PERMISSION FROM MPUMALANGA DEPARTMENT OF
EDUCATION (NKANGALA DISTRICT)**



**LETTER TO REQUEST PERMISSION FROM MPUMALANGA DEPARTMENT OF
EDUCATION**

Request for permission to conduct research at: Nkangala District

Research title: The development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

Date: 26 July 2021 – 2022

Request addressed to: District director

Department: Mpumalanga Department of Education

Contact details: xxxxxxxxxxx

Dear District Director

I, Lettah Sikhosana am doing research under supervision of Prof. AV Mudau, a Professor in the Department of Science and Technology towards a Doctor of Philosophy in Environmental Education at the University of South Africa. We are inviting you to participate in a study entitled the development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

The main aim of this research is to develop and implement sustainable intervention strategy for solid waste management in primary schools located under Nkangala district in Mpumalanga province.

Your district has been selected with the view that they could be dealing with the issues of environment differently in various areas.

The study will entail observations, semi-structured interviews, focus group interviews and a dairy as data collection techniques that school principals, school governing body

representatives, general workers, food handlers, intermediate phase teachers and grade 4, 5 and 6 learners will participate in. Participation in this study is strictly voluntary hence, every participant is allowed to discontinue their engagement should they feel uncomfortable. Before one can participate in this study, the researcher will issue them consent forms to sign and to explain the research process to ensure that they are aware of what is expected from them.

This study will be beneficial to the educational sector as it could contribute knowledge and skills towards solid waste management in schools' by developing a model for sustainable intervention strategy on solid waste management. The study could provide schools as a whole with opportunities to be actively involved in waste management initiatives as a resolution of the current environmental problems that they experience.

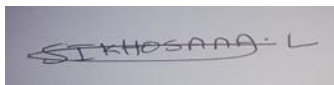
The study could arouse interest amongst the management of the school, teachers, learners and other stakeholders to acknowledge the importance of environmental education and the impact of sustainable intervention strategy on the management of solid waste. The study could also assist in identifying challenges and opportunities that schools experience in relations to waste management. Additionally, the findings coming from the study could be used basis for schools to work on their strengths and weaknesses in the endeavor to manage waste effectively.

There are no potential risks in the study.

There will be no reimbursement or any incentives for participation in the research.

Feedback of the study will be limited to participants who request them.

Yours sincerely

A rectangular box containing a handwritten signature in black ink. The signature appears to be 'Sikhosana L'.

Lettah Sikhosana

Researcher

APPENDIX 4:
MPUMALANGA DEPARTMENT OF EDUCATION (NKANGALA DISTRICT)
APPROVAL LETTER



education
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

Ikhomanga Building, Government Boulevard, Riverside Park, Mpumalanga Province
Private Bag X11341, Mbombela, 1203.
Tel: 013 768 5552/5116. Toll Free Line: 0800 233 116

Litiko le Temfundvo, Linyango we Fundo

Departament van Onderwys

Ndzawulo ya Dyondzo

Enquiries : DM Maja
Tel : 013 947 1701/1710
Email : D.Maja@mpsuedu.gov.za

Ms. L. Sikhosana



51994186@mylife.unisa.ac.za

Dear Madam

RE: ACADEMIC RESEARCH PERMISSION: LETTAH SIKHOSANA, UNISA.

The above matter refers.

The above-mentioned student is studying towards a Doctor of Philosophy in Environmental Education with the University of South Africa (UNISA) under the academic supervision of Prof Awelani V Mudau, in the Department of Science & Technology.

Lettah Sikhosana is granted permission to conduct research on her study, titled:

“The Development and implementation of the sustainable intervention strategies for solid waste management in primary schools: A case of Nkangala District, Mpumalanga Province”.

Kindly note that permission is granted for access to and interaction with the primary schools in the Nkangala District as per your request taking into consideration the following:

- That you first arrange with the schools before the actual visit.
- That teaching & learning is not disrupted.

We wish you well in your academic endeavours and encourage that you share your final research output with the Department as a contribution towards improving teaching and learning.

MR. DM MAJA
DISTRICT DIRECTOR: NKANGALA

DATE: 30 AUGUST 2021



APPENDIX 5:
LETTERS TO REQUEST PERMISSION FROM THE THREE PRIMARY SCHOOLS
EMTHINI PRIMARY SCHOOL (CASE 1)



Request for permission to conduct research at: Emthini Primary School

Research title: The development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

Date: 26 July 2021 – 2022

Request addressed to: School Principal

Department: Mpumalanga Department of Education

Contact details: xxxxxxxxxx

Dear School Principal

I, Lettah Sikhosana am doing research under supervision of Prof. AV Mudau, a Professor in the Department of Science and Technology towards a Doctor of Philosophy in Environmental Education at the University of South Africa. We are inviting you to participate in a study entitled the development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

The main aim of this research is to develop and implement sustainable intervention strategy for solid waste management in primary schools located under Nkangala district in Mpumalanga province.

Your school has been selected with the view that they could be dealing with the issues of environment differently in various areas.

The study will entail observations, semi-structured interviews, focus group interviews and a dairy as data collection techniques that school principals, school governing body representatives, general workers, food handlers, intermediate phase teachers

and grade 4, 5 and 6 learners will participate in. Participation in this study is strictly voluntary hence every participant is allowed to discontinue their engagement should they feel uncomfortable. Before one can participate in this study, the researcher will issue them consent forms to sign and to explain the research process to ensure that they are aware of what is expected from them.

This study will be beneficial to the educational sector as it could contribute knowledge and skills towards solid waste management in schools' by developing a model for sustainable intervention strategy on solid waste management. The study could provide schools as a whole with opportunities to be actively involved in waste management initiatives as a resolution of the current environmental problems that they experience.

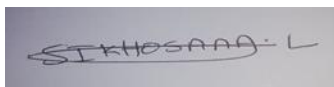
The study could arouse interest amongst the management of the school, teachers, learners and other stakeholders to acknowledge the importance of environmental education and the impact of sustainable intervention strategy on the management of solid waste. The study could also assist in identifying challenges and opportunities that schools experience in relations to waste management. Additionally, the findings coming from the study could be used basis for schools to work on their strengths and weaknesses in the endeavor to manage waste effectively.

There are no potential risks in the study.

There will be no reimbursement or any incentives for participation in the research.

Feedback of the study will be limited to participants who request them.

Yours sincerely

A rectangular box containing a handwritten signature in black ink. The signature appears to read "LETTAH SIKHOSANA" with a stylized flourish at the end.

Lettah Sikhosana

Researcher

TJALA PRIMARY SCHOOL (CASE 2)



Request for permission to conduct research at: Tjala Primary School

Research title: The development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

Date: 26 July 2021 – 2022

Request addressed to: School Principal

Department: Mpumalanga Department of Education

Contact details: XXXXXXXXXX

Dear School Principal

I, Lettah Sikhosana am doing research under supervision of Prof. AV Mudau, a Professor in the Department of Science and Technology towards a Doctor of Philosophy in Environmental Education at the University of South Africa. We are inviting you to participate in a study entitled the development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

The main aim of this research is to develop and implement sustainable intervention strategy for solid waste management in primary schools located under Nkangala district in Mpumalanga province.

Your school has been selected with the view that they could be dealing with the issues of environment differently in various areas.

The study will entail observations, semi-structured interviews, focus group interviews and a diary as data collection techniques that school principals, school governing body representatives, general workers, food handlers, intermediate phase teachers and grade 4, 5 and 6 learners will participate in. Participation in this study is strictly voluntary hence every participant is allowed to discontinue their engagement should they feel uncomfortable. Before one can participate in this study, the researcher will

issue them consent forms to sign and to explain the research process to ensure that they are aware of what is expected from them.

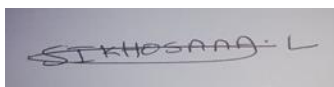
This study will be beneficial to the educational sector as it could contribute knowledge and skills towards solid waste management in schools' by developing a model for sustainable intervention strategy on solid waste management. The study could provide schools as a whole with opportunities to be actively involved in waste management initiatives as a resolution of the current environmental problems that they experience.

The study could arouse interest amongst the management of the school, teachers, learners and other stakeholders to acknowledge the importance of environmental education and the impact of sustainable intervention strategy on the management of solid waste. The study could also assist in identifying challenges and opportunities that schools experience in relations to waste management. Additionally, the findings coming from the study could be used basis for schools to work on their strengths and weaknesses in the endeavor to manage waste effectively.

There are no potential risks in the study.

There will be no reimbursement or any incentives for participation in the research. Feedback of the study will be limited to participants who request them.

Yours sincerely

A rectangular box containing a handwritten signature in black ink. The signature appears to be 'LETTAH SIKHOSANA' written in a cursive, slightly slanted style.

Lettah Sikhosana

Researcher

VUNA PRIMARY SCHOOL (CASE 3)



Request for permission to conduct research at: Vuna Primary School

Research title: The development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

Date: 26 July 2021 – 2022

Request addressed to: School Principal

Department: Mpumalanga Department of Education

Contact details: xxxxxxxxxx

Dear School Principal

I, Lettah Sikhosana am doing research under supervision of Prof. AV Mudau, a Professor in the Department of Science and Technology towards a Doctor of Philosophy in Environmental Education at the University of South Africa. We are inviting you to participate in a study entitled the development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

The main aim of this research is to develop and implement sustainable intervention strategy for solid waste management in primary schools located under Nkangala district in Mpumalanga province.

Your school has been selected with the view that they could be dealing with the issues of environment differently in various areas.

The study will entail observations, semi-structured interviews, focus group interviews and a dairy as data collection techniques that school principals, school governing body representatives, general workers, food handlers, intermediate phase teachers

and grade 4, 5 and 6 learners will participate in. Participation in this study is strictly voluntary hence every participant is allowed to discontinue their engagement should they feel uncomfortable. Before one can participate in this study, the researcher will issue them consent forms to sign and to explain the research process to ensure that they are aware of what is expected from them.

This study will be beneficial to the educational sector as it could contribute knowledge and skills towards solid waste management in schools' by developing a model for sustainable intervention strategy on solid waste management. The study could provide schools as a whole with opportunities to be actively involved in waste management initiatives as a resolution of the current environmental problems that they experience.

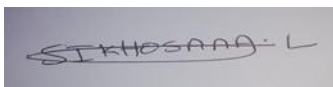
The study could arouse interest amongst the management of the school, teachers, learners and other stakeholders to acknowledge the importance of environmental education and the impact of sustainable intervention strategy on the management of solid waste. The study could also assist in identifying challenges and opportunities that schools experience in relations to waste management. Additionally, the findings coming from the study could be used basis for schools to work on their strengths and weaknesses in the endeavor to manage waste effectively.

There are no potential risks in the study.

There will be no reimbursement or any incentives for participation in the research.

Feedback of the study will be limited to participants who request them.

Yours sincerely

A rectangular box containing a handwritten signature in black ink. The signature appears to be 'LETTAH SIKHOSANA' with a stylized flourish at the end.

Lettah Sikhosana

Researcher

**APPENDIX 6:
APPROVAL LETTERS FROM THE THREE PRIMARY SCHOOLS
EMTHINI PRIMARY SCHOOL (CASE 1)**

PRIMARY SCHOOL

LETTER OF ACCEPTANCE TO CONDUCT A RESEARCH

The SGB and the SMT of the aforementioned School hereby accept the request of Letitia Sikhosana to come and conduct a research at our School, [redacted] Primary School. We are looking forward to be of help to you for the entire period of your research.

You are welcome to engage with all the staff members in the institution as per the guidance of your research. We hope and trust that after the research our School will benefit a lot from it.

You are once more welcome with opened arms' be at home for the entire duration of your research. The SGB, SMT and the entire Staff wish you all the best.

Yours Sincerely

Principal

[redacted]

SGB Chairperson

[redacted]

Signature _____

Date: 02/09/2021

Signature _____

Date: 02/09/2021

EMPUMALANGA
0458

TJALA PRIMARY SCHOOL (CASE 2)

PRIMARY

KWAMHLANGA

1022

To: Ms Sikhosana L
UNISA student

From: The Principal
P. School

Subject: Approval to do research based on solid waste management at the school.

The above refers: -

- You, Ms L. Sikhosana, are given approval to do research at the school as per your request.
- The school shall fully participate co-operatively with the prescripts of your request/research.

We wish you well in your research.



Principal

MPUMALANGA DEPT. OF EDUCATION

KWAMHLANGA, 1022

TWEEETON/ELIN SOUTH CIRCUIT

5.09.2021

Date

VUNA PRIMARY SCHOOL (CASE 3)

PRIMARY SCHOOL	
R E T E Cell: 083 308 1120	St Kv Empumalanga 0458

To : Ms L Sikhosana
Researcher

From : The Principal
zi Primary School
Kwaggafontein East Circuit

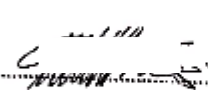
Date : 01.09.2021

SUBJECT : PERMISSION TO CONDUCT A RESEARCH.

This letter serves to acknowledge receipt of your letter requesting permission to conduct a research on the development and implementation of the sustainable intervention strategies for solid waste management in Primary schools : A case of Nkangala District, Mpumalanga Province.

Permission is therefore granted to you to conduct the research as stated above.

Thanary School wishes you all the best in your academic endeavor and hope that you will share your research output with the school.


Principal

DEPARTMENT OF EDUCATION
GOL
58
PRINCIPAL

01 - 09 - 2021.
Date

**APPENDIX 7:
REQUEST LETTER TO PROSPECTIVE PARTICIPANTS FROM THREE PRIMARY
SCHOOLS**



**PARTICIPANTS INFORMATION SHEET FOR SCHOOL PRINCIPAL, SGB,
GENERAL WORKER, FOOD HANDLER AND INTERMEDIATE PHASE TEACHER**

Date: 26 July 2021 – 2022

Title: The development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

DEAR PROSPECTIVE PARTICIPANT

My name is Lettah Sikhosana I am doing research under the supervision of A V Mudau, a professor in the Department of Science and Technology towards a Doctor of Philosophy in Environmental Education at the University of South Africa. We are inviting you to participate in a study entitled: The development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

WHAT IS THE PURPOSE OF THE STUDY?

This study will develop and implement sustainable intervention strategy for solid waste management in primary schools. The study could provide schools as a whole with opportunities to be actively involved in waste management initiatives as a resolution of the current environmental problems that they experience. The study could arouse interest amongst the management of the school, teachers, learners and other stakeholders to acknowledge the importance of environmental education and the impact of sustainable intervention strategies on the management of solid waste. It could also assist in identifying challenges and opportunities that schools experience in relations to waste management. Additionally, the findings coming from

the study could be used basis for schools to work on their strengths and weaknesses in the endeavor to manage waste effectively.

WHY AM I BEING INVITED TO PARTICIPATE?

As a school principal/intermediate phase teacher/school governing body representative/general worker/ food handler (**please tick**), you are invited because of the important role that you play towards the environment and with the view that you could contribute knowledge and skills towards solid waste management in schools' by assisting in developing a model for sustainable intervention strategy on solid waste management

I obtained your contact details from our first meeting during content workshop where I briefed you about the study. Please note that there are 3 school principals, 3 intermediate phase teachers, 3 school governing body representatives, 3 general workers, 3 food handlers and 3 grade 4 learners, 3 grade 5 learners and 3 grade 6 learners selected as participants for this study.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

Describe the participant's actual role in the study.

The study involves observations, semi-structured interviews, focus group interviews and diary. During phase 1 of data collection process, teachers, grade 4, 5 and 6 learners, food handlers and general workers will be observed. After observations, teachers, school principals, school governing body representatives, food handlers and general workers will be interviewed. During phase two of implementing the developed strategy a diary will be used to record the day-to-day experiences across all participants. Only teachers, grade 4, 5 and 6 learners, food handlers and general workers will be observed.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent adult form. You are free to withdraw at any time and without giving a reason. All information that you provided in the study, will remain highly confidential and anonymous.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

This study is expected to benefit the educational sector towards contributing knowledge and skills towards solid waste management in schools' by developing a model for sustainable intervention strategy on solid waste management.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

The research involves the day-to-day activities of the participants. Therefore, there are no negative consequences for participating in this research study.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

You have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research **OR** Your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Your answers may be revised by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Review Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

All information gathered in this study, will remain anonymous and cannot be traced to your name. *While every effort will be made by the researcher to ensure that you will not be connected to the information that you share during the focus group, I cannot guarantee that other participants in the focus group will treat information confidentially. I shall, however, encourage all participants to do so. For this reason, I advise you not to disclose personally sensitive information in the focus group.*

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet and stored with my supervisor in my institution for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. After such time, all hard copies will be shredded and electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

No payment will be given to any participants.

HAS THE STUDY RECEIVED ETHICS APPROVAL

This study has received written approval from the Research Ethics Review Committee of the Research Ethics Review Committee of Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

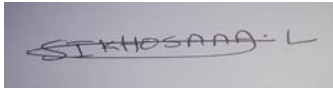
HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Lettah Sikhosana on _____ or email 51994186@mylife.unisa.ac.za

Should you have concerns about the way in which the research has been conducted, you may contact Prof. AV Mudau at mudauav@unisa.ac.za

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

A rectangular box containing a handwritten signature in black ink. The signature appears to be 'LETTAH SIKHOSANA' with a stylized flourish at the end.

Lettah Sikhosana

APPENDIX 8:
LETTER REQUESTING PARENTAL CONSENT FOR MINORS TO PARTICIPATE
IN A RESEARCH PROJECT



Dear Parent

Your child is invited to participate in a study entitled: The development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga province.

I am undertaking this study as part of my doctoral research at the University of South Africa. The purpose of the study is to develop and implement the sustainable intervention strategy for solid waste management in primary schools located in Nkangala district, Mpumalanga province and the possible benefits of the study are the improvement of managing solid waste generated in schools effectively and developing a model for waste management. I am asking permission to include your child in this study because he/she will be able to provide rich data towards solid waste management. I expect to have 30 other children participating in the study.

If you allow your child to participate, I shall request him/her to:

- Take part in observations whereby he/she will be observed in their classroom environment, during lunch breaks and around their school premises.
- Take part in a focus group interview whereby he/she will be interviewed with other learners. The researcher will be the one facilitating the focus group interviews. Questions are going to be asked in an interactive setting. This method will allow learners to discuss all issues related to solid waste generation and waste management within their school environment.

I am going to use audio and video recording during the observations and focus group interviews. I hereby request your permission to record the observations and focus group interviews.

Any information that is obtained in connection with this study and can be identified with your child will remain confidential and will only be disclosed with your permission. His/her responses will not be linked to his/her name or your name or the school's name in any

written or verbal report based on this study. Such a report will be used for research purposes only.

There are no foreseeable risks to your child by participating in the study. Your child will receive no direct benefit from participating in the study; however, the possible benefits to education is your child participation could contribute knowledge and skills towards solid waste management in schools' by assisting in developing a model for sustainable intervention strategy on solid waste management. Neither your child nor you will receive any type of payment for participating in this study.

Your child's participation in this study is voluntary. Your child may decline to participate or to withdraw from participation at any time. Withdrawal or refusal to participate will not affect him/her in any way. Similarly you can agree to allow your child to be in the study now and change your mind later without any penalty.

The study will take place during regular classroom activities during teaching and learning process, lunch breaks and when they play outside on the playground with the prior approval of the school and your child's teacher. However, if you do not want your child to participate, an alternative activity will be available which will be focus group interviews that will be conducted with other learners.

In addition to your permission, your child must agree to participate in the study and you and your child will also be asked to sign the assent form which accompanies this letter. If your child does not wish to participate in the study, he or she will not be included and there will be no penalty. The information gathered from the study and your child's participation in the study will be stored securely on a password locked computer in my locked office for five years after the study. Thereafter, records will be erased.

The benefits of this study will be towards the educational sector as it could contribute knowledge and skills towards solid waste management in schools' by developing a model for sustainable intervention strategy on solid waste management. The study could provide schools as a whole with opportunities to be actively involved in waste management initiatives as a resolution of the current environmental problems that they experience.

The study could arouse interest amongst the management of the school, teachers, learners and other stakeholders to acknowledge the importance of environmental education and the impact of sustainable intervention strategy on the management of solid waste. The study

could also assist in identifying challenges and opportunities that schools experience in relations to waste management. Additionally, the findings coming from the study could be used basis for schools to work on their strengths and weaknesses in the endeavor to manage waste effectively.

There is no potential risks involved.

There will be no reimbursement or any incentives for participation in the research.

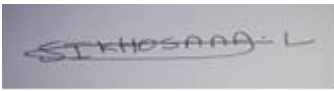
If you have questions about this study please ask me or my study supervisor, Prof Awelani V Mudau, Department of Science and Technology Education, College of Education, University of South Africa. My contact number is _____ and my e-mail is 51994186@mylife.unisa.ac.za. The e-mail of my supervisor is mudauav@unisa.ac.za.

Permission for the study has already been given by Mpumalanga Department of Education and School Principal and the Ethics Committee of the College of Education, UNISA.

You are making a decision about allowing your child to participate in this study. Your signature below indicates that you have read the information provided above and have decided to allow him or her to participate in the study. You may keep a copy of this letter.

Name of child:

Sincerely

_____	_____	
Parent/guardian's name (print)	Parent/guardian's signature:	Date:
<u>Lettah Sikhosana</u>		<u>01 September 2021</u>
Researcher's name (print)	Researcher's signature	Date:

APPENDIX 9:
CONSENT FORM (RETURN SLIP) TO PARTICIPATE IN THIS STUDY FROM
THREE PRIMARY SCHOOLS
(SCHOOL PRINCIPALS, SGB'S, GENERAL WORKERS, FOOD HANDLERS,
INTERMEDIATE PHASE TEACHERS AND GRADE 4, 5 AND 6 LEARNERS)

EMTHINI PRIMARY SCHOOL (CASE 1)
School principal consent form

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, S (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print):

S. S. S.

Participant Signature

Date

07/09/2021

Researcher's Name & Surname (please print):

Lettah Sikhosana

Researcher's signature

Date: 06/09/2021

SGB CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, Sae (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaires.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print)

Sae

Participant Signature

[Handwritten Signature]

Date

07/09/2021

Researcher's Name & Surname (please print):

Lettiah Sikhosana

Researcher's Signature

[Handwritten Signature]

Date: 06/09/2021

INTERMEDIATE PHASE TEACHER CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, E. S. M. M. M. (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print) E. S. M. M. M.

[Signature]
Participant Signature

06/09/2021
Date

Researcher's Name & Surname (please print): Letlah Sikhosane

[Signature]
Researcher's signature

Date: 06/09/2021

GENERAL WORKER CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, Tshepo C. Sana (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print)

Tshepo C. Sana

Participant Signature

Date

Researcher's Name & Surname (please print):

Letrah Sikhosana

Researcher's signature

Date: 06/09/2021

FOOD HANDLER CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, L. S. Singh (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print) L. S. Singh

L. S. Singh
Participant Signature

07-09-2021
Date

Researcher's Name & Surname (please print): Letitia Sikhosana

Letitia Sikhosana
Researcher's signature

Date: 06/09/2021

GRADE 4 LEARNER CONSENT FORM

24



LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH STUDY

Dear learner,

Date: 06/09/2021

My name is Teacher Lettah Sikhosang and would like to ask you if I can come and watch you do some activities with your teacher and when you play outside on the playground. I am trying to learn more about how children do activities with their teachers as well as when they play with friends.

If you say YES to do this, I will come and watch you when you are with your teacher doing activities as well as when you play on the playground. We will do a fun game where you have to answer some questions for me. I will also ask you to do some activities with me. I will not ask to you to do anything that may hurt you or that you do not want to do.

I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you do not want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you did not think of now, ask me next time I visit your school.

Please speak to mommy or daddy about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Lettah Sikhosang

Your Name	Yes I will take part	No I don't want to take part
<u>Mo</u>		
Name of the researcher		
<u>Lettah Sikhosana</u>		
Date: <u>06/09/21</u>		
Witness: <u>[Signature]</u>		

GRADE 5 LEARNER CONSENT FORM

24



LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH STUDY

Dear learner,

Date: 06/09/2021

My name is teacher Lettah Sikhosana and would like to ask you if I can come and watch you do some activities with your teacher and when you play outside on the playground. I am trying to learn more about how children do activities with their teachers as well as when they play with friends.

If you say YES to do this, I will come and watch you when you are with your teacher doing activities as well as when you play on the playground. We will do a fun game where you have to answer some questions for me. I will also ask you to do some activities with me. I will not ask to you to do anything that may hurt you or that you do not want to do.

I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you do not want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you did not think of now, ask me next time I visit your school.

Please speak to mommy or daddy about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Lettah Sikhosana

Your Name	Yes I will take part	No I don't want to take part
<u>Bongani Mkhosi</u>		
Name of the researcher		
Lettah Sikhosana		
Date: <u>06/09/21</u>		
Witness: <u>[Signature]</u>		

GRADE 6 LEARNER CONSENT FORM

24



LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH STUDY

Dear learner,

Date: 06/09/2021

My name is Teacher Letrah Sikhosana and would like to ask you if I can come and watch you do some activities with your teacher and when you play outside on the playground. I am trying to learn more about how children do activities with their teachers as well as when they play with friends.

If you say YES to do this, I will come and watch you when you are with your teacher doing activities as well as when you play on the playground. We will do a fun game where you have to answer some questions for me. I will also ask you to do some activities with me. I will not ask to you to do anything that may hurt you or that you do not want to do.

I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you do not want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you did not think of now, ask me next time I visit your school.

Please speak to mommy or daddy about taking part before you sign this letter. Signing your name at the bottom means if you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Letrah Sikhosana

Your Name	Yes I will take part	No I don't want to take part
NB Manki	✓	
Name of the researcher		
Letrah Sikhosana		
Date: <u>06/09/21</u>		
Witness:		

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TJALA PRIMARY SCHOOL (CASE 2)

SCHOOL PRINCIPAL CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

Mr M. G. (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

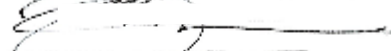
I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print)

Mr M. G.

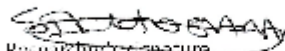

Participant Signature

27.09.2021

Date

Researcher's Name & Surname (please print):

Letrah Sikhosana


Researcher's signature

Date: 27/09/2021

SGB CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, Maw (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print): Maw Ng

Maw Ng
Participant Signature

30-09-2021
Date

Researcher's Name & Surname (please print): Leteah Sikhosana

Sikhosana
Researcher's signature

Date: 27/09/2021

INTERMEDIATE PHASE TEACHER CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, Mr G.M. [unclear] (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print) _____

[Handwritten Signature]
Participant Signature

30-09-2021

Date

Researcher's Name & Surname (please print): Lettah Sikhosana

[Handwritten Signature]
Researcher's signature

Date: 27/09/2021

GENERAL WORKER CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

J. M. Skosana (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print)

J. M. Skosana

J. M. Skosana

Participant Signature

J. M. Skosana

Date

28.09.2021

Researcher's Name & Surname (please print):

Lettah Sikhosana

Researcher's Signature

Lettah Sikhosana

Date: 27/09/2021

FOOD HANDLER CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, Zelke Sikkosana (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print)

Zelke Sikkosana

Participant Signature

[Handwritten Signature]

Date

27-09-2021

Researcher's Name & Surname (please print):

Lettah Sikkosana

[Handwritten Signature]
Researcher's Signature

Date 27/09/2021

GRADE 4 LEARNER CONSENT FORM

24



LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH STUDY

Dear learner,

Date: 27/09/2021

My name is Teacher Lettah Sikhosana and would like to ask you if I can come and watch you do some activities with your teacher and when you play outside on the playground. I am trying to learn more about how children do activities with their teachers as well as when they play with friends.



If you say YES to do this, I will come and watch you when you are with your teacher doing activities as well as when you play on the playground. We will do a fun game where you have to answer some questions for me. I will also ask you to do some activities with me. I will not ask to you to do anything that may hurt you or that you do not want to do.

I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you do not want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you did not think of now, ask me next time I visit your school.

Please speak to mommy or daddy about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Lettah Sikhosana

Your Name	Yes I will take part	No I don't want to take part
<p><u>JHAF</u> <u>B/SC</u> <u>MBU</u></p>		
Name of the researcher		
Lettah Sikhosana		
Date: <u>28/09/2021</u>		
Witness: * <u>CDWJARA</u>		

GRADE 5 LEARNER CONSENT FORM

24



LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH STUDY

Dear learner,

Date: 27/09/2021

My name is Teacher Lettah Sikhosana and would like to ask you if I can come and watch you do some activities with your teacher and when you play outside on the playground. I am trying to learn more about how children do activities with their teachers as well as when they play with friends.

If you say YES to do this, I will come and watch you when you are with your teacher doing activities as well as when you play on the playground. We will do a fun game where you have to answer some questions for me. I will also ask you to do some activities with me. I will not ask to you to do anything that may hurt you or that you do not want to do.

I will also ask your parents if you can take part, if you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you do not want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you did not think of now, ask me next time I visit your school.

Please speak to mommy or daddy about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Lettah Sikhosana

Your Name	Yes I will take part	No I don't want to take part
* Lina	Yes	
Name of the researcher		
Lettah Sikhosana		
Date: * 27-09-2021		
Witness: * Lina - P		

GRADE 6 LEARNER CONSENT FORM

24



LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH STUDY

Dear learner,

Date: 27/09/2021

My name is Teacher Lettah Sikhosana and would like to ask you if I can come and watch you do some activities with your teacher and when you play outside on the playground. I am trying to learn more about how children do activities with their teachers as well as when they play with friends.

If you say YES to do this, I will come and watch you when you are with your teacher doing activities as well as when you play on the playground. We will do a fun game where you have to answer some questions for me. I will also ask you to do some activities with me. I will not ask to you to do anything that may hurt you or that you do not want to do.

I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you do not want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you did not think of now, ask me next time I visit your school.

Please speak to mommy or daddy about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Lettah Sikhosana

Your Name	Yes I will take part	No I don't want to take part
	 <input checked="" type="checkbox"/>	 <input type="checkbox"/>
Name of the researcher Lettah Sikhosana		
Date: <u>28/09/2021</u>		
Witness: <u>Parent</u>		

**VUNA PRIMARY SCHOOL (CASE 3)
SCHOOL PRINCIPAL CONSENT FORM**

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, Mr. N. S. M. M. (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print)

Nel - M. M.

Participant Signature

Date

27-09-2021

Researcher's Name & Surname (please print):

Lettah Sikhusena

Researcher's Signature

Date: 23/09/2021

SGB CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, M. M. (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print) Mus - M.
M. M.
Participant Signature
Date 23/09/2021

Researcher's Name & Surname (please print): Letrah Sikhosana
Letrah Sikhosana
Researcher's Signature
Date 23/09/2021

INTERMEDIATE PHASE TEACHER CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, CHRISTINA MOKHELE (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print) CHR

Ma
Participant Signature

24/09/2021
Date

Researcher's Name & Surname (please print): Lettah Sikhosana

[Signature]
Researcher's Signature

Date: 28/09/2021

GENERAL WORKER CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, J.S. Mokoena (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print)

J.S. Mokoena

Participant Signature

[Handwritten Signature]

27-09-2021

Date

Researcher's Name & Surname (please print):

Lettah Sikhosana

Researcher's Signature

[Handwritten Signature]

Date: 28/09/2021

FOOD HANDLER CONSENT FORM

21



CONSENT FORM TO PARTICIPATE IN THIS STUDY (RETURN SLIP)

I, Elizavira Mkhomo (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the observation, interviews and questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print)

Elizavira Mkhomo

[Signature]

Participant Signature

28/09/21

Date

Researcher's Name & Surname (please print):

Lettah Sikhosana

[Signature]

Researcher's Signature

Date: 23/09.....2021

GRADE 4 LEARNER CONSENT FORM

24



LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH STUDY

Dear learner,

Date: 23/09/2021

My name is Teacher Letlah Sikhosana and would like to ask you if I can come and watch you do some activities with your teacher and when you play outside on the playground. I am trying to learn more about how children do activities with their teachers as well as when they play with friends.



If you say YES to do this, I will come and watch you when you are with your teacher doing activities as well as when you play on the playground. We will do a fun game where you have to answer some questions for me. I will also ask you to do some activities with me. I will not ask to you to do anything that may hurt you or that you do not want to do.

I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you do not want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later than you did not think of now, ask me next time I visit your school.

Please speak to mommy or daddy about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Letlah Sikhosana

Your Name	Yes I will take part 	No I don't want to take part 
Name of the researcher Letlah Sikhosana		
Date:*	29-09-2021	
Witness:*	N. ...	

GRADE 5 LEARNER CONSENT FORM

24



LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH STUDY

Dear learner,

Date: 23/09/2021

My name is teacher Lettiah Sikhosana and would like to ask you if I can come and watch you do some activities with your teacher and when you play outside on the playground. I am trying to learn more about how children do activities with their teachers as well as when they play with friends.

If you say YLS to do this, I will come and watch you when you are with your teacher doing activities as well as when you play on the playground. We will do a fun game where you have to answer some questions for me. I will also ask you to do some activities with me. I will not ask to you to do anything that may hurt you or that you do not want to do.

I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you do not want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you did not think of now, ask me next time I visit your school.

Please speak to mommy or daddy about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Lettiah Sikhosana

Your Name	Yes I will take part	No I don't want to take part
* _____		
Name of the researcher		
Lettiah Sikhosana		
Date: <u>27/09/2021</u>	<u>27/09/2021</u>	
Witness: *	<u>M. ...</u>	

GRADE 6 LEARNER CONSENT FORM

24



LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH STUDY

Dear learner,

Date: 23/09/2021

My name is Teacher Lettah Sikhosana and would like to ask you if I can come and watch you do some activities with your teacher and when you play outside on the playground. I am trying to learn more about how children do activities with their teachers as well as when they play with friends.

If you say YES to do this, I will come and watch you when you are with your teacher doing activities as well as when you play on the playground. We will do a fun game where you have to answer some questions for me. I will also ask you to do some activities with me. I will not ask to you to do anything that may hurt you or that you do not want to do.

I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you do not want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you did not think of now, ask me next time I visit your school.

Please speak to mommy or daddy about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Lettah Sikhosana

Your Name	Yes I will take part 	No I don't want to take part
Name of the researcher <u>Lettah Sikhosana</u>		
Date: * <u>23/09/2021</u>		
Witness: * <u>M. ...</u>		

APPENDIX 10 THE SCHOOLS SAFETY AND SECURITY POLICY (EMTHINI
PRIMARY SCHOOL: CASE 1)



**The School Safety & Security
policy**

EMTHINI SCHOOL

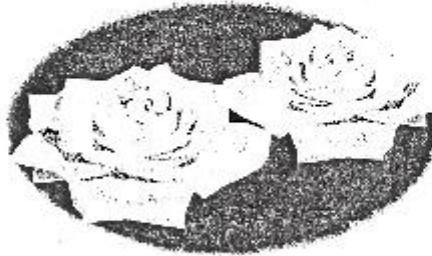
Name of school

KWAZULU - EAST

Name of circuit

NAMPALA

Name of region



- a. The following hazards have been identified in the immediate school environment (e.g. river crossing, busy road, dump etc.) and the actions/ regulations/procedures indicated thereafter will be applied to minimize risk and communicate the danger that they pose.

- School patrols will conduct traffic to ensure safety when crossing busy roads.
- Ensure that the dumps are taken care by the municipality.
 - By removing the dump
 - By fencing around the dump
 - By making sure no dangerous trash is exposed to the learners.

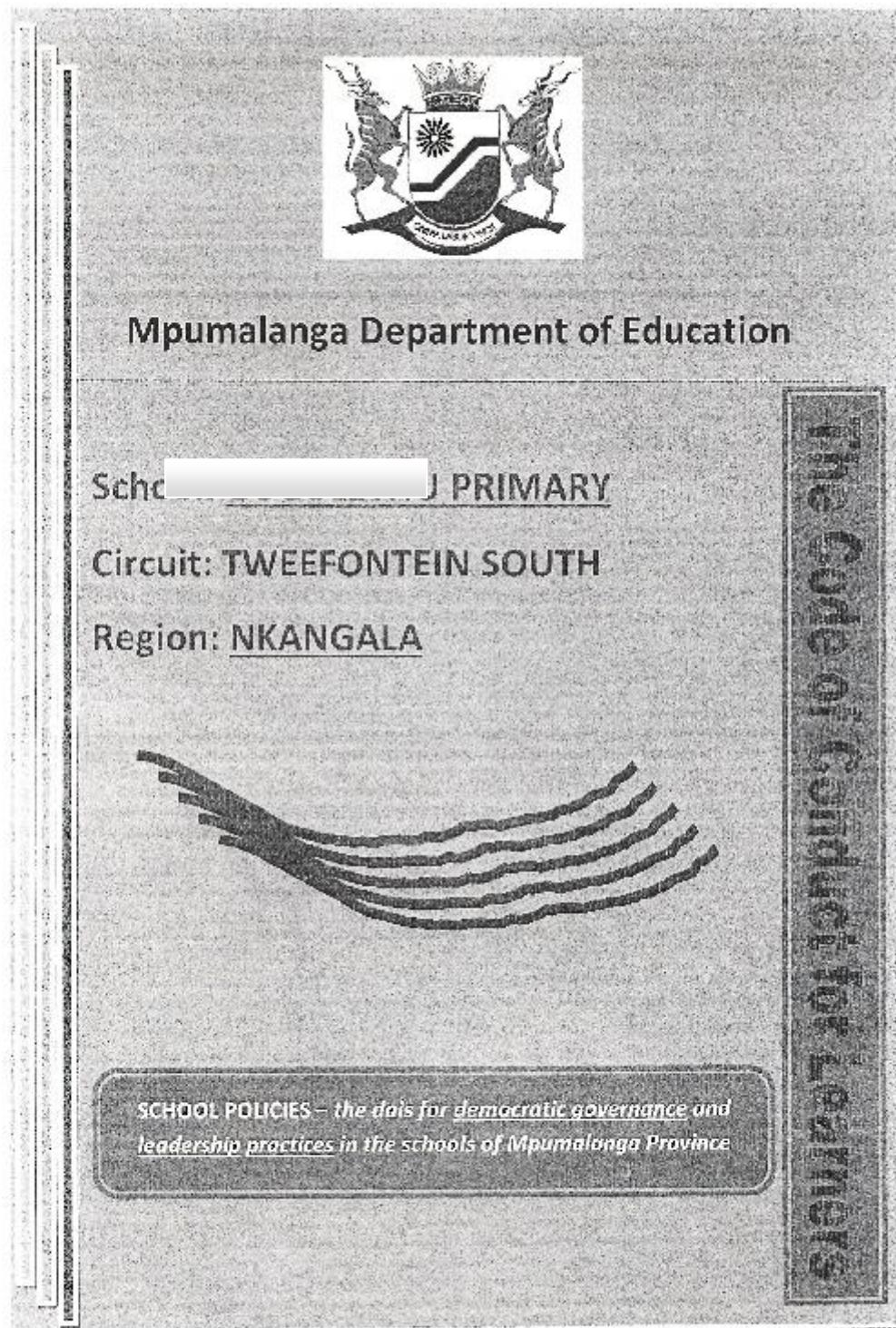
- b. The following measures will be taken to promote road safety for learners travelling to and from school (E.g. teaching young learners to cross the road, highway code for learners travelling by bicycle etc.)

- Safety specialist will come twice a term to promote safety awareness.
- Educators will teach the learners about the safety in their classroom.

6. First-Aid

- a. The following steps will be taken in the event of an injury on the school premises
- i. Any injury that occurs during school hours must be reported to the office immediately.
 - ii. If someone is injured to such an extent that he/she cannot report to the office the educator on duty should be called.
 - iii. First-aid will be administered immediately.
 - iv. If further medical attention is required, the injured person will be taken to a medical officials or hospital.
 - v. Parents will be notify before the learner is taken to the medical official or hospital
 - vi. The parent must accompany the learner to the hospital or delegate other person to fulfil her/his duty.
- b. Learners falling ill while at school will be allowed to rest in the following place/s
- Office
 - Staffroom
- c. The school will maintain two (state number) first-aid kit(s) ,containing the following items:
- i. A number of shopping bags without any holes.
 - ii. A roll of paper towel
 - iii. Four pairs of rubber gloves

APPENDIX 11 THE CODE OF CONDUCT FOR LEARNERS (TJALA PRIMARY
SCHOOL: CASE 2)



5. Principles and values: The rights of learners

- a. All learners and parents of Gugulethu P. School shall have the democratic rights to due process and participation in decision making on matters directly affecting them at the school. Learners shall have rights to the following agreed upon procedures with the SGB and Learner Representative Council (LRC) for expressing and resolving school and learning related grievances:
- b. No corporal punishment shall be applied in this school in whatever manner and method.
- c. No one may discriminate against a learner who must enjoy the equal opportunity, treatment, protection and benefits before the law.
- d. Learners have a right to a clear, safe, harassment-free and healthy environment which provides for conducive teaching and learning.
- e. Learners have the right to expert educators to maintain high standards of professionalism in practice, behaviour and ethics.
- f. Learners have the right to freedom of expression. This freedom has the following limits:
 - Vulgar language is disallowed.
 - Disrespect of cultural practices/ religion.
- g. All learners have the right to privacy and may not have their property seized without reasonable suspicion.
- h. Respect for the human dignity of learners shall be maintained. This includes religious, cultural and other convictions.
- i. Learners have a right to discipline based on respect and dignity and without inhuman treatment, degradation, and inconsideration.
- j. A pregnant learner may not be denied access to education. The handling of learner pregnancy in this school shall be dealt with in the Policy on pregnancy.
- k. No learners shall be locked in isolation and/or solitary detention.
- l. Learners shall have the right to education. This right includes the right to attend all classes in all approved subjects in the school, to be informed regularly about his/her school progress, to make use of all the school facilities and to have their potential developed to its possible fullest.
- m. Learners shall have a right to a safe school environment as dealt with in the school safety policy.

APPENDIX 12 THE SCHOOL CODE OF CONDUCT FOR LEARNERS (VUNA
PRIMARY SCHOOL: CASE 3)

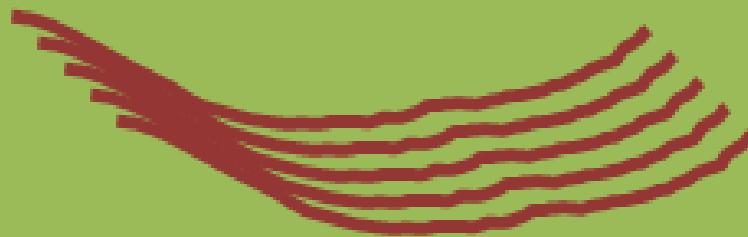


Mpumalanga Department of Education

School: [REDACTED] PRIMARY.

Circuit: KWAGGAFONTEIN EAST.

Region: NKANGALA DISTRICT.



SCHOOL POLICIES – the dais for democratic governance and leadership practices in the schools of Mpumalanga Province

The Code of Conduct for Learners

with the SGB and Learner Representative Council (LRC) for expressing and resolving school and learning related grievance.

- b. No corporal punishment shall be applied in this school in whatever manner and method.
- c. No one may discriminate against a learner who must enjoy the equal opportunity, treatment, protection and benefits before the law.
- d. Learners have a right to a clean, safe, harassment-free and healthy environment which provides for conducive teaching and learning.
- e. Learners have the right to expect educators to maintain high standards of professionalism in practice, behaviour and ethics.
- f. Learners have the right to freedom of expression. This freedom has the following limits: Learners have no freedom to use vulgar words(strong) language against other learners or all adults at school and no rights to leave the school premises without permission.
- g. All learners have the right to privacy and may not have their property seized without reasonable suspicion.
- h. Respect for the human dignity of learners shall be maintained. This includes religious, cultural and other convictions.
- i. Learners have a right to discipline based on respect and dignity and without inhuman treatment, degradation, and inconsideration.
- j. A pregnant learner may not be denied access to education. The handling of learner pregnancy in this school shall be dealt with in the Policy on pregnancy.
- k. No learners shall be locked in isolation and/or solitary detention.
- l. Learners shall have the right to education. This right includes the right to attend all classes in all approved subjects in the school, to be informed regularly about his/her school progress, to make use of all the school facilities and to have their potential developed to its possible fullest

6. Responsibilities of learners

**APPENDIX 13 INTERVIEW SCHEDULE FOR ALL THREE PRIMARY SCHOOLS
STAKEHOLDERS
(SCHOOL PRINCIPAL, SCHOOL GOVERNING BODY REPRESENTATIVES,
GENERAL WORKERS, FOOD HANDLERS, INTERMEDIATE PHASE TEACHERS
AND GRADE 4, 5 AND 6 LEARNERS)**



INTERVIEW QUESTIONS FOR THE SCHOOL PRINCIPALS

BACKGROUND

1. Tell us about your educational background.
2. How long have you been the principal of the school?

PHASE ONE INTERVIEW QUESTIONS

1. What is solid waste according to you?
2. How can you explain the word environment?
3. Who generates solid waste in the school environment, and how?
4. What is a relationship between teaching and learning activities and solid waste generation?
5. What do you understand about solid waste management?
6. Do you manage solid waste generated within the school environment? If yes, how do you do that? If no, why?
7. Do you have any environmental policies that the school adheres to, for the purposes of environmental education and sustaining the environment? If yes, which policies are those? If no, why are the policies not available?
8. What waste management initiatives that you are aware of?
9. Were there any solid waste management initiatives implemented in this school? If yes, which initiatives were those and when were they implemented? If no, why not?

10. What challenges did you encounter in promoting sustainable solid waste management in schools?

PHASE TWO DAIRY QUESTIONS

1. As the principal of the school, how did you promote sustainable solid waste management practices in your school?
2. What challenges did you encounter when implementing the SISS-WMP?
3. What opportunities did the developed SISS-WMP brought in this school?

INTERVIEW QUESTIONS FOR SCHOOL GOVERNING BODY REPRESENTATIVES

BACKGROUND

1. Tell us about your educational background.
2. How long have you been the representative of the school governing body in this school?

PHASE ONE INTERVIEW QUESTIONS

1. What is solid waste according to you?
2. How can you explain the word environment?
3. Who/what generates solid waste in the school environment, and how?
4. What do you understand about solid waste management?
5. As a school governing body, are there any environmental policies that you have drafted and implemented? If yes, which policies are those? If no, why are they not available?
6. Are there any interventions that you have made to assist the school towards solid waste management? Elaborate.
7. How do you promote sustainable solid waste management in this school?
8. What challenges have you encountered in promoting sustainable solid waste management in schools?

PHASE TWO DIARY QUESTIONS

1. As the SGB of the school, how did you promote sustainable solid waste management practices in this school?
2. What challenges did you encounter when implementing the SISS-WMP?
3. What opportunities did the developed SISS-WMP brought in this school?

INTERVIEW QUESTIONS FOR GENERAL WORKERS AND FOOD HANDLERS

BACKGROUND

1. Tell us about your educational background.
2. How long have you been the general worker in this school?

PHASE ONE INTERVIEW QUESTIONS

1. What is solid waste according to you?
2. How can you explain the word environment?
3. What generates solid waste in the school environment, and how?
4. What do you understand about solid waste management?
5. Do you maintain the cleanliness of the school environment? Is so, how? If not why?
6. How do you dispose solid waste generated within the school environment?
7. Why do you dispose solid waste the way you do?
8. What challenges do you encounter when you have dispose solid waste?
9. Were there any interventions implemented by the school management to assist in addressing the abovementioned challenges?
10. How do you promote the sustainable solid waste management practices?

PHASE TWO DIARY QUESTIONS

1. As the general worker/food handler in this school, how did you promote sustainable solid waste management practices in your school?

2. Do you still encounter challenges regarding solid waste management? If yes, name them.
3. What opportunities did the developed SISS-WMP brought in this school?

INTERVIEW QUESTIONS FOR INTERMEDIATE PHASE TEACHERS:

BACKGROUND

1. Tell us about your educational background.
2. How long have you been teaching in this school?

PHASE ONE INTERVIEW QUESTIONS

1. What is solid waste according to you?
2. How can you explain the word environment?
3. Who generates solid waste in a classroom environment, and how?
4. What do you understand about solid waste management?
5. Do you maintain classroom cleanliness during teaching and learning process? If yes, how do you do that? If no, why are you not maintaining classroom cleanliness?
6. Do you have any rules and principles that you implement in your classroom to adhere to classroom cleanliness? If yes, what are those rules, if no, why are they not implemented?
7. What strategies do you use to make learners in your classroom environment aware about the negative impact that solid waste generation has on the environment?
8. Are there any solid waste management initiatives implemented in your classroom?
9. What are the opportunities of managing solid waste generated in classrooms effectively?
10. What challenges do you experience when you have to promote sustainable solid waste management in a classroom environment?
11. How do you address the abovementioned challenges, if not why?

12. Are there any waste management initiatives that you are aware of? If yes, name them.
13. What misconceptions do you know that are associated with waste management initiatives within a school environment?
14. Do you think it is important for you to teach learners about solid waste management to ensure education for sustainable development? Elaborate.
15. How would you promote sustainable solid waste management practices in a school that you are currently teaching in?

PHASE TWO DIARY QUESTIONS

1. As a teacher in this school, how did you promote sustainable solid waste management practices in your school?
2. Do you still encounter challenges regarding solid waste management? If yes, name them.
3. What opportunities did the developed SISS-WMP brought in this school?

FOCUS GROUP INTERVIEW QUESTIONS FOR LEARNERS:

PHASE ONE

1. What is solid waste according to you?
2. How can you explain the word environment?
3. What generates solid waste in the school environment, and how?
4. What do you understand about solid waste management?
5. Do you generate solid waste at in your classroom? If so how? If not, why?
6. Do you generate solid waste during lunch breaks? If so how? If not, why?
7. How do you dispose solid waste that you have generated?
8. Do know any waste management initiatives? If so, which one are those?
9. Does your school implement any waste management initiatives? If yes, which one are those?
10. What are the opportunities do you think the implemented sustainable intervention strategy will bring towards management of solid waste?

PHASE TWO DIARY QUESTIONS

1. As learners do you still encounter challenges regarding solid waste management? If yes, name them.
2. What opportunities did the developed SISS-WMP brought in this school?

APPENDIX 14 OBSERVATION SCHEDULE



OBSERVATION SCHEDULE FOR TEACHERS, LEARNERS, FOOD HANDLERS AND GENERAL WORKERS

GENERAL INFORMATION

Researcher's name: Lettah Sikhosana

Observation dates: 2021-2022

Name of the participant:

Time: 08H00-15H00

Aim: The main aim of my study was to develop and implement sustainable intervention strategy for solid waste management in primary schools of Nkangala district, Mpumalanga province.

Objectives:

1. To understand the views and reasons of stakeholders in how they shaped the management of solid waste in schools
2. To identify opportunities in the development of the sustainable intervention strategy for solid waste management
3. To understand the implementation of the sustainable intervention strategy for solid waste management

TEACHERS OBSERVATION SCHEDULE

CLASSROOM ENVIRONMENT	OBSERVER'S NOTES	RESEARCHER'S REFLECTION
Classroom neatness.		
Inviting and environmental friendly classroom atmosphere.		
Availability of waste disposal bins.		
Monitoring of waste		

generated and how it is disposed inside a classroom environment.		
--	--	--

LEARNERS OBSERVATION SCHEDULE

CLASSROOM ENVIRONMENT	OBSERVER'S NOTES	RESEARCHER'S REFLECTION
Classroom neatness.		
Inviting and environmental friendly classroom atmosphere.		
Maintenance of classroom cleanliness.		
Usage of waste disposal bins (if available)		
SCHOOL PREMISES	OBSERVER'S NOTES	RESEARCHER'S REFLECTION
Waste generation.		
Waste disposal.		
Waste management.		

GENERAL WORKERS & FOOD HANDLERS OBSERVATION SCHEDULE

SCHOOL ENVIRONMENT	OBSERVER'S NOTES	RESEARCHER'S REFLECTION
Cleanliness of school environment.		
Inviting and environmental friendly school environment.		
Waste management.		
Waste disposal.		

MY

REFLECTIONS:.....

APPENDIX 15 DIARY



DIARY

Monday (Date: 2022)	Tuesday (Date: 2022)	Wednesday (Date: 2022)	Thursday (Date: 2022)	Friday (Date: 2022)
Researcher experience:... Reflections:...	Researcher experience:... Reflections:...	Researcher experience:... Reflections:...	Researcher experience:... Reflections:...	Researcher experience:... Reflections:...

PHASE ONE SEMI-STRUCTURED INTERVIEWS, FOCUS GROUP INTERVIEWS

TRANSCRIPTS AND OBSERVATIONS

APPENDIX 16 SEMI-STRUCTURE AND FOCUS GROUP INTERVIEW

TRANSCRIPT (EMTHINI PRIMARY SCHOOL: CASE 1)

IsiNdebele and IsiZulu	English
<p><i>“Alright [Laughing] ha ha ha. Alright Jah ne for example when we talk about i-waste singathi it’s something at the moment nasiyibheka siyibona ukuthi it’s something engekho useful. Esingana mberego nayo unless senza I recycling because currently, truly speaking la eskolweni we do not care about i-waste yethu. Like if you can go around here you will see ama phepha aziphaphela, uyangithola?”-SGB1</i></p>	<p><i>“Alright (laughing) ha ha ha. Alright when we talk about waste, we can say it is something that when we look at it at this moment, is no longer useful. It is something that we do not see no use at all unless we do recycling. Currently, truly speaking here at school we do not care about our waste. Like if you can go around here you will see papers all over the place, do you get me?”-SGB1</i></p>
<p><i>“Solid waste? I-waste angitjho kumotjha, ngilokhu okumotjhekileko njengama phepha la...abantwana bayadla bayalahla ngombana angeke basawaberegisa.”-GW1</i></p>	<p><i>“Solid waste? Waste is to ruin, it is something that is ruined such as papers... learners they eat and they throw papers because they will not use them anymore.”-GW1</i></p>

**APPENDIX 17 SEMI-STRUCTURE AND FOCUS GROUP INTERVIEW
TRANSCRIPT (TJALA PRIMARY SCHOOL: CASE 2)**

IsiNdebele, IsiZulu and Sepedi	English
<i>"Waste ziinzibi so, ke ditjhila"-SGB2</i>	<i>"Waste is waste, it is waste"-SGB2</i>
<i>"Kulahliwa nokufeyilisa koke nje"-GW2</i>	<i>"It is to throw away and making everywhere dirty"-GW2</i>
<i>"Zizinto ekufanele zilahlwe kosa kukhambe"-FH2</i>	<i>"Are the things that must be thrown away they must go"-FH2</i>
<i>"Kumotjheka"-TL4</i>	<i>"It is to ruin"-TL4</i>
<i>"Kumotjheka kwento"-TL5</i>	<i>"It is to ruin something"-TL5</i>
<i>"Kumotjheka kwezinto"-TL6</i>	<i>"It is to ruin things"-TL6</i>
<i>"Like ukudla, amanzi, ihlabathi."-TL5</i>	<i>"Like food, water, soil"-TL5</i>
<i>"Ya environment ke o tlwile, but... environment nkare keng mara? Environment kemo ke philang ko teng"-SGB2</i>	<i>"Yes environment I heard about it, but...environment what can I say huh? Environment is where we live in"-SGB2</i>
<i>"Yila sihlala khona sibabantu"-GW2</i>	<i>"It is where we stay as people"-GW2</i>
<i>"Kukwakheka kwento."-TL6</i>	<i>"It is how something is built"-TL6</i>
<i>"Mthunzi so."-TL5</i>	<i>"It is a shade like"-TL5</i>
<i>"Ya ne ibhoduluko yi-environment"-FH2</i>	<i>"Ya ne environment is environment"-FH2</i>
<i>"Yila sihlala khona sibabantu"-GW2</i>	<i>"It is where we stay as people"-GW2</i>

**APPENDIX 18 SEMI-STRUCTURE AND FOCUS GROUP INTERVIEW
TRANSCRIPT (VUNA PRIMARY SCHOOL: CASE 3)**

IsiNdebele and IsiZulu	English
<p><i>“Ngokuthi kubalulekile ukuthi sihlale endaweni e-clean.”-GW3</i></p>	<p><i>“Because it is important that we stay in the environment that is clean.”-GW3</i></p>
<p><i>“I-waste yilokha nakunamaphepha ijarida loke.”-FH3</i></p>	<p><i>“Waste is when there are papers all over the yard.”-FH3</i></p>
<p><i>“Waste is anything that can no longer be used, something that was started for a purpose and then--- how I put it... Kosa ngiberegise i-English kuphela?”-T3</i></p>	<p><i>“Waste is anything that can no longer be used, something that was started for a purpose and then--- how I put it... Am I supposed to use English only?”-T3</i></p>
<p><i>“I waste ngibona kuyinto engasana mberego ukuthi abantu sebaqedile nga whatever bebayenza ngayo then something emele ilahlwe.”-T3</i></p>	<p><i>“Waste I see it as something that has no use that when people are done with whatever they were doing with it then it is something that must be thrown away.”-T3</i></p>
<p><i>“Kulahla izinto because ezinye azisadingi ukusetjenziswa.”-VL5</i></p>	<p><i>“It is to throw things away because some of them are not useful anymore.”-VL5</i></p>

APPENDIX 19 OBSERVATIONS (EMTHINI PRIMARY SCHOOL: CASE 1)

Upon my arrival at Emthini primary school, the school environment in front was clean as displayed in Picture A, Picture B presented the metal bins that the school used to dispose solid waste.

Picture A: School environment



Picture B: Metal bins

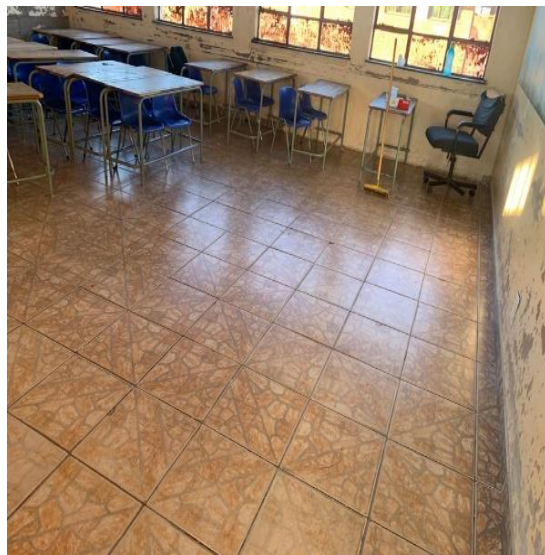


Picture C and D presented the classrooms of Emthini primary school. The classroom had boxes that were used as bins.

Picture C: Classrooms



Picture D: Classrooms



APPENDIX 20 OBSERVATIONS (TJALA PRIMARY SCHOOL: CASE 2)

Upon my arrival at Tjala primary school, food handlers were already on duty and preparing food for learners as seen in Picture A. I noted one street vendor early in the morning selling products to learners as seen in Picture B.

Picture A: Food handlers



Picture B: Street vendor



As I continued with my observations, I noted that the school environment was very clean with no solid waste on site as presented in Picture C. Furthermore, the GW2 ensured that the each school block has a dustbin available as presented in Picture D.

Picture C: School environment



Picture D: Dustbins



APPENDIX 21 OBSERVATIONS (VUNA PRIMARY SCHOOL: CASE 3)

Upon my arrival at Vuna primary school, I noted that the School environment was not clean there was solid waste all over the school environment as presented in Picture A

Picture A: School environment



Picture B: School environment



Food handlers were already on duty to prepare food for learners. There was a 25kg maize meal package, boxes and boxes all lined up for the purpose of making fire as presented in Picture C and Picture D.

Picture C: Food handlers



Picture D: Food handlers



PHASE TWO TRANSLATED DIARY ENTRIES AND OBSERVATIONS

APPENDIX 22 TRANSLATED DIARY ENTRIES (EMTHINI PRIMARY SCHOOL: CASE 1)

IsiNdebele and IsiZulu	English
<p><i>“Sabawa u-principal ne SGB ukuthi ba change ama dustbin because bekunama dustbinlawe we dromu then baya e-office bayowakhulumela then bawathenga”-GW1</i></p>	<p><i>“We told the principal to change the dustbin because we had metal dustbins, so we went to the office and talked about them, and then they bought them”-GW1</i></p>
<p><i>“Ya but anyway nathi first asitjho ukuthi si impressed at least ukwazile to make improvement nyana la ekhaya and then ngiyaqabanga the time ubuyafuthi kuyokwenzeka more than what we have seen”-SP1</i></p>	<p><i>“Yes, but anyway, let us first say that we are impressed. At least you managed to help us make improvements here and I believe that there will still be more changes”.SP1</i></p>
<p><i>“Let me just indicate ukuthi ama committee sinawo, ama sub-committee we SGB. We decided to merge them with your strategy because manengi and we will not find time ukuthi siwa manage woke. It is better when some of them we merge”-SGB1</i></p>	<p><i>“Let me indicate that we do have a committee and an SGB sub-committee. We decided to merge them and include this strategy because there are many and we will not find time to manage all of them if we introduce another committee, so we merged them”-SGB1</i></p>

**APPENDIX 23 TRANSLATED DIARY ENTRIES (TJALA PRIMARY SCHOOL:
CASE 2)**

IsiNdebele and IsiZulu	English
<p><i>"Beba positive as if bebalindile ukuthi sizoba fowunela yabona... ya nanoma after sicocile kwakhamba three or four days bese yafika"-SP2</i></p>	<p><i>"They were positive as if they were waiting for us to call them, even though after we talked with them only three or four days passed and the skip bin arrived"-SP2</i></p>
<p><i>"Ya, ukhona umehluko omkhulu vele. Nanje asisatjhihi solo kwafika I-bin leya"-GW2</i></p>	<p><i>"Yes, there is a huge difference because now I do not burn things anymore since the bin arrived"-GW2</i></p>
<p><i>"Abantwana bayawabutha amaphepha bawafake kuma boxes. Bese abantwana nabaladelweko bayabadobhisa amaphepha, kuzoba nomehluko"-FH2</i></p>	<p><i>"Learners do clean up after themselves now, and they put everything in the box, and when there are late comers, the SGB2 makes them pick up papers across the school yard, so the difference will be there"-FH2</i></p>
<p><i>"Basidobhisa amaphepha nasiladelwako"-TL5</i></p>	<p><i>"They make us pick papers when we are late."-TL5</i></p>
<p><i>"Principal uyasitjela ukuthi siberegise idustbin"-TL6</i></p>	<p><i>"Principal told us to use the dustbin every day."-TL6.</i></p>

**APPENDIX 24 TRANSLATED DIARY ENTRIES (VUNA PRIMARY SCHOOL:
CASE 3)**

IsiNdebele and IsiZulu	English
<i>“Sazisusa nabo laba abakhona ama EA sazi tjhisa.”-GW3</i>	<i>“We cleaned up with the EA’s”-GW3</i>
<i>“Kunama assistants abasizako”-FH3</i>	<i>“There are assistants that helped”-FH3</i>
<i>“Umalume sekuna bantu abamusizako bese nabo mamma laba abathengisako bayabutha ngoba u-Principal waba caller into order”-T3.</i>	<i>“Uncle now has people who offer assistance and even the street vendors now clean every day after selling their products ever since the school principal called them into order.”-T3.</i>
<i>“I-SGB ibize I meeting yama parents and we included the strategy ku Agenda”-SP3</i>	<i>“The SGB organized a parents’ meeting and we are going to include your strategy in the agenda.”-SP3</i>
<i>Woo sithuthile lapha abo mem bathi kuseduze. Shukuthi intuthu beyingena e classin. Ya yafika ngoba ngiyakhumbula beku khona u mem la ngoba naloka sishisa iy hlal hlala so kuthiwa khamba uyocisha lapha uohethwe angazi yini ma sinus. Yena akasekho Seka shonile bekangu vice principal last year.</i>	<i>“We moved there because the teachers said it was next to the classes. There was a teacher. Whenever we burned papers, she would tell me to go and stop the fire because she was suffering from asthma and sinuses. Unfortunately, she is no longer with us. She passed away last year. She was a vice principal”-GW3</i>

APPENDIX 25 OBSERVATIONS (EMTHINI PRIMARY SCHOOL: CASE 1)

I saw changes in how Emthini primary school stakeholders shaped their management of solid waste. For instance, SP1 and SGB1 replaced their old metal dustbins represented in Picture A, which SP1 referred to as becoming rubbish themselves, with the new plastic bins illustrated in Picture B:

Picture A: Old metal dustbins



Picture B: New plastic bins



Furthermore, I noted that the school environment was clean and free from solid waste, as presented in Picture C and D:

Picture C: Before



Picture D: After



During observations, one of the notable concerns that I noted at Emthini primary school was how the dumping site for open burning of solid waste escalated compared to when I collected data for phase one in Picture E and during phase two of the implementation of the SISS-WMP in Picture F:

Picture E: Before



Picture F: After



APPENDIX 26 OBSERVATIONS (TJALA PRIMARY SCHOOL: CASE 2)

Picture A and B displayed the skip bin supplied by the SDS in the local municipality:

Picture A: Skip bin



Picture B: Skip bin



I noted that the stakeholders had already started using the skip bin. Furthermore, the school environment was indeed inviting, as displayed in Picture C and D:

Picture C: School environment



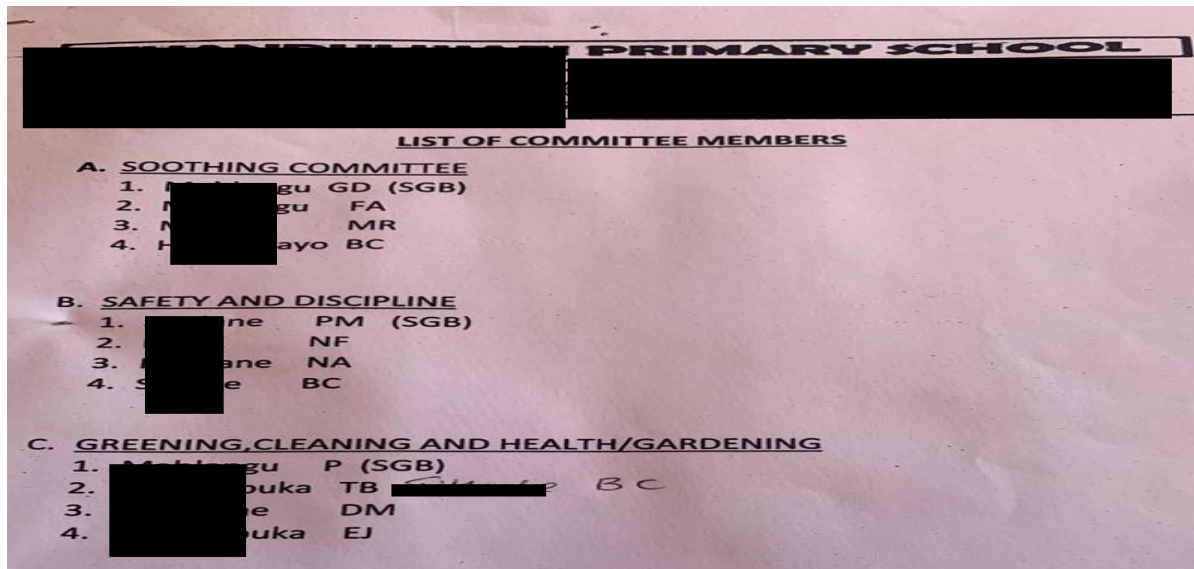
Picture D: School environment



APPENDIX 27 OBSERVATIONS (VUNA PRIMARY SCHOOL: CASE 3)

Picture A presented the committee members for the greening, cleaning, and health/garden was established by the school.

Picture A: committee for greening, cleaning and health/gardening



I also noted that the school environment was clean compared to phase one of data collection, as seen in Picture B and D, which were taken during phase one of data collection and Picture C and E which were taken during phase two of the implementation of the SISS-WMP:

Picture B: Before



Picture C: After



Picture D: Before

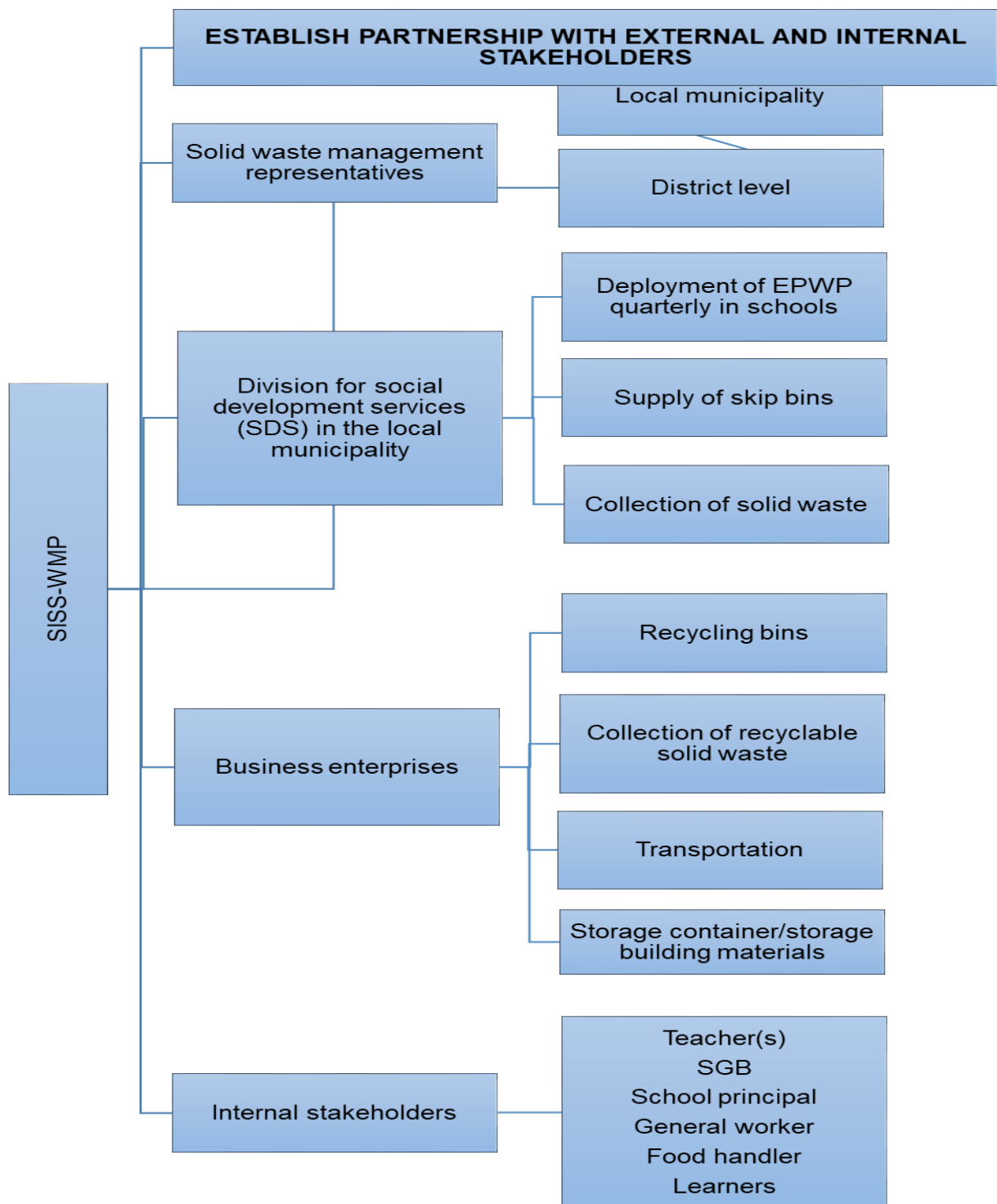


Picture E: After



**THE IMPLEMENTATION OF THE:
SUSTAINABLE INTERVENTION STRATEGY FOR
SOLID WASTE MANAGEMENT THROUGH
PARTNERSHIP
(SISS-WMP)**

Compiled by: Lettah Sikhosana



CONTACT THE FOLLOWING EXTERNAL AND INTERNAL STAKEHOLDERS FOR THE IMPLEMENTATION OF THE: SUSTAINABLE INTERVENTION STRATEGY FOR SOLID WASTE MANAGEMENT THROUGH PARTNERSHIP (SISS-WMP)

SOLID WASTE MANAGEMENT REPRESENTATIVES

Notes: Contact the above solid waste management representatives at the district or local municipality level and invite them to school to raise awareness and teach about solid waste management through environmental education.

SOCIAL DEVELOPMENT SERVICES (SDS) IN THE LOCAL MUNICIPALITY

Notes: Contact the Local Municipality and request assistance with solid waste management by intervening with the following: Deployment of EPWP in school; Supply of skip bins; and Collection of solid waste.

BUSINESS ENTERPRISES

Notes: Contact the solid waste management business enterprises and request supplies of recycling bins in order for the school to facilitate its own recycling programme, request the same companies to collect the recyclable materials or to provide the school with a transportation to transport these recyclables materials. Contact the container companies and request supplies of storage containers. Contact warehouses for storage building materials.

INTERNAL STAKEHOLDERS

Notes: A teacher must establish a committee for solid waste management that will be made up of stakeholders such a SGB representative, additional teacher(s), general worker, food handler as well as learners. The committee will be responsible for the following:

- Drafting a policy that shapes solid waste management
- Raise awareness about environmental education
- Introduce solid waste management programs
- Ensure that the school environment is free from solid waste
- Report to the school management (school principal and the SGB)

APPENDIX 29 EMTHINI PRIMARY SCHOOL (CASE 1) PROPOSAL LETTERS


	PRIMARY SCHOOL
--	-----------------------

We the above mentioned School located at _____ Local Municipality which is in Nkangangala District Mpumalanga Province, with an enrolment of _____ Company for donation of wheely recycling bins.

As we plan to operate a waste recycling program. This is informed by the waste that our community and learners cause around and inside school premises if the company can donate for our school it will be easily to facilitate the recycling program that we intend to initiate as a school. we humbly request your company to provide us with a transport to carry and deposit the recyclables materials.

waiting to hear from you.

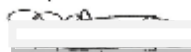
sincerely yours



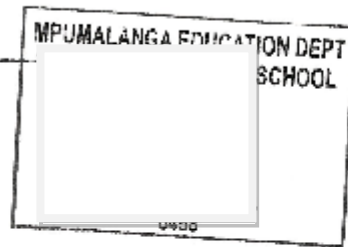
Principal

03/02/2022

Date



Chairperson



03/02/2022

Date

████████████████████ PRIMARY SCHOOL

We the above mentioned School located at ██████████ Local Municipality which is in Nkangangala District Mpumalanga Province, with an enrolment of ██████████ Company for donation of wheely recycling bins.

As we plan to operate a waste recycling program. This is informed by the waste that our community and learners cause around and inside school premises if the company can donate for our school it will be easily to facilitate the recycling program that we intend to initiate as a school. we humbly request your company to provide us with a transport to carry and deposit the recyclables materials.

waiting to hear from you.

sincerely yours

Principal

03/02/2022
Date

Chairperson

MPUMALANGA EDUCATION DEPT
██████████ Y SCHOOL
3
A

03/02/2022
Date

APPENDIX 30: EDITORS CONFIRMATION LETTER



Academic consultancy

"Perfection is our DNA"

academicconsultancy3@gmail.com

27 February 2022

To whom it may concern

This letter is to confirm that I, Keegan Bruce Schmidt, freelance copy-editor, have edited and proofread the thesis entitled *"The development and implementation of the sustainable intervention strategy for solid waste management in primary schools: A case of Nkangala district, Mpumalanga Province."* by Lettah Sikhosana for grammar and spelling. For the purposes of clarity, I have not changed any of the ideas presented in this thesis; only the grammar and spelling have been altered for the purposes of clarity. This is to confirm that I have edited the document to a level I deem satisfactory.

Keegan Schmidt

Qualifications:

- BIS (University of Pretoria)
- BIS Hons (University of Pretoria)

APPENDIX 31 TURNITIN REPORT

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