**Investigating effective strategies for integrating littering management Into Education for Sustainable Development in Vhembe East District, Limpopo Province**

By

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## DECLARATION

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**INVESTIGATING EFFECTIVE STRATEGIES FOR INTERGRATING LITTERING MANAGEMENT INTO EDUCATION FOR SUSTAINABLE DEVELOPMENT IN VHEMBE EAST DISTRICT, LIMPOPO PROVINCE**

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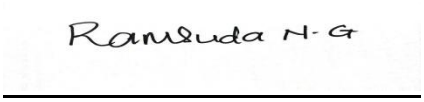

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## DEDICATION

This dissertation is dedicated to my brother Limela Ndivhuwo, who serves as my last hope and helper when circumstances seem impossible, and my loving and kind mother Limela Mukumela. Your guidance helped me becoming who I am today through your support.

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## ABSTRACT

Littering in schools remains a persistent global challenge with significant implications for learners' health and environmental well-being. Despite the efforts of governments and schools to maintain clean and safe learning environments, littering continues to be a widespread problem. This study investigates how littering can be sustainably managed in primary schools as a form of Education for Sustainable Development (ESD), focusing on selected schools in the Vhembe East District, Limpopo Province. Specifically, it explores the factors that enable or hinder the sustainable management of litter within the school environment. The study is framed by the Theory of Planned Behavior (TPB), which provides a lens for understanding the attitudes, subjective norms, and perceived behavioral controls influencing litter management practices. An exploratory qualitative multiple case study design was employed, targeting three conveniently selected primary schools in the district. Data were collected through semi-structured interviews, focus group discussions, and non-participant observations, and analyzed using thematic analysis. Participants included school principals, School Governing Body (SGB) chairpersons, Grade 6 Natural Science and Technology teachers, school cooks, street vendors, and learners. Focus group discussions with learners, cooks, and vendors provided diverse perspectives, while observations offered valuable insights into littering patterns and practices within the school context.

The study revealed that participants possessed limited knowledge of environmental education and sustainable litter management strategies and faced numerous challenges requiring support from the Department of Basic Education. While some teachers attempted to address littering through classroom rules, learners' codes of conduct, and outdoor activities, schools generally lacked the resources necessary for effective litter management. The findings underscore the need for external support, including teacher training, provision of recycling bins, financial assistance, and clear guidance on litter management practices. Furthermore, the study highlights the importance of government-led awareness initiatives—such as campaigns to minimize litter and the establishment of school libraries to prevent littering caused by discarded learning materials.

To promote sustainable litter management, the study recommends targeted teacher training on integrating litter management into classroom instruction, the provision of recycling bins and other relevant resources, systematic separation of waste for recycling, implementation

of environmental awareness programmes, and the development of school-specific environmental policies by principals and School Governing Bodies.

**Keywords:** *Littering management, Education for Sustainable Development, Environmental education, Sustainable schools, Waste management, Environmental awareness*

## ABSTRACT

U laṱela thukhwi zwikoloni zwi kha ḓi vha khaedu ya ḽifhasi i sa fheli ine ya vha na masiandoitwa mahulwane kha mutakalo wa vhagudi na vhuḓifari ha mupo. Naho mivhuso na zwikolo zwo ita vhuḓidini ha u vhulunga fhethu ha u guda ho kunaho na ho tsireledzeaho, u posa mathukhwi zwi kha ḓi vha thaidzo yo phaḓalalaho. Ngudo iyi i ṱoḓisisa nḓila ine u laṱwa ha mathukhwi ha nga langiwa ngayo nga nḓila i bveledzaho zwikoloni zwa phuraimari sa mufuda wa Pfunzo ya Mveledziso ya Tshifhinga tshilapfu (ESD), yo sedza kha zwikolo zwo khethiwaho zwa Tshiṱiriki tsha Vhembe Vhubvaḓuvha, Vunḓuni ḽa Limpopo. Zwo ṱanḓavhuwaho, i ṱoḓisisa zwithu zwine zwa konisa kana u thithisa ndaulo ya mathukhwi i bveledzaho nga ngomu ha vhupo ha tshikolo. Ngudo yo vhumbiwa nga Theory of Planned Behavior (TPB), ine ya ṋetshedza lense ya u pfesesa mavhonele, maitele a ṱhoho, na ndaulo ya vhuḓifari yo dzhiiwaho ine ya ṱuṱuwedza maitele a u langa mathukhwi. Ho shumiswa nzudzanyo ya ngudo ya tsumbo nnzhi ya ṱhoḓisiso ya vhuimo, yo livhiswaho kha zwikolo zwiraru zwa phuraimari zwo khethiwaho zwavhuḓi kha tshiṱiriki. Datha yo kuvhanganywa nga kha inthavhiyu dzo dzudzanywaho nga tshipiḓa, nyambedzano dza zwigwada zwo livhiswaho, na ṱhogomelo dza vha sa dzheneli, nahone dza senguluswa hu tshi shumiswa tsenguluso ya thero. Vha dzhenelaho vho katela ṱhoho dza zwikolo, vhadzulatshidulo vha Tshigwada tshi Langaho Zwikolo (SGB), vhadededzi vha Gireidi ya 6 ya Saintsi ya Mvelo na Thekinoḽodzhi, vhabiki vha zwikolo, vharengisi vha zwiṱaraṱani, na vhagudiswa. Nyambedzano dza zwigwada zwo livhiswaho na vhagudi, vhabiki, na vharengisi dzo ṋetshedza mavhonele o fhambanaho, ngeno u sedza zwo ṋetshedza nḓivho ya ndeme kha maitele a u posa mathukhwi na maitele nga ngomu ha nyimele ya tshikolo.

Ngudo yo dzumbulula uri vha dzhenelaho vho vha vhe na nḓivho ṱhukhu ya pfunzo ya mupo na zwiṱirathedzhi zwa u langa mathukhwi zwi bveledzaho nahone vho sedzana na khaedu nnzhi dzine dza ṱoḓa thikhedzo u bva kha Muhasho wa Pfunzo ya Mutheo. Naho vhaṅwe vhadededzi vho lingedza u tandulula u laṱwa ha mathukhwi nga milayo ya kiḽasirumuni, milayo ya vhuḓifari ya vhagudi, na mishumo ya nnḓa, zwikolo nga u angaredza zwo vha zwi si na zwishumiswa zwi ṱoḓeaho u itela u langa mathukhwi nga nḓila i bvelelaho. Mawanwa a ombedzela ṱhoḓea ya thikhedzo ya nnḓa, hu tshi katelwa na u gudisa vhadededzi, u ṋetshedzwa ha mabini a u vhuedzedza zwithu zwo no shumiswaho, thuso ya masheleni, na vhulivhisi vhu re khagala ha maitele a u langa mathukhwi. Zwiṅwe hafhu, ngudo i sumbedza ndeme ya vhukando ha u ḓivhadza vhune ha rangwa phanḓa nga muvhuso—vhu ngaho

mafulo a u fhungudza mathukhwi na u thomiwa ha laiburari dza zwikolo u itela u thivhela mathukhwi ane a vhangwa nga zwishumiswa zwa u guda zwo laṱiwaho.

U ṱuṱuwedza ndaulo ya mathukhwi i bveledzaho, ngudo i themendela vhugudisi ho livhiswaho ha vhadededzi kha u ṱanganya ndaulo ya mathukhwi kha ndayo ya kiḽasirumuni, ṉetshedzo ya mabini a u vhuedzedza mathukhwi na zwiṅwe zwishumiswa zwo teaho, u fhandekanya nga nḓila yo dzudzanyeaho mathukhwi u itela u vhuedzedza, u thomiwa ha mbekanyamushumo dza nḓivho ya mupo nga ṱhoho dza tshikolo dza mupo, na mveledziso ya mbekanyamaitele dzo khetheaho dza mupo wa tshikolo.

**Maipfi a ndeme**: Ndangulo ya mathukhwi, Pfunzo ya Mveledziso ya Tshifhinga tshilapfu, Pfunzo ya mupo, Zwikolo zwi bveledzaho, Ndangulo ya mathukhwi, Nḓivho ya mupo

## ABSTRACT

Ku lahliwa ka thyaka eswikolweni ku tshama ku ri ntlhontlho wa misava hinkwayo lowu phikelelaka lowu nga na switandzhaku leswikulu eka rihanyo ra vadyondzi na vuhlayiseki bya mbango. Ku nga khathariseki matshalatshala ya tihulumendhe ni swikolo ku hlayisa tindhawu to dyondzela eka tona leti tengeke ni leti hlayisekeke, ku lahliwa ka thyaka ku ya emahlweni ku va xiphiqo lexi hangalakeke. Dyondzo leyi yi lavisisa hilaha ku lahliwa ka thyaka ku nga lawuriwaka hakona hi ndlela leyi nga heriki eswikolweni swa le hansi tanihi xivumbeko xa Dyondzo ya Nhluvukiso lowu nga heriki (ESD), ku kongomisa eka swikolo leswi hlawuriweke eXifundzheni xa Vhembe East, eXifundzheninkulu xa Limpopo. Hi ku kongoma, yi lavisisa swilo leswi endlaka leswaku ku va na vulawuri lebyi nga heriki bya thyaka endzeni ka ndhawu ya xikolo. Dyondzo leyi yi vumbiwile hi Theory of Planned Behavior (TPB), leyi nyikaka lens yo twisisa mavonelo, mimpimanyeto ya xiviri, na vulawuri bya mahanyelo lebyi voniwaka lebyi kucetelaka maendlelo ya vulawuri bya thyaka. Dizayini ya dyondzo ya timhaka to tala ya xiyimo xo lavisisa yi tirhisiwile, leyi kongomisiweke eka swikolo swinharhu swa le hansi leswi hlawuriweke hi ndlela yo olova eka xifundzankulu. Data yi hlengeletiwile hi ku tirhisa mimbulavurisano leyi nga hlelekangiki ngopfu, mimbulavurisano ya ntlawa lowu kongomisiweke, na ku langutisisa loku nga nghenerikí, naswona yi xopaxopiwile hi ku tirhisa nxopaxopo wa nhlokomhaka. Vatekaxiave va katsa tinhloko ta swikolo, vatshamaxitulu va Huvo leyi Fumaka ya Swikolo (SGB), vadyondzisi va Giredi ya 6 ya Sayense ya Ntumbuluko na Thekinoloji, vapheki va swikolo, vaxavisi va le xitarateni, na vadyondzi. Mimbulavurisano ya ntlawa lowu kongomisiweke na vadyondzi, vapheki, na vaxavisi yi nyikile mavonelo yo hambana, kasi ku langutisisa ku nyikile vutivi bya nkoka eka swivumbeko na maendlelo yo lahlela thyaka endzeni ka xiyimo xa xikolo.

Dyondzo yi paluxile leswaku vatekaxiave a va ri na vutivi lebyi nga nyawuriki bya dyondzo ya mbango na tindlela ta vulawuri bya thyaka lebyi nga heriki naswona va langutane na mintlhontlho yo tala leyi lavaka nseketelo ku suka eka Ndzawulo ya Dyondzo ya Masungulo. Loko vadyondzisi van'wana va ringete ku lulamisa ku lahliwa ka thyaka hi ku tirhisa milawu ya tlilasi, milawu ya mahanyelo ya vadyondzi, na migingiriko ya le handle, swikolo hi ntolovelo a swi pfumala switirhisiwa leswi lavekaka eka vulawuri bya thyaka lebyi humelelaka. Swikumiwa swi kandziyisa xilaveko xa nseketelo wa le handle, ku katsa na ndzetelo wa vadyondzisi, mphakelo wa swibye swo vuyisa swilo leswi nga tirhisiwangiki, mpfuneto wa timali, na nkongomiso lowu nga erivaleni eka maendlelo ya vulawuri bya thyaka. Ku tlula kwalaho, nkambisiso lowu wu kombisa nkoka wa migingiriko yo lemukisa leyi kongomisiwaka hi mfumo—yo tanihi matshalatshala yo hunguta thyaka ni ku simekiwa ka tilayiburari ta swikolo ku sivela ku lahliwa ka thyaka loku vangiwaka hi switirhisiwa swo dyondza leswi lahliweke.

Ku tlakusa vulawuri bya thyaka lebyi nga heriki, ndzavisiso wu ringanyeta ndzetelo wa vadyondzisi lowu kongomisiweke eka ku hlanganisa vulawuri bya thyaka eka ndzetelo wa le tlilasini, mphakelo wa swibye swo vuyisa thyaka na switirhisiwa swin'wana leswi

faneleke, ku hambanisiwa ka thyaka hi ndlela leyi hlelekeke ku tlherisériwa endzhaku, ku tirhisiwa ka minongonoko yo lemukisa mbango, na ku tumbuluxiwa ka tipholisi ta mbango leti kongomisiweke eka swikolo hi tinhloko ta swikolo na Mihlangano yo Lawula Swikolo.

**Marito ya nkoka:** Vulawuri bya ku lahlela thyaka, Dyondzo ya Nhluvukiso lowu nga heriki, Dyondzo ya mbango, Swikolo leswi nga ta tshama nkarhi wo leha, Vulawuri bya thyaka, Ku lemuka mbango.

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## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| C2005 | Curriculum 2005 |
| CAPS | Curriculum and Assessment Policy Statement |
| DBE | Department of Basic Education |
| DEA | Department of Environmental Affairs |
| DEFSD | Decade of Education for sustainable Development |
| DESD | Decade of Environmental Development |
| EE | Environmental Education |
| EECI | Environmental Education Curriculum Initiatives |
| EEPI | Environmental Education Policy Initiative |
| EMA | Environmental Management Act |
| ESD | Education for Sustainable Development |
| GAP | Global Action Programme |
| ICT | Information and Communication Technologies |
| KNZB | Keep New Zealand Beautiful |
| KZN | KwaZulu Natal |
| MEC | Member of Executive Council |
| NCES | National Conservation Education Strategy |
| NCF | National Conservation Foundation |

| | |
|---|---|
| NCS | National Curriculum Statement |
| NDP | National Development Plan |
| NPC | National Planning Committee |
| NEEC | Nigeria Environmental Education Curriculum |
| OBE | Outcome Based Education |
| SADC | Southern African Development Community |
| SAGSP | South African Green Schools Programme |
| SD | Sustainable Development |
| SDGs | Sustainable Development Goals |
| SGB | School Governing Bodies |
| TPB | Theory of Planned Behavior |
| UN | United Nations |
| UNEP | United Nation Environmental Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organisation |
| UNISA | University of South Africa |

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# CHAPTER 1: ORIENTATION TO THE STUDY

## 1.1 Introduction and study Background

In the wake of South Africa's post-apartheid educational reforms, the national curriculum has undergone significant transformation. The shift from the Outcomes-Based Education (OBE) approach in 2005 to the more structured Curriculum and Assessment Policy Statements (CAPS) introduced in 2011 reflects an ongoing effort to promote inclusivity and address historical educational inequalities. Scholars such as Bertram (2020), Hoadley (2018), and Chisholm (2005) have extensively discussed these reforms, which signify broader attempts to enhance the quality and relevance of education in the country. However, amid these curriculum transformations, the integration of Education for Sustainable Development (ESD) has become increasingly crucial, particularly in addressing environmental challenges such as littering.

Globally, the United Nations Sustainable Development Goals (SDGs)—specifically Goal 4 (Quality Education) and Goal 12 (Responsible Consumption and Production)—emphasize the importance of embedding sustainability principles within education systems. This emphasis is especially pertinent in regions such as the Vhembe East District of Limpopo Province, where persistent littering presents serious risks to both public health and ecological stability. In South Africa, this global agenda has been echoed through various initiatives, including the Environmental Education Policy Initiative (EEPI) established in 1992, which laid the foundation for integrating Environmental Education (EE) into the national curriculum. The initiative was later formalized in the 1995 White Paper on Education and Training, which positioned EE as a core component of the education system (Ndzimbomvu et al., 2021).

Despite these progressive policy developments, the practical implementation of ESD in schools continues to face numerous challenges. ESD aims to foster long-term behavioral change by helping learners understand the environmental and health consequences of littering. Studies by Alia and Akbarb (2024) and Masemene (2021) indicate that littering contributes to the spread of infectious diseases such as cholera, typhoid fever, and diarrhea—underscoring the urgent need for effective waste management and educational interventions. The Vhembe East District, like many rural

areas in South Africa, struggles with persistent littering problems that threaten both environmental and public health. Through education, learners can develop environmental responsibility and actively contribute to solving ecological challenges. Fang et al. (2022) argue that when learners acquire the necessary knowledge, attitudes, and skills, they become empowered to protect the environment and develop a sustained sense of responsibility. Similarly, Olaitan et al. (2021) highlight that ESD can play a preventive role by promoting awareness campaigns, environmental sanitation practices, and behavioral change aimed at reducing littering and preventing diseases such as cholera.

However, the integration of ESD, particularly littering management, within the school curriculum remains inconsistent. Research suggests that ESD content is often neglected, resulting in limited learner awareness of environmental issues and related legislation (Tsai et al., 2020). This neglect is compounded by teachers' challenges, including inadequate training, limited teaching resources, and insufficient institutional support, which collectively undermine effective ESD implementation in classrooms (Matsekoleng & Awshar, 2022).

Given the central role of education in promoting sustainable development, this study investigates sustainable strategies for managing littering as a component of ESD in selected schools within the Vhembe East District. By addressing local environmental challenges, the study contributes to broader national and global objectives of enhancing environmental sustainability and improving the quality of education in South Africa. The findings are expected to provide actionable recommendations for educators, policymakers, and other stakeholders to support the development of a more environmentally conscious education system.

Considering ongoing national efforts to embed ESD into the curriculum, this study addresses a critical gap in existing literature by identifying effective, context-specific strategies for integrating littering management into the ESD framework. By doing so, it aligns with both local and global sustainability goals—contributing to responsible consumption, environmental protection, and the promotion of sustainable education practices. Despite the existence of national policies supporting Environmental Education

(EE) and ESD, many schools in the district continue to struggle with limited resources and institutional support, leading to inconsistent implementation. This study, therefore, seeks to bridge this gap by proposing sustainable and contextually relevant strategies for effective integration of littering management into ESD, thereby advancing both local and national environmental priorities.

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### 1.2 Motivation of the study

The motivation for this study arises from the researcher's personal experiences as an educator and observations of the everyday realities within primary schools in the Vhembe East District, Limpopo Province, particularly concerning the implementation of Education for Sustainable Development (ESD). The researcher's interest was further inspired by recurring observations of how litter within school environments contributes to broader environmental challenges and poses risks to both learners and local wildlife (Anokye et al., 2024). These experiences prompted a desire to investigate the factors influencing learners' attitudes and behaviors toward littering in different school contexts. Examining littering within schools provides an opportunity to identify practical and sustainable strategies for integrating litter management into ESD practices in the district.

Furthermore, the presence of school vendors and tuck shops, common sources of food in rural schools, was observed to contribute significantly to littering. Fast-food wrappers, disposable containers, and food packaging are often discarded carelessly during break times, creating untidy and unhygienic school environments (Tetteh, 2022). Unlike in the past, when learners often went home for meals during school breaks, today's learners rely heavily on packaged food, typically wrapped in materials such as plastic, aluminum, and paper. These materials not only accumulate as waste but also have detrimental effects on the environment (Akhtar, 2023).

The shift in consumption patterns and lifestyle practices within schools highlights the growing environmental burden posed by littering, which can adversely affect both ecological systems and human health. These concerns collectively motivated the

researcher to undertake this study, which seeks to explore how littering can be sustainably managed as a form of Education for Sustainable Development (ESD) in selected primary schools in the Vhembe East District, Limpopo Province.

### 1.3 Theoretical framework

A theoretical framework serves as a logically structured and interconnected set of concepts and propositions, often derived from one or more established theories, that provides a foundation for guiding a research study (Varpio et al., 2020). Similarly, Vinz (2022) describes a theoretical framework as a foundational review of existing theories that functions as a roadmap for developing and organizing the arguments within a scholarly work. In this study, the Theory of Planned Behavior (TPB) was adopted to examine and interpret learners' behavioral intentions toward littering management in selected primary schools in the Vhembe East District, Limpopo Province. The TPB, a psychological theory developed by Ajzen (1985, 1991), seeks to explain the relationship between individuals' attitudes, subjective norms, perceived behavioral control, and their intentions to engage in specific behaviors (Rahman et al., 2022).

The theory is grounded in three key constructs: attitude toward behavior, subjective norm, and perceived behavioral control. These components collectively serve as critical determinants for understanding behavioral intentions, which in turn influence actual behavior (Ibrahim et al., 2021). Within the context of this study, the TPB provides a framework for understanding the factors that motivate or hinder responsible environmental behavior among learners. Specifically, it assists in identifying the underlying beliefs, social influences, and perceived constraints that shape learners' attitudes and actions toward littering. Thus, the TPB offers valuable insights into the cognitive and social dimensions of learners' environmental behavior, enabling the study to explore both the causes of irresponsible littering and the potential pathways for fostering responsible and sustainable practices. A more detailed discussion of the theory and its relevance to this study is presented in Chapter 2.

## 1.4 Elucidation of key concepts

### 1.4.1 Education for Sustainable development (ESD)

Education for Sustainable Development (ESD) is a transformative approach to learning that seeks to promote development capable of meeting the needs of present generation without compromising the ability of future generations to meet their own needs (UNESCO, 2003). Through ESD, learners acquire the knowledge, skills, attitudes, and values necessary to understand environmental, social, and economic interconnections and to act responsibly within their communities. When learners gain this understanding, they develop a sense of care and responsibility for their surroundings, fostering behaviors that support environmental protection and sustainability. According to Taimur and Sattar (2020), ESD empowers learners to make informed decisions and take responsible actions that promote environmental integrity, economic viability, and social justice for both present and future generations, while embracing cultural diversity. Similarly, UNESCO (2014) emphasizes that ESD enables all individuals to acquire the competencies required to shape a more sustainable future. Beyond imparting knowledge, ESD encourages active participation, critical thinking, and problem-solving, enabling learners to contribute meaningfully toward the creation of a sustainable society.

### 1.4.2 Integration

Hornby (2010), in the *Oxford Advanced Learner's Dictionary*, defines integration as the act or process of combining two or more elements so that they function together effectively. In the context of this study, integration refers to the incorporation of environmental education into Life Skills content, linking classroom learning with learners' daily human activities. This approach promotes holistic understanding by connecting theoretical knowledge with practical, real-world experiences. Similarly, McNeil (1996) describes integration as a method of organizing curriculum content that fosters coherence and relevance across learning areas. According to McNeil, integration necessitates transformative changes within schools, including a re-evaluation of educational goals and learning outcomes. It may also involve collaborative

efforts that extend beyond the classroom, encouraging parental involvement and community participation in supporting learners' educational experiences.

### 1.4.3 Littering management

Littering management involves the development and implementation of proactive strategies to address littering, promote responsible behavior, and ensure effective waste management (Lev et al., 2023). It encompasses the policies, practices, and interventions designed to reduce and control litter in public spaces, schools, communities, and the broader environment (Schenck et al., 2022). According to Johannes et al. (2021), littering management also includes systematic collection, removal, and proper disposal of waste materials, such as trash and debris, to maintain environmental cleanliness and prevent ecological degradation.

### 1.4.4 Environmental Education (EE)

Ramesh et al. (2023) define Environmental Education (EE) as a strategy that enables individuals to investigate environmental issues, identify solutions, and take proactive steps to improve the environment. By acquiring knowledge about their natural surroundings, individuals develop a sense of care and responsibility toward the environment. Similarly, Munasi (2019) describes EE as a process through which values are acknowledged and concepts clarified, fostering competent individuals who understand the interdependence between humans and their biophysical environment. Fang et al. (2022) further emphasize that EE involves recognizing values and clarifying ideas to develop the skills, attitudes, and understanding necessary to appreciate the complex interrelationships among humans, cultures, and their biological and physical environments.

### 1.4.5 Sustainable development (SD)

According to Deren and Skonieczny (2022:1), sustainable development is "a development that takes into consideration processes of change, where the exploitation of resources does not prevent future generations from having the ability to meet their own needs." In the context of this study, sustainable development refers to the

responsible stewardship of the environment by the current generation in a way that preserves a clean, healthy, and viable environment for future generations.

### 1.4.6 Effective Strategies

Effective strategies are carefully designed methods or procedures intended to achieve specific objectives or to address problems successfully (Nickols, 2016). Fuertes et al. (2020) further emphasize that effective strategies involve activities through which an institution distinguishes itself by creating lasting impact in the way it chooses to act and implements its initiatives. In the context of this study, effective strategies refer to the various procedures and activities employed by principals, School Governing Body (SGB) chairpersons, teachers, learners, cooks, and vendors in selected primary schools to identify and implement ways of integrating littering management into Education for Sustainable Development (ESD).

## 1.5 PROBLEM STATEMENT

Littering is a pervasive environmental issue globally, with significant implications for schools as key sites for promoting sustainable practices. International studies have documented the detrimental effects of littering on both the environment and public health. For example, Syakura et al. (2020) found that schools in Indonesia often dispose of waste in unregulated landfills, contributing to environmental degradation. Similarly, Dowarah et al. (2022) emphasized that raising awareness through education is crucial for the successful implementation of litter management programs in India. In Sierra Leone, Kamara et al. (2021) highlighted the risks of improper waste disposal, noting that animals frequently ingest plastic waste, causing digestive blockages, while careless disposal of garbage leads to injuries and accidents.

In the African context, littering remains a pressing challenge, particularly within schools. Mugo (2020) observed that littering contributes to unsanitary conditions in Kenyan schools, fostering disease outbreaks. Ampofo (2020) reported that poor waste disposal practices persist in Senior High Schools in rapidly growing Ghanaian cities, exacerbating environmental challenges. Furthermore, studies by Mbaka et al. (2019) and Kariuki et al. (2023) noted that reliance on wood fuel in Kenyan institutions further depletes vegetation cover, adding to the environmental burden.

In South Africa, the issue of littering in schools is well-documented. Matsekoleng and Mapotse (2018) found that learners often show little concern for the negative consequences of improper litter disposal, even after participating in classroom activities related to environmental care. Similarly, Mapotse and Matsekoleng (2017) and Mboweni (2019) highlighted the significant environmental challenges faced by South African schools due to littering. Gule (2021) further observed that primary schools in the iLembe district of KwaZulu-Natal are heavily polluted with solid waste in their schoolyards and playgrounds.

Education for Sustainable Development (ESD) provides a critical framework for addressing these challenges. ESD equips individuals with the values, knowledge, and skills necessary to contribute to a sustainable future (Glavic, 2020). By incorporating key sustainability issues, such as waste management, into teaching and learning, ESD aligns with the 2030 Sustainable Development Agenda, which prioritizes fostering pro-environmental behavior to achieve global sustainability goals. Despite its potential, there is a notable gap in the literature regarding how ESD can be effectively leveraged to manage littering in schools, particularly within the South African context.

This study seeks to address this gap by exploring sustainable strategies for managing littering as a form of ESD in selected schools in the Vhembe East District, Limpopo. According to the Constitution of the Republic of South Africa (1996, Chapter 2, Bill of Rights), everyone has the right to an environment that is not harmful to their health or well-being. Schools, as critical institutions for shaping the habits of young learners, have a responsibility to foster healthy and sustainable environments. However, many schools continue to face challenges in environmental protection, often falling short of the standards envisioned in the Bill of Rights.

## 1.6 RESEARCH QUESTION

### 1.6.1 Main Research Question

The main research question for this study is: How can littering be sustainably managed as a form of ESD in selected schools in Vhembe East District Limpopo Province?

### 1.6.2 RESEARCH SUB- QUESTIONS

The research sub- questions for this study are:

- What factors promote implementing sustainable management of littering as a means of ESD in schools?
- What factors impede sustainable management of littering as a form of ESD in schools?
- What strategies can be implemented and maintained to strengthen the enabling factors for the sustainable management of littering in schools as part of ESD?
- How can potential limiting factors be addressed to facilitate the school-based management of littering as a part of ESD?

## 1.7 RESEARCH AIM AND OBJECTIVES

### 1.7.1 AIM OF THE STUDY

The aim of this study is to explore how littering could be sustainably managed as a form of ESD in selected schools in the Vhembe East District Limpopo Province.

### 1.7.2 OBJECTIVES OF THE STUDY

- To investigate the factors that supports the implementation of sustainable littering as an approach to ESD in schools.
- To examine the factors hindering the sustainable management of littering as a form of ESD in schools.
- To explore strategies to maintain and strengthen the enabling factors that ensures the sustainable management of littering in schools as part of ESD.
- To develop recommendation and strategies for addressing limiting factors to facilitate school-based management of littering as part of ESD.

## 1.8 RESEARCH METHODOLOGY

According to Bloomberg and Volpe (2019), research methodology is the backbone of any study, as it guides the research process and ensures the credibility of results.

Similarly, McMillan and Schumacher (2010) define research methodology as a systematic approach for gathering and evaluating information to investigate a particular topic. For this study, a qualitative research methodology was employed to conduct an in-depth investigation into littering management in selected primary schools within the Vhembe East District. The methodology provided a structured framework for the researcher, outlining the procedures and techniques used to collect data, monitor findings, and analyze outcomes related to the study focus. Chapter 3 presents a detailed description of the research methodology, including the research paradigm and approach, research design, population and sampling, data collection methods, data analysis and interpretation, ethical considerations, delimitations and limitations, and the strategies employed to ensure the trustworthiness of the study.

### 1.8.1. Research paradigm

Lincoln et al. (2011) define a paradigm as a set of philosophical assumptions or basic beliefs that guide a researcher's actions and shape their worldview. The purpose of this study is to investigate effective strategies for integrating littering management into Education for Sustainable Development (ESD) in selected schools in the Vhembe East District, Limpopo Province. The main research question guiding the study is: How can littering be sustainably managed as a form of ESD in selected schools in the Vhembe East District, Limpopo Province?

The researcher determined that the interpretivist paradigm would be the most suitable for achieving the study's objectives. According to Ugwu et al. (2021), the aim of the interpretivist approach is to understand and interpret human behavior in context. This paradigm emphasizes that any phenomenon under study may have multiple realities and that the researcher interprets the data using their reasoning, informed by interactions with participants, to answer the research question.

The following section discusses the research approach adopted for this study.

### 1.8.2 Research approach

A research approach is a systematic plan that outlines how a researcher will conduct a study, including the methods for data collection, analysis, and interpretation (Boaduo,

2011). This study adopted a qualitative research approach, which involves collecting data on naturally occurring phenomena, with the information gathered primarily in the form of words rather than numbers (McMillan & Schumacher, 2010). The qualitative approach is particularly suitable for this study because it allows for an in-depth exploration of the complexities of the social world and is designed to understand people's lived experiences (Tuffour, 2017). Unlike quantitative research, which focuses on measurement, qualitative research seeks to comprehend participants' perspectives and how groups behave in relation to the research topic (Teherani et al., 2015). Furthermore, qualitative research prioritizes understanding the internal perspectives of participants, capturing their insights and experiences in their own terms (Tuffour, 2017).

### 1.8.3 Research design

Research design refers to the plan or strategy for conducting a study, including the procedures for data collection and analysis (McMillan & Schumacher, 2010). Abbott and McKinney (2012) describe research design as a systematic mode of observation that allows researchers to collect data in a structured and organized manner. Similarly, Ansari et al. (2022) argue that research design helps distinguish between significant and less relevant tasks, making the research process more constructive and insightful by providing detailed guidance at each stage.

For this study, data were collected from multiple cases to investigate effective strategies for integrating littering management into Education for Sustainable Development (ESD) in selected primary schools in the Vhembe East District, Limpopo Province. The researcher employed multiple case-study design, which enables the use of various methods to explore each participant's bounded systems within real-life contexts comprehensively. An exploratory case-study design was particularly suitable because it allows for the investigation of real-world scenarios where interventions may produce uncertain or diverse outcomes (Yin, 2003).

## 1.9 Population and sampling

The population for this study consisted of Grade 4–6 learners, one Grade 6 Natural Science and Technology teacher, the School Governing Body (SGB) chairperson, the principal, three school cooks, and three vendors from each selected school. Participants

were purposively selected from each participating school to ensure they could provide relevant insights into littering management practices. A total of three primary schools in the Vhembe East District were included in the study. The convenience sampling method was applied for selecting the schools, as they were located near the researcher's workplace, which facilitated easier access and communication with participants throughout the research process.

### 1.10. Data collections

Data collection is the process of gathering information from individuals who have experienced the phenomenon under study (Creswell, 2013). In this study, data were collected through semi-structured interviews, focus group discussions, and observations. Face-to-face interviews were considered appropriate, as the researcher aimed to gather in-depth insights from participants regarding littering management, particularly from Grade 6 Natural Science and Technology teachers who had direct experience teaching the subject. These teachers were purposively sampled to participate in the interviews, alongside groups of three learners from each school. This approach enabled the researcher to explore learners' responses to how littering management is integrated into classroom teaching. Additionally, learners' attitudes and behaviors toward the environment were observed. Field notes were used to record and reflect on events during classroom sessions and general school observations, providing a rich source of contextual information for analysis.

### 1.11. Data analysis and interpretation

The researcher employed thematic analysis to analyze the collected data. During this process, themes and sub-themes were identified as they emerged from the data. The transcribed data were carefully read and re-read line by line and word by word to ensure thorough understanding before grouping meaningful segments into themes. Coding was applied to interpret the data, and similar codes were grouped together to identify common patterns and perspectives among the participants. This approach allowed the researcher to systematically capture and represent the key insights related to littering management in the participating schools.

### 1.12. Ethical considerations

Ethics in research refers to the accepted codes of conduct that define right and wrong behavior in the research process (Kumar, 2018). Ethical clearance for this study was obtained from the University of South Africa (UNISA), and consent was sought from relevant authorities, including the district senior manager of the Limpopo Department of Education, circuit managers, school governing bodies, principals, staff, cooks, and students. For learners under the age of eighteen, parental consent was obtained through signed consent forms. The purpose of the study was clearly explained to all participants, and their informed consent was obtained, ensuring that they understood they could withdraw from the study at any stage without any negative consequences.

### 1.13. Trustworthiness of the study

Trustworthiness in qualitative research refers to the systematic evaluation of the research design to ensure the integrity and rigor of the study. It is commonly assessed using four key criteria: credibility, transferability, dependability, and confirmability.

#### 1.13.1 Credibility

Trochim and Donnelly (2006) define trustworthiness as the assessment of the credibility of a study's findings from the participants' perspective. To ensure credibility, the researcher conducted extended fieldwork and ongoing observations in all selected schools. Methodological triangulation was also employed, using multiple data collection and analysis methods to examine the same phenomenon (Stahl et al., 2020). Additionally, participants were provided with interview transcripts to verify that their responses had been accurately interpreted, further enhancing the credibility of the study's findings.

#### 1.13.2. Transferability

According to Shenton (2004:69), transferability refers to the extent to which the findings of a study can be applied or generalized to other contexts. Similarly, Anney (2014) notes that transferability pertains to the degree to which results from a particular study can be utilized in different settings without losing their intended meaning. Providing a detailed description of the study's original context enables others to make informed judgments about the applicability of the findings (Houghton et al., 2013). To ensure

transferability in this study, the researcher provided detailed accounts of the raw data and the context in which it was collected. Interviews with participants were recorded and later transcribed into written form, offering a rich and transparent description of the data that can be referred to in other settings.

### 1.13.3. Dependability

Lincoln and Guba (2011) suggest that the dependability of research findings can be ensured through three techniques: the investigator's position, triangulation, and an audit trail. In this study, triangulation was employed, as the researcher used multiple data collection methods—including questionnaires, interviews, and classroom observations—to gather comprehensive information. To further ensure dependability, the researcher meticulously documented all records generated during the data analysis process. These records were preserved to provide transparency, allowing other researchers to understand and verify how the data were analyzed and interpreted.

### 1.13.4 Confirmability

Confirmability is defined by Shenton (2004:72) as the extent to which research findings can be independently verified and supported by evidence from other sources. Nassaji (2020:429) highlights that an effective strategy to ensure confirmability is the use of an audit trail, where the researcher documents and explains each decision and action taken during data classification and analysis. In this study, an audit trail was employed to minimize bias and provide transparency regarding the procedures used, ensuring that the findings and conclusions were grounded in the data (Carcary, 2020). The researcher's personal beliefs and perspectives did not influence the analysis; instead, careful attention was given to documenting each step of data analysis and providing participants with detailed descriptions of the process to uphold confirmability.

## 1.14. Delimitation of the study

Delimitations refer to the boundaries that a researcher deliberately sets to define the scope of a study. They establish the limits of the research to ensure that the study's goals and objectives remain manageable and achievable (Theofanidis & Fountouki, 2018). This study focused on investigating the factors that support the implementation of sustainable littering management as an approach to Education for Sustainable

Development (ESD), with particular emphasis on littering. The study was confined to one Grade 6 Natural Science and Technology teacher, three Grade 6 learners, and school cooks in selected schools within the Vhembe East District, Limpopo Province, South Africa, all chosen through purposive sampling. Additionally, the study included three principals and three street vendors. The findings of this study are context-specific and cannot be generalized to other districts or populations, as the sampling method does not represent the entire population. Furthermore, the study was conducted within the researcher's workplace, and observations were carried out periodically, reflecting the specific context of the selected schools.

## 1.16. DISSERTATION OUTLINE

The study is organized into five chapters:

### Chapter 1: Introduction and Background

This chapter presents the introduction and background of the study, including motivation and rationale, theoretical framework, clarification of key concepts, problem statement, research questions, aims and objectives, research methodology, research design, measures of trustworthiness, ethical considerations, delimitations, chapter outline, and a summary.

### Chapter 2: Literature Review

This chapter provides a comprehensive review of literature related to the research topic, highlighting relevant studies, theories, and conceptual frameworks.

### Chapter 3: Research Methodology

This chapter describes the research design and methodology employed in the study, including the research approach, population and sampling, data collection methods, and data analysis procedures.

### Chapter 4: Research Findings

This chapter presents the findings of the study, based on the analysis of the collected data.

### Chapter 5: Discussion, Conclusion, and Recommendations

This chapter discusses the findings in relation to the research aim and objectives, draws conclusions from the study, and provides recommendations for practice and further research.

## 1.17. Chapter summary

The study begins with an introduction and background, followed by the motivation and theoretical framework underpinning the research, as well as a clarification of key

concepts and the problem statement guiding the investigation. This chapter also outlines the research questions, aims, and objectives focused on exploring effective strategies for integrating litter management into Education for Sustainable Development (ESD) in the Vhembe East District, Limpopo Province. Furthermore, it details the research methodology, paradigm, approach, and design, along with the population and sampling procedures, data collection methods, data analysis process, and ethical considerations that underpin the study. The chapter also highlights issues of trustworthiness, delimitations, and limitations of the study, and concludes with a chapter outline and summary. The next chapter, Chapter 2, presents the review of relevant literature.

# CHAPTER 2: LITERATURE REVIEW

Chapter 1 provides an overview of the study, including the background, motivation, theoretical framework, key concepts, problem statement, research questions, aims and objectives, research methodology, and research design. It also outlines the measures of trustworthiness, ethical considerations, delimitations of the study, and the chapter outline. Chapter 2 presents a review of literature on the development of Education for Sustainable Development (ESD). The chapter begins by defining Environmental Education (EE) and providing its historical background from global, African, and South African perspectives. It then defines ESD and traces its evolution across these same contexts. The relationship between Environmental Education and Education for Sustainable Development is examined, followed by a discussion on the definition and causes of littering in schools. Furthermore, the chapter explores the effects of littering and strategies for managing litter both in schools and within the broader community.

## 2.1 Definition of Environmental Education

The foundation of this research rests on a clear understanding and definition of Environmental Education (EE). Depending on the context, demographics, and intended outcomes, EE is a multidisciplinary concept that encompasses knowledge, beliefs, attitudes, and behaviors concerning the environment. It can be interpreted and applied in diverse ways. However, without a precise and consistent definition, it becomes difficult to evaluate its effectiveness, compare outcomes, or design relevant educational interventions. In this study, a clear definition ensures that the purpose, objectives, and instructional strategies are aligned and well understood, thereby enabling a focused investigation and the generation of meaningful findings. Moreover, sustainability cannot be achieved without ecological literacy and environmental consciousness, as EE forms the core foundation of Education for Sustainable Development (ESD).

EE has evolved over time, with numerous definitions reflecting its dynamic and multifaceted nature. The United Nations Educational, Scientific and Cultural Organization (UNESCO) first defined EE in 1968 as “the process that recognizes values and clarifies concepts to develop the skills and attitudes which are important to understand the interrelatedness among humans, culture, and the environment”

(Loubser, 1992, p. 92). Later, the Tbilisi Conference (UNESCO, 1978) expanded this view by defining EE as “a learning process that enhances knowledge and awareness of the environment, develops skills to address challenges, and fosters attitudes and commitments to make informed decisions and take responsible action.”

According to Owojori et al. (2022), EE is a continuous process that cultivates environmental consciousness and empowers individuals and communities to address environmental issues. Similarly, the Tbilisi Declaration emphasizes that EE “enhances people’s environmental knowledge and awareness about the environment and its related challenges and develops the skills and motivation to address those challenges” (Sola, 2014, p. 333). Ramesh et al. (2023) further assert that EE promotes awareness and understanding of the environment, helping individuals recognize its relationship with humanity and daily activities. In the same vein, Archie and McCrea (1996, p. 8) define EE as “a process which promotes the analysis and understanding of environmental issues and questions as the basis for effective education, problem-solving, policymaking, and management.”

Collectively, these definitions highlight the diverse and evolving nature of EE and its critical role in fostering environmental awareness, knowledge, and action. EE seeks to instill pro-environmental attitudes and behaviors while enhancing learners’ environmental literacy. As noted by Masemene and Msezane (2021), EE empowers individuals to make informed and sustainable decisions that promote environmental stewardship. Integrating EE into school curricula equips learners with the necessary skills to reduce littering behavior, enhances their understanding of environmental issues, and encourages positive attitudes toward environmental protection.

Moreover, EE provides learners with opportunities to critically analyze environmental challenges and engage in problem-solving processes that promote sustainable practices. Through this engagement, learners develop essential knowledge, attitudes, and motivation to take meaningful environmental action (Dalu et al., 2020). The evolving conceptualizations of EE thus underscore its pivotal role in shaping informed, responsible, and environmentally conscious citizens.

## 2.2 Education for Sustainable Development

McKeown et al. (2002) note that Education for Sustainable Development (ESD) originated from influences beyond the education sector, with significant momentum coming from international political and economic forums. As global discussions on Sustainable Development (SD) evolved, it became increasingly clear that education plays a central role in achieving sustainability (McKeown et al., 2002). According to UNESCO (2017), ESD encompasses educational practices that promote responsible resource use to ensure their continued availability for future generations.

The 1992 Earth Summit (United Nations Conference on Environment and Development – UNCED) held in Rio de Janeiro marked a pivotal moment in promoting sustainable development through education. The summit produced Agenda 21, an action plan for achieving sustainability, and UNESCO was designated as the Task Manager for Chapter 36, which focuses on education, public awareness, and training (Leicht et al., 2018). Chapter 36 emphasized that education, awareness, and training are integral to achieving the objectives of all other Agenda 21 chapters. One of the key outcomes of the conference was the recognition that education serves as a catalyst for sustainable development.

The roots of ESD can be traced back to the 1987 Brundtland Report, which popularized the concept of sustainable development, and gained momentum through the United Nations General Assembly's Resolution 57/254 (2002), which proclaimed 2005–2014 as the UN Decade of Education for Sustainable Development (DESD) (Owojori et al., 2022). As Rieckmann (2018) highlights, the DESD focused on integrating social, economic, and environmental dimensions of sustainability. The primary goal of ESD is to empower individuals to make informed decisions and take responsible actions to preserve the environment, promote an equitable society, and sustain an eco-social economy for present and future generations, while respecting cultural diversity. Agbedahin (2018) further emphasizes that ESD employs participatory teaching and learning strategies across formal, informal, and non-formal educational settings. These approaches aim to motivate and empower both teachers and learners to reflect

critically, change their behaviors, and take meaningful action towards sustainable development.

While Environmental Education (EE) primarily emphasizes environmental protection, ESD adopts a broader and more holistic perspective that incorporates economic, social, and human development dimensions alongside environmental stewardship (Sinakou & Boeve-de Pauw, 2019). ESD is therefore not limited to knowledge acquisition but also emphasizes the practical application of sustainability principles in everyday life. According to Estrada-Vidal and Gómez (2020), social norms play a crucial role in shaping individual behavior in ESD, and educational institutions can foster environmentally responsible competencies through policy and curriculum initiatives.

Muller et al. (2021) argue that ESD is fundamentally about empowering individuals to think and act with foresight, to understand the consequences of their actions, and to make informed, ethical decisions. Sustainable learning environments—such as eco-schools or green campuses—provide valuable opportunities for integrating sustainability principles into daily educational practices. Involving learners in ESD-related activities, such as school clean-up campaigns, helps foster positive attitudes toward environmental care through experiential learning. These initiatives not only encourage students to take responsibility for their surroundings but also contribute to sustainable litter management and broader environmental awareness that extends beyond the school context (Muller et al., 2021).

According to Agbedahin (2019) and UNESCO (2018), ESD promotes the development of knowledge, skills, attitudes, and values that enable learners to make informed and responsible decisions for environmental integrity, economic viability, and social justice. Efforts have therefore been made globally to mainstream ESD into education policies, curricula, and teacher education programs. For this integration to be effective, educators must not only adopt ESD principles but also engage in critical reflection and dialogue to construct their own informed understanding of sustainable development, which can then guide curriculum planning and classroom practice.

### 2.2.1 Education for Sustainable Development: Global perspectives

The concept of sustainable development emerged globally in the 1980s in response to the growing awareness of the need to balance social and economic progress with environmental stewardship (Agbedahin, 2019). In 1987, during the United Nations General Assembly, sustainable development was defined as a guiding principle for organizing human progress to meet present needs without compromising the ability of future generations to meet their own. Subsequently, on December 20, 2002, the United Nations General Assembly adopted a resolution designating the years 2005–2014 as the United Nations Decade of Education for Sustainable Development (DESD). According to Vilmala et al. (2022), ESD was developed to provide individuals with the knowledge, skills, values, and attitudes necessary to contribute meaningfully to sustainable development, as outlined by UNESCO (2014). The primary mission of ESD is to integrate sustainability principles into education systems at all levels and across all forms of learning.

ESD was first promoted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1992 and gained global recognition during the DESD (2005–2014). This initiative was succeeded by the Global Action Programme on ESD (GAP) from 2014 to 2019, which sought to consolidate and expand on the progress achieved during DESD. However, Ssosse et al. (2021) note that Agenda 21, which emerged from the 1992 Rio Earth Summit, introduced the concept of sustainable development and its three pillars—environmental, social, and economic—into educational reform. Over time, these principles gradually shifted the emphasis from traditional Environmental Education (EE) to Education for Sustainable Development (ESD). The successful implementation of ESD within school curricula largely depends on teachers' competence and commitment to sustainability.

The most recent follow-up framework, ESD for 2030, aims to build a more just and sustainable world by strengthening ESD and contributing to the realization of the 17 Sustainable Development Goals (SDGs). According to Veidemane (2022), ESD provides a systematic framework for transforming education systems by instilling sustainability values within the minds, hearts, and actions of future generations (Zguir et

al., 2021). Similarly, UNESCO (2005) asserts that ESD is a key contributor to sustainable futures by raising awareness, fostering appropriate values, and influencing behaviors at all societal levels. In November 2019, UNESCO adopted the new global framework for ESD 2030 (2020–2030), which focuses on integrating ESD and the SDGs into policy, learning environments, educator capacity building, youth empowerment, and community-level action (Glavic, 2020).

Despite these international efforts, challenges in the effective implementation of ESD persist. As Verhelst and Vanhoof (2022) observe, there is no universal model for integrating ESD into school systems. Promoting sustainability in learners' values, behaviors, and actions remains essential to encouraging positive environmental attitudes, including the reduction of littering. In a study conducted in Russia, Kasimov et al. (2002) emphasized that ESD is guided by core principles such as sustainability, prevention, environmental awareness, economic balance, and social responsibility. They further highlighted that the lack of reliable information about the impacts of human activities poses a challenge to the effective delivery of SD education.

In the Indian context, Verma and Priya (2020) describe ESD as an educational approach designed to equip learners with the knowledge, skills, values, and attitudes required for sustainable living. It is grounded in the principle that sustainable development entails meeting present needs without compromising future generations' ability to do the same. ESD in India also aligns with the global commitment to inclusivity, encapsulated in the theme "No one left behind" (Verma & Priya, 2020). Since independence, successive Indian governments have introduced numerous education policies and initiatives as part of national development efforts. However, Mohanty and Dash (2018) note that dropout rates among disadvantaged communities—particularly Scheduled Castes and Tribes—remain above the national average. To promote equitable and inclusive education, the government launched several initiatives under the Planning Commission (NITI Aayog), but these often lacked a sustainable framework aligned with international education standards.

Jetly and Singh (2019) add that India's historically low carbon footprint has been largely due to deeply rooted cultural practices that emphasize sustainability. Traditionally,

Indian households practiced the three Rs of sustainability—reduce, reuse, and recycle—through everyday actions such as reusing clothes, books, and toys within families. However, these practices have declined in modern times. Although the DESD period helped galvanize the ESD movement in India, it had limited impact in terms of effectively integrating sustainability into formal school curricula.

To address this, India's National Education Policy (NEP) 2020 was introduced as a reform aimed at achieving the Sustainable Development Goals (SDGs) through education. The NEP 2020 is founded on the principles of access, equity, quality, affordability, and accountability in education (Verma & Priya, 2020). This policy represents an important step toward embedding sustainability in educational planning, teaching, and learning, thereby ensuring that future generations are equipped to contribute meaningfully to sustainable national and global development.

### 2.2.2 Education for sustainable Development: African perspectives

The selected countries provide a diverse geographical representation of the African continent, enabling a comprehensive understanding of littering issues across different contexts. Furthermore, these countries offer opportunities for comparative studies on environmental attitudes and litter management practices across various cultural and socioeconomic settings (Van Oosterhout et al., 2022).

#### 2.2.2.1 Education for Sustainable Development in Botswana

In Botswana, environmental and sustainability themes are integral to the country's education system and national development agenda, as underscored by Mathews et al. (2020). Sustainable Development (SD) and Education for Sustainable Development (ESD) have been incorporated into the curriculum through subject syllabi, making environmental and sustainability discourses key components of education and the Environmental Education (EE) Guidelines (Ministry of Education, 2002). The Government of Botswana has prioritized sustainability in its National Development Plans from 1991 to 2016, supported by key policy documents such as the National Environmental Education Strategy and Action Plans 1 and 2 (Botswana Government, 1996; 2007). Furthermore, Velempini and Randolph (2019) highlight Botswana's

ongoing efforts to develop a national ESD strategy that promotes pedagogical approaches and learning environments fostering participatory learning and community engagement. Importantly, teachers' beliefs and values are recognized as critical factors influencing effective curriculum implementation.

#### 2.2.2.2 Education for Sustainable Development in Kenya

Nyatuka (2020) highlights that Kenya's Vision 2030 development plan and the Global Action Programme (GAP) on Education for Sustainable Development (ESD) emphasize key priorities such as developing relevant policies, transforming teaching, learning, and training environments, building the capacities of educators and trainers, and accelerating youth empowerment across all 17 Sustainable Development Goals (SDGs). According to UNESCO (2019), by 2030, all learners should acquire the knowledge and skills necessary to promote sustainable development, including aspects such as ESD, sustainable lifestyles, human rights, and gender equality.

Sustainable Development Goal 4 (SDG 4), which seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all," serves as a cross-cutting enabler for the achievement of all other SDGs in Kenya. The Ministry of Education has prioritized identifying gaps in the education sector, particularly in implementing the competency-based curriculum (CBC) in basic education institutions. Although significant progress has been made, challenges such as inadequate teacher training, infrastructural deficiencies, and limited financial resources continue to impede progress and must be addressed to ensure the effective realization of education initiatives aligned with sustainable development (Nyatuka, 2020).

According to Kariuki-Githinji et al. (2022), Kenya has made deliberate efforts to integrate Environmental Education (EE) within the broader framework of ESD. The Ministry of Education has articulated specific goals and objectives that reflect the country's educational vision, including Goal 8, which emphasizes the need to promote environmental awareness and appreciation. This goal underscores the importance of

fostering positive attitudes toward environmental protection and good health among learners. Furthermore, education is viewed to instill in the youth values that promote physical and mental well-being. However, Kariuki-Githinji et al. (2022) note that many teachers in both primary and secondary schools are inadequately trained, lack motivation, and possess limited knowledge of EE, posing a challenge to the effective integration of environmental and sustainability education in Kenya's curriculum.

#### 2.2.2.3 Education for Sustainable Development in Nigeria

According to Palmer (2013:303), "Education for Sustainable Development is a dynamic concept that encompasses a new vision of education—an education at all levels that can shape the world of tomorrow by equipping individuals and societies with the skills, perspectives, knowledge, and values needed to live and work in a sustainable manner." Palmer further asserts that ESD aims to balance human and economic well-being with cultural integrity and respect for the earth's natural resources, emphasizing that tertiary institutions should play a central role in cultivating behaviors that promote sustainability.

Education, besides being a fundamental human right, is also critical for promoting sustainable development and enhancing individuals' capacities to address environmental and developmental challenges (Sterling, 2014, as cited in Ugonwa, 2018). However, Ilechukwu et al. (2014) note that despite global efforts to achieve Education for All (EFA) by 2015 in alignment with the Millennium Development Goals (MDGs), many countries have struggled to meet these targets.

The UNESCO (2008) Global Monitoring Report (GMR) indicated that while countries in North America, Europe, and parts of Asia had achieved significant progress toward EFA, Nigeria was among 129 countries lagging. Scholars attribute this shortfall to the chronic neglect and underfunding of education in Nigeria, which has resulted in the deterioration of public-school systems, a widening gap between educational theory and practice, and the proliferation of private schools catering primarily to children from affluent families.

Furthermore, Aberu (2022) contends that one of the major challenges facing education in Nigeria is inadequate funding. The government has consistently failed to allocate sufficient resources to revitalize and sustain educational development. Consequently, Nigeria remains far from meeting UNESCO's recommended funding benchmarks, thereby constraining the nation's human development potential and impeding progress toward sustainable development.

#### 2.2.2.4 Education for Sustainable Development in South Africa

According to Mandikonza and Kavai (2023), South Africa adopted Education for Sustainable Development (ESD) at the national level in 2005, aligning with UNESCO's Decade of Education for Sustainable Development (DESD) initiative. This adoption recognized Environmental Education (EE) as a key vehicle for advancing ESD. Although South Africa lacks specific education policies that directly address ESD, several policies incorporate related aspects. However, the absence of clear policy guidelines poses a challenge, even for educators who possess the capacity and agency to integrate ESD into their teaching practices.

Peden (2008) explains that the launch of the DESD in South Africa followed a long history of EE. Before 1994, EE initiatives were largely driven by environmental NGOs and universities. Since the end of apartheid, however, environmental themes have been formally integrated across the national school curriculum as cross-cutting concepts in various subjects. Teise and Le Roux (2016) argue that education should not only embody the principles and values of sustainable development but also empower learners with the knowledge, skills, and attitudes necessary to transform society. They maintain that ESD and EE are inherently interconnected and should not be viewed in isolation.

Similarly, Bopape (2022) notes that South Africa's National Development Plan (NDP) highlights the country's slow progress in sustainable resource utilization and underscores the need to build environmental sustainability and resilience. Resilience—defined as the capacity of a system to prepare for, absorb, recover from, and adapt to

stress or disruptive events—is promoted through practices such as recycling, reusing, and reducing waste, all of which align with the concept of zero waste. With sustainability becoming a national priority, South Africa has increasingly focused on transitioning towards a green economy to promote efficient and equitable service delivery. According to Putri et al. (2023), the Department of Environmental Affairs defines a green economy as one that is ecologically sustainable, economically viable, and socially inclusive. It supports a low-carbon, resource-efficient, and equitable economic model that contributes to poverty eradication, job creation, and skills development in key sectors such as renewable energy, natural resource management, waste management, and green urban transport infrastructure.

### 2.4 The Relationship between Environmental Education and Education for Sustainable Development

The terms Environmental Education (EE) and Education for Sustainable Development (ESD) have generated considerable debate regarding their definitions and interrelationship (Kimaro, 2018:31). Scholars agree that both EE and ESD share a common vision: creating a better world by balancing economic, ecological, and social concerns. However, there are differing interpretations of their relationship. Some scholars argue that ESD evolved from EE (Yang, Lam & Wong, 2010), while others claim the terms are synonymous and can be used interchangeably, or that EE has simply been rebranded as ESD (McKeown & Hopkins, 2009). Alternatively, some authors, such as Loubser et al. (2014), suggest that ESD should be considered an objective added to the goals of EE. Agbedahin (2018) emphasizes that ESD emerged from two distinct yet interrelated areas of interest for the United Nations—education and sustainable development. Kopnina and Meijers (2014) note that the concept of ESD originated from the 1987 report of the World Commission on Environment and Development, Our Common Future.

Hesselink, van Kempen, and Wals (2000), as well as Wals and Jickling (2000) cited in Kimaryo (2011), propose four perspectives on the relationship between EE and ESD: (1) EE is viewed as part of ESD; (2) ESD is considered part of EE; (3) EE and ESD partially overlap; and (4) ESD represents a stage in the evolution of EE. Despite these

differing perspectives, the shared goal remains the creation of a better world through the integration of EE and ESD (Kimaryo, 2011:33).

Nomura (2009), in a study conducted in Indonesia, asserts that the emphasis on the "social" aspect distinguishes ESD from EE. While EE focuses on the idea that humans are part of nature and emerged from environmental concerns, ESD is more human-centered, emphasizing human roles in achieving sustainability. Similarly, Kopnina (2018) in the Netherlands notes that ESD is unlikely to replace EE but rather serves as one of its important goals. Nonetheless, ESD has become a dominant perspective of EE in practice. Lucas (1979) highlights distinctions within EE—education "in," "about," or "for" the environment—to clarify its intended focus, and similar distinctions exist between EE and sustainable development education (Kopnina, 2018).

Agbedahin (2018) emphasizes that ESD promotes lifelong learning experiences that are concrete, locally relevant, and culturally appropriate. It accommodates the evolving nature of sustainability, addressing content while considering local priorities and global issues. ESD thus responds to global needs and conditions while acknowledging that addressing local needs has broader international implications. Cartea (2005), cited in Pavlova (2011), reports that the 1999 'ESD debate' at UNESCO revealed varied views: some participants saw ESD as a stage in the evolution of EE, while others conceptualized EE as part of ESD, ESD as part of EE, or EE and ESD as overlapping fields.

In South Africa, EE was first introduced in the 1970s, stimulated by the Belgrade Charter of 1975 and the Tbilisi Principles of 1977 (Irwin & Lotz-Sisitka, 2005:47). Before these frameworks, the focus was primarily on conservation education. Irwin (1990:1) traces the roots of modern EE to industrialization and the increasing, often wasteful, demand for natural resources over the past century. For the purposes of this study, the first perspective will be adopted: EE is viewed as part of ESD. This approach encompasses all school-based activities and experiences related to environmental education, both academic and non-academic, within and outside the classroom, thereby

integrating environmental awareness into the broader framework of sustainable development.

### 2.5 Definition of littering

Ibrahim et al. (2021) highlight littering as a harmful human activity with numerous adverse effects on the environment, stemming from a lack of awareness and sensitivity to surroundings. Littering involves actions such as throwing, dropping, placing, or depositing any form of waste, paper, plastic, cans, or other debris, on public or private property without proper authorization, in line with the City's Waste Collection By-Law. Mosala (2021) provides a detailed description of litter, including items such as cigarette butts, chewing gum, food and drink packaging, drug-related waste, carrier bags, and dog fouling, all of which contribute to the defacement of public spaces. Similarly, Schenck et al. (2022) define littering as the careless and improper disposal of small amounts of waste, resulting in the persistence of unwanted and unnatural elements in the environment.

For the purposes of this study, litter is defined as any form of illegal or improper disposal of waste, whether intentional or unintentional, that disrupts the cleanliness and aesthetics of the natural environment. Mosala (2021) categorizes litter into forms such as plastic, solid waste, tins, and cans. Within schools, litter includes any unwanted or improperly disposed items that may produce odor or threaten the visual and environmental quality of the school setting due to human behavior.

This study focuses on investigating factors that support or hinder effective litter management in schools. It aims to develop recommendations and explore strategies to maintain and strengthen the enabling factors that ensure the sustainable management of litter as part of Education for Sustainable Development (ESD).

### 2.6 Causes of littering in schools

Nurfurqon et al. (2023) highlight that garbage is a significant social problem that has become increasingly difficult to manage. Improper waste disposal can dirty the environment, damage its aesthetic appeal, produce unpleasant odors, and serve as a source of various diseases that threaten public health. Marmiati et al. (2021) further

emphasize that waste generation in schools is inevitable. Learners use various materials for daily activities, producing waste of different forms, types, and volumes. Additionally, the learning process itself contributes to the accumulation of waste within the school environment.

### 2.6.1 Causes of littering in schools: Global perspectives

Causes of littering in schools include a lack of awareness about the consequences of littering, poorly designed commercial packaging, the volume of existing litter in a school, and the number, placement, and appearance of waste collection bins (Aziz et al., 2019). Ibrahim et al. (2021) in Malaysia found that students often struggle to dispose of rubbish properly in bins. Strategies to control littering include providing sufficient waste bins around schools, conducting environmental campaigns to raise awareness about littering, incorporating Environmental Education into the school curriculum, and promoting the collection and recycling of materials such as tins, cans, and paper for creative projects.

Similarly, Budimansyah et al. (2016) in Indonesia identified factors contributing to littering among students, including limited access to waste disposal facilities, parents' and communities' lack of knowledge about the causes of littering, and insufficient school efforts to address students' littering behavior. Herdiansyah et al. (2021) noted that the unavailability of trash bins increases students' tolerance for littering. Rehmani et al. (2022) further observed that classroom activities, such as giving assignments on small or large sheets of paper, can generate waste that contributes to littering when not properly managed.

### 2.6.2 Causes of littering in schools: African Perspectives

In a study conducted by Chatira et al. (2019) in Zimbabwean secondary schools, various sources of solid waste were identified, including kitchens, hostels, school grounds, classrooms, laboratories, workshops, administration blocks, and agricultural areas. The study found that the primary sources of waste, in order of prevalence, were the kitchens, classrooms, and administration areas, with the waste mainly consisting of paper, plastics, and furniture. Similarly, Woko and Ogologo (2019) in Nigeria observed that schools generate waste through routine activities such as classwork, sweeping,

food preparation and serving, and bush clearing. Common types of solid waste include paper, grass, sachets (e.g., water, biscuits, ice cream, sweets), sugarcane, maize cobs, and groundnut shells. Other forms of waste were also present on school premises, some of which were not directly generated by pupils or teachers.

Malomo et al. (2021), also in Nigeria, highlighted that open spaces around classrooms contribute to uncontrolled littering. Improperly disposed litter from classrooms can be carried by the wind to open spaces, eventually reaching waterways and causing pollution and flooding. Uncontrolled disposal of classroom litter creates additional workload for janitorial staff and poses environmental concerns. The study further emphasized that packaged food in plastic bags and other materials increases the likelihood of classroom littering, suggesting that student indiscipline, lack of respect, and negligence may contribute significantly to environmental degradation.

### 2.6.3 Causes of littering: South African Perspectives

South Africa, as a developing country with a diverse population, is not exempt from littering. Littering is among the environmental issues that degrade the beauty of the environment due to human actions, and it also poses significant health hazards (Matsekoleng, 2017:52). Moqbel et al. (2020) similarly note that littering remains a persistent problem in developing countries, including South Africa. Ana et al. (2011, as cited in Matsekoleng, 2017:25) reported that many public schools face high levels of pollution due to littering. The presence of litter around schools indicates that learners often fail to recognize the environmental risks associated with their actions. Litter accumulates from daily activities such as classwork, sweeping, food service, and bush clearing, all of which contribute to environmental degradation (Ana et al., 2011, in Matsekoleng, 2017:55).

Mapotse and Mashiloane (2017) in South Africa recommend implementing environmental education for school students to raise awareness about littering. Anwar, Saudi, and Sinaga (2017) found that learners often struggle to dispose of rubbish properly in designated bins. Schenck et al. (2022) observed that individuals frequently attribute their own littering to external factors, such as insufficient infrastructure or the behavior of others. Their study further emphasized that factors such as a lack of social

pressure, minimal penalties or inconsistent enforcement, social rebellion, and limited knowledge of the environmental consequences of littering contribute to the persistence of the problem. Additionally, poorly designed packaging, the amount of existing litter, the presence and design of signage, and the number, placement, and appearance of waste disposal bins influence littering behavior (Schenck et al., 2022:1).

Msezane and Mudau (2014) reported in Mpumalanga that a significant amount of school waste originates from littering, which further degrades the environment. They noted that increasing population growth and development patterns place additional stress on the environment, and unacceptable learner behavior is evident in school settings. Learners reported disposing of litter through burning, throwing in open spaces, or leaving waste next to containers (Msezane & Mudau, 2014).

The South African government has implemented policies such as the Curriculum and Assessment Policy Statement (CAPS), supporting National Waste Management Strategies and emphasizing the inclusion of Environmental Education in schools (Goal 5). These policies aim to protect the environment from degradation. However, despite these measures, individuals continue to litter in schools and public spaces, and little effort has been made to apply technological solutions to reduce improper waste disposal (Kamara, 2006).

In summary, littering is a global environmental problem driven by multiple factors, with evidence that everyone contributes to it. This study, therefore, seeks to investigate effective strategies for integrating littering management into sustainable development practices within schools.

## 2.7 Effects of littering

### 2.7.1 Effects of littering: Global perspectives

Other countries face similar environmental challenges related to litter management, particularly within educational settings (Brotosusilo et al., 2022). Selecting these countries as points of reference allows for a comparative analysis of how different educational systems address the same environmental problem. Furthermore, examining school littering within dynamic and evolving contexts provides valuable insights into how environmental education adapts to increasing levels of waste in schools (Maunatlala, 2024). This approach also creates opportunities to identify both gaps and successful strategies for fostering environmentally conscious behavior among learners.

#### 2.7.1.1 Effect of littering in Malaysia

Ibrahim et al. (2021), in a study conducted in Malaysia, highlight that littering can lead to health hazards, such as the spread of diseases like malaria, and contribute to unpleasant odors in the surrounding environment. Garbage that is not properly disposed of in bins emits foul smells, which can attract wild animals such as rats, dogs, monkeys, and flies searching for food. Improperly managed waste thus becomes a carrier of diseases (Ibrahim et al., 2021). Furthermore, Schultz et al. (2005), as cited in Cuff (2014), suggest that when individuals are aware of the consequences of their actions, they develop attitudes that encourage more environmentally responsible behaviors.

#### 2.7.1.2 Effect of littering in Indonesia

Augustina et al. (2023) note that littering has caused several social and health problems in Indonesia. It is not limited to uneducated communities but also occurs within educational institutions. Improperly managed waste dirties the environment and creates unhealthy conditions, contributing to health issues such as respiratory problems, diarrhea, and fever. Furthermore, Augustina et al. (2023) emphasize that peers can exert either positive or negative influence on behavior, depending on their own practices. Non-integrated waste management can lead to the accumulation of large piles of waste (Dhahir, 2020). Similarly, Nanda et al. (2024) report that inadequate waste management practices result in litter buildup, posing significant environmental

challenges and negatively affecting public health. Nanda (2024) further asserts that a poorly maintained and polluted environment has profound consequences for both human health and the ecosystem, underscoring the responsibility of every individual to protect the environment and prevent disease.

#### 2.7.1.3 The effect of littering in China

Zhang et al. (2023) indicate that unregulated dumping and open burning of waste have become breeding grounds for disease vectors and contribute to environmental concerns, including greenhouse gas emissions. To address these issues, a program called Waste Wise was launched in local schools in China to provide incentives for environmentally friendly behavior among students (Zhang et al., 2023). Similarly, Qian (2019) highlights that littering contributes to land pollution, which poses significant risks to wildlife and ecosystems. Many types of litter, particularly plastics, contain hazardous chemicals that can leach into soil and water, forming toxic compounds that degrade land quality. Additionally, burning plastic waste releases harmful chemicals into the air, creating respiratory problems for both wildlife and humans (Qian, 2019).

### 2.7.2 The effect of Littering: African Perspective

#### 2.7.2.1 The effects of littering in Nigeria

Woko and Ogologo (2019), in Nigeria, highlighted that poor waste handling practices and inadequate provision for solid waste management pose significant risks to school students. Improper storage and disposal of waste are major contributors to environmental pollution, creating breeding grounds for pathogenic organisms and facilitating the spread of infectious diseases. Similarly, Woko and Nwala (2019) noted that exposure to litter increases the risk of serious health conditions, including cancer, heart disease, and asthma. Therefore, proper waste disposal methods are essential to prevent negative impacts on the immediate environment and to safeguard the health of community members. Moreover, Oluwande (1997), as cited in Akinnubi and Alla (2017), reported that indiscriminate disposal of solid waste leads to unhygienic environments and contributes to the prevalence of infectious diseases.

### 2.7.2.2 The effect of littering in Ghana

According to Ampofo (2020:56), a study conducted in Ghana indicated that poor waste disposal in schools within developing countries can have serious implications for health, the economy, and the environment. Decomposing piles of waste, particularly in schools, attract vermin and rodents that spread diseases. Additionally, foraging animals such as dogs and goats may scatter contaminated waste, further spreading pathogens and causing nuisances (Ampofo, 2020). Nipah et al. (2024) further highlighted that human activities have contributed to environmental degradation, making surroundings untidy and unfit for habitation. Littering, as one form of pollution, not only creates visual intrusion but also poses health risks to both humans and wildlife (Nipah et al., 2024).

### 2.7.2.3. Effect of littering in Zimbabwe

Chatira–Muchopa et al. (2019), in a study conducted in Zimbabwe, indicated that waste disposal in schools largely relies on traditional methods, with recycling yet to be widely adopted as a form of waste management. The preferred methods of disposal are burning waste and relying on council collection. However, participants were largely unaware that burning solid waste contributes to air pollution (Chatira–Muchopa et al., 2019). Mutungwe et al. (2011:559) noted that waste dumping is a common practice across Zimbabwe, and schools are no exception. Although waste management laws exist, they are often not enforced, and litter along school fences remains a concern. Zimbabwe has experienced cholera outbreaks since 2008, affecting adults, school-aged children, and younger children. Despite this, the education sector appears to have played a limited role in mitigating disease outbreaks or improving waste management. Shoko and Mberengwa (2024) further added that learners in Zimbabwe face increasing risks of contracting diseases such as respiratory infections, dysentery, cholera, diarrhea, bilharzia, soil-transmitted worms, and injuries due to their involvement in cleaning activities and handling littered materials in schools.

### 2.7.3 Effects of Littering: South African Perspectives

Dalu et al. (2020), in Thohoyandou, South Africa, highlighted that the quality of the environment is strongly influenced by human behavior and emphasized the dangers of plastic pollution to aquatic and terrestrial fauna, its negative aesthetic impacts, and the

release of toxic gases when improperly burned. The current study aims to help learners, teachers, principals, and community members explore sustainable litter management as a component of Education for Sustainable Development (ESD) in Vhembe East District, Limpopo.

The problem of littering is particularly visible in areas where waste collection is lacking, such as schools in rural regions. In these areas, uncollected litter often pollutes the immediate environment and contaminates river ecosystems, eventually reaching the oceans (Maunatlala, 2024). Mapotse and Mashiloane (2017) note that learners commonly discard plastics, paper or foil wrappers, tins, peels, seeds, and other items onto the ground, contributing to environmental pollution. Both home and school education can serve as effective platforms for addressing environmental issues like littering. Litter also poses a threat to plants and animals, as it often contains hazardous objects such as syringes, broken bottles, plastics, metals, and glass, which can injure both children and adults (Mapotse & Mashiloane, 2017). Furthermore, Mboweni (2015) asserts that littering, dumping of garbage, refuse, and rubble are human activities that disrupt ecosystems, upon which human life ultimately depends.

## 2.8 Management of littering

### 2.8.1 How littering is managed in schools and community globally

Globally, the waste management sector faces numerous challenges. Herdiansyah et al. (2021) emphasized that achieving a clean environment requires a fundamental shift in mindset and human behavior toward reducing waste and littering. While waste collection, recycling, and processing are essential, the environment will remain polluted if individuals continue to dispose of garbage improperly. Awareness of environmental issues and understanding public environmental needs are crucial in reducing waste consumption, with parental education emerging as a significant influence on human behavior.

In a study by Ibrahim et al. (2021) in Malaysia, scholars noted that Japan exemplifies effective anti-littering practices, where waste is highly respected and cleaning is considered efficient and noble. The country spends minimal resources on litter removal

due to the active participation of volunteers. The study highlighted that anti-littering practices are vital for maintaining health, safety, and comfort, particularly in higher education institutions. Similarly, Omar (2023) reported that Lebanon has developed a 12-hour curriculum on waste management for schoolteachers. This curriculum enhances teachers' and learners' knowledge about different types of indoor and outdoor solid waste, their effects on human health and the environment, and equips teachers to design and deliver waste management lessons effectively.

In New Zealand, litter pollution has been addressed through legislation such as the New Zealand Litter Act (1979), which aims to reduce litter pollution across ecosystems. Section 4 of the Act designates Keep New Zealand Beautiful (KNZB) Incorporated as the primary body responsible for promoting litter control. Established in 1969 as the Litter Council, KNZB continues to advocate for nationwide litter prevention and public awareness (Keep New Zealand Beautiful, 2018).

In response to littering challenges in the Philippines, Hoffmann and Muttarak (2020) revealed that the government emphasizes community-centered, bottom-up approaches combined with continued environmental education in formal schooling. However, issues in solid waste management persist. According to Molina and Catan (2021), improper waste disposal, inefficient collection, and lack of disposal facilities remain major concerns. Additionally, Al-Katib et al. (2010) assert that effective solid waste management requires consideration of technical, political, legal, socio-cultural, environmental, economic factors, and the availability of resources.

### 2.8.2 How littering is managed in schools and community in African countries

A clean environment is a shared aspiration for all citizens (Satria et al., 2021). Debra et al. (2021) emphasize the crucial role of formal education for sustainable development (SD) in addressing solid waste and environmental issues in developing countries. They argue that sustainability education at all levels can catalyze broader societal transformation. To achieve better environmental sustainability and effective waste management, educators must possess the appropriate knowledge, attitudes, skills, and capacity for innovation.

In Zimbabwe, solid waste management is guided by the Environmental Management Act (EMA), Chapter 20:27, as noted by Chatira et al. (2019). Section 70(1) of the EMA states that “No person shall discharge or dispose of any waste in a manner that causes environmental pollution or ill health to any person.” Consequently, individuals generating waste are legally required to implement measures to minimize waste through treatment, reclamation, and recycling.

In Ghana, Boateng et al. (2023) reported that prevailing waste management practices in senior high schools largely involve dumping waste in pits. While this method is common, it can produce unpleasant odors and pose potential respiratory health risks. The authors stress the need for proper waste management practices in schools to ensure a healthy and safe environment for students. Other practices observed include burning waste in open dumps, which can be hazardous. Schenck et al. (2019) caution that simply digging holes for waste disposal is ineffective if the process is not properly controlled and monitored.

Similarly, in Nigeria, Dung et al. (2021) highlight the importance of educating young people about environmental problems, particularly the management of solid waste and developing positive attitudes toward sustainable practices. The scholars emphasize the need for public participation in both the formulation and implementation of waste management plans at national and local levels. Teachers, as future implementers of the Environmental Education curriculum, play a critical role and should demonstrate positive attitudes toward solid waste management to effectively influence learners.

### 2.8.3 How littering is managed in schools and community in South Africa

The South African Constitution (Act 108 of 1996) guarantees in the Bill of Rights, Section 24, that everyone has the right to an environment that is not harmful to their health and well-being, and that this right should be protected through reasonable legislative and other measures (South Africa, 1996). Complementing this, the National Environmental Management Act (NEMA, Act 107 of 1998) serves as South Africa’s framework environmental law, providing principles for environmental protection such as “pollution prevention,” “polluter pays,” “duty of care,” and an “integrated and holistic approach,” while promoting effective litter management (South Africa, 1998).

According to Masemane and Msezane (2021), South Africa has sought to meet its international obligations by integrating Environmental Education (EE) into the school curriculum to develop an environmentally literate citizenry. However, Tlhabanelo (2020) notes that schools in Southern African Development Community (SADC) countries lack clear, independent environmental education policies emerging from the Department of Basic Education. Owojori et al. (2022) emphasize that applying the principles of "reduce, re-use, recycle, and recover" within a circular economy framework is a significant approach to minimizing the environmental impact of solid waste generation. Despite this, waste management in South African schools remains underdeveloped, and the absence of clear environmental policies negatively impacts learners' awareness and concern regarding littering (Matsekoleng, 2023). Another challenge identified is teachers' insufficient practical knowledge of waste management and limited understanding of what they teach learners (Debrah et al., 2022). Nevertheless, Matsekoleng and Mapotse (2022) note that learners can use waste materials to produce manure and fertilize school vegetable gardens, demonstrating practical applications of waste management.

Involving learners, staff, and the wider community is a key strategy for promoting awareness of Education for Sustainable Development (ESD) and fostering positive attitudes toward waste management. Waste management programs are recognized as effective tools to control littering in schools (Gyberg et al., 2020). The present study aims to demonstrate to learners, colleagues, and the community how littering can be sustainably managed as part of ESD.

Moyo (2021), in Newcastle, KwaZulu-Natal, suggests that waste management programs can support effective waste management not only in communities but also in schools. Integrating waste management themes into the curriculum across all grades is crucial for equipping learners with knowledge and skills to manage litter and adopt environmentally responsible behavior. Similarly, Sikhosana (2022) reports that the South African Green Schools Programme (SAGSP), initiated in 105 schools in Limpopo province in 2017, aimed to raise awareness of environmental degradation among

teachers and learners. The program promoted the 3Rs—reduce, re-use, recycle—and encouraged sustainable environmental resource practices for the benefit of future generations (DEA, 2017).

Dalu et al. (2020), in a study conducted in Thohoyandou, Limpopo, found that schools have introduced plastic bins and instructed learners to use them for litter, reducing the dumping of plastics and other waste into the natural environment. Encouraging waste recycling in schools has been shown to improve learners' attitudes and behavior toward waste and environmental stewardship (Dalu et al., 2020). Additionally, the strategic placement of litter bins in both urban and rural municipal areas is essential for promoting effective waste disposal practices among communities in the Greater Thohoyandou Local Municipality (Mosala, 2021).

### 2.9 Factors that promote implementing sustainable management of littering

Sustainable waste management remains a global challenge and represents a crucial strategy for addressing the litter we produce. It emphasizes reducing waste generation and minimizing environmental harm while promoting the potential reuse of waste materials to create useful products (Nakholi, 2021:287). In Indonesia, Rachman et al. (2021) highlighted the importance of learners and teachers working collaboratively to clean the school environment, both indoors and outdoors, including collecting litter and maintaining classrooms and yards, to promote a healthier and more sustainable school setting.

Herdiansyah et al. (2021) emphasized that the environment is vital for human survival, and proper waste management is necessary to protect it. Improper disposal of waste triggers environmental problems, often exacerbated by a lack of knowledge about responsible waste handling. Scholars further assert that achieving a clean environment requires a fundamental shift in mindset and behavior toward reducing waste and littering. Parental education plays a critical role in shaping human behavior, as children often emulate their parents' practices (Jancius & Gavenauskas, 2022). Norms, rules, and guidance from parents influence how children behave in society, including their environmental attitudes. Learners are more likely to adopt environmentally responsible behaviors at home when the community actively supports learning activities conducted

outside the school (Priatmoko et al., 2023). Schenck et al. (2021) also noted that children who are not guided or disciplined by parents to dispose of litter properly tend to replicate these behaviors in society. Augustina et al. (2023) similarly observed that when families model proper waste disposal, children are more likely to adopt these behaviors from a young age, as parental influence reinforces proper environmental practices.

Kayihan and Tonuk (2012:81) reported in Istanbul that Eco-Schools programs provide environmental management and certification frameworks designed to implement Education for Sustainable Development (ESD) in schools. These programs encourage children and young adults to actively participate in managing their school environment for the benefit of sustainability. Economic incentives also play a role in promoting pro-environmental behaviors such as waste sorting and recycling. Individuals are more likely to engage in these activities when they see tangible economic benefits (Herdiansyah et al., 2021:2). Similarly, Lee and Manfredi (2021) highlighted that while the installation of bins and signage provides a good starting point for encouraging recycling, a formal strategy is needed to ensure long-term sustainability. Pro-environmental behaviors for children include proper waste disposal, waste classification, and adherence to the principles of reducing, reusing, and recycling. Waste classification, which categorizes materials such as plastics, organics, and bottles, facilitates the recycling process (Lee & Manfredi, 2021).

In South Africa, Owojori et al. (2022) emphasized that environmental protection, conservation, and sustainable management are critical and can be advanced through environmental education and awareness. However, many people still lack awareness of proper waste disposal or ways to minimize waste generation (Herdiansyah et al., 2021). Students are key agents of sustainable development, and schools are important institutions for fostering awareness and practical skills in solid waste management. Goldschagg et al. (2025) recommended that recycling topics be better integrated into the curriculum, requiring teachers to include waste sorting and recycling activities in lessons. Students are at the heart of environmental education, and schools must encourage viewing waste as a resource rather than as mere refuse (Owojori et al.,

2022). Furthermore, Boyle (2023) emphasizes that recycling and composting in public schools provide tangible benefits to both the environment and the school community, reinforcing the value of practical, hands-on engagement in waste management.

### 2.10 Factors that impede the implementation of sustainable management of littering in schools

Ojedokun et al. (2022) indicate that, like many other environmental issues, littering is primarily driven by human behavior, making it both an environmental and a social-behavioral problem. Lev et al. (2023) further demonstrate that littering is a complex negative environmental behavior that is difficult to understand. Its causes are multifaceted, encompassing external factors such as the cleanliness of surroundings, availability and distribution of waste bins, as well as personal determinants including sociodemographic and psychological dimensions.

In a study conducted in Peru, McAllister (2015:34) noted that inadequate landfill disposal hinders the implementation of sustainable litter management in schools. Similarly, the limited use of recycling programs is a major obstacle to effective waste management. In Botswana, Bolaane (2006) found that the absence of visible recycling centers and receptacles restricts participation in recycling initiatives. O'Connell (2011) also emphasized that limited access to recycling facilities is a key reason why individuals in developing countries fail to engage in litter management.

In Malaysia, Ahmad et al. (2015) reported that the lack of waste sorting facilities, combined with gaps in students' knowledge, attitudes, and practices, contributes to poor participation in sustainable waste management. Overall, youth engagement in everyday sustainability practices remains low and unsatisfactory (Ahmad et al., 2015). Altikolatsi et al. (2021) highlighted that knowledge about recycling programs positively influences recycling attitudes, while a lack of understanding of proper recycling practices prevents participation.

Recycling is a critical component of integrated waste resource management and is widely recognized as one of the most effective methods for reducing litter (Adu & Adzorah, 2023). However, Anua et al. (2022) also identified ineffective litter

management and insufficient knowledge of the principles of reduce, reuse, and recycle as key factors hindering the sustainable management of litter in schools.

## 2.11 Theoretical Framework

As discussed in Chapter 1, a theoretical framework serves as a logically developed and interconnected set of concepts and premises, often derived from one or more existing theories, created by a researcher to provide structure to a study (Varpio et al., 2020). Vinz (2022) emphasizes that a theoretical framework represents a foundational review of existing theories, functioning as a roadmap for constructing arguments within a study. Similarly, Kivunja (2018) notes that a theoretical framework summarizes concepts and theories developed from previously tested and published knowledge, helping researchers synthesize information and establish a theoretical basis for data analysis and interpretation.

Theoretical frameworks are crucial because they provide platforms for researchers to interpret environmental observations and serve as bridges between research and education (Schunk, 2012). Furthermore, Collins and Stockton (2018) highlight that a theoretical framework can function as a lens or signpost, guiding how a study processes and interprets new knowledge. In this study, the Theory of Planned Behavior (TPB) was employed to examine and identify the behavioral intentions of learners in selected schools in the Vhembe District, Limpopo Province, regarding littering management.

### 2.11.1 Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) is a psychological framework that examines the relationship between an individual's attitude, subjective norms, perceived behavioral control, and their intentions to perform a specific behavior (Rahman et al., 2022). Developed by Ajzen in 1985, TPB builds upon the earlier Theory of Reasoned Action (TRA), introduced in 1975, which explains human behavior based on the intention to adopt certain behaviors. In TRA, the central factor influencing behavior is the individual's intention to perform a particular action (Ajzen, 1991).

### 2.11.2 Characteristics and objectives of Theory of Planned Behavior

Ajzen (1991) identifies three key components within the Theory of Planned Behavior (TPB) that influence behavior. The first component, behavioral beliefs, refers to beliefs about the likely outcomes of a specific behavior and the evaluation of those outcomes. These beliefs shape attitudes, which can be positive or negative toward the behavior. Ajzen (2020) further notes that behavioral beliefs involve a person's subjective probability that performing a behavior will lead to a particular outcome or experience. In the context of littering, teachers' and learners' beliefs about the consequences of littering and their evaluation of those outcomes directly influence their attitudes toward littering. Educating individuals about the negative environmental consequences of littering and emphasizing the positive outcomes of responsible waste disposal can foster positive attitudes toward litter management practices.

The second component, normative beliefs, involves beliefs about the expectations of important others—such as friends, teachers, and parents—and the motivation to comply with these expectations. Subjective norms reflect learners' perception that these important others endorse environmentally responsible behavior. Learners' attitudes can be shaped by the actions and guidance of those around them. For example, if peers support negative littering behaviors, learners are more likely to adopt similar behaviors. Conversely, if families, teachers, and neighbors model environmentally responsible behaviors, learners are more likely to develop positive attitudes toward proper waste disposal and engage in environmentally friendly practices.

The third component, control beliefs, relates to perceptions of factors that may facilitate or impede behavior, along with the perceived power of these factors. Control beliefs give rise to perceived behavioral control, which refers to an individual's perception of the ease or difficulty of performing a specific behavior (Ajzen, 1991). Learners' perceptions of control over littering behaviors influence their actual engagement in pro-environmental actions. Together, behavioral beliefs, normative beliefs, and control beliefs shape behavioral intentions, which subsequently guide actual behavior, provided individuals have sufficient control over their actions.

Although TPB emphasizes attitudes as a major influence on behavior, Yuriev et al. (2020) argue that knowledge and habitual behaviors also play a role, though these are not explicitly included in the theory. Ajzen (2020) acknowledges that behavior can be adapted to align with specific goals in different contexts. Responsible environmental behavior, such as proper waste disposal, is considered a planned behavior that involves intentional actions to reduce environmental harm, as noted by Krajhanzl (2010) and supported by Steg and Vlek (2009). Effective behavior change programs should first identify the behavior to be modified and then examine the factors influencing it.

Learners' attitudes are a powerful determinant of behavior. Positive attitudes toward environmental protection promote environmentally responsible actions, while negative attitudes can hinder them. Shange (2021) highlights that environmentally responsible behavior is grounded in knowledge, skills, values, attitude changes, and commitment to environmental protection, aligning closely with the principles of TPB. Ibrahim et al. (2021) similarly note that learners' attitudes toward the environment directly affect their intention to engage in littering behavior: more positive attitudes toward environmental responsibility correspond to more positive behavioral intentions.

This study focuses on investigating effective strategies for integrating littering management into Education for Sustainable Development (ESD) in schools. According to Ojedokun (2022), littering prevention behavior refers to voluntary actions aimed at ensuring that waste is not disposed of in inappropriate places. The study seeks to explore how littering can be sustainably managed in schools and to identify factors contributing to irresponsible environmental behavior.

Furthermore, De Leeuw et al. (2015) note that attitudes toward a behavior are grounded in behavioral beliefs—individuals' beliefs about the likely consequences of performing the behavior. Learners who perceive environmentally sustainable behaviors as beneficial are more likely to develop positive attitudes and engage in such behaviors. Conversely, learners who associate negative outcomes with littering are more likely to hold unfavorable attitudes toward responsible waste management. Finally, perceived behavioral control arises from control beliefs, reflecting learners' perception of their ability to perform or refrain from littering behavior.

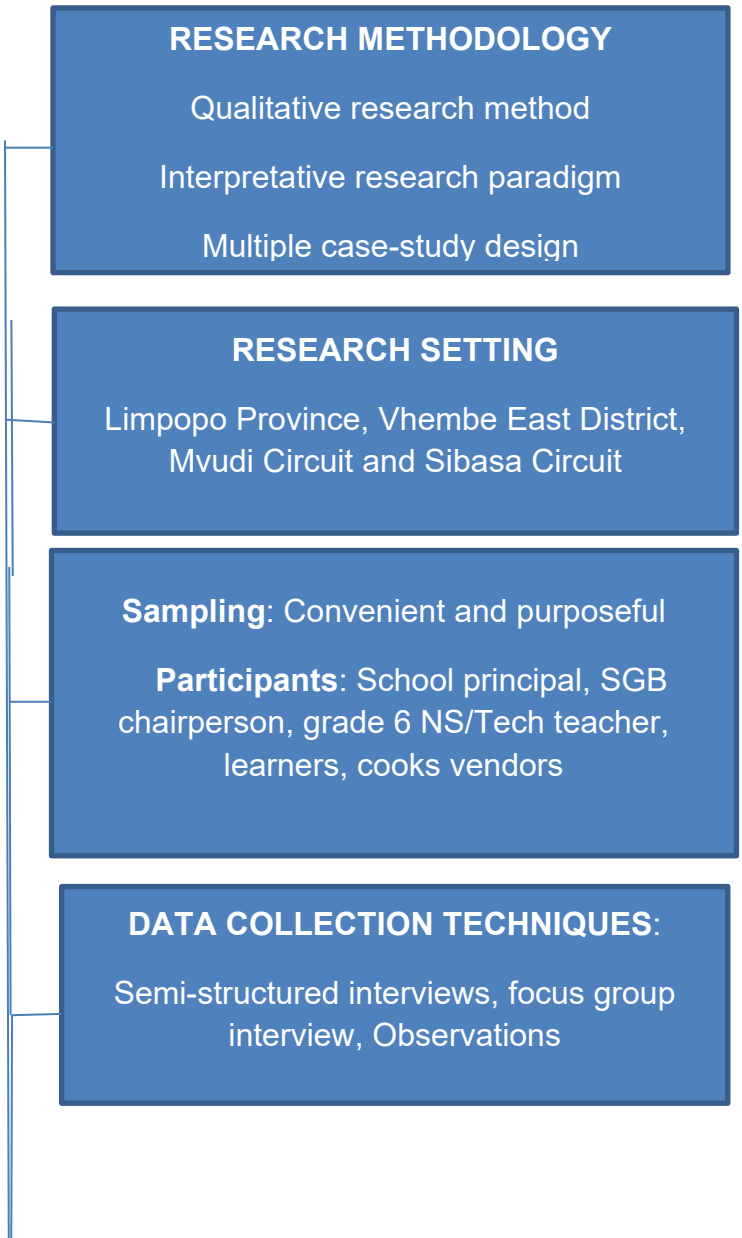
## 2.12 Chapter Summary

This chapter began by presenting various definitions of Environmental Education (EE) and tracing its historical development, with discussions spanning global, African, and South African perspectives. Similarly, definitions of Education for Sustainable Development (ESD) were provided, and its evolution and implementation were discussed from global, African, and South African viewpoints. Relevant literature from previous researchers was used to support these discussions. The chapter also examined the effects of littering globally, in African countries, and specifically in South Africa. Furthermore, it explored strategies for managing littering and highlighted how littering is addressed in schools and communities worldwide, across Africa, and in South Africa. Factors that promote or hinder the implementation of sustainable litter management in schools were also discussed. Finally, the chapter presented the Theory of Planned Behavior as the theoretical framework guiding this study. The research methodology will be outlined in the following chapter.

# CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

## 3.1 Introduction

The previous chapter provided an overview of the literature relevant to this study. This chapter focuses on the research methodology employed to conduct the study. It outlines the research paradigm appropriate for the study, followed by the research approach and design used. The population and sampling methods are described, along with an overview of the data collection techniques. Additionally, the chapter details the procedures for data analysis and interpretation and discusses ethical considerations. Issues of rigor and the trustworthiness of the study are also addressed, and the delimitations and limitations of the study are presented. The structure of the research methodology is summarized below.



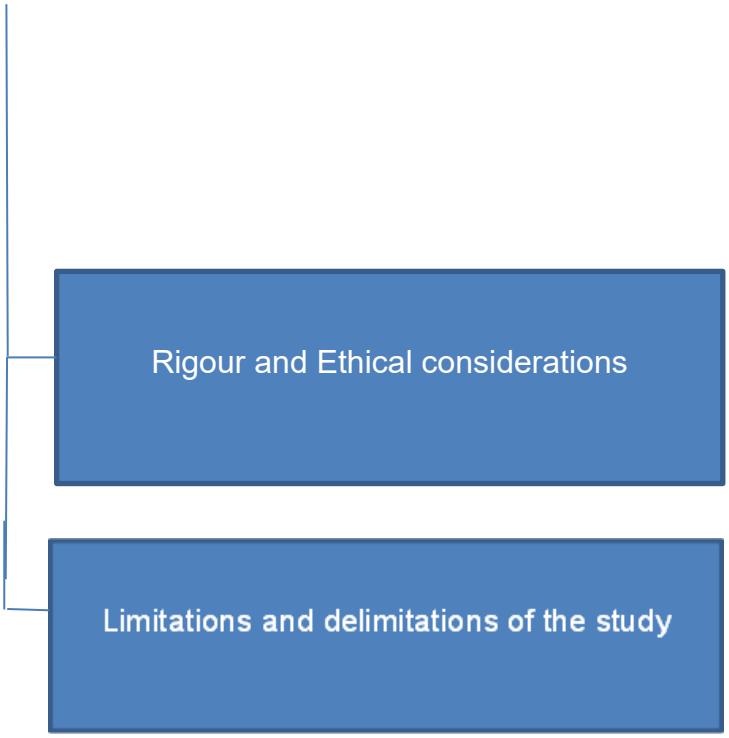



**Figure 3.1: Chapter 3 outline**

Note: The researcher developed the outline model for Chapter 3.

### 3.2 Research methodology

Research methodology is the backbone of any research, as it guides the study and ensures credible results (Bloomberg & Volpe, 2019). McMillan and Schumacher (2010) define research methodology as the systematic way of collecting and analyzing data to investigate a particular research problem. Petty et al. (2012) further describe research methodology as encompassing the theoretical, political, and philosophical foundations of social research and their implications for research practice and the use of specific research methods. In essence, research methodology refers to the strategies employed by researchers to collect, analyze, and interpret data to explain a phenomenon (Petty et al., 2012). Similarly, Ugwu et al. (2021:118) assert that methodology broadly refers to the research approaches, designs, methods, and procedures used in an investigation aimed at discovering information. In this study, methodology refers to the various approaches utilized to collect data and monitor findings regarding littering management in selected schools in the Vhembe East District, Limpopo Province.

Given (2008) emphasizes that research methodology should detail the actions taken in a study and the rationale for these actions in testing or formulating theory. The aim of research methodology, according to Given (2008), is to clarify how a study is conducted.

Clough and Nutbrown (2012) add that methodology aims to describe, analyze, and infer from a range of approaches used to collect data, considering the strengths and limitations of each approach.

As highlighted by Given (2008), this study's research methodology addresses several key aspects: the research paradigm employed, the research approach and design, the research setting, population and sampling strategies, data collection procedures and techniques, the process of data analysis and interpretation, and ethical considerations. Each of these aspects will be discussed in detail below.

### 3.3 Research Paradigm

According to Singh (2019:3), the term "paradigm" was first used by Thomas Kuhn in 1962 to describe a philosophical way of thinking that encompasses a collection of ideas representing a worldview. Lincoln et al. (2011) further state that a paradigm refers to the philosophical assumptions or basic set of beliefs that guide a researcher's actions and define their worldview. Willis (2007) defines a research paradigm as a comprehensive set of values, worldviews, or frameworks that direct study and action within a particular field. Creswell and Creswell (2005) agree that a research paradigm is composed of ontology, epistemology, and methodology, which are detailed below.

Scotland (2012:9) and Creswell and Creswell (2005) emphasize that a research paradigm fundamentally includes epistemology, ontology, and methodology, which are central to how researchers conceptualize trust and knowledge creation. Cohen et al. (2007) and Khan (2014) explain that epistemology is the philosophy of how knowledge is acquired and communicated, illustrating the relationship between the researcher and reality and how the phenomenon under study can be understood. Kivunja and Kuyini (2017) highlight the role of a researcher's personal beliefs in shaping their paradigm, while Aliyu et al. (2014) argue that within an interpretivist ontology, multiple realities or truths can exist, provided they are validated.

Dawadi et al. (2021:26) identify four major research paradigms: positivism, constructivism, interpretivism, and pragmatism. These research paradigms will be discussed in the following section.

### 3.3.1 Positivists paradigm

Kivunja and Kuyini (2017:31) stated that positivism demonstrates naïve realism, implying that certain objects or phenomena can be accepted as true through experimentation and common sense. Rehman and Alharthi (2016) further explained that positivism assumes reality exists independently of human perception and is consistent for all individuals, allowing measurement and observation to provide an understanding of society. However, Hiller (2016:106) noted that while positivism upholds an ontological belief in the objective nature of reality, any attempt to fully comprehend this reality is inherently limited by human cognitive capacities. Additionally, positivism is not mediated by human senses and is governed by immutable laws. Researchers operating within the positivist paradigm typically favor quantitative methods and deductive reasoning (Kaushik & Walsh, 2019).

### 3.3.2 Constructivism paradigm

Cresswell (2014) highlighted that constructivism focuses on how people interpret their own subjective experiences in relation to subjects, considering their social and historical contexts. Constructivism relies on analyzing social discourse, which is captured through data collection methods such as observations and interviews. Bogna et al. (2020) further indicated that constructivism aims to uncover worldviews, subjective meanings, and perspectives within social contexts, emphasizing the beliefs and opinions of participants to help researchers identify patterns and themes. Moreover, Das and Devi (2023) noted that epistemologically, constructivism places strong emphasis on participants' subjective interactions with the researcher and the co-creation of meaning.

### 3.3.3 Pragmatism paradigm

According to Kaushik and Walsh (2019:3), the pragmatism paradigm posits that human actions cannot be separated from past experiences or the beliefs derived from those experiences. Similarly, Kelly and Cordeiro (2020) assert that, within pragmatism, the significance and value of research findings are evaluated based on their practical application and usefulness. Researchers adopting a pragmatic approach are often associated with mixed-methods or multiple-methods research (Kaushik & Walsh, 2019).

### 3.3.4 Interpretivism paradigm

According to Ugwu et al. (2021:120), the ontology of interpretivism is relativism, which assumes that knowledge is gained or generated from the perspective of the individual directly involved. They further note that the interpretivism paradigm supports the idea that any phenomenon being studied has multiple realities and that the researcher interprets the data through their own thinking, informed by interactions with participants.

In this study, the researcher adopted an interpretivist paradigm to explore how Natural Sciences teachers integrate ESD into their lessons and how learners, as members of a specific cultural context, express their own experiences. Thanh and Thanh (2015:25) note that the interpretive paradigm is preferred for its subjective nature, in contrast to positivist research, which is more objective. This paradigm allows participants to freely share their views without fear or favor, and researchers approach reality through the perspectives of those who experience it. Qualitative methods are often used to collect data within this paradigm (Thanh & Thanh, 2015).

For this study, the researcher engaged directly with participants, including school learners, principals, teachers, SGB members, cooks, and street vendors operating in school premises, to interpret reality regarding how littering can be managed in schools. Participants were encouraged to voice their opinions openly. The researcher did not follow rigid procedures when seeking answers, allowing for flexibility and responsiveness to participants' experiences. Different approaches can be employed in qualitative research, and the next section outlines the specific research approach used in this study.

## 3.4 Research approach

A research approach is defined by Singh (2015) as a systematic and logical way of conducting research to achieve the study's goals and objectives. It provides a structured plan and procedure, outlining the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation. In educational research, various approaches are employed, including qualitative, quantitative, and mixed-methods research (Sikhosana, 2022). For this study, a qualitative research approach was adopted, as discussed in detail below.

### 3.4.1 Qualitative research approach

Tuffor (2017) defines the qualitative approach as a method designed to investigate the complexities of people's social worlds and to study their life experiences. Denzin and Lincoln (2011) note that qualitative research relies on the natural setting as the direct source of data. This approach emphasizes lived, real-life experiences and situations as they occur in the day-to-day course of events. Similarly, Magi (2010) describes qualitative research as a method that enables a broader understanding of human behavior and the reasoning that underlies it.

Taherdoost (2022:53) identifies three main research approaches: qualitative, quantitative, and mixed methods. The qualitative approach focuses on collecting non-numerical data, often in textual or visual form (Creswell, 2014). In contrast, the quantitative approach involves numerical data and statistical analysis. The mixed-methods approach combines qualitative and quantitative techniques, depending on the study's objectives and research questions, aiming to advance knowledge on the topic (Terrell, 2012; Taherdoost, 2022; Babbie, 2009).

This study adopted a qualitative approach because it allowed data to be collected in the form of words, enabling participants to express their own views and knowledge about the phenomenon under investigation. The qualitative approach was particularly suitable for this study as it allowed the researcher to probe deeply and seek answers to the research questions based on participants' lived experiences. Participants were able to provide insights into effective strategies for integrating littering management into Education for Sustainable Development in Vhembe East District, Limpopo Province. Moreover, this approach enabled the researcher to engage with experts and gain a nuanced understanding of the field (Magi, 2010).

## 3.5 Research Design

Research design is a structured plan for conducting research, including the collection and analysis of data. McMillan and Schumacher (2010) define research design as the technique or strategy followed to carry out a study. Similarly, Abbott and McKinney (2012) note that research design provides a systematic and structured mode of observation, allowing researchers to collect data in an organized manner. Ansari et al.

(2022) further argue that a research design helps to distinguish between significant and less significant tasks in the research process, making the study constructive and meaningful by providing detailed insights at every step.

Various research designs can be employed in studies, including case study, phenomenology, ethnography, grounded theory, participatory action research, and narrative research approaches (Creswell, 2014). For this study, the researcher adopted a case study research design, which is discussed in detail below.

### 3.5.1 Case study design (multiple case study)

Yin (2003) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, particularly when the boundaries between the phenomenon and its context are not clear. Similarly, Hoorani et al. (2019:286) describe a case study as a method that draws on multiple data sources to develop a contextualized understanding of a phenomenon, with the aim of confronting theory by comparing it with empirical evidence. Furthermore, Harrison et al. (2017) note that case study research is a qualitative approach in which the researcher collects thorough, in-depth data from a variety of sources to investigate a single bounded system (a case) or multiple bounded situations (cases) over time.

Baxter and Jack (2008:547) categorize case studies into four types: explanatory case studies, which aim to explain a question or phenomenon; exploratory case studies, used to explore situations where the intervention has no clear, predetermined outcomes; descriptive case studies, which describe an intervention or phenomenon within its real-life context; and collective case studies, which examine multiple cases simultaneously. Stake (1995) classifies case studies as intrinsic, instrumental, or collective, while Yin (2003) differentiates between single holistic case studies and multiple-case studies, as discussed below.

#### 3.5.1.1 Intrinsic case study

Stake (1995) explains that when the goal is to gain a deeper understanding of a specific issue, researchers who have a genuine interest in the subject should use an intrinsic case study. An intrinsic case study focuses on a particular subject or topic for its own

sake, rather than because it represents other cases or illustrates a broader characteristic or issue. The case is studied primarily due to its unique qualities and inherent interest (Stake, 1995).

#### 3.5.1.2 Instrumental case study

Baxter and Jack (2008) assert that an instrumental case study serves a purpose beyond simply understanding a specific situation; it provides insight into a broader problem or supports the development of a theory. While the case itself is of secondary importance, it aids in understanding another issue by offering context and evidence. Because the case contributes to the researcher's exploration of external interest, it is often examined in detail, including its environment and routine behaviors. In essence, an instrumental case study uses a particular case to shed light on a wider issue (Baxter & Jack, 2008).

#### 3.5.1.3 Collective case study

Yin (2018) explains that collective case studies use information from multiple previous studies to inform and shape a new study. This approach allows researchers to incorporate additional insights without the need for extensive time or financial resources for new data collection. Collective case studies are similar in nature to multiple case studies, as both involve examining more than one case. In a multiple case study, the researcher investigates variations within and between cases, aiming to replicate findings across cases. Cases are carefully selected to allow meaningful comparisons, enabling the researcher to identify results that are either consistent across cases or vary according to a specific hypothesis (Yin, 2018).

#### 3.5.1.4 Single case study

Yin (2003) highlights that a single case study can be classified as either single holistic or single embedded. A single holistic case study examines one case with the unit of analysis being the entire case as a single entity. In contrast, a single embedded case study focuses on one case but involves multiple units of analysis within that case. Stake (1995) argues that single case studies can provide highly compelling data for testing theories, particularly when the case possesses unique features or characteristics that are essential to achieving the study's objectives.

### 3.5.1.5 Multiple case study

Gustafsson (2017) noted that when a study involves more than one case, a multiple case study design is appropriate. Similarly, Baskarada (2014) explained that in multi-case studies, each case should be selected to either predict similar results (literal replication) or predict contrasting results for anticipated reasons (theoretical replication). If multiple cases produce contradictory results, the preliminary theory should be revised and tested with another set of cases (Baskarada, 2014). Moreover, studying multiple cases allows the researcher to understand both the differences and similarities between cases (Baxter & Jack, 2008).

Yin (2003) categorizes multiple case studies into two types: multiple holistic case studies and multiple embedded case studies. Multiple holistic case studies involve examining more than one case, with each case treated as a single unit of analysis. Multiple embedded case studies, on the other hand, involve more than one case, with multiple units of analysis within each case. In this study, data were collected from multiple cases to address the research questions, and the researcher employed a multiple case-study design to thoroughly explore each participant's bounded systems in real-life contexts.

An exploratory case study was employed for this research. Thomas (2021:142) notes that an exploratory case study is used when little is known about a phenomenon and aims to establish the shape of the problem or issue, examining data both at surface and deeper levels. This type of study is often an initial investigation, designed to identify patterns and generate hypotheses for further research (Baskarada, 2014; Toyon, 2023). Exploratory case studies are particularly useful when the intervention being evaluated has no clearly defined outcomes (Yin, 2003).

The current study used a multiple exploratory case-study design to examine three primary schools in the Vhembe East District of Limpopo Province. Each school was treated as a separate case, resulting in three distinct cases. The study was not comparative in nature, as participant experiences and knowledge levels regarding littering management varied across schools. Each case was thoroughly examined individually, but the findings were also summarized to highlight differences, similarities,

and general trends, providing insights into effective strategies for integrating littering management into Education for Sustainable Development (ESD) in the district (Stake, 2005).

Within each case, the researcher engaged directly with school principals, chairpersons of the School Governing Body (SGB), grade 6 NS/Technology teachers, and one learner per grade from grades 4 to 6. This approach enabled a detailed understanding of the challenges faced by participants individually. Cases were integrated during discussions through comparison and verification of findings, but not combined, ensuring that each school's unique context and participant experiences were respected. The multiple case-study design facilitated an in-depth exploration of the phenomenon without treating it as a comparative study (Gustafsson, 2017).

### 3.6 Research context

This section presents the research setting, identifies the population and sampling methods, and discusses the sample size. Its purpose is to justify the decisions made regarding participant selection and their relevance to the study. The figure below shows a map indicating the location of the provinces where the research was conducted in South Africa.

#### 3.6.1 Research setting

The Republic of South Africa comprises nine provinces: Mpumalanga, KwaZulu-Natal, Free State, Limpopo, North West, Gauteng, Western Cape, and Northern Cape. This study was conducted in Limpopo Province, which borders Botswana, Zimbabwe, and Mozambique. Limpopo is known for its bushveld and wildlife reserves and is administratively divided into ten districts, each managed by a district manager. The study was conducted in Vhembe East District, which consists of 20 circuits.

The district was selected based on convenience. Two primary schools were chosen from the Mvudi Circuit, and one primary school was selected from the Sibasa Circuit. All three schools are no-fee-paying institutions and rely on the National School Nutrition Programme (NSNP). Figure 2 illustrates the study setting.

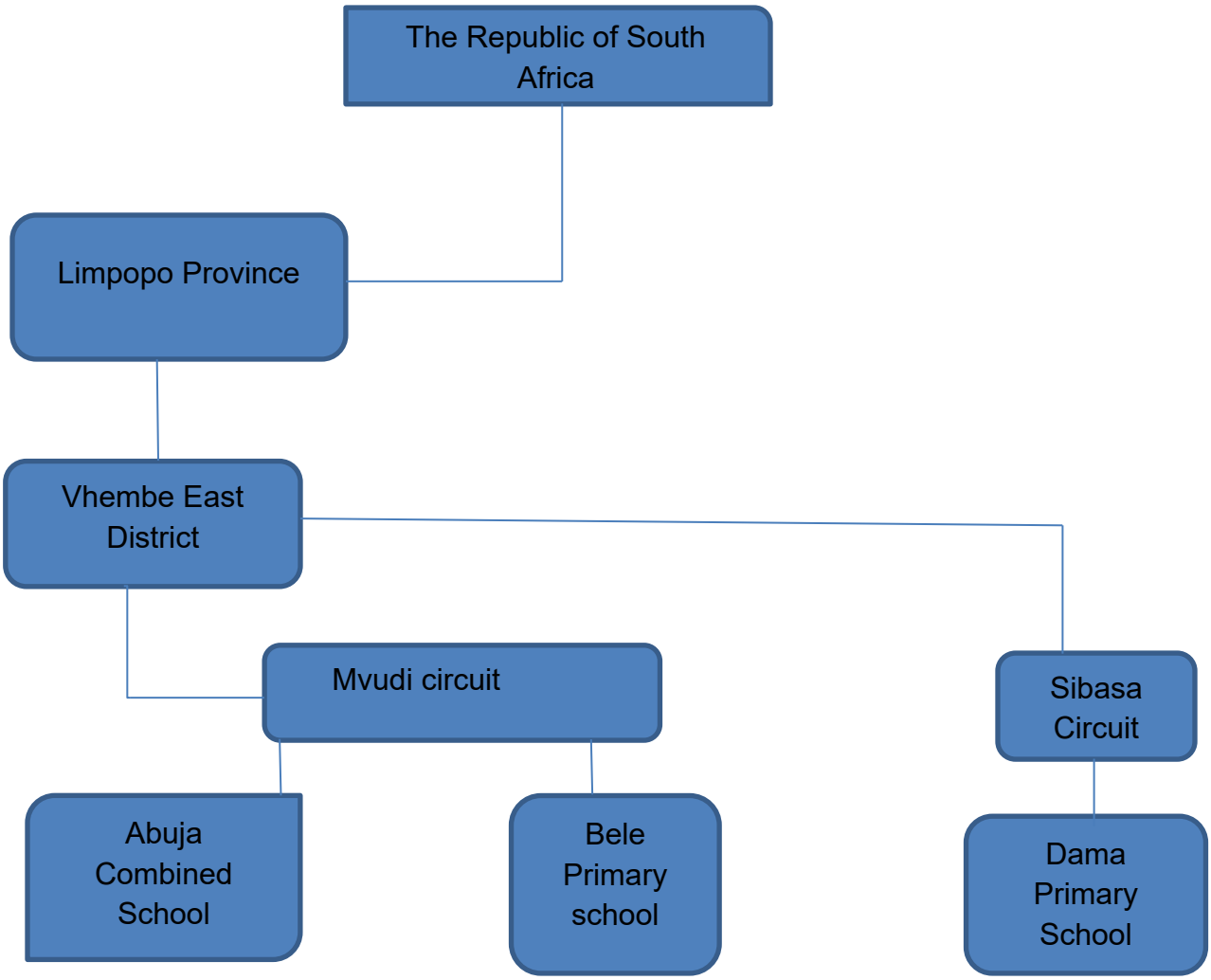



**Figure 3.2: Setting of the study**

Note: The study setting model was compiled by the researcher.

### 3.7 Population and Sampling

#### 3.7.1 Population

According to Kuswendi and Arga (2020), a population refers to a group of people or objects sharing specific characteristics that are subject to examination. Similarly, Smith (2000) asserts that a population comprises individuals who share essential traits, allowing researchers to generalize study findings. Rai and Thapa (2015) further argue

that a population is the group of people about whom assumptions or conclusions are intended.

In the context of this study, the population encompassed the geographic area of Vhembe East District, the three selected schools within this district, and the individuals associated with them. Specifically, the research population consisted of Grade 4–6 learners, one Grade 6 Natural Science and Technology teacher, school principals, cooks, the School Governing Body (SGB) chairpersons, and three street vendors permitted to sell within the schools. Both male and female participants from these three selected schools in Vhembe East District, Limpopo, were included as part of the study's focus.

### 3.7.2 Sampling

Creswell and Poth (2016) note that sampling refers to the techniques used to select research participants. Sampling is the method researchers use to choose participants from the broader population for data collection purposes. Furthermore, Creswell and Poth (2016) define sampling as the decision-making process for including individuals, settings, events, or behaviors as study participants. Similarly, Islam et al. (2022:4) describe sampling as the procedure for selecting objects, participants, or interview subjects for research. According to Obilor (2023:2), sampling is the act, process, or technique of selecting a suitable sample, or a representative part of a population, to determine the characteristics or parameters of the whole population.

Creswell and Poth (2016) categorize qualitative sampling approaches to include purposive sampling, quota sampling, convenience sampling, and snowball sampling. For this study, the researcher employed a combination of purposive and convenience sampling strategies. Convenience sampling was used to select the study area, which included three schools in the Vhembe East District. Purposive sampling was applied to select participants, including principals, SGB chairpersons, learners, cooks, street vendors, and Life Skills teachers, who had relevant experience with the phenomenon under investigation. The use of both convenience and purposive sampling is explained in detail below.

### 3.7.2.1 Convenience sampling method

According to Obilor (2023:4), convenience sampling, also known as grab, accidental, or opportunity sampling, is a technique in which a sample is drawn from the part of the population that is closest at hand, readily available, or convenient. Obilor (2023) further notes that convenience sampling is a non-probability sampling method used when researchers collect data from an easily accessible pool of respondents. Similarly, Lopez and Whitehead (2013:124) define convenience sampling as the most common form of qualitative sampling, occurring when participants are selected because they are conveniently or opportunistically available in terms of access, location, time, and willingness to participate. Additionally, convenience sampling is considered a relatively fast and straightforward way to achieve the desired sample size (Lopez & Whitehead, 2013). For this study, three schools that were accessible were selected using convenience sampling.

### 3.7.2.2 Purposive sampling method

Patton (2014) notes that purposive sampling involves selecting participants who possess significant knowledge about the research topic. Similarly, McMillan and Schumacher (2010:138) describe purposive sampling as a method of choosing participants with specific characteristics. This approach entails selecting individuals who can provide rich, relevant information about the subject under investigation. Whitehead and Whitehead (2020:119) emphasize that purposive sampling targets individuals with the required status, experience, or knowledge needed by the researcher. Furthermore, Etikan and Bala (2017) assert that purposive sampling relies on the researcher's judgment to identify participants who can provide the most meaningful information to achieve the study's objectives.

In this study, purposive sampling was aligned with the Theory of Planned Behavior, the study's theoretical framework, to focus on participants capable of sharing insights and experiences relevant to littering management in schools. Participants were selected for specific reasons:

- **Principals and SGB Chairpersons:** One principal and one SGB chairperson per school were purposively selected because they are responsible for

implementing environmental policies and monitoring tools, such as litter pick-up duty rosters, and thus possess a deep understanding of strategies to manage littering (Xaba & Nhlapo, 2014).

- **Natural Science and Technology Teachers:** One grade 6 teacher per school was selected, as Natural Science and Technology in the Intermediate Phase covers Education for Sustainable Development (ESD) content, including environmental conservation and the 3Rs (reduce, reuse, recycle) (Ugwu, 2018; Masemane & Msezane, 2021:236). Teachers provide critical information on how littering can be integrated into ESD lessons.
- **Learners:** Three learners per school, one from each grade (4–6), were chosen as class representatives because they are directly involved in maintaining cleanliness in their classrooms (Sikhosana, 2022).
- **Cooks:** Three cooks per school were selected due to their role in the National School Nutrition Program (NSNP), which generates litter from food packaging, vegetable peels, and tins. Where more than three cooks were available, the most experienced were chosen (Maphaha, 2020).
- **Street Vendors:** Three street vendors per school, permitted to sell food on the school premises, were selected because their activities contribute to littering. Vendors were chosen based on their years of experience working with learners (Makonya, 2004).

In summary, the study's sample consisted of: three school principals, three SGB chairpersons, three cooks per school, three street vendors per school, three intermediate-phase teachers, and three learners per grade (4–6) for focus group interviews. Grade 6 learners were also observed in class. Data collection was conducted across three schools in the Vhembe East District, within the Mvudi and Sibasa circuits, selected for convenient access.

To maintain confidentiality, pseudonyms were assigned to the schools: **Case 1 – Abuja Combined School**, **Case 2 – Bele Primary School**, and **Case 3 – Dama Primary School**.

### 3.8 Data collection techniques

Tomaszewski and Zarestky (2020) define data collection as the process of gathering and analyzing various forms of documentation and information using systematic strategies that enable a researcher to answer research questions and evaluate findings. Similarly, Mwita (2022:532) describes data collection as a methodical procedure for obtaining information necessary to address a specific research problem, respond to research questions, and provide a foundation for confirming or refuting research hypotheses.

Lopez and Whitehead (2013:128) assert that qualitative data collection primarily involves direct interaction with participants or relies on the researcher's proximity to relevant events. In contrast, quantitative data collection techniques often do not require face-to-face interaction with individuals or events. Aguinis et al. (2021:3) further emphasize that data collection involves a series of decisions, including selecting the research design, choosing sampling procedures, determining whether to use control variables and which ones, and managing missing data.

Moser and Korstjens (2018) highlight that there are various data collection methods, such as surveys, interviews, focus groups, observations, data extraction, and secondary data sources. Interviews, for example, can take several forms, including structured, semi-structured, and open-ended interviews (MacMillan & Schumacher, 2010). In this study, three data collection methods were employed: semi-structured interviews, observations, and focus group interviews. These methods were selected because they provided rich, in-depth information needed to answer the research questions. This section outlines the chosen techniques, justifies their selection, and explains the approach for presenting and analyzing the collected data.

#### 3.8.1 Semi-structured interviews

Magaldi and Berler (2020) define a semi-structured interview as an exploratory tool commonly used in the social sciences for qualitative research or to gather detailed research data. Similarly, Gillham (2000) describes semi-structured interviews as standardized yet flexible, personal, and unique, often based on open-ended questions. Mashuri et al. (2022:24) further argue that providing questions prior to the interview

allows researchers to probe deeply and explore participants' perspectives in greater detail.

For this study, the researcher conducted one-on-one semi-structured interviews with three school principals, three grade 6 Natural Science and Technology teachers, and three School Governing Body (SGB) chairpersons. The semi-structured format allowed the researcher the flexibility to probe participants for elaboration or to pursue lines of inquiry introduced by the interviewees. This method was particularly suitable for exploring participants' experiences, views, opinions, ideas, and beliefs regarding littering issues (Islam et al., 2022).

The interviews were designed to answer the following research questions:

- How can littering be sustainably managed as a form of Education for Sustainable Development (ESD) in selected schools in Vhembe East District, Limpopo Province?
- What factors promote the implementation of sustainable litter management as a means of ESD in schools?

Prearranged questions guided both the semi-structured interviews and the focus group discussions. Participants included school principals, SGB chairpersons, learners from grades 4–6, grade 6 NS/Tech teachers, cooks, and school vendors from the three selected primary schools. To minimize disruptions to teaching and learning, timetables were obtained from school principals prior to data collection. Principals were interviewed during their free time after school hours, while teachers were interviewed during available periods or after school as needed. All interviews were conducted between 07:00 and 15:30 during school hours. Audio recording and note-taking were employed, with participants' consent, to ensure accurate transcription and maintain data reliability (Netshivhumbe & Mudau, 2023).

### 3.8.2 Focus group

According to Busetto et al. (2020:4), focus groups are group interviews designed to explore participants' expertise and experiences, including investigations into how and why people behave in certain ways. Similarly, Lopez and Whitehead (2013) define focus groups as in-depth group interviews in which participants are purposively selected to

represent a specific population and focus on a given topic. They further note that participants are chosen based on their ability to contribute relevant insights, sharing similar socio-demographic characteristics, and being comfortable engaging both with the interviewer and with each other.

Moreover, Onwuegbuzie et al. (2009) highlight that focus groups are a fast, effective, and economical method for collecting information from well-organized participants in a socially interactive environment.

For this study, one learner per grade from grades 4–6, three cooks per school, and three street vendors allowed to sell products in schools were interviewed using focus group discussions. The questions were designed to address the following research question:

- How can the enabling factors and strategies be maintained to ensure the sustainable management of littering in schools as part of ESD?

Learners were interviewed during breaks and after school to avoid disrupting teaching and learning. Cooks were interviewed while preparing food for learners, and vendors were interviewed before, during, and after selling their products to learners.

### 3.8.3 Observation

Observation, as defined by Muzari et al. (2022), involves a purposeful, systematic, and selective way of watching and listening to interactions or research phenomena as they unfold. Busetto et al. (2020) note that observations are particularly useful for gaining insights into actual behavior within a setting, as opposed to reported behavior or opinions. Kamper (2004) describes observation as the careful watching of something or someone to gather information, while Pandey (2021:65) emphasizes that data obtained through observation are often more authentic and reliable than data collected through other methods.

Observation is a fundamental method of data collection in qualitative research because it allows researchers to capture real-time behaviors, interactions, and contextual nuances that may not be easily documented through interviews or surveys. This method

was especially useful in this study for including participants, particularly learners, who might not actively participate in interviews (Pandey, 2021).

According to Saou and Nasri (2023:501), qualitative observation methods include approaches such as participant and non-participant observation. In this study, the researcher adopted a non-participant observer role, meaning that she observed participants without actively engaging in their activities. By remaining a passive observer, the researcher was able to watch and listen to participants' behaviors and interactions, drawing conclusions directly from these activities. This approach enabled the collection of information about both the physical environment and human behavior without relying on participants' retrospective or anticipatory accounts (Saou & Nasri, 2023).

The researcher observed learners in and outside of classrooms. In classrooms, at least one grade 6 Natural Sciences and Technology lesson per school was observed to determine whether teachers incorporated strategies to manage littering as part of ESD. During breaks, the researcher observed the school environment to see how learners applied the theory taught in class in real-life situations. Teachers, principals, cooks, and street vendors allowed to sell products in schools were also observed to examine how they generate waste, their behaviors and attitudes toward littering, and how they disposed of waste.

Observation was chosen for this study because it allows researchers to see how people behave in their natural environment, revealing potential discrepancies between what participants say and what they do (Lim, 2025).

### 3.9 DATA PRESENTATION

In and Lee (2017) indicated that data presentation involves transforming raw data into a format that is easy to understand and interpret, often using visual aids such as charts, graphs, and tables to convey information clearly and make complex data more accessible. Similarly, Ningi (2022) noted that data presentation is an essential component of the research methodology, varying according to the research approach.

This includes all data gathered through observation, interviews, and focus group discussions.

For this study, data were presented and discussed in narrative paragraphs. The data obtained from semi-structured interviews, observations, and focus group interviews with school principals, SGB chairpersons, grade 6 NS/Tech teachers, learners, cooks, and vendors allowed to sell their products in schools were used for triangulation. To ensure clarity and prevent data mix-ups, the data were presented per case with clearly identified themes and sub-themes. Additionally, the themes and sub-themes were aligned with the study's aims, objectives, and research questions. The table below illustrates the data analysis plan.

| **Theme** | **Sub-themes** |
|---|---|
| 4.1 Factors promoting sustainable litter management in schools | 4.1.1 Environmental Awareness and Education |
| | 4.1.2 Teacher and learner engagement in litter management |
| | 4.1.3 School-based policies and procedures |
| | 4.1.4 Resources availability and waste disposal infrastructure |
| 4.2 Factors hindering sustainable litter management in schools | 4.2.1 Inadequate resources and infrastructure |
| | 4.2.2 Limited Institutional support and training |
| | 4.2.3 Attitude and Behavioral challenges |
| | 4.3.4 External environmental factors |
| 4.3 Strategies for improving and sustaining litter management in schools | 4.3.1 Strengthening environmental education |
| | 4.3.2 Increasing stakeholder involvement |
| | 4.3.3 Improving waste management |

| | |
|---|---|
| | infrastructure |

**Note:** The researcher prepared the data analysis plan.

### 3.9.1 DATA ANALYSIS

Ngulube (2015:1) noted that qualitative data analysis is one of the most important steps in the qualitative research process. Magi (2010) contends that data analysis involves dissecting, classifying, arranging, and condensing data to answer the study's research questions. Similarly, Flick (2013) defines qualitative data analysis as the classification and interpretation of linguistic or visual material to make statements about both the implicit and explicit dimensions and structures of meaning within the material. Cohen et al. (2007) further describe data analysis as the process of bringing order and meaning to collected data.

Dawson (2009:119–125) categorizes qualitative data analysis into four components: thematic analysis, comparative analysis, content analysis, and discourse analysis. Madill and Gough (2016) classify methods of analyzing qualitative data as discursive, thematic, structured, and instrumental. Thematic analysis is described by Dawson (2022) as a method in which themes emerge from the data rather than being imposed by the researcher. Bowen (2009) and Braun and Clarke (2006) elaborate that thematic analysis involves identifying, analyzing, and reporting patterns within the data.

The data analysis process involves careful review and coding of the data. King (2004) distinguishes between theoretical coding, developed by Glaser and Strauss (1967), and thematic coding. Braun and Clarke (2006) provide six steps for conducting thematic analysis: familiarizing oneself with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report. Thematic analysis was the chosen approach for analyzing the data in this study.

For this study, data collected through interviews were transcribed verbatim and analyzed using color-coded or other practical methods to identify common themes, patterns, and regulations in participants' perspectives (Alase, 2017). The researcher organized the data into themes and sub-themes to improve accessibility, followed by

detailed coding and tabulation for easier reference. Following data analysis, interpretation was conducted as detailed in the subsequent section.

### 3.9.2 Data Interpretation

Pandey (2021) defines data interpretation as the process of analyzing data and drawing relevant conclusions using various analytical research techniques. It helps researchers organize, process, and summarize data to address key research questions. Similarly, Spiggle (1994:492) describes data interpretation as assessing the intentions and inferences of a study, making sense of experiences and behaviors, understanding phenomena on their own terms, and grasping their essence.

Ngulube (2015) emphasizes that data interpretation involves several processes, including searching, evaluating, coding, and mapping. In this study, data collected through interviews were interpreted by coding, grouping into themes and sub-themes, and then reducing and organizing them into categories. Observational data were interpreted by analyzing behavior patterns displayed by participants during the observation period to address the research questions. Focus group interview data were interpreted by identifying patterns and connections, as well as providing in-depth explanations of terms and concepts within the data to create meaningful context (Nieuwenhuis, 2016).

## 3.10 Rigour

In qualitative research, rigour—or trustworthiness—refers to the measures researchers take to demonstrate the quality and integrity of their study. Rigour encompasses a range of strategies and approaches that account for the influence of multiple realities on qualitative research (Ayton, 2023). In this study, factors such as credibility, dependability, transferability, and confirmability were considered to ensure and maintain rigour.

### 3.10.1 Credibility and trustworthiness

According to Nassaji (2020:428), depending on the type of data, member checking—or participant validation—is a useful strategy that involves sharing the data and interpretations with research participants to confirm accuracy. To ensure credibility and

trustworthiness, member checking was employed in this study, whereby the field notes taken during data collection were shared with participants to correct any errors (Sikhosana, 2022; Nassaji, 2020). When participants were given interview transcripts, member checking was further employed to ensure that the information recorded accurately reflected what they had said in the interviews.

Additionally, the researcher employed triangulation, a method that uses multiple data sources to examine different aspects of a phenomenon and to cross-verify findings, ensuring that no dataset invalidates conclusions drawn from another (Noble & Heale, 2019). In this study, data from semi-structured interviews, observations, and focus group interviews were integrated for triangulation.

To further guarantee credibility, the researcher conducted prolonged fieldwork, ongoing observations, and continuous participant verification across all selected schools (Stahl et al., 2020). Learners and teachers were observed and interviewed regarding littering behavior in classrooms, during breaks, outdoor activities, and after school. Cooks and street vendors permitted to sell products in schools were also observed and interviewed through focus groups. Principals and SGB chairpersons were interviewed individually using semi-structured interviews.

Finally, to ensure accurate representation and avoid misinterpretation, participants' responses were translated from Tshivenda to English during data analysis, maintaining fidelity to their intended meaning.

### 3.10.2 Pilot study

Teresi et al. (2022) define a pilot study as an essential first step to assess the feasibility of the methods and procedures intended for a larger study. Prior to conducting the main study, the researcher carried out a pilot study to examine the proposed design, identify potential instrument deficiencies, and anticipate challenges. The findings from the pilot study were not included in the main research. The pilot study was conducted in one primary school that was not part of the final study sample. Permission to conduct the research was obtained from the circuit manager and the school principal, following

submission of the research ethics certificate from the Limpopo Department of Education.

Participants in the pilot study included the school principal, SGB chairperson, grade 6 NS/Tech teacher, one learner per grade from grades 4–6, cooks, and vendors operating in the school. The principal welcomed the study and called all available participants to explain the procedures to be followed. Consent to participate was obtained from all necessary participants.

During the pilot study, the researcher encountered difficulties scheduling interviews with the teachers and principal, as they were occupied with teaching and learning due to staff shortages. Consequently, the researcher conducted general school observations and interviewed other participants, waiting for the preoccupied staff later. This experience highlighted the importance of conducting interviews outside school hours to avoid disrupting teaching activities and underscored the value of scheduling telephonic interviews when necessary.

Despite these challenges, the pilot study allowed the researcher to evaluate the effectiveness of data collection methods, including observations, semi-structured interviews, and focus group interviews. It was also noted that some semi-structured interview questions did not directly address the research questions and required restructuring for the main study. Overall, the pilot study reinforced the need to refine the research approach and strengthen communication skills prior to the main data collection.

### 3.10.3 Dependability

Lincoln and Guba (2011) suggest that the dependability of research findings can be ensured through three techniques: the investigator's position, triangulation, and an audit trail. This study focused on triangulation, where the researcher employed multiple procedures, including interviews, focus groups, and classroom observations, to collect data.

According to Nassaji (2020:428), dependability is considered the qualitative counterpart to reliability in quantitative research. In this approach, the research report should be

written in such a way that other researchers reviewing the data could reach similar conclusions. Dependability can be enhanced by meticulously documenting all research activities, findings, and any modifications made as the study progresses.

For this study, the researcher ensured that all records generated during data collection, analysis, and interpretation were clearly documented and securely maintained, allowing other researchers to understand the process and verify the findings.

### 3.10.4 Confirmability

Confirmability is concerned with ensuring that the results of a study can be corroborated using different methods or approaches, such that one set of findings supports and validates the others. Shenton (2004:72) defines confirmability as the degree to which outcomes can be independently verified and supported by other sources. Since confirmability and dependability are closely related, confirmability also pertains to the objectivity and accuracy of the data (Houghton et al., 2013:13). According to Lincoln and Guba (1985), confirmability reflects the objectivity of a study. Nassaji (2020:429) highlights that an effective strategy to ensure confirmability is the use of an “audit trail,” where the researcher documents and explains each action and decision made during data classification and analysis. An audit trail was employed in this study to minimize bias, clearly documenting the procedures followed and how findings and conclusions were drawn (Carcary, 2020). In this study, the researcher ensured that personal beliefs or perspectives did not influence judgment and provided participants with a detailed description of every step of the data analysis process.

### 3.10.5 Transferability

Transferability refers to the extent to which the findings of a study can be applied or generalized to other contexts. According to Shenton (2004:69), transferability concerns how study results can be relevant and useful in settings beyond the original research. Anney (2014) further explains that transferability pertains to the degree to which the outcomes of a study can be applied in different circumstances. This involves careful consideration of how the study’s conclusions might be adapted to other settings without losing their intended meaning. Providing a detailed description of the original research context helps others make informed decisions regarding applicability (Houghton et al.,

2013). To ensure transferability in this study, the researcher provided detailed accounts of the collected data, including raw data and descriptive information. Interviews with participants were audio-recorded and subsequently transcribed into written form, enabling a comprehensive representation of the findings that could be applied or referenced in other contexts.

## 3.11 ETHICAL CONSIDERATIONS

Ethics in research refers to accepted codes of conduct that distinguish right from wrong behavior (Kumar, 2018). Kang and Hwang (2021) emphasize that ethical behavior is crucial for safeguarding participants' well-being and minimizing potential harm. Similarly, McMillan and Schumacher (2010) assert that researchers have a responsibility to protect participants, and strict adherence to ethical standards is essential for maintaining research credibility. A primary function of research ethics is to ensure the welfare of participants throughout the study (McMillan & Schumacher, 2010). To uphold these principles, this study prioritizes respect for all participants, honesty in data collection and reporting, and the assurance of confidentiality and anonymity (Loubser & Simalumba, 2016).

### 3.11.1 Informed consent

Bazzano et al. (2021:81) assert that informed consent is a fundamental principle underpinning the protection of human subjects in research. Ethical clearance for this study was obtained from the University of South Africa (UNISA), and permission was granted by relevant authorities, including the Limpopo Department of Education District Senior Manager, Circuit Managers, School Governing Bodies, school principals, staff members, cooks, and learners. Participants were provided with an ethics clearance certificate from the College of Education Ethics Review Committee, and letters of permission were given to the three primary school principals to facilitate participation in the study.

O'Sullivan et al. (2021) highlight that the informed consent process involves establishing rapport and trust with prospective participants and should respect cultural and societal norms, including consulting family members or friends when necessary. In this study, parents of learners under the age of 18 were required to sign consent forms for their

children, while learners themselves freely signed assent forms. Informed consent was obtained from all participants, who were also given the freedom to withdraw from the study at any time.

Participants were provided with detailed information about the interview process in advance to ensure transparency and informed participation. Standardized interview questions were used to maintain reliability. Following data collection, the research findings were validated to ensure alignment with the study objectives.

### 3.11.2 Voluntary participation

Milluma and Bromwich (2021) emphasize that informed consent must be obtained from all participants to ensure voluntary participation, with the freedom to withdraw from the study at any time. Furthermore, participants were informed about the purpose of the research, the procedures involved, and any potential risks and benefits. These details were clearly stated in a written consent form, which participants signed voluntarily (Milluma & Bromwich, 2021).

### 3.11.3 Confidentiality and anonymity

Saunders et al. (2015:617) define anonymity as the protection of all information so that it is only accessible to the primary research team. Anonymity is a form of confidentiality that ensures participants' identities remain hidden. Hwang (2023) emphasizes that safeguarding participants' privacy requires adhering to ethical principles, including maintaining confidentiality and anonymity throughout data collection, analysis, and reporting.

Prior to data collection, the researcher assured participants that their school names and personal identities would remain confidential and would not be traceable from the presented data. Saunders et al. (2015) note that anonymization is a complex process; changing names or disguising locations is only the initial step in managing identifying details. In this study, pseudonyms were used for the schools to ensure anonymity:

- Case 1: Abuja Combined School

- Case 2: Bele Primary School
- Case 3: Dama Primary School

Additionally, to protect individual participants, codes were assigned as follows: school principals were labeled SP1, SP2, SP3; SGB chairpersons as SGB1, SGB2, SGB3; teachers as T1, T2, T3; cooks as C1, C2, C3; learners as L1, L2, L3; and vendors as V1, V2, V3.

### 3.12 Chapter Summary

This chapter provided a summary of the research methodology, including the paradigm, approach, and design employed in this study. It outlined the research context, data collection techniques, and strategies for ensuring rigour, while also highlighting the ethical considerations. The chapter concluded with a discussion of the study's limitations and delimitations. The next chapter presents and discusses the data collected from Case 1: Abuja Combined School, Case 2: Bele Primary School, and Case 3: Dama Primary School.

# CHAPTER 4: DATA PRESENTATION

## 4.1 INTRODUCTION

The preceding chapter outlined the methodology employed in conducting this research. The focus of the current chapter is to present the findings obtained from participants at Case 1: Abuja Combined School, Case 2: Bele Primary School, and Case 3: Dama Primary School. The chapter highlights the specific details that provide answers to the research questions. The following section addresses the research questions as explored in this study.

- What factors promote implementing sustainable management of littering as a means of ESD in schools?
- What factors impede sustainable management of littering as a form of ESD in schools?
- How can the enabling factors and strategies be maintained to ensure the sustainable management of littering in schools as part of ESD?
- How can potential limiting factors be addressed to facilitate the school-based management of littering as a part of ESD?

The collected data were presented and discussed collectively, with findings narrated in paragraphs for each case. This chapter focuses on presenting the findings derived from qualitative data collected through face-to-face interviews, focus groups, and non-participant observations involving school principals, SGB chairpersons, grade 6 Natural Science and Technology teachers, cooks, and vendors in the schools. The data were analyzed on a per-case basis, presented, discussed, and conclusions drawn accordingly, reflecting the non-comparative nature of the study. Emphasis was placed on the themes and sub-themes outlined in Table 4.1 of the data analysis plan.

**Table 4.1: Data Analysis Plan**

| Theme | Sub-themes |
|---|---|
| 1 Factors promoting sustainable litter management in schools | 1.1 Environmental Awareness and Education |
| | 1.2 Teacher and learner engagement in litter management |
| | 1.3 School-based policies and procedures |
| | 1.4 Resources availability and waste disposal infrastructure |
| 2 Factors hindering sustainable litter management in schools | 2.1 Inadequate resources and infrastructure |
| | 2.2 Limited Institutional support and training |
| | 2.3 Attitude and Behavioral challenges |
| | 2.4 External environmental factors |
| 3 Strategies for improving and sustaining litter management in schools | 3.1 Strengthening environmental education |
| | 3.2 Increasing stakeholder involvement |
| | 3.3 Improving waste management infrastructure |

**Note: The researcher prepared the data analysis plan.**

The use of pseudonyms was guided by ethical considerations, as indicated in Table 4.2, for the presentation, discussion, and reporting of findings related to each participant, including school principals, SGB chairpersons, grade 6 NS/Tech teachers, learners, cooks, and vendors in each case.

**Table 4.2 Participants pseudonyms per case**

| Cases | Participants | Pseudonyms |
|---|---|---|
| Case 1 | School principal | SP1 |
| | SGB chairperson | SGB1 |
| Abuja Combined | Teacher | T1 |
| | Learners | L1 |
| School | Cooks | C1 |
| | Vendor | V1 |
| Case 2 | School principal | SP2 |
| | SGB chairperson | SGB2 |
| Bale Primary | Teacher | T2 |
| | Learner | L2 |
| School | Cooks | C2 |
| | Vendors | V2 |
| Case 3 | School principal | SP3 |
| Dama Primary | SGB chairperson | SGB3 |
| School | Teacher | T3 |
| | Learner | L3 |
| | Cooks | C3 |
| | Vendors | V3 |

**The pseudonyms and codes per case and each participant were prepared by the researcher.**

## 4.2 THE CASES

The current section presents the findings from three cases: Case 1 Abuja Combined School, Case 2 Bele Primary School, and Case 3 Dama Primary School. Data from each case are presented separately to facilitate an in-depth understanding and to highlight the unique aspects of each context. Pseudonyms, as detailed in Table 4.2, were assigned to each participant. Guided by Ajzen's (1991) Theory of Planned Behavior, which examines and predicts human behavior as a planned action, this study employed the framework to investigate participants' littering attitudes, social norms, and

perceived behavioral control as key determinants of intentions. The framework enhanced understanding of the challenges faced by participants at different levels and guided the development of strategies for integrating effective littering management into Education for Sustainable Development (ESD).

### 4.2.1 Case 1: ABUJA COMBINED SCHOOL

#### 4.2.1.1 DATA PRESENTATION

**A. Factors promoting sustainable litter management in schools**

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan. The main theme, factors that promote sustainable litter management in schools, was explored through the following sub-themes: Environmental Awareness and Education, Teacher and Learner Engagement in Litter Management, School-Based Policies and Procedures, and Resource Availability and Waste Disposal Infrastructure.

**i. Environmental Awareness and Education**

The findings indicate that environmental awareness and education play a critical role in promoting sustainable litter management in schools. Participants emphasized that teaching learners about environmental conservation is essential for shaping positive attitudes towards waste management. The school principal (SP1) highlighted that Education for Sustainable Development (ESD) equips learners with the knowledge, skills, values, and attitudes necessary to make responsible environmental decisions. SP1 stated:

*"ESD aims to equip individuals with the knowledge, skills, values, and attitudes needed to take responsible actions to protect the environment, promote social equity, and ensure economic viability for present and future generations."* – SP1

Teachers expressed similar views. Teacher 1 (T1) emphasized the importance of integrating litter management into classroom instruction, particularly in subjects such as Natural Sciences and Social Sciences, where environmental issues are addressed. However, T1 noted that the current curriculum does not provide sufficient time for comprehensive environmental education. T1 explained:

*"In Grade 6, we teach about ecosystems and how pollution affects the environment, but it's not enough. If littering were a topic on its own, it would help learners understand their role in protecting the environment."* – T1

The school has also implemented initiatives to enhance environmental awareness, including educational field trips. The principal described a partnership with the local botanical gardens, providing learners with experiential learning opportunities related to conservation and pollution:

*"Recently, we took our learners to the botanical gardens, where they were taught about conservation and the impact of pollution."* – SP1

### ii. Teacher and Learner Engagement in Litter Management

The study revealed that both teachers and learners play important roles in litter management, although levels of engagement vary. The school principal (SP1) explained that teachers facilitate litter management by establishing classroom rules that discourage littering and by monitoring learner behavior:

*"Each class is expected to have ground rules where learners are discouraged from littering."* – SP1

Learners (L1) echoed this sentiment during focus group interviews, acknowledging the teachers' role in reinforcing environmental responsibility. One learner explained:

*"Our teachers always remind us to follow class rules and also to care for the environment."* – L1

These findings indicate that while teachers provide guidance and set expectations, learners actively participate in maintaining cleanliness. The extent to which learners internalize these responsibilities depends on consistent reinforcement and the presence of structured environmental programs within the school.

During class observations with the Grade 6 teacher, the researcher noted classroom rules posted on the wall, including the message "Do not litter" (see Figure A).

Additionally, buckets were provided in classrooms to serve as designated litter disposal points, in alignment with the classroom rules (see Figure B).

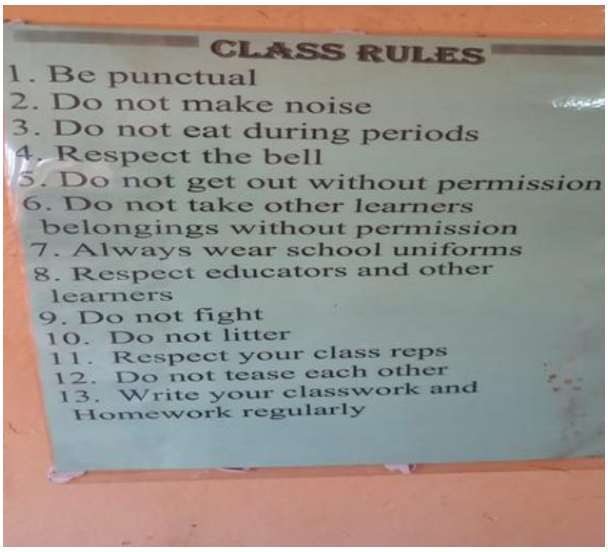



**Figure A: Classroom rules** (Source: Author).

**Figure B: Classroom litter bin (Source: Author)**

Although teachers actively encourage learner participation in litter management, they expressed concern that some learners do not fully take responsibility for their waste, often relying on school cleaners to maintain cleanliness. One teacher described a classroom strategy in which learners are instructed to pick up litter before lessons begin:

*"Before we start teaching, we tell learners to pick up any litter around them. This encourages responsibility, but not all learners follow through."* – T1

Learners themselves acknowledged their contribution to littering, with some attributing it to peer pressure and carelessness. One learner admitted:

*"Some learners throw papers on the ground even when bins are nearby."* – L1

Despite ongoing efforts to engage learners in maintaining a clean school environment, certain attitudes and behaviors continue to pose challenges. This issue was further highlighted by street vendors (V1), who observed instances where learners, when tasked with disposing of litter, failed to do so responsibly:

*"Sometimes learners may be sent to dispose of litter in the dumping area near our market, but on their way, they leave it there and go back to their classes."* – V1

Observations conducted during school visits confirmed these concerns. At one dumping site, a dustbin was found overturned with litter scattered across the ground. Learners playing nearby reported seeing two boys carrying the bin but not knowing their destination. According to these learners, the boys seemed unconcerned, assuming that cleaners would eventually manage the mess.

This observation underscores the persistent challenge of learner attitudes toward waste disposal and the reliance on others to manage litter. It highlights the need for stronger accountability measures and continuous environmental education to instill a sense of responsibility and sustainable behavior among learners.

**Figure C: Litter disposal (Source: Author)**

However, learners noted that their teachers consistently provide motivational talks every morning before lessons, emphasizing classroom rules and responsible behavior toward the environment. One learner (L1) explained:

*"Our teacher always reminds us to use litterbins, avoid producing unnecessary waste, follow class rules, and care for the environment. We are told that litter can attract insects, rodents, rats, or dogs, which can spread diseases."* – L1

**iii. School-Based Policies and Procedures**

The findings indicate that school-level structures aimed at promoting sustainable litter management positively influence environmental cleanliness. The school principal (SP1) highlighted the implementation of weekly litter collection schedules among intermediate-phase learners:

*"Every week, four grades take turns picking up papers around the school."* – SP1

Despite these structured efforts, the School Governing Body (SGB) representative acknowledged the absence of a formal litter management policy and recognized the need to develop one:

*"We don’t have a specific littering policy, but this study has opened our eyes. We need to draft one to clearly define responsibilities."* – SGB1

This suggests that while practices exist, litter management remains largely informal, dependent on individual or group initiatives rather than institutional frameworks.

Further inquiry regarding vendor-related litter management revealed additional gaps. When asked whether the school had formal agreements or contracts with vendors to maintain cleanliness, the SGB representative admitted:

*"No, we have not, but they are cooperating well."* – SGB1

However, observations during school visits revealed inconsistencies in vendor practices. Vendors were seen leaving their market areas after breaks without cleaning up. When questioned, vendors stated that they take turns cleaning, but this arrangement lacked consistency and accountability. One vendor remarked dismissively:

*"I do not care, since we are working outside the school yard. I will handle it tomorrow, or the ground staff in school can even pick up the litter."* – V1

These findings highlight the absence of formal agreements and institutional oversight regarding vendor responsibilities, which undermines sustainable litter management and places additional strain on school ground staff. This points to the need for formal policies that clearly delineate stakeholder responsibilities, including vendors, to ensure accountability and sustainable practices.

**iv. Resources Availability and Waste Disposal Infrastructure**

The availability of litter bins, composting practices, and designated dumping areas was found to contribute to sustainable waste management. The principal (SP1) noted that while litter bins are provided, they are insufficient:

*"We have litter bins, but not enough; sometimes two classes share one bin."* – SP1

In addition to litter bins, the school has initiated composting practices. Organic waste is disposed of in a compost pit, later used to enrich the school garden and other green areas:

*"We dug a hole where we put leaves and grass cuttings to use as compost for our garden. We also use it for flowers and the lawn."* – SP1

Outside the school, waste disposal practices appear less structured. Vendors indicated a lack of resources, often resorting to an illegal dumping site near the school, where plastics and papers are burned:

*"We do not have any resources; we just throw our litter in the nearby illegal dumping site and burn plastics and papers."* – V1

Observations near the school fence corroborated this, showing large accumulations of litter from vendors. When asked about responsibility, one vendor said:

*"Mmm… it is ours, but we think the municipal will come and collect it since they get paid."* – V1
*"Even the school ground staff will pick up some litter because it blows from the school; they are also responsible."* – V1

These findings indicate that although the school has implemented measures such as composting and litter bins, challenges remain due to inadequate resources and unclear responsibility, particularly regarding areas used by vendors and the surrounding community. The lack of collaboration between the school, community, and municipal authorities undermines sustainable litter management.

Subsequent observations revealed that school ground staff were responsible for cleaning and collecting litter after breaks. Vendors operating outside the school, whose products contributed significantly to litter — including sweet wrappers, snack packaging, and ice pop plastics — did not participate in clean-up. Vendors stated that they only assist when instructed by the principal, often leaving shortly after breaks to avoid such responsibilities:

*"We sweep if the school principal orders us to, but most of the time we go home shortly after break."* – V1

This highlights a lack of accountability and cooperation from vendors and the absence of structured policies clearly defining their responsibilities in maintaining cleanliness around the school.

During classroom observations, learners used buckets as litter receptacles while working on activities such as cutting and pasting in their exercise books. Although the classroom was initially untidy, the teacher instructed learners to pick up papers and place them in the buckets before continuing the lesson. When full, the class representative emptied the bucket into a larger dustbin on the veranda.

However, during break times, bins were often found overturned as learners played, showing little concern for proper use (see Figure D). After school, cleaners collected all litter resources and disposed of them in the school dumping area, where some waste was burned (see Figures E and F). This demonstrates that while infrastructure is available, learner attitudes and behaviors significantly affect the effectiveness of waste management practices.

**Figure D: Litter bin in the veranda (Source: Author)**

**Figure E: School open dumping site**

**Source: Author**

**Figure F: school open dumping site**

**Source: Author**

**B. Factors hindering Sustainable Litter Management in Schools**

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: inadequate resources and infrastructure, limited institutional support and training, attitudes and behavioral challenges, and external environmental factors.

**i. Inadequate Resources and Infrastructure**

One of the most pressing challenges identified was the lack of adequate waste disposal infrastructure. The school principal (SP1) highlighted that although litter bins are available, they are insufficient:

*"We do not have litter bins for each class. Two classes share one bin, and sometimes they overflow."* – SP1

Teachers and learners confirmed this concern. One teacher explained how overflowing bins contribute to secondary littering:

*"Sometimes bins are full, and the wind blows papers out. Learners also don't always use them properly."* – T1

Vendors selling food near the school also struggle to dispose of their waste due to the lack of dedicated bins in their working areas. One vendor (V1) noted:

*"We just throw litter anywhere because we don't have dustbins. If we had bins, we would use them."* – V1

The absence of structured recycling programs was also highlighted as a concern. Teachers suggested that recycling could provide a solution, but the school lacks the necessary resources and expertise to implement such programs.

**ii. Limited Institutional Support and Training**

Limited teacher training in environmental education affects the integration of litter management into the curriculum. SP1 stated:

*"I think the Department of Environmental Affairs should be engaged in training our teachers about integrating litter management into the curriculum."* – SP1

Teacher T1 emphasized that the time allocated for addressing litter in the classroom is insufficient:

*"We do not have enough time to elaborate on littering in the curriculum."* – T1

T1 further noted:

*"The lack or limited availability of litter resources in school and limited knowledge of services such as recycling negatively affects litter management."* – T1

**iii. Attitudes and Behavioral Challenges**

Learners', teachers', and vendors' attitudes toward littering emerged as a recurring challenge. Cleaners and cooks emphasized that many learners do not take responsibility for maintaining cleanliness. One cook (C1) explained:

*"Learners see us as workers who must clean up after them. They eat and leave their plates on the ground for us to collect."* – C1

Despite the presence of litter bins and daily reminders during assembly and morning motivational talks, learners still scatter papers on the ground. Vendors also indicated inconsistent cooperation. V1 stated:

*"Sometimes you see learners dropping or throwing papers, and even if you call them, some are careless or ignorant; they do not think about the dirtiness of our environment."* – V1

SP1 corroborated this observation:

*"Some vendors do not clean up after themselves. When we monitor, we find they have already left without picking up litter."* – SP1

These findings suggest that litter management is often viewed as someone else's responsibility rather than a shared effort.

**iv. External Environmental Factors**

External environmental factors were also highlighted as influential. Teacher T1 noted that municipal support could improve waste management:

*"If the municipality can come and collect litter on a weekly basis, litter can be managed sustainably, but I do not know how they should be contacted."* – T1

Vendor V1 expressed a similar view:

*"If the municipality can provide skip bins, we would be able to separate and collect our litter to be collected; plastics and papers would otherwise be burned."* – V1

T1 also suggested that digital technologies, such as robotics, could help reduce litter in schools:

*"Digital strategies like robotics, which learners enjoy, can help minimize litter because teachers use slides during teaching and learning."* – T1

Additionally, T1 emphasized the importance of involving external stakeholders, such as the Department of Environmental Affairs, to raise awareness among learners and staff, including parental education:

*"By involving stakeholders such as the Department of Environmental Affairs, who are knowledgeable, learners can be educated about the dangers and negative impacts of littering. Parental education at home can also reinforce environmental responsibility."* – T1

V1 further suggested that recycling could serve as a strategy to reduce littering and generate income. However, observations indicated that vendors did not take recycling seriously, as empty plastic bottles at their market stalls were found ready to be burned, contradicting their claims during interviews.

**C. Strategies for Improving and Sustaining Litter Management in schools**

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: strengthening environmental education, increasing stakeholder involvement, and improving waste management infrastructure.

**i. Strengthening Environmental Education**

A key recommendation was to enhance environmental education by integrating litter management into the curriculum. Teachers emphasized that this would help learners develop a stronger sense of responsibility. Teacher T1 noted:

*"If littering was a standalone topic in the curriculum, it would help learners understand their role in protecting the environment."* – T1

The school principal (SP1) also highlighted the importance of educating both learners and staff:

*"By educating both learners and staff about the environment and the importance of keeping it clean, we can foster responsible environmental behavior."* – SP1

### ii. Increasing Stakeholder Involvement

Participants stressed the importance of involving parents, vendors, and local authorities in managing litter. The principal highlighted efforts to engage health practitioners to educate learners about waste-related diseases:

*"Health practitioners visit the school to educate learners on the impact of littering on health."* – SP1

Teacher T1 further elaborated on involving external stakeholders:

*"By involving stakeholders such as the Department of Environmental Affairs, who are knowledgeable, they can educate learners through awareness campaigns about the dangers and negative impacts of littering. Parental education at home can also reinforce environmental responsibility."* – T1

Vendor V1 suggested collaboration with municipal authorities:

*"To keep our environment clean, if we can work with the municipality, they can provide skip bins so we can collect and dispose of our litter in a timely manner."* – V1

The SGB representative (SGB1) emphasized the need for a formal policy that clearly defines the responsibilities of all stakeholders:

*"We need a school policy that defines responsibilities for everyone—teachers, learners, vendors, and ground staff."* – SGB1

### iii. Improving Waste Management Infrastructure

Participants recommended increasing the number of bins, establishing recycling programs, and ensuring regular waste collection. Teacher T1 noted:

*"If the municipality collected litter weekly, it would make a big difference."* – T1

Vendor V1 highlighted the challenges faced due to inadequate waste disposal resources:

*"We just throw litter anywhere because we do not have dustbins or black plastic bags. If we had bags, we could collect our litter and the municipality could pick it up, which would help."* – V1

During researcher observations at the vendor market area, a vendor was seen carrying a large basin with peeled potato waste, ready to dispose of it at an illegal dumping site near their selling spot (see Figure G). When asked about litter disposal, V1 reiterated:

*"We just throw litter anywhere here as we do not have dustbins or black plastic bags."* – V1

These findings indicate that strengthening environmental education, engaging stakeholders, and improving waste management infrastructure are critical steps toward achieving sustainable litter management in schools.


**Figure G: Basin full of peels (Source: Basin with peels picture captured during general school observations)**

During the focus group interview with the cooks, the researcher inquired about how they dispose of waste after cleaning the kitchen. One cook explained: "*We sweep the waste and dispose of it in the kitchen trash container, and then it is taken to a designated school dumping site where we burn it*." –C1

The researcher further probed about the disposal of fish tins, as they cannot be burned. C1 responded:

"*Fish cans are collected in a sack and then transported by the general worker to the nearest landfill site in the Tswinga area using the school van*." –C1

C1 also demonstrated awareness of the health risks associated with improper waste management:
"*If tins are not collected, they can become breeding grounds for insects and attract flies, which can spread diseases such as malaria*." –C1

### 4.2.2 Case 2: Bele Primary School

#### 4.2.2.1 DATA PRESENTATION

**A. Factors promoting sustainable litter management in schools.**

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan. The factors that hinder sustainable litter management in schools include Environmental Awareness and Education, Teacher and Learner Engagement in Litter Management, School-Based Policies and Procedures, and Resources Availability and Waste Disposal Infrastructure.

**i. Environmental Awareness and Education**

Discussions with participants highlighted the critical role of environmental awareness and education in shaping learners' attitudes toward litter management and environmental care. During interviews, participants were asked about their understanding and knowledge of environmental education (EE), as such education is crucial for promoting responsible behaviors. Teacher T2 expressed her understanding of Education for Sustainable Development (ESD) and emphasized its aim to prevent environmental pollution:

"*ESD is the education that strives to educate learners not to pollute the environment, because if we pollute it, it cannot provide us with the necessities that nature is responsible for; we are interdependent with the environment*." –T2

Similarly, the principal acknowledged the importance of education in addressing environmental issues and highlighted the role of ESD in equipping today's learners to safeguard resources for future generations:

"*I think it's the education system that needs to promote or address environmental issues rather than destroy them. ESD is an educational structure aiming to deliver knowledge to today's generation while considering the needs and resources of future generations*." –SP2

### ii. Teacher and Learner Engagement in Litter Management

Both teachers and the principal emphasized the importance of collaboration and teamwork in reducing litter, as well as the development of a code of conduct. Teacher T2 noted:

"*Developing a code of conduct and other school policies that include litter management will help manage litter sustainably. Although we work as a team in school, we should encourage each other to be active participants in litter management, rather than shifting responsibilities to our managers only*." –T2

The School Governing Body (SGB) representative (SGB2) echoed this sentiment, highlighting the collaborative efforts observed during school visits:

"*We are all responsible for this, and I can see it is working because sometimes I visit the school for meetings or other duties, and I find the principal, teachers, and learners picking up unused items like papers to keep the school clean*." –SGB2

### iii. School-Based Policies and Procedures

The existence of a learner code of conduct that addresses litter management was highlighted as a positive factor. Teacher T2 stated:

"*We also have a code of conduct in school where littering is prohibited. Learners are always reminded by their teachers to use litter bins both inside and outside the classroom*." –T2

Learners confirmed this guidance during interviews, stating:

"*Our teacher always reminds us not to litter in the school and to follow the code of conduct and class rules*." –L2

However, despite the presence of class rules posted on the walls (see Figure H) and regular reminders before lessons, observations revealed that papers were still scattered on the floor (see Figure I), indicating that adherence to these policies is inconsistent.


**Figure H: Classroom rules (Source: Author)**

When the teacher inquired about the scattered papers, the learners pointed at one another and explained that they had been playing a game called 'Hot' in the absence of the teacher. This behavior was consistent with their responses during focus group interviews, where they stated:

"*We play with papers when the teachers are absent. We tear papers and play different games, such as 'Hot'*." –L2

**Figure I: Scattered papers in classroom (Source: Author)**

**iv. Resources Availability and Waste Disposal Infrastructure**

The availability of litter resources in the school is evident, although they are not always easily accessible, as observed during the study. Learners sometimes hinder proper use of these resources by treating them as toys. For instance, new wheeled bins purchased by the school principal to facilitate waste disposal were often used by learners to play and push each other around, making it difficult to find bins for actual litter disposal. One learner explained:

"*Our school principal bought new bins with wheels to make disposal easier, but some learners play with them as toy cars. They push each other around, and when you want to dispose of litter, you find the bins being used for play*." –L2

The SGB chairperson (SGB2) mentioned the intended disposal method:

"*We dispose of papers in the hole dug in the school, and when it is full, we burn them*." –SGB2

However, observations contradicted this claim. Litter was often not disposed of in the designated hole but left in open spaces under trees, where it remained scattered on the ground instead of being burned, as illustrated in Figure J.

**Figure J: Unburnt litter in school dumping site (Source: Author)**

This view was further supported by one of the school cooks, who explained:

"*Sometimes litter can remain unburnt for the entire week, and when the wind blows, it scatters around the school. Even if we clean our kitchen and its surroundings, it seems as though we have not cleaned because the papers end up messily spread across the yard."* –C2

Similarly, during focus group interviews, street vendors highlighted that the lack or shortage of bins contributes to uncontrolled litter and emphasized the consequences of insufficient resources:

"*The shortage of bins leads to waste accumulation. We dig a small hole at the back to dispose of our litter, but the problem is that the wind blows it away before we can burn it*." –V2

## B. FACTORS HINDERING SUSTAINABLE LITTER MANAGEMENT IN SCHOOLS

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: inadequate resources and infrastructure, limited institutional support and training, attitudes and behavioral challenges, and external environmental factors.

### i. Inadequate Resources and Infrastructure

Almost all participants identified inadequate resources and infrastructure as a major challenge. Learner L2 stated:

"*There are bins, but they are not enough, and some learners do not use them; they just throw or drop their litter on the ground, even next to the bin*." –L2

This aligns with the findings of Woko and Ogologo (2019) in Nigeria, who noted that poor waste handling practices and insufficient provision of solid waste management resources pose a threat to school students. Similarly, one of the cooks remarked:

"*School managers are trying to buy litter bins, although they are not enough*." –C2

The school principal regularly reprimands learners during Monday and Friday assemblies to discourage littering and encourage proper use of bins. However, the SGB representative (SGB2) observed:

"*There are bins available, but they are not enough. We have bins in every class, eish… but outside, we can say they are insufficient*." –SGB2

The statements of C2 and SGB2 align with Herdiansyah et al. (2021), who noted that the unavailability of trash bins tends to make individuals more tolerant of littering behaviors. Proper waste disposal behavior requires supporting infrastructure, including sufficient garbage bins.

Observations conducted by the researcher confirmed these findings. For instance, no bins were available in the corridors because some were being used by the principal and learners during school ground litter-picking activities (see Figure K). Additionally, learners were seen playing with milk boxes, flattening them on the ground, further contributing to litter accumulation.

**Figure K: Bins on the playground (Source: Author)**

Moreover, during a face-to-face interview with a teacher, the lack of adequate infrastructure was mentioned as another factor hindering sustainable litter management in the school. T2 stated:

"*Lack of space or places to store our books, previous years' examination scripts, and library materials means learners tend to tear papers and play with them during the absence of teachers in class*." –T2

### ii. Limited Institutional Support and Training

Participants highlighted the lack of teacher training and limited support from relevant government departments regarding environmental education in the school curriculum. SGB2 emphasized:

"*The government must play a role, particularly the Department of Environmental Affairs and Tourism, in raising awareness and supporting the teaching of our learners*." –SGB2

SGB2 further explained:

"*Educating the broader community can also encourage learners. If only the school is providing litter management education, it is limited. Parents and other stakeholders should collaborate with the school to reinforce this knowledge at home. Including environmental education in the school curriculum would be very helpful*." –SGB2

Similarly, T2 noted that while Grade 6 learners study ecosystems in Natural Science and Technology (NS/Tech), the content is not detailed enough, and insufficient time is allocated:

"*In Grade 6, learners learn about ecosystems and the consequences of polluting the environment. However, the content is not detailed enough, and limited time is given. They learn to care for the environment, avoid littering, and be aware of diseases caused by litter*." –T2

Vendors also expressed concerns about the lack of guidance and support from relevant authorities:

"*There is no one from the municipal section or any department to educate us or make us aware of proper waste management. We do as we like without any proper knowledge*." –V2

**iii. Attitudes and Behavioral Challenges**

Attitudes and behaviors of learners, teachers, cooks, and other non-teaching staff emerged as a recurring challenge. Teachers, cooks, and the SGB noted that many learners are careless and do not take responsibility for the environment. T2 stated:

"*Learners tear papers to make things like airplanes, draw for fun, or after eating snacks, they just throw wrappers on the floor*." –T2

Learners themselves admitted to irresponsible behaviors during focus group interviews:

"*When we do activities or projects in class, especially from the atlas, we cut and paste papers, and some scraps can drop on the floor*." –L2

C2 added:

"*Some learners are careless; they throw litter on the ground even when they are next to a bin*." –C2

These statements indicate that learners at Bele Primary School are the main contributors to litter in the school environment. Despite reprimands through various platforms, they continue their behavior.

The principal emphasized the school's continuous efforts to encourage positive behavior:

"*We teach learners daily about responsible litter behavior, in assemblies and classrooms. Teachers encourage students to address litter-related content in their subjects for the benefit of the learner and the environment*." –SP2

**iv. External Environmental Factors**

Participants highlighted the role of external environmental factors, particularly the involvement of municipal authorities. C2 observed:

"*We are still waiting for the municipality to collect waste. Now it produces an unpleasant smell and attracts flies and rodents, which can cause diseases. Learners may also be injured if they play near these tins*." –C2

SGB2 echoed similar concerns:

"*We face challenges in the kitchen, especially with tinned fish. Initially, the municipality collected these tins using trucks, but now they are scattered against the kitchen wall, producing bad smells and attracting insects, which can harm the learners*." –SGB2

Participants suggested that the inclusion of the Department of Environmental Affairs and the Department of Health could provide awareness campaigns and motivational talks to foster environmental care and respect. V2 highlighted:

"*There is no one from the municipal section or any department to educate us; we do as we like without proper knowledge*." –V2

SGB2 added:

"*The government must ensure that the Department of Environmental Affairs and Tourism play a significant role in educating learners. If taught early, they can carry this knowledge forward and pass it to future generations*." –SGB2

T2 confirmed:

"*No awareness from the Department of Environmental Affairs or related departments is currently provided to learners regarding litter management*." –T2

**C. Strategies for Improving and Sustaining Litter Management in Schools**

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: strengthening environmental education, increasing stakeholder involvement, and improving waste management infrastructure.

**i. Strengthening Environmental Education**

Responses highlighted the integration of environmental education (EE) into the curriculum as a key strategy for improving and sustaining litter management in schools. SGB2 suggested:

"*I think the most important strategy is for the Department to implement environmental education as a subject in the curriculum. This can be a long-term solution, allowing learners more time to be educated about litter management*." –SGB2

Similarly, T2 emphasized that EE should be integrated across all subjects, with teachers equipped to deliver comprehensive instruction to foster learners' understanding and responsibility towards the environment.

**ii. Increasing Stakeholder Involvement**

Participants, including SGB2, C2, and T2, highlighted the importance of engaging parents and other stakeholders, such as the Department of Environmental Affairs, to reinforce learners' environmental responsibility. SGB2 stated:

"*Parents should also be included in these practices so they can help guide their children at home on how to behave responsibly in society*." –SGB2

C2 added:

"*As cooks and parents in the school, we should work together to shape learners' behavior and attitudes towards littering. If we see a learner littering, we should take responsibility to remind them to use the litter bin*." –C2

T2 further emphasized:

"*There should be more programs from the Department of Education and other related departments to raise awareness. Littering should also be integrated into all subjects across the curriculum. Additionally, universities could deploy students studying environmental education to teach environmental literacy to our learners, so they grow up understanding how to care for and respect the environment*." –T2

The principal also noted the importance of stakeholder involvement in enhancing litter management:

"*Environmental education should be a life-long process, reinforced everywhere—in assemblies and even in classrooms. Last year, we engaged with the Department of Environmental Affairs, Vhembe District, and they came to raise awareness about litter management with our learners*." –SP2

### iii. Improving Waste Management Infrastructure

Participants identified inadequate litter resources and insufficient waste disposal sites as significant challenges. Limited knowledge of recycling was also noted as a barrier to effective waste management. C2 observed:

"*Bins are available, but they are not enough. Sometimes you look for one and cannot find it, especially if learners are picking up litter*." –C2

This observation was corroborated by the researcher, who noted that no litter resources were available near the kitchen. Waste was temporarily placed next to the door, as shown in Figure L, highlighting the need for improved infrastructure to support proper waste management practices.

**Figure L: Kitchen litter (Source: Author)**

T2 stated:

"*Our solution in school is to burn the waste*." –T2

Additionally, the teacher noted:
"*We do not have knowledge of where the school can take old or broken furniture for recycling*." –T2

The principal explained that the school had attempted a recycling initiative in the past, but the effort was discontinued because the partners they worked with did not meet expectations and the financial returns were lower than anticipated:

"*We tried it before, but the person we were working with disappointed us. However, we will try to find another partner to collaborate with*." –SP2

The principal's account aligns with Sikhosana (2022), who reported that Tjala Primary School had implemented recycling initiatives but was unable to sustain them due to high transportation costs, which ultimately led to the program being discontinued.

### 4.2.3 CASE 3: Dama Primary School

#### 4.2.3.1 DATA PRESENTATION

#### A. Factors promoting Sustainable litter management in school

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan. Factors that hinder sustainable litter management in schools include Environmental Awareness and Education, Teacher and Learner Engagement in Litter

Management, School-Based Policies and Procedures, and Resources Availability and Waste Disposal Infrastructure.

### i. Environmental Awareness and Education

T3 explained that Education for Sustainable Development (ESD) equips learners with knowledge and skills to promote environmental sustainability:
"*ESD is an approach to education that provides learners with knowledge and skills to promote sustainability in the environment. It also creates awareness and encourages learners to take responsibility for a sustainable future*." –T3

The teacher emphasized the importance of integrating litter management across the curriculum from the early grades. T3 further indicated that inclusion of environmental education should be strengthened across school subjects:
"*If ESD were included in the school curriculum from the early stages, teachers could educate learners on environmental literacy, cleanliness, proper disposal of waste, and the consequences of littering, while also encouraging practical activities to manage litter effectively*." –T3

C3 suggested that the school engage relevant external departments to enhance learners' environmental literacy and promote health awareness:
"*If the school can contact relevant departments, including the Department of Environment, they could raise awareness among learners and staff on proper litter management. Additionally, the Department of Health could conduct campaigns on maintaining hygiene and preventing infections caused by improper waste disposal*." –C3

### ii. Teacher and Learner Engagement in Litter Management

The findings indicate that teachers and learners collaboratively manage litter in school. During focus group interviews, learners reported:
"*Our teachers always remind us to use litter bins and follow class rules, which emphasize proper waste disposal*." –L3

Teachers also actively establish classroom rules to support litter management:

"*At the beginning of the year, classroom rules are displayed, including one that prohibits littering, to help learners understand that disposing of waste improperly is not acceptable*." –T2

However, during classroom observations, the researcher noted that the posted rules were old and faded, although they included guidance on littering and the use of litter resources (see Figure M).

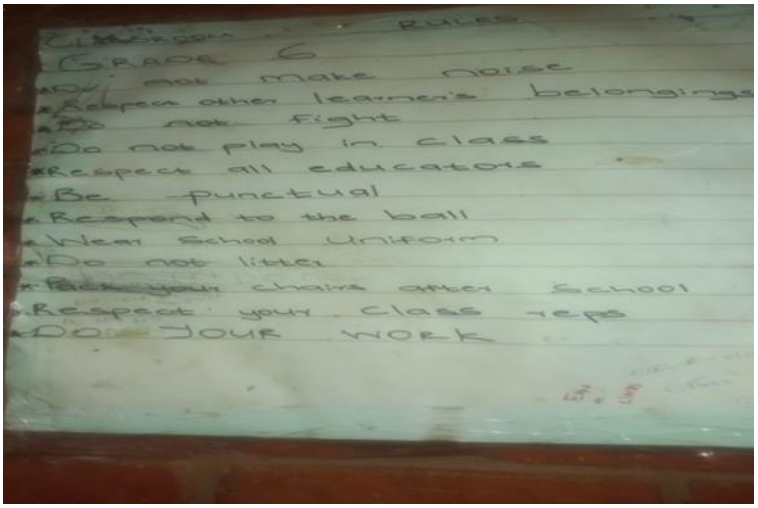



**Figure M: Classroom rules (Source: Author)**

In addition, a new bin was placed next to the door, and most learners were observed using it, as shown in Figures N and L. However, some learners sitting closer to the bin showed little concern for proper use, as they admitted during focus group interviews.

**Figure N: Learners utilizing bin**

Source: Author

**Figure O: Classroom litter**

Source: Author

### iii. School-Based Policies and Procedures

SGB3 indicated that during policy review sessions at the school, teachers and the principal were allowed to have learners pick up litter as a form of disciplinary action for classroom misconduct and late arrivals, aiming to reduce litter in the school. SGB3 stated:

*"We also agreed with the principal that late-coming learners should pick up litter as a form of punishment to reduce litter, although it is not formally written down."* – SGB3

During semi-structured interviews, SGB3 further noted that the school does not have any written contract with vendors regarding the cleaning of their working areas: *"We do not have a written contract, but we have never had any problems with them."* – SGB3

Observations confirmed this claim. There is no formal school-based policy or procedure governing litter management for either learners or vendors. However, despite the absence of a cleaning roster in the market area, it was observed to be clean and free of litter. Participants reported that there are no issues with laziness or shifting responsibilities in that area.

### iv. **Resources Availability and Waste Disposal Infrastructure**

The findings indicate that the availability of litter resources and adequate waste disposal infrastructure is critical for promoting sustainable litter management in schools. Participants emphasized that this strategy would be effective if sufficient government funding were provided to purchase and maintain these resources. Dama Primary School noted a lack of support from the Department of Education, attributing the improper disposal of litter to inadequate resources. SP3 explained: *"Limited waste disposal facilities are a challenge because litter resources are insufficient. Learners end up disposing litter everywhere due to limited funding from the department. Moreover, the lack of proper litter bins contributes to environmental pollution in the school."* – SP3

During interviews, SGB3 mentioned that a large disposal pit had been dug to accommodate both kitchen and school-generated litter: *"We have dug a big hole that can last for a long time, where all the litter from our kitchen and around the school is disposed."* – SGB3

However, vendor V3 highlighted that the lack of sufficient litter resources in the market area makes controlling paper, food wrappers, and other litter challenging: *"Lack of bins and disposal facilities in our market area is a challenge. We sweep, pick up litter, and burn it daily, but sometimes we cannot burn it immediately. By the next day, litter is scattered by the wind. During windy and rainy weather, it is even harder to control. With proper bins, it would be easier for us."* – V3

Observations at Dama Primary School contradicted SGB3's statement about the large disposal pit. The researcher noted that there is inadequate waste disposal infrastructure; litter was disposed of in an open dumping site and blown around by the wind (see Figure P).

**Figure P: school dumping site (Source: Author)**

**B. Factors Hindering Sustainable Litter Management in schools**

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: Inadequate Resources and Infrastructure, Limited Institutional Support and Training, Attitude and Behavioral Challenges, and External Environmental Factors.

### i. Inadequate Resources and Infrastructure

Participants confirmed that inadequate resources and infrastructure pose significant challenges to maintaining effective litter management in schools. Vendor V3 suggested that providing sufficient litter bins and a proper building for selling products could help control litter:

*"If the government can help us by providing a building where we can sell our products, litter can be minimized because it would not be blown around. Having litter bins to dispose of waste would also help."* – V3

Similarly, T3 emphasized the need for learner responsibility despite insufficient resources:
*"There are not enough dustbins, but regardless of the shortage, learners are expected to take responsibility for how they discard their litter in the available bins, which will help control litter around the school."* – T3

T3's observation aligns with Augustina et al. (2023), who noted that even when litter disposal facilities are provided, improper disposal practices often persist.

Cooks also highlighted infrastructural challenges. C3 pointed out that the lack of a proper fence exacerbates littering problems:

*"The school does not have a proper fence. Some community members pass through the school, eat, and dispose of leftovers or wrappers along the way. Additionally, dogs and other animals are attracted by the odor from the disposal holes and may enter the school."* – C3

**Figure Q: Goat attracted by food leftovers in school (Source: Author)**

### i. Recycling

Recycling is an integral component of an optimized integrated waste resource management plan and is widely recognized as an effective method for reducing litter. However, SGB3 highlighted that the lack of knowledge about accessible recycling depots has hindered sustainable litter management in the school. Initial attempts at recycling were challenged by high transport costs and insufficient funds: *"We initially tried to recycle, but the idea faded away. Transport costs were a problem as we had no funding. Teachers volunteered to use their own cars to take waste to the recycling centre, but the money received from the centre was less than the petrol costs. Today, the centre is no longer operating, so burning waste has become our solution in the school."* – SGB3

### ii. Limited Institutional Support and Training

Limited support and motivation from relevant departments was identified as a key factor contributing to an environmentally illiterate society. Teachers need proper training and skills in environmental education to effectively manage litter. T3 explained: *"Even teachers are not fully trained in litter management, and this gap can be addressed by the Environmental Department through teacher training in ESD.*

*Moreover, the current teacher-to-learner ratio makes it difficult to enforce litter management consistently; more teachers would help."* – T3

### iii. Attitudes and Behavioral Challenges

Negative attitudes and careless behavior towards the environment were frequently cited as major contributors to litter in schools. Principals, cooks, and learners themselves agreed that most learners are careless and significantly contribute to litter accumulation. SP3 noted:

*"Learners are learners; sometimes they forget to place their litter in bins. Even though bins are available, they may choose to dispose of waste elsewhere."* – SP3

Cooks further emphasized:

*"Ignorance and laziness also contribute to littering. Learners are not properly trained to adopt positive behavior towards waste; they just drop papers everywhere."* – C3

Learners themselves admitted to behaviors that contribute to littering: *"On Fridays, most learners play the 'goodbye game' with friends, hitting each other with paper balls. These papers end up scattered on the ground."* – L3

Observations conducted by the researcher corroborated these statements. Groups of learners were seen eating snacks during break time and leaving wrappers scattered on the ground, illustrating the behavioral challenges that exacerbate litter problems.

**Figure R: Litter and leftovers on the ground (Source: Author)**

### iv. External Environmental Factors

The study findings at Dama Primary School suggested that collaboration with external departments could strengthen litter management in the school. C3 proposed: *"I think if the school could coordinate with the local municipality, they might provide large bins for us to dispose of litter, which could then be collected weekly or at intervals specified by them."* – C3

During interviews, T3 emphasized the challenge posed by the school's rural location: *"Our school is in a rural area, and there is no municipal waste collection service. If such a service were available to collect the school's litter, it would be highly effective."* – T3

SP3 highlighted the importance of parental involvement in fostering responsible litter management among learners:

*"School governing bodies also play a role in motivating parents during meetings to educate their children about proper litter management."* – SP3

## C. Strategies for Improving and Sustaining Litter Management in schools

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: strengthening environmental education, increasing stakeholder involvement, and improving waste management infrastructure.

### i. Strengthening Environmental Education

The findings highlighted that enhancing environmental education is a key strategy for improving and sustaining litter management in schools. The principal emphasized that integrating environmental topics into the curriculum allows learners to acquire essential knowledge:

*"When teaching learners in subjects like Life Orientation, Natural Sciences, and Technology, such topics are included, which is where learners gain that knowledge. However, practically, as I illustrated, we haven't done that due to lack of time and funds."* – SP3

Furthermore, participation in environmental campaigns was mentioned as a practical way to engage learners, teachers, and non-teaching staff:
*"We also participate in environmental days, for instance, World Clean-up Day, encouraging everyone to take action against litter in our school."*

The teacher suggested that environmental education should be systematically included across all grades:

*"Litter management should be incorporated in Life Orientation from Grade R to Grade 7."* – T3

**ii. Increasing Stakeholder Involvement**

Engaging community members, parents, and relevant government departments was highlighted as a strategy to improve litter management. C3 suggested:
*"If the school can contact relevant departments, including the Environmental Department, they could raise awareness among learners and staff about managing litter. Additionally, the Department of Health could conduct campaigns to teach proper hygiene and ways to avoid infections or diseases caused by improper disposal of waste."* – C3

T3 emphasized the influence of community behavior on learners:
*"Learners learn by imitating; if the community neglects litter management, learners at school are likely to adopt the same behavior."* – T3

SGB3 also highlighted the importance of external support:
*"By inviting external experts to educate learners, we may be able to reduce littering and change their attitudes toward the environment."* – SGB3

**iii. Improving Waste Management Infrastructure**

Participants proposed improving the availability of litter resources, upgrading dumping sites, regular monitoring of waste disposal, and initiating litter separation and recycling programs. C3 expressed concerns about the current state of the school's waste disposal site:

*"The dumping hole is not suitable; it produces foul odors and attracts flies and mosquitoes. We fear diseases and bacteria that can emanate from it. Moreover, during rainy or sunny days, insects fly around the hole, which can be dangerous to our food."* – C3

**Figure S: Kitchen dumping site (Source: Author)**

Based on the findings from interviews with the vendors, V3 suggested: *"I think recycling could be the best strategy. We could separate litter and use some of it as compost. In our school, we have pit toilets, and we could use ashes from our kitchen to reduce odor and slow them from filling up, which would help minimize litter in the hole."* – V3

The school principal emphasized that implementing an Eco-School program could further improve litter management:

*"We could also have an Eco-School program where learners use neglected materials to create new items—for example, using boxes to build small houses or bottles to make attractive projects."* – SP3

This perspective aligns with Muller et al. (2021), who assert that sustainable learning environments, such as eco-schools or green campuses, enable educators and learners to integrate sustainability principles into their daily practices.

### 4.3 Cross-Case Thematic Summary

This section presents a comparative summary of the key findings from the three participating schools—Abuja Combined School (Case 1), Bele Primary School (Case 2),

and Dama Primary School (Case 3)—organized according to the main themes and sub-themes that emerged during data analysis. The thematic analysis follows the framework outlined in the Data Analysis Plan in Table 4.1.

### 4.3.1 Factors Promoting Sustainable Litter Management

All three schools demonstrated some level of environmental awareness among both learners and staff. Participants across cases agreed that Education for Sustainable Development (ESD) plays a crucial role in shaping learners' attitudes toward waste management. While Case 1 reported integrating environmental education through field trips and subject content, Cases 2 and 3 emphasized the importance of early curriculum inclusion, with teachers highlighting the need for more structured integration.

Teachers in all three schools actively reinforced environmental messages through classroom rules and daily reminders. Case 1 used class-based rules, Case 2 implemented a formal learner code of conduct, and Case 3 relied on continuous reminders and encouragement during school activities. Learners across all cases acknowledged that teachers regularly promoted positive littering behavior.

Case 2 was the only school with a formally recognized learner code of conduct that specifically included litter management. In Case 1, the principal described informal routines, while Case 3 had no formal procedures, relying instead on general school rules and teacher guidance. Across all three schools, common challenges included the absence of explicit policies and limitations in available resources. Case 1 had some infrastructure, such as composting facilities; Case 2 experienced misuse of available bins; and Case 3 faced significant infrastructure gaps, including insufficient bins and unsafe dumping sites. Despite these differences, all schools recognized the need for improved waste disposal systems.

### 4.3.2 Factors Hindering Sustainable Litter Management

Participants from all three schools reported a shortage of bins, inadequate waste disposal systems, and limited access to recycling. In Case 3, the use of dumping holes

attracted pests and posed significant health risks, whereas Case 2 relied on waste burning, an unsustainable practice. None of the schools received consistent support or training from the Department of Education or the Department of Environmental Affairs. Teachers highlighted the need for professional development to integrate ESD more effectively, with Case 3 specifically noting that the lack of teacher training reduced their confidence in addressing environmental topics.

Behavioral challenges were reported across all three cases, with learner carelessness, lack of accountability, and peer influence contributing to littering. In Case 3, learners admitted to incorporating littering into their games. Participants also observed that inconsistent enforcement of school rules weakened the culture of environmental responsibility. Additionally, the absence of municipal waste collection and limited collaboration with external stakeholders were common barriers. While Case 1 had some engagement with external health practitioners, all three schools emphasized the need for greater municipal support and broader community involvement to improve litter management.

### 4.3.3 Strategies for Improving and Sustaining Litter Management

Participants across all three schools recommended that environmental education be formally incorporated into the curriculum. Teachers, principals, and SGB members emphasized the importance of early and continuous engagement with learners on environmental issues to foster sustainable behaviours.

All cases highlighted the critical role of stakeholder collaboration. Suggestions included involving parents, municipal authorities, the Department of Environmental Affairs, and community-based organizations. Case 2 particularly emphasized parental education, while Case 3 underscored the potential of the Eco-Schools programme to enhance environmental literacy.

Across the three schools, participants proposed similar practical improvements: increasing the number of bins, implementing structured recycling programmes, improving dumping sites, and ensuring consistent waste removal. Vendors and cooks

also recommended composting and separating recyclables as feasible solutions, although few of these strategies had been fully implemented.

### 4.4 Chapter summary

This chapter has presented an analysis of the data collected from three cases: Case 1 – Abuja Combined School, Case 2 – Bele Primary School, and Case 3 – Dama Primary School, followed by a cross-case thematic summary highlighting the key similarities and differences across the schools. While there is evident awareness and willingness among participants to manage litter sustainably, gaps in policy, infrastructure, and external support continue to limit progress. The next chapter will provide a comprehensive discussion of these findings, drawing on relevant literature and theoretical perspectives to explore their implications within the context of Education for Sustainable Development (ESD).

# CHAPTER 5: Discussion of Findings

## 5.1. Introduction

This chapter presents a critical discussion of the findings outlined in Chapter 4, aiming to interpret them in relation to the study's research questions, objectives, and theoretical framework. Drawing on the Theory of Planned Behaviour (TPB) and the principles of Education for Sustainable Development (ESD), the chapter examines both within-case and cross-case patterns across the three schools. Key themes are analyzed in relation to existing literature, highlighting the opportunities, challenges, and contextual factors influencing sustainable litter management in school settings. The chapter concludes by linking the findings to the original research objectives and reflecting on their broader implications.

## 5.2 DISCUSSIONS OF FINDINGS

This section presents discussion of **CASE 1:**

### 5.2.1 ABUJA COMBINED SCHOOL.

### A. Factors promoting sustainable litter management in schools

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan. Factors that promote sustainable litter management in schools include Environmental Awareness and Education, Teacher and Learner Engagement in Litter Management, School-Based Policies and Procedures, and Resources Availability and Waste Disposal Infrastructure.

#### i. Environmental Awareness and Education

One of the primary factors enabling sustainable litter management in schools is the emphasis on environmental education. Participants highlighted the importance of teaching learners about environmental conservation as a strategy to shape attitudes toward waste management. As discussed in Chapter 2, literature emphasizes the need for teachers to ensure that learners are aware of environmental conservation, develop

necessary knowledge and values, and adopt positive attitudes toward litter management (UNESCO, 1977; Agbedahin, 2019; Moyo, 2021).

SP1 highlighted the importance of Education for Sustainable Development (ESD) in equipping learners with environmental knowledge and values. The theoretical lens of the Theory of Planned Behaviour (TPB) in this study suggests that principals and teachers should possess environmental knowledge and share it consistently with learners (Knauder & Koschmieder, 2019).

Similarly, T1 noted that environmental education content is included in Grade 6 Natural Science and Technology, although teaching time is limited. Teachers have restricted opportunities to address environmental topics because they are integrated across subjects and allotted insufficient time. Moreover, participants indicated that the lack of teaching and learning resources further limits the integration of environmental education (Velempini, 2020). Mawela (2020) similarly found that while environmental education is formally recognized in South African curricula, many teachers are not adequately trained to implement it, and only schools with a specific interest in environmental education actively participate.

Using TPB as a lens, successful integration of environmental education requires sufficient learning resources; without them, teachers face challenges in implementing ESD effectively (Acut et al., 2025). Data from participants in this study revealed that teachers actively impart environmental knowledge and values to learners to encourage daily application. Mapotse and Mashiloane (2017) also emphasize that environmental education in schools enhances learner awareness of littering, while lack of awareness can contribute to improper waste disposal (Aziz et al., 2019). Participants at Abuja Combined School demonstrated awareness and commitment to teaching learners about environmental education.

### ii. Teacher and Learner Engagement in Litter Management

School policies or class rules are critical for consistent implementation of litter management activities. Although South Africa lacks a comprehensive formal policy on ESD (Mandikonza & Kavai, 2023), both teachers and learners acknowledged that

daily reinforcement of class rules helps learners take responsibility for their environment. Teachers are guided by constitutional principles that safeguard everyone's right to a healthy environment.

Learners recognized their role in contributing to littering, often citing peer pressure and carelessness. TPB suggests that teacher-learner engagement in litter management is influenced by subjective norms, meaning learners' attitudes are shaped by the actions and guidance of teachers, parents, and peers (Raghu & Rodrigues, 2022). V1 expressed concern about learners' behaviour, noting that some fail to follow instructions for proper waste disposal. The absence of formal environmental policies in schools negatively impacts learners' concern for littering (Matsekoleng, 2023).

The study revealed that when teachers actively provide environmental education, learners participate in cleaning their school. This aligns with Muller et al. (2021), who assert that ESD empowers individuals; by integrating its principles into school activities such as clean-up campaigns, learners gain firsthand experience in environmental stewardship.

### iii. School-Based Policies and Procedures

Participants at Abuja Combined School offered varied perspectives regarding school-based policies. SP1 indicated that litter collection schedules are implemented weekly per phase. However, SGB1 acknowledged the absence of a formal litter management policy. During observation, the researcher did not see drafted schedules or evidence of learner-led litter collection; only school cleaners were fully engaged in maintaining the environment. Nyatuka (2020) also notes that even where policies exist, waste management often depends on individual or group efforts rather than formal structures.

V1 reported similar challenges, observing that vendors often left market areas uncleaned. The absence of formal policies for vendors led to inconsistent practices and shifting responsibility, illustrating divergent understandings of environmental education policies among participants.

### iv. Resources Availability and Waste Disposal Infrastructure

Participants offered diverse perspectives on resource availability. At Abuja Combined School, SP1 noted that litter bins are available but insufficient. Omar (2023) emphasized that bins, composting practices, and designated dumping areas contribute to effective litter management. T1 also stated that bins exist but are limited, resulting in learners disposing of litter indiscriminately. Chapter 2 highlighted that lack of disposal facilities remains a significant concern for solid waste management (Molina & Catan, 2021).

In contrast, V1 reported that bins were unavailable, forcing the use of illegal dumping sites. TPB (control beliefs) suggests that environmental behavior is influenced by factors such as the presence of disposal infrastructure. V1's response indicated limited knowledge about the health risks of poor waste handling, including the spread of infectious diseases like malaria (Woko & Ogologo, 2019).

Although SP1 believed that composting could reduce litter, its implementation is challenging when reliant on school cleaners rather than involving learners directly. Literature suggests that waste management programs are essential for controlling litter in schools (Gyberg et al., 2020), yet time constraints and insufficient knowledge hinder successful execution. Without direct learner involvement, the opportunity for experiential learning in litter management is diminished.

## B. Factors Hindering Sustainable Litter Management in Schools

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan. The main factors identified as hindering sustainable litter management in schools were Inadequate Resources and Infrastructure, Limited Institutional Support and Training, Attitudes and Behavioral Challenges, and External Environmental Factors.

### i. Inadequate Resources and Infrastructure

Participants highlighted the lack of adequate waste disposal infrastructure as a key challenge in schools. Although opinions varied regarding resources and infrastructure, participants shared a common understanding of the limitations. SP1 noted that litter bins

were available but insufficient, while T1 emphasized that overflowing bins contributed to secondary littering. Similarly, V1 reported the absence of bins and structured recycling programs in their workplace. These findings align with Herdiansyah et al. (2021), who observed that the unavailability of litter resources may lead to more tolerant littering behavior.

From the perspective of the Theory of Planned Behaviour (TPB), participants' control beliefs influenced their littering practices; insufficient or overflowing bins often led to litter being discarded on the ground.

### ii. Limited Institutional Support and Training

Participants also highlighted the lack of institutional support and training as a barrier to effective litter management. SP1 suggested that the Department of Environmental Affairs should train teachers to integrate litter management into the curriculum. T1 added that teachers had not received training on environmental matters from the Department of Education, reflecting a gap in support for integrating environmental education.

According to TPB, positive behavioral intentions are more likely when enabling factors, such as institutional support and training, are in place. Velempini (2020) similarly noted in Botswana that teacher training programs are essential for effective integration of environmental education into schools. T1 also mentioned that while recyclable materials exist at the school, they are often burned due to a lack of knowledge about proper recycling procedures.

The study revealed that government schools generally receive no structured support for environmental education, including the provision of litter resources or programs such as waste separation and recycling. Consequently, teachers were not fully aware of how to integrate environmental content effectively.

### iii. Attitudes and Behavioral Challenges

Attitudes toward littering among learners, teachers, and school vendors were identified as recurring challenges. Matsekoleng (2017) observed that learners' environmental

attitudes are generally poor, with girls being somewhat more committed to environmental issues. Similarly, focus group data from C1 and V1 indicated that many learners do not take responsibility for maintaining school cleanliness. However, some learners actively participate in environmental activities and adhere to class rules, including litter management, reinforced through assemblies and classroom guidance.

Daily reminders about the consequences of littering were emphasized, yet littering remained a persistent problem in primary schools (Matsekoleng, 2017). TPB suggests that perceived behavioral control relates to learners' confidence in their ability to engage in sustainable practices. Negative peer influences and carelessness can thus result in unfavorable attitudes toward littering.

V1 noted that some learners are careless or indifferent, discarding litter without concern, while SP1 observed that vendors often leave areas uncleaned. These findings align with Malomo et al. (2021), who reported that indiscipline, neglect, and lack of responsibility among learners contribute to environmental degradation. Overall, learners demonstrated partial awareness of environmental issues but insufficient understanding to prevent littering effectively.

### iv. External Environmental Factors

External environmental factors were also highlighted as influential. T1 suggested that sustainable litter management could be achieved if the municipality collected litter weekly, though they were unsure how to coordinate this service. The availability of municipal skip bins at strategic locations would facilitate proper litter collection, echoing Mosala (2021), who emphasized the importance of municipal support in both urban and rural areas.

T1 further stressed the role of the Department of Environmental Affairs in raising awareness among learners and staff, including parental education, to ensure learners understand the consequences of littering. This aligns with Herdiansyah et al. (2021), who noted that family influence can shape children's behavior toward waste management. According to TPB, collaboration with relevant departments can positively influence teachers' and learners' attitudes and promote responsible littering behavior.

Nonetheless, parents' attitudes can significantly affect learners' overall disposition toward littering. T1's responses indicated limited understanding of the full potential impact of external environmental factors.

### C. Strategies for Improving and Sustaining Litter Management in Schools

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: Strengthening Environmental Education, Increasing Stakeholder Involvement, and Improving Waste Management Infrastructure.

#### i. Strengthening Environmental Education

A key recommendation from participants was to enhance environmental education by integrating litter management into the curriculum. Teachers emphasized that this integration would help learners develop a stronger sense of responsibility. Chapter 2 of this study also highlighted that including environmental education in school curricula equips learners with the skills necessary to minimize littering behavior (Masemene & Msezane, 2021). Moreover, environmental education is widely recognized as a critical factor for empowering learners to act responsibly and contribute to a sustainable future (Munasi, 2024). According to the Theory of Planned Behaviour (TPB), successful integration of environmental education requires learners and teachers to hold generally positive attitudes toward environmental conservation.

SP1 further explained that both learners and staff should be educated on the importance of maintaining a clean environment. This aligns with Gyberg et al. (2020), who noted that engaging learners, employees, colleagues, and the wider community is a crucial strategy for raising awareness of Education for Sustainable Development (ESD) and fostering a shift in environmental mindset.

#### ii. Increasing Stakeholder Involvement

Participants emphasized the importance of involving parents, vendors, and local authorities in managing litter. The principal highlighted efforts to engage health practitioners in educating learners about waste-related diseases. This is consistent with

Nipah et al. (2024), who argued that effective environmental education programs should include awareness and sensitization efforts to promote behavioral change in learners.

During interviews, SGB1 suggested developing school policies that define clear responsibilities for all members of the school community—including teachers, learners, vendors, and ground staff—to improve litter management. However, the absence of guidance or policies from the Department of Education remains a significant challenge. According to TPB, increasing stakeholder involvement can positively influence behavior through situation-specific beliefs and attitudes (Ibrahim et al., 2021).

The lack of departmental policies for ESD implementation contrasts with findings from Verma and Priya (2020), who noted that India's National Education Policy (NEP 2020) explicitly incorporates ESD principles based on Access, Equity, Quality, Affordability, and Accountability. Participants in this study demonstrated awareness of environmental education but faced limited opportunities to engage with it due to insufficient support from relevant authorities.

### iii. Improving Waste Management Infrastructure

Participants highlighted the need for improved waste management infrastructure. T1 suggested increasing the number of bins, establishing recycling programs, and ensuring regular waste collection. This recommendation aligns with Lee and Manfredi (2021), who emphasized that strategically placing bins and signage is an effective starting point for promoting teamwork and sustainability, but noted that formal strategies are necessary for long-term success.

According to TPB, even in contexts with limited infrastructure, individuals with positive attitudes toward the environment are more likely to demonstrate pro-environmental behaviors. However, V1 reported the absence of dustbins or black plastic bags, often resorting to discarding litter anywhere. During a focus group interview, C1 explained that fish tins, which cannot be burned in the school dumping site, are collected in sacks and transported to the nearest landfill. This indicates limited understanding and engagement with environmental care practices among some participants.

### 5.2.2 CASE 2: Bele Primary School

#### A. Factors promoting sustainable litter management in school.

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: Environmental Awareness and Education, Teacher and Learner Engagement in Litter Management, School-Based Policies and Procedures, and Resources Availability and Waste Disposal Infrastructure.

##### i. Environmental Awareness and Education

Participants expressed varying perspectives regarding knowledge, values, and attitudes toward the environment. These findings align with Munasi (2019), who noted that environmental education enables learners to understand their environment while developing literacy skills. T2 emphasized the importance of teaching environmental literacy to equip learners with the knowledge and attitudes necessary to maintain a clean environment and adopt positive behaviors toward littering. The Theory of Planned Behaviour (TPB) suggests that positive behavioral intentions can be developed through environmental literacy during teaching and learning, allowing learners to engage in environmentally friendly behaviors.

Similarly, SP2 demonstrated a clear understanding of environmental education, acknowledging its role in addressing environmental issues. This aligns with Dalu et al. (2020), who highlighted that environmental education provides learners with opportunities to engage with complex environmental problems while fostering knowledge, motivation, and positive attitudes for environmental action. Verma and Priya (2020) also asserted that environmental education encourages care for both present and future generations. These perspectives indicate that both principals and teachers in the study possess awareness and understanding of environmental education.

##### ii. Teacher and Learner Engagement in Litter Management

Participants emphasized the importance of collaborative efforts and the development of a learner code of conduct to promote litter management. T2 highlighted that the school had developed a learner code of conduct and actively engaged learners in litter management. This aligns with Estrada-Vidal and Gomez (2020), who noted that social norms shape individual behaviors in ESD, and that public institutions, including schools, can foster environmentally responsible actions through policies and social expectations.

SGB2 echoed this perspective, emphasizing that all members of the school community share responsibility for fostering learners' attitudes toward maintaining a clean environment. According to TPB, behavioral beliefs influence attitudes toward behavior; if learners perceive that proper disposal of litter produces positive outcomes, their attitudes toward litter management will be favorable (Mavuso, 2022). Participants in Bele Primary School demonstrated awareness and active engagement in promoting responsible litter management among learners.

### iii. School-Based Policies and Procedures

The presence of a learner code of conduct to promote litter management was reported as a positive factor facilitated by teachers. T2 noted that the code serves as a practical tool to remind learners that littering is prohibited and encourages the proper use of available litter resources. However, this contrasts with Matsekoleng (2022), who argued that the absence of environmental coordinators and formal policies limits effective ESD implementation in schools. Mandikonza and Kavai (2023) also observed that unclear policy guidelines pose challenges even for educators capable of integrating ESD into the curriculum.

Chapter 2 literature highlights that environmental education equips learners with skills to minimize littering behavior and fosters positive attitudes toward waste reduction (Masemene & Msezane, 2021). L2 acknowledged the presence of both class rules and the learner code of conduct, but observations revealed only deteriorated classroom rules on the wall and no formal evidence of the code. Guided by TPB, learners demonstrate positive behavioral intentions toward litter management when supported by teachers who model pro-environmental attitudes.

### iv. Resources Availability and Waste Disposal Infrastructure

Litter resources were available but not always easily accessible, as observed during school visits. Learners sometimes misused new bins, treating them as toys, which TPB identifies as a negative behavioral intention influencing littering outcomes. This aligns with literature indicating that strategically placed and appropriately designed waste bins are essential for controlling littering (Ibrahim et al., 2021; Schenk et al., 2022).

SGB2 reported disposing of paper waste in dug pits and burning it when full, which aligns with findings by Boateng et al. (2023) that pit disposal and open burning are common waste management practices in schools. However, observations revealed that waste was often left on open ground under trees and not burned, scattering across the yard. Open burning, while common, poses negative consequences, including bad odors (Boateng et al., 2023). C2 further noted that unburned papers can remain scattered for an entire week. TPB suggests that beliefs about the outcomes of leaving litter unburned influence attitudes and behaviors, highlighting the link between resource limitations and negative littering practices.

Participants demonstrated awareness of limited resources and inadequate disposal infrastructure. Literature corroborates that improper waste disposal, inefficient collection, and lack of adequate facilities remain significant challenges in solid waste management (Molina & Catan, 2021).

## B. Factors Hindering Sustainable Litter Management in Schools

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: Inadequate Resources and Infrastructure, Limited Institutional Support and Training, Attitudes and Behavioral Challenges, and External Environmental Factors.

### i. Inadequate Resources and Infrastructure

Participants across the study highlighted inadequate resources and infrastructure as a major challenge in schools. Despite some differences in opinion, there was a shared

understanding of the limitations. L2, C2, and SGB2 reported that bins are available but insufficient. This aligns with Woko and Ogologo (2019) in Nigeria, who noted that poor waste handling and inadequate solid waste management pose risks to school students.

Furthermore, these participants' views align with Herdiansyah et al. (2021), who argued that the unavailability of trash bins can lead to greater tolerance of littering behavior. According to the Theory of Planned Behaviour (TPB), normative beliefs suggest that insufficient bins may function as environmental factors that increase the likelihood of negative littering intentions. For instance, even when bins are present, their distance or accessibility can affect learners' willingness to dispose of waste properly (Anwar, Saudi, & Sinaga, 2017). Conversely, Schenck et al. (2022) observed that individuals often attribute their own littering to external factors, such as insufficient infrastructure, rather than personal responsibility.

T2 also noted that the absence of certain infrastructure, such as a library, indirectly hinders sustainable litter management. Learners may tear papers and play with them during teacher absences. This aligns with Ravindranath (2017), who suggested that poor infrastructure, including inadequate classrooms and high teacher-student ratios, limits the implementation of sustainable litter management strategies. Overall, Bele Primary School's challenges are largely linked to insufficient infrastructure, which participants acknowledged and understood.

### ii. Limited Institutional Support and Training

Participants highlighted the lack of teacher training and institutional support as key barriers. SGB2 emphasized the need for the Department of Environmental Affairs and Tourism to raise awareness among learners and involve the community and parents in passing on knowledge about litter management. From a TPB perspective, the lack of teacher training represents a control belief that hinders the performance of desired behaviors, reducing teachers' perceived ability to support learners effectively.

This aligns with Herdiansyah et al. (2021), who argued that individual environmental awareness and understanding of public environmental needs are crucial for reducing waste consumption. T2 further noted that limited curriculum time and content allocated

to litter management restrict learners' engagement. In contrast, Omar (2023) highlighted Lebanon's 12-hour curriculum on waste management for schoolteachers, enabling learners to gain comprehensive environmental knowledge. V2 also reported minimal guidance from relevant departments, leaving them to manage waste without sufficient knowledge or support.

### iii. Attitudes and Behavioral Challenges

The study revealed recurring issues related to the attitudes and behaviors of learners, teachers, cooks, and other non-teaching staff. Teachers, cooks, and SGB members noted that many learners are careless and indifferent toward maintaining a clean environment. This observation aligns with Lev et al. (2023), who identified willingness to act and self-responsibility as critical factors influencing littering.

However, learners' behavior contradicted some literature reviewed in Chapter 2. For instance, Chitara et al. (2019) in Zimbabwe highlighted legal mandates prohibiting improper waste disposal (EMA Act, Section 70[1]). Despite this, T2 reported that learners often tear papers for fun, a behavior they also admitted during interviews. TPB supports this observation, showing that learners are more likely to litter when surrounded by others who do so (subjective norms).

Rehman et al. (2022) further noted that classroom activities, such as assignments that generate scrap paper, can contribute to littering if not managed properly. C2 also highlighted that some learners carelessly discard waste even when bins are nearby, reflecting findings by Ibrahim et al. (2021) that students often struggle to dispose of waste correctly. These behaviors indicate that learners are the primary contributors to litter at Bele Primary School. Despite the principal's efforts to provide guidance and education on environmental protection, some learners remain disengaged, emphasizing that ESD is not only about knowledge acquisition but also about practicing sustainable behaviors (Sinakou & Boeve-de Pauw, 2019).

### iv. External Environmental Factors

Participants also highlighted the role of external environmental factors. Although municipal authorities are currently not involved in school litter management, participants considered their engagement essential. C2 noted that school waste produces unpleasant odors and attracts flies and rodents, posing health risks, and emphasized the need for regular municipal waste collection. TPB suggests that negative municipal attitudes toward litter collection can produce harmful outcomes, including environmental degradation and health risks (Maunatlala, 2024).

These findings are consistent with Mosala (2021), who emphasized the importance of strategically placing litter bins in municipal areas. Cooks and SGB2 reported that the municipality previously collected fish tins using trucks, but services have since stopped, resulting in waste being scattered near the kitchen, generating odors and attracting insects. These observations align with Woko and Ogologo (2019), who argued that poor waste handling and inadequate solid waste management threaten school learners. Litter also contributes to environmental pollution, providing breeding grounds for pathogens and increasing risks of diseases, including cancer, heart disease, and asthma.

While schools have attempted to engage municipal services, long-term solutions remain uncertain. Dalu et al. (2020) argued that encouraging recycling in schools improves learners' environmental attitudes and behaviors. However, SGB members reported limited knowledge about recycling, a finding consistent with Anua et al. (2022), who highlighted that ineffective litter management and lack of awareness of reduce, reuse, and recycle strategies are major challenges.

Participants' suggestions, including those of V2, SGB2, and T2, align with Owojori et al. (2022) in South Africa, who emphasized that sustainable environmental management requires protection, conservation, and awareness-raising through environmental education. These interpretations highlight the diverse perspectives of participants regarding external factors that hinder effective litter management in schools.

### C. Strategies for Improving and Sustaining Litter Management in Schools

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: Strengthening Environmental Education, Increasing Stakeholder Involvement, and Improving Waste Management Infrastructure.

### i. Strengthening Environmental Education

Responses regarding the integration of environmental education into the curriculum highlighted it as a key strategy for improving and sustaining litter management in schools. SGB2 suggested that the Department of Education could implement environmental education as a formal subject, providing learners with more time and structured opportunities to learn about litter management. This aligns with Masemene and Msezane (2021), who noted that including environmental education in school curricula equips learners with the skills needed to reduce littering behavior.

Similarly, T2 emphasized the need to integrate environmental education across all subjects and stressed that teachers should be adequately trained to deliver this content. According to the Theory of Planned Behaviour (TPB), integrating environmental education into the curriculum is essential for equipping learners with the necessary knowledge and skills to minimize littering; without these skills, learners may struggle to maintain a sustainable, litter-free environment (Olaitan, 2021). These responses also indicate participants' partial understanding of environmental education and its role in shaping sustainable behaviors.

### ii. Increasing Stakeholder Involvement

Participants highlighted the importance of engaging parents and other stakeholders, such as the Department of Environmental Affairs, to foster environmental responsibility among learners. SGB2 explained that parental involvement is critical, as parents can reinforce appropriate environmental behaviors at home. TPB supports this notion, suggesting that normative beliefs—social pressure from teachers, parents, friends, and neighbors—can strongly influence learners' positive or negative littering behaviors (Nipah, 2024).

Additionally, SGB2's perspective aligns with Herdiansyah et al. (2021), who noted that children spend more time with their families, and parental behaviors can shape their subjective norms regarding littering. Jancius and Gavenauskas (2022) also reported that children often emulate their parents' behaviors, including those related to waste disposal.

T2 further proposed that universities could deploy environmental education students to schools to teach environmental literacy, supporting Milupi et al. (2022), who emphasized that governments should re-train teachers in effective environmental education and ESD methodologies. The principal also highlighted the need for broad stakeholder involvement, emphasizing that environmental education should be a lifelong process. This view is supported by the Tbilisi Declaration (1977) and Dorn (2020), both of which stress that environmental education should begin at preschool and continue through all formal and non-formal stages of learning.

### iii. Improving Waste Management Infrastructure

Participants consistently identified insufficient litter resources and inadequate waste disposal facilities as significant challenges to effective waste management. They also highlighted a lack of knowledge about recycling as a barrier to sustainable waste management. Applying TPB, schools' understanding of recycling practices is crucial for enhancing waste management infrastructure and supporting perceived behavioral control among learners and staff.

The study revealed limited availability of bins, and their locations sometimes made them difficult to access. Observations confirmed that in some areas, such as kitchens, no litter resources were available, forcing staff to place waste on the floor next to doors. These findings align with Lev et al. (2023) and Debra et al. (2021), who noted that insufficient resources and lack of bin availability hinder sustainable litter management in schools.

T2 suggested burning litter as a method of managing waste, which corresponds with findings by Boateng et al. (2023), who observed that open burning is a common school waste management practice. Nakholi (2021) also noted that waste can be repurposed,

highlighting potential value in litter management practices. Furthermore, Owojori et al. (2022) emphasized the importance of the “reduce, reuse, and recycle” approach as a key strategy for minimizing waste in South African schools.

Although the principal indicated that recycling initiatives were previously attempted, they were discontinued due to low motivation among participants and financial challenges. This aligns with Sikhosana (2022), who reported that some South African schools abandoned recycling programs due to high transportation costs.

Overall, T2, C2, and SP2 demonstrated awareness of the importance of improving waste management infrastructure, but their understanding of practical implementation strategies remains limited.

### 5.2.3 CASE 3: Dama Primary School.

#### A. Factors promoting sustainable litter management in school

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: Environmental Awareness and Education, Teacher and Learner Engagement in Litter Management, School-Based Policies and Procedures, and Resources Availability and Waste Disposal Infrastructure.

##### i. Environmental Awareness and Education

Chapter 2 highlighted the importance of Education for Sustainable Development (ESD) in equipping individuals with the knowledge, skills, values, and attitudes necessary to contribute to sustainable development (UNESCO, 2014; Vilmala et al., 2022). The application of the Theory of Planned Behaviour (TPB) in this study suggested that environmental awareness and education are key factors promoting sustainable litter management in schools. TPB posits that educating individuals about the negative consequences of littering, while emphasizing the positive outcomes of responsible waste disposal, can foster favorable attitudes and pro-environmental behavior.

Findings from Dama Primary School demonstrated that participants recognize environmental education as essential for shaping learners' attitudes toward litter management. This aligns with the goals defined by UNESCO (1977) and highlighted by Gobel (2022), emphasizing that environmental education provides opportunities to acquire knowledge, values, attitudes, commitment, and skills to protect and improve the environment.

Despite this recognition, T3 emphasized the importance of integrating litter management across the curriculum from early grades. Literature in Chapter 2 recommends that the Department of Education integrate recycling and waste-sorting topics across subjects, requiring teachers to include practical waste management in lessons (Goldschagg et al., 2025). However, findings from Botswana by Velempini (2020) indicated that teachers' efforts to integrate environmental education are limited due to inadequate resources and lack of training. Similarly, C3 demonstrated limited knowledge and expressed the need for support from the relevant department to equip learners with environmental literacy, particularly to prevent health risks. This finding resonates with Aziz et al. (2019), who noted that lack of awareness about littering consequences contributes to poor waste management in schools, and with Ampofo (2020), who highlighted that education can promote awareness and knowledge on environmental issues.

The study underscores that participants' perspectives on littering are shaped by their own attitudes. TPB is appropriate here because anti-littering behavior is a planned action. Collaboration with various departments can foster positive behavioral intentions. T3 emphasized that ESD provides learners with knowledge and skills to promote sustainability. Literature also suggests that environmental education as a subject remains underdeveloped in both teacher training and school curricula in Zambia (Milupi et al., 2022), while South Africa has sought to develop environmentally literate citizens through curriculum integration (Masemane & Msezane, 2021). In line with TPB, the Department of Education must support teachers and schools in integrating environmental education effectively.

### ii. Teacher and Learner Engagement in Litter Management

As noted in Chapter 2, studies in Indonesia emphasize the importance of collaborative efforts by teachers and learners to maintain clean school environments, including indoor and outdoor cleaning activities (Rachman et al., 2021). In this study, teachers and learners showed awareness of environmental cleanliness but had limited understanding of their responsibilities. Teachers created class rules that included litter management, but engagement was often minimal. TPB suggests that learners' attitudes are positively influenced when teachers actively model anti-littering behaviors (Ibrahim et al., 2021).

Observations revealed that classroom rules were outdated and poorly maintained, and teachers did not prioritize revising them annually. Additionally, teachers had limited time to engage learners in environmental activities. V3 noted learner carelessness: while some students used new bins, others ignored them despite proximity. Chapter 2 literature emphasizes that ESD empowers individuals through participation in environmental activities, such as school cleaning campaigns, which promote learning by experience (Muller et al., 2021). This study confirms that even when environmental education is provided, some learners choose not to participate. While both teachers and learners are aware of ESD, their knowledge is limited, affecting active engagement in waste management.

### iii. School-Based Policies and Procedures

Chapter 2 highlighted that environmental education policies serve as tools for addressing environmental challenges (Rachman et al., 2021). Despite piloting environmental education integration since 2001, South African schools lack formal policies (Mawela, 2020). In Dama Primary School, SGB3 reported that informal practices, such as having teachers and the principal pick up litter as punishment, were used to address misconduct and instill awareness.

According to TPB, teachers' knowledge of policies is essential for fostering positive beliefs and pro-environmental behaviors among learners. Tlhabanelo (2020) observed that schools in Southern African Developing Countries (SADC) lack clear, independent environmental education policies, a finding echoed by Mawela (2020). The absence of departmental guidance leaves schools without formal support for implementing school-

based policies. Matsekoleng (2023) also noted that a lack of environmental policy contributes to limited awareness and inconsistent practices. TPB suggests that having clear policies helps align behavior with environmental goals.

At Dama Primary School, informal policies—such as learner litter collection and verbal cleaning rosters for vendors—serve as stopgap measures. However, these lack formal enforcement and recognition by the department, aligning with Schenk et al. (2022), who noted that absent or poorly enforced penalties contribute to persistent littering.

### iv. Resources Availability and Waste Disposal Infrastructure

Literature in Chapter 2 highlights that external factors, including cleanliness levels, dispersion of litter, and bin availability, influence littering behaviors (Lev et al., 2023). This study found that sufficient litter resources and proper waste disposal infrastructure are critical for promoting sustainable litter management in schools. Participants emphasized that government support, particularly adequate funding, is necessary to procure and maintain litter resources.

Dama Primary School participants reported insufficient support from the Department of Education, resulting in inadequate bins and improper disposal, which led learners to discard waste indiscriminately. TPB suggests that behavioral beliefs influence attitudes toward littering; despite learners understanding the benefits of using bins, the limited number of bins contributes to negative intentions. Participants had dug a large pit for waste disposal, but lack of departmental and municipal support compromised its effectiveness.

Cooks reported that despite attempts to implement proper waste management, litter resources and separation remained inadequate, with limited knowledge about sustainable disposal practices. Findings align with Molina and Catan (2021), who observed that insufficient infrastructure and poor waste management contribute to school environmental pollution. Participants demonstrated awareness of proper litter disposal but lacked the readiness or knowledge to improvise or use available resources effectively, highlighting ongoing challenges in promoting sustainable waste management.

## B. Factors Hindering Sustainable Litter Management in Schools

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: Inadequate Resources and Infrastructure, Limited Institutional Support and Training, Attitude and Behavioral Challenges, and External Environmental Factors.

### i. Inadequate Resources and Infrastructure

Participants confirmed that inadequate resources and infrastructure posed significant challenges to maintaining litter management in schools. Despite varying perspectives on the availability of litter resources, participants shared a common understanding that resources were insufficient. T3 emphasized that while bins exist, they are not enough, and learners must take responsibility for proper disposal. According to TPB, even if participants hold positive behavioral intentions toward proper litter disposal, limited resources can lead to negative littering behavior. C3 further highlighted that inadequate fencing also hinders effective waste management.

These findings contrast with Augustina et al. (2023), who noted that litter disposal facilities, when provided, are often misused. Literature in Chapter 2 emphasizes that recycling is a critical component of integrated waste management and is one of the most widely practiced litter reduction strategies (Safo-Adu & Adzorah, 2023). However, SGB3 reported that lack of knowledge about recycling depots and the high costs of transportation hindered the effective implementation of recycling in schools.

### ii. Limited Institutional Support and Training

Participants identified a lack of support and motivation from relevant departments as a key barrier to developing environmentally literate schools. Teachers emphasized the need for training and equipping with the necessary knowledge and skills to promote environmental education. T3 noted that they had not received formal training in litter

management and had not been supported by the environmental department to practice ESD.

This finding aligns with Maphaha (2020), who reported that teachers without departmental motivation struggle to promote environmental education effectively. TPB posits that positive behavioral outcomes require planning and institutional support; thus, departments should proactively provide training and guidance to equip teachers with knowledge and skills to promote anti-littering behavior. Similarly, Velempini (2020) found in Botswana that teachers' efforts to integrate environmental education were limited due to high numbers of untrained educators. The findings indicate that teachers are aware of the factors that support litter management but lack the formal support to act effectively.

### iii. Attitudes and Behavioral Challenges

Negative attitudes and careless behavior were consistently identified as contributors to litter in schools. Data from one-on-one and focus group interviews revealed that learners are largely responsible for most of the litter, as confirmed by SP3 and L3. The principal of Dama Primary School noted that, even with limited resources, learners often dispose of waste outside designated bins.

These observations align with Msezane and Mudau (2014), who reported that learners dispose of litter through burning, scattering, or leaving it near containers. Chapter 2 literature also emphasizes that learners struggle to properly dispose of waste in bins (Ibrahim et al., 2021). In this study, ignorance and laziness further contributed to improper disposal, with learners dropping papers indiscriminately.

L3 reported that on Fridays, learners play a "goodbye game," hitting each other with paper balls, which results in litter scattered across the schoolyard. According to TPB, learners' attitudes are influenced by the behavior of peers; thus, such games reinforce negative attitudes toward littering. Schenck et al. (2022) describe littering as careless disposal of small waste items, often driven by personal traits such as inattentiveness,

laziness, or ignorance. Observations during breaks confirmed this behavior, as learners discarded snack wrappers on the ground. These findings suggest that learners at Dama Primary School have limited understanding and awareness of proper environmental practices.

### iv. External Environmental Factors

Participants emphasized that collaboration with external stakeholders is essential for effective litter management in rural schools. They noted that schools cannot manage litter independently and require engagement with municipalities, parents, and the wider community. C3 suggested arranging for municipal support, such as providing large bins to be emptied on a regular schedule.

TPB posits that control beliefs—perceptions of factors facilitating or impeding behavior—affect perceived behavioral control (Mavuso, 2022). T3 explained that the school's rural location and lack of municipal waste collection services make litter management difficult, and support from the municipality would significantly improve outcomes.

SP3 highlighted parental involvement as crucial, noting that families influence children's littering behavior. This is supported by literature; Augustina et al. (2023) and Herdiansyah (2021) note that children mimic their parents' waste disposal practices, and parental education can instill proper litter management habits. Conversely, families indifferent to waste disposal may produce children with little concern for the environment.

The study findings demonstrate that while the principal understands sustainable litter management, the Department of Education does not provide sufficient support or resources, and the local municipality is not engaged in waste collection. Parents, however, were identified as immediate contributors to improving litter management by organizing cleaning efforts. These findings align with Herdiansyah et al. (2021), who emphasize that family involvement can positively shape children's attitudes and

behaviors toward littering. Overall, participants displayed limited knowledge and highlighted the need for support from multiple stakeholders to promote sustainable litter management.

### C. Strategies for Improving and Sustaining Litter Management in Schools

This theme was examined through the sub-themes outlined in Table 4.1 of the data analysis plan: Strengthening Environmental Education, Increasing Stakeholder Involvement, and Improving Waste Management Infrastructure.

#### i. Strengthening Environmental Education

Strengthening environmental education was identified as a key strategy for improving and sustaining litter management in schools. The principal suggested that incorporating environmental education into the school curriculum would enable learners to acquire essential knowledge about sustainable waste management. Guided by TPB, the normative expectations of teachers can motivate learners to develop positive attitudes toward the environment through social influence. Chapter 2 highlighted that ESD aims to provide learners with the knowledge, skills, values, and attitudes needed to contribute to sustainable development (UNESCO, 2014; Vilmala et al., 2022).

T3 emphasized the importance of including both theoretical and practical components in environmental education, although limited time and funding currently hinder the full implementation of these topics. Teachers are often constrained by departmental requirements to complete their pace setters and assessments, which limits opportunities to explore environmental issues in depth. This challenge aligns with Aberu (2022), who observed that poor funding hampers educational initiatives in Nigeria.

Teachers also participate in environmental campaigns, such as World Cleanup Day, encouraging learners, staff, and the school community to engage in litter management activities. T3 suggested that environmental education should be integrated across all grades, from Grade R to Grade 7. Literature in Chapter 2 underscores the importance of embedding waste management themes into curricula to equip learners with knowledge

and promote environmentally responsible behavior (Moyo, 2021). The South African Green Schools Programme (SAGSP) similarly aims to enhance teachers' and learners' understanding of environmental issues and promote practices such as reduce, reuse, and recycle (Sikhosana, 2022). While SP3 demonstrated understanding of this notion, T3 indicated that additional departmental support is needed to improve and sustain litter management practices in schools.

### ii. Increasing Stakeholder Involvement

Participants highlighted the engagement of community members, parents, and relevant government departments as critical for enhancing litter management. Cooks suggested involving departments such as Environmental Affairs and Health to raise awareness among learners and staff about proper waste disposal and hygiene practices. TPB indicates that learners' behavioral intentions can be influenced by social pressures; thus, the involvement of parents, community members, and relevant authorities can positively shape learners' litter management behavior.

This finding aligns with Priatmoko et al. (2023), who noted that learners' pro-environmental behaviors at home are influenced by supportive community engagement. Similarly, Herdiansyah (2021) emphasized that many individuals lack awareness of proper waste disposal practices, which underscores the need for external support. Teachers noted that learners often imitate the behaviors of their families; if families neglect waste management, learners may adopt similar attitudes. TPB assumes that learners' attitudes toward littering are shaped by the behavior of influential figures, including parents. SGB3 also highlighted the benefits of inviting external experts to educate learners and staff, reinforcing positive attitudes and practices toward littering. Insufficient awareness and knowledge were identified as key barriers at Dama Primary School.

### iii. Improving Waste Management Infrastructure

Participants emphasized the need to enhance litter resources, improve dumping sites, monitor waste disposal regularly, and initiate litter separation and recycling programs. C3 noted that the existing dumping hole produces unpleasant odors and attracts flies

and mosquitoes. TPB suggests that behavioral beliefs influence attitudes; participants recognized that improper waste disposal leads to negative outcomes, including health risks and environmental degradation.

C3's observations align with Boateng et al. (2022), who reported that unmonitored dumping can cause bad odors, respiratory problems, and other health hazards. Vendors suggested that recycling and composting could be effective strategies for managing school waste. V3 supported this notion, citing Boyle (2023), who emphasized that recycling and composting in schools benefit both the environment and the school community.

However, the study found that previous recycling initiatives were discontinued due to transport costs. The principal acknowledged the potential benefits of an Eco-School program but lacked sufficient knowledge and resources to implement it effectively. This limited awareness restricts the school's capacity to improve waste management infrastructure. Muller et al. (2021) reinforce this idea, noting that sustainable learning environments, such as eco-schools, enable educators and learners to integrate sustainability principles into daily practices.

## 5.2 Cross-Case Discussion

## 5.2 Theme 1: Factors Promoting Sustainable Litter Management in school

### 5.2.1 Environmental Awareness and Education

All three schools acknowledged the critical role of environmental awareness and education in shaping learners' attitudes and promoting sustainability. This aligns with UNESCO (2014), which emphasizes that ESD equips learners with the knowledge, skills, values, and attitudes necessary to contribute to sustainable development.

Participants reported that environmental topics were integrated into subjects such as Natural Sciences and Social Sciences. However, limited time allocation and inadequate resources hindered deeper engagement. For example, at Abuja Combined School, Teacher 1 (T1) noted that "if littering was a topic on its own, it would help learners understand their role in protecting the environment." Similar sentiments were expressed

across other schools. Dama Primary School (Case 3) emphasized the importance of integrating litter management across the curriculum from the earliest grade (Grade R). Meanwhile, at Bele Primary School (Case 2), SP2 highlighted the need for ongoing environmental education that addresses the needs of the present generation while also considering the resources and well-being of future generations.

Guided by the Theory of Planned Behavior (TPB), participants demonstrated positive attitudes and perceived social pressure (subjective norms) to teach sustainability. However, constraints in curriculum time and limited external support negatively affected their perceived behavioral control. These findings are consistent with Goldschagg et al. (2025), who suggested that early integration of ESD topics can significantly improve learner attitudes, and with Velempini (2020), who found that a lack of teacher training hinders effective environmental education integration in Botswana.

### 5.2.2 Teacher and Learner Engagement in litter management

Across the three cases, teacher and learner engagement emerged as a key factor in promoting sustainable litter management. Teachers in all schools reinforced classroom rules related to littering and consistently reminded learners of their responsibility toward the environment. These practices highlight the influence of subjective norms on behavior, as proposed by the Theory of Planned Behavior (TPB).

At Bele Primary School (Case 2), the development of a learner code of conduct specifically addressing littering reflects an institutionalized effort to embed pro-environmental norms. In contrast, at Abuja Combined School and Dama Primary School, teachers primarily played a facilitative role by establishing class rules aimed at controlling littering. Additionally, at Abuja Combined School, learners took turns picking up litter under teacher guidance, as noted by the school principal. These findings align with Estrada-Vidal and Gomez (2020), who emphasized that social norms strongly shape behavior in environmental education settings.

### 5.2.3 School-Based Policies and Procedures

Only one school, Bele Primary, had a formally documented learner code of conduct specifically addressing littering. The other schools relied on informal class rules or general school norms. At Abuja Combined School, SGB1 acknowledged the absence of a formal litter management policy but noted consistent efforts to establish a broader school environmental policy during SGB planning meetings. In contrast, at Dama Primary School, SGB3 confirmed the use of an informal policy that allows teachers and the principal to involve learners in picking up litter as a form of punishment for classroom misconduct or late arrival, aiming to reduce litter in the school.

The absence of clear institutional policies diminishes perceived behavioral control, making it challenging for stakeholders to enforce and monitor proper littering behavior effectively. Moreover, the lack of formal school-based policies contributes to limited teacher engagement in litter management. These findings align with Mandikonza and Kavai (2023), who observed that South African schools often lack official policies for implementing Education for Sustainable Development (ESD), thereby restricting coordinated action and accountability.

Guided by the Theory of Planned Behavior (TPB), the presence of clear environmental policies in schools can help shape learners' behavior by providing structured goals and expectations, enabling them to consistently engage in activities that reduce environmental harm.

### 5.2.4 Resources availability and waste disposal infrastructure

Across all three cases, the availability of litter resources and waste disposal infrastructure emerged as key factors for promoting sustainable litter management in schools. Participants consistently reported that insufficient litter resources hinder learners' ability to manage waste effectively. At Abuja Combined School, SP1 highlighted that a limited number of bins means multiple classes often share a single bin, and waste disposal practices appear less structured. The school principal also noted that organic waste is collected and later used as compost.

In Bele Primary School, learners themselves sometimes complicate litter management by using the few available bins as toys, further limiting proper waste disposal. This observation aligns with Molina and Catan (2021), who emphasized that inadequate disposal facilities pose a significant challenge to solid waste management. Guided by the Theory of Planned Behavior (TPB), these practices reflect negative behavioral intentions, as learners are not fully aware of proper litter management.

While both Abuja Combined School and Bele Primary School face challenges related to resource availability, Dama Primary School highlighted limited departmental funding as a contextual barrier to sustainable litter management. SP3 explained, "Limited waste disposal facilities are a challenge because litter resources are not enough, meaning learners can dispose of their litter anywhere. This, coupled with limited funding from the department, contributes to school environmental pollution."

SP3 explained that limited waste disposal facilities are a challenge because litter resources are not enough, meaning learners can dispose of their litter anywhere. This coupled with limited funding from the department, contributes to school environmental pollution.

## 5.3 Theme 2: Factors Hindering Sustainable Litter Management in schools

### 5.3.1 Inadequate Resources and Infrastructure

All three schools reported challenges related to insufficient bins, inadequate waste disposal systems, and unsafe dumping practices. At Dama Primary School, dumping

pits attracted flies and posed health risks. Bele and Abuja schools faced additional issues, such as burning of waste and limited support for recycling initiatives. In Abuja Combined School, composting was attempted but ultimately failed due to time constraints and insufficient resources. Moreover, SP2 from Bele Primary School highlighted a significant obstacle: community members sometimes hinder school efforts by stealing litter resources and showing little interest in participating in litter management.

These infrastructural deficiencies limit participants' ability to act in accordance with their intentions, a key construct in Ajzen's Theory of Planned Behavior. Even when stakeholders demonstrated positive attitudes and supportive norms, the perceived lack of control weakened effective implementation. This finding is consistent with studies by Boateng et al. (2023) and Sikhosana (2022), which indicate that inadequate infrastructure disrupts sustainable waste management practices in schools.

### 5.3.2 Limited Institutional Support and Training

Participants across all cases emphasized the absence of formal training or ongoing support from the Department of Education or local municipalities. Teachers reported lacking the capacity to confidently deliver integrated environmental education.

At Abuja Combined School, participants noted some engagement with the Department of Environmental Affairs, which provided training on incorporating litter management into the curriculum. Similarly, at Bele Primary School, teachers reflected on past collaboration with the Department of Environmental Affairs, which offered awareness programs and experiential learning activities that motivated learners to participate in clean-up initiatives. Participants across these schools emphasized the need for continued collaboration with relevant departments to effectively pass litter management knowledge to learners.

In contrast, participants at Dama Primary School highlighted a persistent lack of support and motivation from relevant departments, noting that teachers have not been trained in litter management. This gap aligns with Millupi et al. (2022), who argued for retraining teachers in environmental education methods to strengthen effective implementation.

The lack of departmental support reflects a weak institutional context, which undermines perceived behavioral control, a key construct in the Theory of Planned Behavior. T2 recalled previous support provided by the Department of Environmental Affairs, noting that continued engagement could enhance learners' environmental consciousness. However, they stressed that no follow-up support has occurred since that time.

### 5.3.3 Attitudes and Behavioral Challenges

Learners' behavior, including carelessness, peer influence, and poor littering habits, was consistently identified as a major challenge. While some learners exhibited positive behaviors, many failed to internalize pro-environmental values.

At Abuja Combined School, participants emphasized that many learners do not take responsibility for keeping the school clean, relying instead on cleaners to collect their litter. Similarly, at Bele Primary School, some learners were described as ignorant and careless, disposing of litter on the ground even when bins were nearby. In Dama Primary School, learners were reported to struggle with proper disposal, often discarding litter anywhere. One cook explained, "Ignorance and laziness also promote littering, and learners themselves are not properly trained to adopt positive behavior; they just drop papers everywhere."

Observations across all three schools confirmed that some learners were not participating in litter management in classrooms or around the school. These patterns highlight that, although knowledge may be present, attitudes alone are insufficient—consistent social reinforcement and behavioral control mechanisms are necessary to influence sustainable behavior (Ajzen, 1991). At Abuja Combined School, for instance, cleaners attempted to manage litter throughout the school, yet their efforts could not prevent the continued accumulation of waste. This aligns with findings by Msezane and Mudau (2014), who reported that a lack of accountability and positive behavioral modeling in schools contributes to persistent littering.

### 5.3.4 External environmental factors

All three cases highlighted the importance of external environmental factors in promoting sustainable litter management. However, participants consistently reported a lack of support from the local municipality and relevant government departments. In both Abuja Combined School and Dama Primary School, participants suggested arranging with the local municipality to provide large bins for school litter, with regular collection on a weekly basis to ensure effective waste management. Interestingly, at Abuja Combined School, T1 also noted the use of digital technologies, such as robotics, as a potential tool to reduce litter in schools.

At Bele Primary School, C2 highlighted delays in municipal services, noting that although the municipality previously collected litter bins, the service was often slow. Participants further emphasized the role of parental education as a critical factor in shaping learners' positive litter management practices. This finding aligns with Herdiansyah et al. (2021), who argued that because children spend significant time with their families, parents play a key role in shaping and guiding their children's behavior toward littering. Guided by the Theory of Planned Behavior, particularly the construct of subjective norms, learners may adopt attitudes and behaviors regarding littering based on perceived social pressure from their parents. Therefore, parental involvement can significantly support learners in developing environmentally responsible behaviors and positive litter management practices.

## 5.4 Theme 3: Strategies for Improving and Sustaining Litter Management in schools

### 5.4.1 Strengthening Environmental Education

All schools recommended the formal integration of environmental education across subjects and grade levels. This aligns with Moyo (2021), who emphasized that embedding environmental content at all levels is crucial for fostering environmentally responsible behavior. Participants also highlighted the importance of support from different departments as an essential strategy to strengthen environmental education.

At Abuja Combined School, participants emphasized educating both learners and staff about litter management, including activities such as field trips to the Botanical Gardens, which enhanced environmental awareness given the school's proximity to wetlands.

Similarly, in Bele Primary School, participants suggested implementing environmental education as a formal subject within the curriculum. In Dama Primary School, participants actively engaged in initiatives such as “World Clean-Up Day,” demonstrating the practical application of positive behavioral intentions.

Despite these efforts, limitations such as insufficient curriculum time, lack of resources, inadequate funding, and insufficient teacher training continue to hinder the sustained impact of environmental education in all three schools.

### 5.4.2 Increasing Stakeholder Involvement

Involving parents, municipalities, and the Department of Environmental Affairs was a recurring recommendation, consistent with Herdiansyah (2021), who emphasized that parental behavior strongly influences learners’ norms.

At Abuja Combined School and Bele Primary School, participants highlighted parental engagement as a strategy to guide learners toward caring for the environment and improving sustainable litter management. Similarly, SP3 from Dama Primary School noted, “Parents can organize themselves and take turns to clean the classes,” illustrating a grassroots response in the absence of formal institutional support. This community-driven approach reflects Ajzen’s concept of social norms, where external stakeholders play a crucial role in reinforcing pro-environmental behaviors.

### 5.4.3 Improving Waste Management Infrastructure

Participants proposed practical strategies for improving waste management, such as installing bins, implementing composting, and restarting recycling programs. While some knowledge of waste separation and recycling existed, implementation was limited due to transport costs and lack of municipal support.

At Abuja Combined School, participants acknowledged the establishment of composting programs and the role of a school van in facilitating regular waste collection. For example, C1 explained that fish tins were stored in large sacks and transported to the nearest landfill site, helping to control litter within the school. In contrast, participants at

Bele and Dama Primary Schools relied primarily on open dumping holes, which negatively affected the learning environment by producing foul odors and attracting flies and mosquitoes, posing health risks.

Furthermore, SGB3 at Dama Primary School suggested introducing competitions with rewards between foundation and intermediate phase learners as a strategy to minimize litter. Despite these efforts, all three schools reported practices such as dumping litter in open pits and burning waste, which contradict the environmentally sustainable approaches advocated by Boyle (2023), who emphasized the social and environmental value of school-based recycling, and Muller et al. (2021), who promoted Eco-Schools as models for sustainable learning environments.

### 5.5 Chapter summary

In summary, this chapter interpreted the study's findings through thematic and cross-case analysis, drawing on relevant literature and the theoretical framework. The findings revealed that, while all three schools demonstrated environmental awareness and a willingness to promote sustainable practices, limitations in infrastructure, policy, and stakeholder collaboration hindered consistent implementation. These results addressed the study's research questions and highlighted the complex interplay of contextual factors influencing school-based waste management. Overall, these interpretations provide a foundation for the conclusions and recommendations presented in Chapter 6.

# CHAPTER 6: SUMMARY, RECOMMENDATIONS AND CONCLUSION

## 6.1 Introduction

The previous chapter interpreted the study's findings through thematic and cross-case analysis, drawing on the literature, the theoretical framework, and data collected from Case 1: Abuja Combined School, Case 2: Bele Primary School, and Case 3: Dama Primary School. This chapter begins with a summary of the findings, addresses the research questions, highlights the key contributions, presents recommendations, and concludes with insights drawn from the discussion.

## 6.2 SUMMARY FINDINGS

The study answered the main research question: How can littering be sustainably managed as a form of ESD in selected schools in Vhembe East District Limpopo Province?

The research sub- questions for this study are:

- What factors promote implementing sustainable management of littering as a means of ESD in schools?
- What factors impede sustainable management of littering as a form of ESD in schools?
- How can the enabling factors and strategies be maintained to ensure the sustainable management of littering in schools as part of ESD?
- How can potential limiting factors be addressed to facilitate the school-based management of littering as a part of ESD?

The research questions answers are presented below:

### 6.2.1 What factors promote implementing sustainable management of littering as a means of ESD in schools?

It was important to examine participants' awareness regarding the integration of litter management into Education for Sustainable Development (ESD) across different schools. Interviews were conducted with school principals, SGB chairpersons, and Grade 6 NS/Tech teachers to address the research questions. Triangulation was further achieved through focus group interviews and classroom observations.

**Case 1: Abuja Combined School**

At Abuja Combined School, SP1 and T1 were able to identify factors that promote the implementation of sustainable litter management as part of ESD. The study found that the presence of these factors could facilitate effective litter management through education and awareness. Despite the insufficient availability of litter resources, observations showed that cleaners and some learners made considerable efforts to use available resources to maintain cleanliness around the school.

The findings discussed in Chapter 4 revealed that teachers at Abuja Combined School successfully employed both classroom and outdoor strategies to implement ESD. Outdoor strategies engaged learners in practical activities, allowing them to experience and interact with nature. T1 also drafted classroom rules aimed at promoting environmental education and raising learners' awareness.

Additionally, learners at Abuja Combined School, with teacher guidance, took turns picking up litter, while cleaners contributed to maintaining the school environment by planting flowers, tending shade and fruit trees, and preventing soil erosion. SGB1 suggested that establishing an environmental committee for litter management could make a significant contribution to improving school cleanliness. Furthermore, field trips to the Botanical Gardens provided learners with opportunities to acquire environmental knowledge and skills, fostering positive attitudes that could be applied in real-life environmental problem-solving—particularly relevant given the school's proximity to wetlands.

**Case 2: Bele Primary School**

The SP2, T2 and SGB2 showed the availability of litter resources although they pointed out that they are insufficient, education and awareness as the factors that promote the management of littering in their school. However, during observation there were no available litter resources at the corridor, the visible litter resources were with the principal and some learners' busy picking up litter in the school ground. Despite the presents of code of conducts mentioned by the participants during interviews they were not located or available during the observations in school. In addition, classroom rules were the only policy available in class where littering was included.

**Case 3: Dama Primary School**

The participants interviewed from the school expressed the lack of litter resources although limited numbers are available.C3 mentioned that they have no litter resource at their working place. Across the three schools, participants demonstrated general lack of education and awareness regarding to integrating littering management into ESD in schools. Hence, the absence of litter resources is not a surprise in the schools.

### 6.2.2 What factors impede sustainable management of littering as a form of ESD in schools?

Participants highlighted the absence of litter resources and adequate disposal infrastructure in their schools, indicating a need to explore the impediments that hinder access to these resources.

**Case 1: Abuja Combined School**

Participants offered different perspectives on factors impeding sustainable litter management as part of ESD. The school principal and teacher cited the education system as a significant barrier, emphasizing that although litter management exists in the school, there is a notable shortage of litter resources. Another participant identified inadequate implementation and monitoring as a hindrance, noting that without proper oversight, some individuals might neglect their responsibilities. SGB1 identified vendors

as a potential impediment, highlighting their lack of accountability and tendency to shift responsibility to others. Additionally, the teacher emphasized that limited teaching time allocated to environmental education content restricts learners' understanding of how to act responsibly toward the environment.

**Case 2: Bele Primary School**

Participants at Bele Primary School provided limited input regarding obstacles to litter management. The teacher suggested that nothing significantly impedes the school's ability to manage litter but stressed the importance of integrating litter management into the curriculum or establishing it as a standalone subject. Another participant noted that a lack of support from the department poses challenges, as some teachers are untrained and lack knowledge of environmental education content. Practically, the study revealed that some litter was initially recycled, but the program was discontinued due to uncooperative participants. Learners also highlighted carelessness and ignorance among peers as a significant challenge. Parents were recognized as key influencers in shaping responsible behavior, and several participants suggested increased awareness and support from relevant departments to enhance learners' environmental knowledge.

**Case 3: Dama Primary School**

Participants at Dama Primary School identified multiple challenges that impede litter management. The Department of Basic Education emerged as a major barrier, as insufficient funding prevents the school from purchasing resources or implementing 3Rs programs for sustainable litter management. The lack of resources results in learners disposing of litter indiscriminately. Additional impediments included the absence of formal policies, insufficient colleague support, and inadequate monitoring. The SGB committee implements an informal policy requiring latecomers to participate in litter pick-up, but this is limited in scope. Being in a remote rural area, the school receives no municipal waste collection support. Furthermore, limited education, awareness, and guidance from the relevant department contribute to ongoing challenges in managing litter effectively.

### 6.2.3 How can the enabling factors and strategies be maintained to ensure the sustainable management of littering in schools as part of ESD?

Participants emphasized the importance of schools having litter management programs to ensure the sustainable management of waste. However, some participants were unable to provide comprehensive responses due to limited knowledge about the enabling factors and strategies necessary to maintain sustainable litter management as part of ESD.

**Case 1: Abuja Combined School**

Participants suggested that providing recycling bins in schools could help prevent learners from disposing of litter indiscriminately. Learners and other stakeholders should receive guidance from the relevant department regarding litter management. Additionally, some participants recommended that the department allocate budgets to purchase essential resources for schools, such as bins for recycling and materials for Robotics programs that integrate environmental education. Participants further suggested initiating school-based recycling programs, including strategies such as composting, to reinforce sustainable practices.

**Case 2: Bele Primary School**

At Bele Primary School, participants noted that the availability of litter resources could help learners avoid improper disposal of food waste. However, litter resources were reported as a significant challenge, as community members often removed or stole school bins. Participants highlighted the importance of awareness programs from the relevant department to foster environmentally responsible behavior among learners. Several participants recommended that the department equip schools with tools and guidance to implement recycling programs, as previous initiatives started by the school had stalled. Additionally, participants suggested that municipal support, such as regular collection of fish tins and other litter, would improve waste management.

### Case 3: Dama Primary School

Participants at Dama Primary School emphasized the importance of available litter resources and disposal facilities, alongside classroom rules and an informal policy drafted by the SGB, as strategies to manage litter. While these measures were helpful, the study revealed that educating the broader school community is also critical for effective litter management. The rural context of the school presented challenges, as many learners did not separate waste or practice recycling, and community members contributed to litter when passing by the school. Participants recommended that the department allocate sufficient budgets to provide the necessary resources. Additionally, cooks suggested introducing a reuse program, such as using firewood remains in pit toilets to reduce odor, rather than allowing waste to scatter around.

### 6.2.4 How can potential limiting factors be addressed to facilitate the school-based management of littering as a part of ESD?

### Case 1: Abuja Primary School

The findings suggested that schools need to collaborate with other departments, such as the Department of Environmental Affairs (DEA), the local municipality, and the Department of Basic Education (DBE). Through multisector collaboration, schools can access more information, resources, and support. Discussions in Chapter 5 indicated that providing teachers with training equips them to become environmental experts. The findings further suggested that the DBE, DEA, and local municipalities should support schools with resources, provide learners with relevant information on litter management, and actively promote environmental awareness (Maphaha, 2020). Participants also emphasized that NS/Tech grade 6 teachers, who integrate environmental education topics into their teaching plans, should actively engage learners in caring for the environment, although limited curriculum time remains a challenge.

### Case 2: Bele Primary School

At Bele Primary School, almost all participants highlighted the lack of litter resources as a key factor impeding school-based management of littering as part of ESD. The SGB2 and C2 noted that they were waiting for the municipality to collect litter from the school, as they had provided this service previously. Participants suggested that NS/Tech grade 6 teachers, who are more knowledgeable about litter management, should take a proactive role in guiding learners to care for their surroundings. Additionally, cooks proposed working alongside parents to help learners manage litter sustainably, reinforcing the importance of community involvement.

**Case 3: Dama Primary School**

Participants at Dama Primary School reported that teachers had not received training on integrating litter management into their subjects. The South African Constitution emphasizes the right to a safe and healthy environment; however, interview data revealed that littering negatively affects learners' health. Observations at the school showed that some learners were careless and unaware of proper litter management, discarding food leftovers and waste on the ground. Participants suggested that learners often imitate observed behavior, highlighting parents as key contributors to shaping positive environmental attitudes. Despite these insights, the school continues to burn litter as a method of disposal, reflecting ongoing challenges in implementing sustainable litter management practices.

### 6.2.5 Cross- Case Synthesis of Findings

**Theme 1: Factors promoting litter management in schools**

Across the three schools, several factors were found to promote effective litter management, including the availability of litter resources, environmental awareness and education, and school-based policies and procedures. At Abuja Combined School, participants were aware of environmental education and had integrated it into the curriculum, but limited time constrained its full implementation. Although litter bins were insufficient, most teachers, cleaners, and some learners actively participated in managing and maintaining the available litter resources.

At Dama Primary School, participants recognized the crucial role of environmental education in promoting litter management and proposed integrating it across all grades from R to 7. In contrast, at Bele Primary School, the key to success was active learner participation, which was largely driven by awareness programs conducted by relevant departments that equipped learners with knowledge about the environment.

Despite these positive practices, all three schools faced common barriers, including lack of rule enforcement, absence of formal environmental policies, and limited infrastructure. At Bele Primary, learners admitted that they did not perceive littering as a serious issue and tended to litter despite the existence of a formal code of conduct. Dama Primary relied on an informal policy implemented by the SGB, while Abuja Combined School acknowledged the absence of any formal environmental policy.

Overall, the synthesis highlights that without formal departmental environmental policies and adequate institutional support, sustainable litter management in schools remains challenging.

**Theme 2: Factors hindering sustainable litter management**

Across all three cases, inadequate resources and infrastructure, limited institutional support, and attitude and behavioral challenges consistently emerged as factors hindering sustainable litter management in schools. All schools exhibited carelessness and ignorant attitudes towards littering. At Abuja Combined School, the limited available resources were shared to manage litter, whereas at Dama Primary School, teaching staff lacked the necessary support to manage litter sustainably. At Bele Primary School, available litter resources were often misused by learners, resulting in uncontrolled littering, further compounded by community members who frequently stole the school's litter resources.

Dama Primary School demonstrated the weakest practice, with limited planning and insufficient departmental funding impeding overall sustainable litter management. Additionally, the lack of teacher training to integrate litter management into classroom instruction was identified as a significant challenge across the schools. Support from the local municipality for litter collection was also noted as a barrier to sustainable

management. However, Abuja Combined School had a relative advantage due to the availability of a school van, which facilitated the transport of fish tins and other waste to the nearest landfill site.

**Theme 3: Strategies for improving and sustaining litter management in schools**

The analysis revealed that several strategies have been effective—or could be effective if properly implemented—in improving and sustaining school litter management. These strategies include strengthening environmental education, increasing stakeholder involvement, and improving waste management infrastructure.

At Abuja Combined School, sustainable litter management was demonstrated through partnerships with the Botanical Gardens to raise awareness and reinforce environmental education. Teachers were highly involved in litter management, integrating ESD into their lessons and consistently enforcing classroom rules. In contrast, Dama Primary School showed limited confidence in using classroom rules; their rules were outdated and unclear. Teachers highlighted a lack of support from the Department of Basic Education to equip them with knowledge and procedures for integrating environmental issues into the curriculum. Nevertheless, they engaged learners in environmental events such as 'World Environment Day' to promote awareness.

Across all three schools, participants emphasized efforts to instill environmental consciousness through education and by improving disposal facilities and infrastructure. Parental involvement emerged as a key enabling factor, as learners often imitate positive littering behaviors observed at home. At Abuja Combined School, bins were limited, but the school strategically placed them in corridors where two classes shared a bin. The availability of cleaning staff also ensured that the school grounds remained consistently clean. The study synthesis suggests that combining environmental education, adequate infrastructure, and hands-on participation from all school stakeholders promotes effective litter management.

However, challenges remain. All three schools burned litter in dumping sites. At Bele and Dama Primary Schools, these sites produced unpleasant odors that could affect

learners and the wider school community. In contrast, Abuja Combined School demonstrated proactive engagement in litter management by implementing composting programs to reduce waste.

## 6.3 Main contributions

Various studies on littering in schools have been conducted, but their focus has primarily been on solid waste management. For example, Sikhosana (2022) examined the development and implementation of sustainable intervention strategies for solid waste management in primary schools. However, few studies have specifically addressed litter management or the challenges faced by the entire school community.

This study revealed that participants had limited knowledge of environmental education, awareness, and strategies for sustainably managing litter in schools. Participants also identified a range of challenges and emphasized the need for support from relevant departments. Despite these gaps, some teachers conveyed environmental knowledge to learners through classroom rules, learner codes of conduct, and outdoor strategies aimed at addressing environmental problems.

The study also highlighted the availability and accessibility of litter resources in different schools, although these resources were often insufficient. It underscored the need for external support, particularly from the Department of Basic Education (DBE), to provide teacher training, recycling bins, funding, and practical solutions, given the schools' limited knowledge of litter management. Furthermore, the study contributes to discussions on government initiatives, such as using Robotics programs to minimize litter in schools. It also raises awareness of the need to build school libraries, as old books often become scattered and contribute to litter due to insufficient classroom space.

## 6.4 Recommendations

To address the problem of littering in schools and promote effective litter management, the following recommendations are proposed:

- The study revealed that a lack of environmental knowledge among teachers hinders their ability to teach learners effectively. Therefore, it is recommended that the Department of Basic Education facilitate training for teachers on how to integrate litter management into their lessons.

- The study indicated that schools require adequate resources to manage litter. Accordingly, it is recommended that the Department of Basic Education provide schools with recycling bins and sufficient funding to purchase other necessary litter management resources.
- Schools should implement waste separation practices by categorizing litter into peels, tins, papers, and plastics to promote recycling and proper disposal.
- The government should support environmental awareness programs focused on litter management to educate learners and the school community, while also reducing the risk of disease associated with improper waste disposal.
- One school highlighted the importance of having an environmental policy. It is recommended that principals and members of School Governing Bodies collaborate to draft and implement school-specific environmental policies to guide sustainable litter management practices.

### 6.5 Recommendations for Further Studies

This study was conducted in only three primary schools that were purposively selected within the Limpopo Province, Vhembe East District, Mvudi and Sibasa Circuits. Based on the findings, the following recommendations for future research are proposed:

- Future studies should include a larger number of primary and secondary schools and be conducted across other districts to ensure more comprehensive and generalizable findings.
- This study engaged school principals, SGB chairpersons, grade 6 NS/Tech teachers, grade 4–6 learners, cooks, and vendors. Future research should also

include circuit managers, policymakers, additional teachers, learners from other grades, and other School Governing Body members to gain a broader understanding of their roles in policy implementation within schools.

- Environmental Education (EE) should be considered as a standalone subject across all grades, rather than being integrated only into selected subjects.

- Participants expressed concern about the absence of formal environmental policies in schools. Future research should explore the development and implementation of environmental policies in schools.
- Further studies on strategies to integrate litter management into ESD should include schools without NSNP programs, as littering is a challenge across all schools.

### 6.6 Limitations of the study

According to Theofanidis and Fountouki (2018:156), the limitations of a study refer to potential weaknesses that are generally beyond the researcher's control. Similarly, Price and Muman (2004) argue that limitations are issues or challenges encountered during a study that may influence or affect the results and their interpretation.

The focus of this study was to explore how littering could be sustainably managed as a form of Education for Sustainable Development (ESD) in selected schools within the Vhembe District, Limpopo Province. However, the study was limited to only three purposively selected primary schools and involved three principals, three SGB chairpersons, three grade 6 NS/Tech teachers, nine cooks, nine vendors, and nine learners from grades 4–6. This sampling procedure restricted the study's ability to identify additional strategies for integrating litter management into ESD across other schools.

Additionally, time constraints for data collection limited the depth of engagement with participants. Some selected participants were also uncomfortable with the research process and attempted to withdraw, further constraining the study's scope.

## 6.7 Conclusion

The study aimed to explore how littering could be sustainably managed as a form of Education for Sustainable Development (ESD) in selected schools in the Vhembe East District, Limpopo Province. Across the three schools, littering was largely driven by insufficient litter resources and limited knowledge of environmental education, including awareness of the consequences of littering for both people and the environment. Teachers and the broader school community had not received training or support in litter management. While class rules and reinforcement by the principal during assemblies were applied in all three schools, only one school had a learners' code of conduct, which helped alter learners' attitudes and behaviors toward littering.

Another challenge was the volume of litter generated. The study highlighted strategies such as composting, recycling programs, and repurposing food waste by providing it to community members for pigs or poultry. Schools were also encouraged to collaborate with parents, communities, and municipalities to reduce littering. Furthermore, awareness and education on litter management could be strengthened through engagement with the Department of Basic Education (DBE) and other relevant departments. Expanding participation among various school stakeholders would enhance knowledge and understanding of litter management, promote sustainable practices, and benefit future generations.

The study demonstrated that learners became more environmentally conscious. Schools intended to introduce environmental policies to guide learners' behavior, fostering a safe and favorable learning environment. Teachers actively engaged learners in environmental sustainability topics through essays, debates, and projects. Vendors also contributed by reducing litter: they encouraged learners to bring reusable containers for snacks and offered discounts for doing so, promoted bulk purchases to minimize individually wrapped products, and monitored waste generated at their stalls. Additionally, the School Governing Body (SGB) proposed in-school competitions with awards per phase to motivate positive behavior, while teachers worked with learners to monitor each other's littering habits.

Despite these efforts, all schools demonstrated limited knowledge and capacity for composting and recycling. Transport costs further hindered the facilitation of recycling programs, as expenses exceeded available funds. The study also recommended introducing Robotics as a classroom and school-wide strategy to minimize paper-based waste. This approach would not only reduce litter but also enhance learners' digital literacy and enable them to educate peers, friends, and family, reinforcing the notion that educating learners contributes to educating the broader community.

The findings underscored that litter management is a shared responsibility. Awareness, education, and engagement with the natural environment—such as trips to the Botanical Gardens—provided learners with firsthand experiences to promote sustainable litter practices. Collaboration among schools, relevant departments, parents, and communities was identified as essential to cultivate responsible citizenship, embed sustainable practices, and ensure environmentally conscious school communities for the benefit of future generations.

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## Appendices

APPENDIX A: Interview guide

### Focus group questions for learners and street vendors allowed to sell their products in school

1. According to you what is littering?
2. How can you define the term "environment"?
3. How and what produce waste in a classroom/school setting?
4. What do you know about littering management?
5. How do you think littering can be managed in your schools?

6. What kind of support do your teachers provide to promote sustainable management of littering in school?

7. What specific practices are used in your classroom/school to manage litter sustainably?

8. What kind of challenges do you encounter when you try to ensure the sustainable management of littering in your school and how do you address them?

### Semi-structured Interview questions

**Semi structured Interview schedule for schools that will be selected for this study focus for principals**

**TITLE: INVESTIGATING EFFECTIVE STRATEGIES FOR INTERGRATING LITTERING MANAGEMENT INTO EDUCATION FOR SUSTAINABLE DEVELOPMENT IN VHEMBE EAST DISTRICT, LIMPOPO PROVINCE**

1. According to your understanding, what is littering?
2. How is Littering managed in your school?
3. What is your understanding of Education for sustainable development (ESD)?
4. How do you think ESD can be used to manage littering in your school?
5. Are there any environmental policies in your school that encourage littering management?

6. Who is responsible for littering management in your school?
7. What role does the following (learners, teachers, cook and vendors) play in supporting littering management in your school?

   Learners – by participating in a litter pick up

   Teacher-by teaching or integrating litter management strategies in their lessons
8. What strategies do you believe are most effective for managing littering sustainably in the school?
9. What factors do you think are the factors that promote sustainable management of littering in the school environment?
10. What factors do you think are the factors that hinder the sustainable management of littering in the school environment?
11. What challenges do you face in ensuring sustainable littering management in your school, and how do you address them?

**Semi structured Interview schedule for schools that will be selected for this study focus for teachers.**

**TITLE: INVESTIGATING EFFECTIVE STRATEGIES FOR INTERGRATING LITTERING MANAGEMENT INTO EDUCATION FOR SUSTAINABLE DEVELOPMENT IN VHEMBE EAST DISTRICT, LIMPOPO PROVINCE**.

1. According to your understanding, what is littering?
2. How is Littering managed in your school?
3. What is your understanding of Education for sustainable development (ESD)?
4. How do you think ESD can be used to manage littering in your school?
5. How would you promote sustainable littering management practices in your classroom?
6. Who is responsible for littering management in your school?
7. What factors do you think as a teacher promotes the sustainable management of littering in the school environment?
8. What factors do you think as a teacher hinders the sustainable management of littering in the school environment?

9. What strategies do you believe are most effective for managing littering sustainably in the school?
10. What challenges do you face in ensuring sustainable littering management in your school, and how do you address them?

**Semi structured interview Questions for the school Governing Body (SGB).**

**TITLE: INVESTIGATING EFFECTIVE STRATEGIES FOR INTERGRATING LITTERING MANAGEMENT INTO EDUCATION FOR SUSTAINABLE DEVELOPMENT IN VHEMBE EAST DISTRICT, LIMPOPO PROVINCE.**

1.What is littering according to your understanding?

2.Which factors do you think promote littering in your school?

3.What factors do you think promote implementing sustainable management practices of littering?

4.Are you familiar with the school's environmental policies? Can you describe some of the policies related to litter management?

5.Who do you think should be responsible for littering management in your school?

6.What role do you play in managing littering generated in your school?

7.What specific challenges does the school face in achieving sustainable litter management? and how do you address them?

8.What strategies can be implemented to improve litter management in the school?

9.What actions or initiatives can the SGB take to encourage learners, teachers, cooks and vendors to adopt sustainable litter management practices in schools?

**TITLE: INVESTIGATING EFFECTIVE STRATEGIES FOR INTERGRATING LITTERING MANAGEMENT INTO EDUCATION FOR SUSTAINABLE DEVELOPMENT IN VHEMBE EAST DISTRICT, LIMPOPO PROVINCE.**

**Focus group interview questions for cooks**

1. According to your understanding, what is littering?
2. In your view, what factors promote littering in school?
3. Who is responsible for littering management in your school and why?
4. What specific practices are used in your classroom/school to manage litter sustainably?
5. How do you maintain cleanliness in the kitchen during food preparation and cooking, and how does this contribute to litter management?
6. What kind of challenges do you encounter when you try to ensure the sustainable management of littering in your school and how do you address them?
7. What kind of support do your school leaders provide in order to promote sustainable management of littering in school?
8. What would you say could be the best strategy of managing littering in your school?

APPENDIX B : ETHICAL CLEARANCE

UNISA university of south africa

**UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE**

Date: 12 September 2024

Ref: **2024/09/12/000000162/04/RB**
Name: **Mrs Limela Ndivhiseni**
Student No.: **47020350**

**Decision:** Ethics Approval form

Dear **Mrs Limela Ndivhiseni**

**Researcher(s):** Name: **Mrs Limela Ndivhiseni**
E-mail address: 47020350@mylife.unisa.ac.za
Telephone: **0724292900**

**Supervisor:** Name: **Dr Khathutshelo Ronald, Munasi**
E-mail address: emunask@unisa.ac.za
Telephone: **0790354981**

**Title of research: Investigating effective strategies for integrating littering management into education for sustainable development in Vhembe East District Limpopo Province.**

**Qualification: Master of Education in 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 **2024/09/12** to **2027/09/12**.

*The **write risk level** application was reviewed by the Ethics Review Committee on **12 September 2024** 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
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

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 risk s 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 **2027/09/12.** Submission of a completed research ethics pro gress report will constitute an application for renewal of Ethics Research Committee approval.

*Note:*
*The reference number* **2024/09/12/00000162/04/RB** *should be clearly indicated on all forms of communication with the intended research pa rticipants, as well as with the Committee.*

Kind regards,

Prof RB Monyai
Acting Head: CEDU Research
monyarb@unisa.ac.za

Prof Mpine Makoe
Executive Dean: CEDU
qakisme@unisa.ac.za



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APPENDIX C: LETTER FOR PERMISSION FROM LIMPOPO PROVINCE

**CONFIDENTIAL**

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

OFFICE OF THE PREMIER

**TO: MS. MABOGO MG**

**FROM: DR. M MAEBANE**

**ACTING CHAIRPERSON: LIMPOPO PROVINCIAL RESEARCH ETHICS COMMITTEE (LPREC)**

**REVIEW DATE: 27 NOVEMBER 2024**

**SUBJECT: INVESTIGATING EFFECTIVE STRATEGIES FOR INTEGRATING LITTERING MANAGEMENT INTO EDUCATION FOR SUSTAINABLE DEVELOPMENT IN VHEMBE EAST DISTRICT LIMPOPO PROVINCE**

**RESEARCHER: LIMELA N**

Dear Colleague

The above researcher's research proposal served at the Limpopo Provincial Research Ethics Committee (LPREC). The committee is satisfied with the methodological and ethical soundness of the proposed study.

**Decision: The proposal is granted full approval.**

Regards

Acting Chairperson: Dr Maebane

Secretariat: Ms. J Mokobi

Date: 16/01/2025

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
# EDUCATION

Ref: 2/2/2
Limela N

CONFIDENTIAL

Enq: Makola MC Tel No: 015 290 9448 E-mail:MakolaMC@gdu.limpopo.gov.za
PO BOX 136
Thohoyandou
0950
ndivhil@gmail.com

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

1. The above bears reference.
2. The Department wishes to inform you that your request to conduct research has been approved. Topic of the research proposal: "INVESTIGATING EFFECTIVE STRATEGIES FOR INTERGRATING LITTERING MANAGEMENT INTO EDUCATION FOR SUSTAINABLE DEVELOPMENT IN VHEMBE EAST DISTRICT LIMPOPO PROVINCE."

3.The following conditions should be considered:

3.1 The research should not have any financial implications for Limpopo Department of Education.

3.2 Arrangements should be made with the District or Circuit Office and the School concerned.

3.3 The conduct of research should not in anyhow disrupt the academic programs at the schools.

3.4 The research should not be conducted during the time of Examinations especially the fourth term.

3.5 During the study, applicable research ethics should be adhered to; in particular the principle of voluntary participation (the people involved should be respected).



Cnr 113 Biccard & 24 Excelsior Street, POLOKWANE, 0700, Private Bag X 9489, Polokwane, 0700
Tel:015 290 7600/ 7702 Fax 086 218 0560

APPENDIX D: LETTER FOR PERMISSION FROM SIBASA AND MVUDI CIRCUIT

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

**SIBASA CIRCUIT**

Enq: Tshivhase T.A
Cell: 082 906 3766

TO: LIMELA N

**REQUEST FOR PERMISSION TO CONDUCT RESEARCH WITHIN SIBASA CIRCUIT.**

1. The above matter has reference.
2. The circuit wishes to inform you that your request to conduct research has been approved.
3. Our office hereby notifies you that your request is approved provided you do not interrupt teaching and learning activities.
4. Thanking you in advanced.

Tshivhase

**CIRCUIT MANAGER: SIBASA**

27/01/2025

**DATE**

DEPARTMENT OF EDUCATION
SIBASA CIRCUIT
2025 -01- 27
P/BAG 2166, SIBASA,0970
LIMPOPO PROVINCE

LIMPOPO
PROVINCIAL GOVERNMENT
DEPARTMENT OF
EDUCATION
VHEMBE DISTRICT

REF NO: 14/7/R
ENQ: MUHANGANEI H.I
TEL: 071 475 9951

MVUDI CIRCUIT
PRIVATE BAG x2166
SIBASA
0970
18 FEBRUARY 2025

**TO: LIMELA NDIVHISENI**

**PERMISSION TO CONDUCT RESEARCH**

1. The above matter refers.
2. Our office received your request for permission to conduct research in our primary school.
3. This office has no objection as long as you don't disrupt lessons during school time.
4. Wishing you the best in all your endeavours for the completion of your studies

.....
**CIRCUIT MANAGER**

18/02/25
**DATE STAMP**

MVUDI CIRCUIT
VHEMBE EAST DISTRICT
DEPARTMENTAL DATE STAMP
18 -02- 2025
TEL: 015 963 1895
P/BAG X2166 SIBASA 0970
LIMPOPO DEPT. OF EDUCATION

**APPENDIX E: consent letter to the school principals and SGB**

**Request letter School Principal**


Ndivhiseni Limela

PO Box 310

Thohoyandou

0950

Date

The principal

Name of the School

School Address

Dear Principal

**Request for permission to conduct research at your school**

Title of the research: Investigating effective strategies for integrating littering management into ESD in Vhembe East District Limpopo.

I, Ndivhiseni Limela, am doing research under supervision of Dr Khathutshelo Ronald Munasi, a lecturer in the Department of Science and Technology Education towards a MEd at the University of South Africa. I hereby wish to request your permission to

conduct masters' research entitled Investigating effective strategies for integrating littering management into ESD in Vhembe East District Limpopo.

The aim of the study is to explore how littering can be managed in a sustainable way as a form of ESD in selected schools in the Vhembe East District Limpopo Province.

Your school was chosen since the conditions under investigation also exist in primary schools in the circuit, which falls within your province, and it provides convenience for the researcher. Audiotaping device will be used to supplement the notes taken from the participants during semi-structured interviews, focus group interviews and classroom observations. These interviews will include open-ended questions to which you will respond on investigating effective strategies for integrating littering management into education for sustainable development in primary schools. Each of the participating principal will be expected to participate in the one-on-one semi-structured interview session, while each participating educator will participate in one of the three focus group interviews. The semi-structured interviews will last about 40 minutes, whereas the focus group interviews will last for approximately an hour.

The study will employ a qualitative approach and exploratory case study method will be used. The target population from each participating schools will be one principal, one NS Tech teacher, one SGB Chairpersons, three cooks, three street vendors who allowed to sell their product in schools, three learners from selected primary schools in the Vhembe East District. I will use semi-structured interviews, observations and focus group interviews to collect data. All interviews will be conducted at a time when they will not interfere with the participant's work or teaching schedule.

**The benefits of this study are**: - (1) It will make known the strategies and how those strategies can be effectively used to manage littering as a form of ESD in schools (2) And to explore the acquired knowledge to address littering management challenges faced in schools.

There will be no reimbursement or any incentives for participation in the research. The research will give participants an opportunity to contribute to research that may benefit others and to have a sense of being “heard” concerning their experience.

**Potential risks:** This is an extremely medium-risk study, thus there are no potential risks anticipated. The researcher will ensure that each participant receives, reads, understands and signs a letter of informed consent before the start of the study and information gathered will be treated as confidential.

**Feedback procedures**: I will submit a copy of my dissertation to your office which will provide procedures for the study, including findings and recommendations.

I promise that I will abide by the principles of anonymity and confidentiality.

Yours Faithfully

Ms N Limela (researcher)

Cell: 0724292900

Email: ndivhi1@gmail.com

**Consent letter to SGB Chairperson**


**PARTICIPANT INFORMATION SHEET (letter for consent)**

Title: Investigating effective strategies for integrating littering management into ESD in Vhembe East District Limpopo.

SGB chairperson

**DEAR PROSPECTIVE PARTICIPANT**

My name is Ndivhiseni Limela, I am doing research under the supervision of Dr Khathutshelo Ronald Munasi, a lecturer in the Department of Science and Technology Education towards a Med at the University of South Africa. We are inviting you to participate in a study entitled Investigating effective strategies for integrating littering management into ESD in Vhembe East District Limpopo.

**WHAT IS THE PURPOSE OF THE STUDY?**

This study is expected to collect important information that could explore how littering can be managed in a sustainable way as a form of ESD in selected schools in the Vhembe East District Limpopo Province.

**WHY AM I BEING INVITED TO PARTICIPATE?**

You are invited because you have valuable experience and knowledge related to my research topic that you can share towards littering management in schools by helping in developing effective strategies to manage littering.

I obtained your contact details from The Department of Basic Education, Vhembe East district. For this research school principal, one SGB Chairperson, one NS Tech grade 6 teacher, three learners, three cooks, three street vendors who allowed to sell their products in school from convenience selected primary school will be purposively selected to participate in the research.

**WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?**

Describe the participant's actual role in the study.

The study will involve audiotaping, as well as focus groups, semi-structured interviews and observations. The semi structured interview will include open ended questions in which participants will answer regarding the effective strategies for integrating littering management into ESD in our schools. Principals, SGB Chairpersons and teachers will be expected to participate in the semi-structured interviews. three learners, three cooks and three street vendors will participate in focus group interview. There will be cooks observation from early in the morning until the finish preparing learners food, learners and general school observation in the classrooms and outside the classrooms especially during breaktime. The semi -structured interview will take approximately 40 minutes, while focus group interview will last for one hour.

**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 form. You are free to withdraw at any time and without giving a reason.

**WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?**

The study would benefit all people including school learners at all levels because the findings can identify the challenges that schools face regarding litter management and explore strategies to address the identified challenges in our primary schools. The teachers should be able to use successful strategies to integrate ESD in their lessons.

Participating in this research will give participants an opportunity to contribute to research that may benefit others and to have a sense of being “heard” concerning their experience.

**ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?**

There is no risk involved. No sensitive information will be asked or be disclosed. Uncomfortable feeling may arise during the interviews due to long sitting and talking. Steps to be taken in case of risks: The school’s first-aid kit will be used with the help of the trained teacher who is in charge. The nearby clinic will be consulted if the efforts of first aid fail.

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 .

Please note that confidentiality agreements should be submitted to the Research Ethics Review Committee for consideration. Your answers may be reviewed 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.

Please note that, your anonymous data may be used for other purposes, such as a research report, journal articles and/or conference proceedings. Also indicate how privacy will be protected in any publication of the information A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report). Please keep in mind that it is sometimes impossible to make an absolute guarantee of confidentiality or anonymity, e.g. when focus groups are used as a data collection method.

A group of people will be interviewed together at the same time exchanging ideas in a focus group. 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 at home 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. Hard copies will be shredded and/or 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?

There will be no reimbursement or any incentives for participation in the research.

HAS THE STUDY RECEIVED ETHICS APPROVAL

This study has not yet received written approval from the Research Ethics Review Committee of the Unisa. A copy of the approval letter will be obtained from the researcher after approval.

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 Ndivhiseni Limela on 0724292900 or email ndivhi1@gmail.com .The findings will be accessible for five years.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact me on 0724292900 or email ndivhi1@gmail .com.

Should you have concerns about the way in which the research has been conducted, you may contact Dr KR Munasi on 0790354981 or emunask@unisa.ac.za

Thank you for taking time to read this information sheet and for participating in this study.

Thank you

---

Ndivhiseni Limela

**APPENDIX F: Letter requesting parental consent for minors to participate in a research project (focus group interview and observation)**

**Dear Parent**

Your child is invited to participate in a study entitled INVESTIGATING EFFECTIVE STRATEGIES FOR INTEGRATING LITTERING MANAGEMENT INTO EDUCATION FOR SUSTAINABLE DEVELOPMENT IN VHEMBE EAST DISTRICT, LIMPOPO PROVINCE.

I am undertaking this study as part of my master's research at the University of South Africa. The purpose of the study is to explore how littering could be Sustainably managed as a form of ESD in selected schools in the Vhembe East District Limpopo Province and the possible benefits of the study are the improvement of the challenges

that schools face regarding litter management and to explore strategies to address the identified challenges in our primary schools. I am asking permission to include your child in this study because he /she will be able to give rich information towards littering management. I expect to have 40 other children participating in the study.

If you allow your child to participate, I shall request him/her to:

- Take part in observation in their classrooms during Natural Science and Technology Period, during lunch breaks and in general school surroundings.

- Take part in a focus group interview, when he/she will be asked questions together with other learners. and take a turn to answer, directed by the researcher only. Interactive setting will be used which can allow learners to discuss all issues associated with littering and littering management in their school. The study will take place at the school during school time. I am going to use audio and video recording during observation and the 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 are (1) gaining more knowledge about the environment (2) sharing ideas on littering management in schools. 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 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 after school using cellphone group call.

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 are :(1) gaining more knowledge about the environment (2) sharing ideas on littering management in schools. Neither your child nor you will receive any type of payment for participating in this study. There are no potential risks in this study. 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, Dr Munasi KR, Department of Science and Technology, College of Education, University of South Africa. My contact number is 0724292900 and my e-mail is ndivhi1@gmail.com. The e-mail of my supervisor is emunask@unisa.ac.za. Permission for the study has already been given by DET/principal/SGB 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:

_____ _____

_____

Researcher's name (print) Researcher's signature Date:

**Assent from learners in a primary school to participate in a research project (focus group interview and observations)**

A LETTER REQUESTING ASSENT FROM LEARNERS IN A PRIMARY SCHOOL TO PARTICIPATE IN A RESEARCH PROJECT

Dear learner

Date _____

My name is Teacher Ndivhiseni Limela and would like to ask you if I can come and observe you during Natural Sciences and Technology period with your teacher. I am trying to learn more about how children care about their class and surrounding when they play with friends.

If you say YES to do this, I will come and watch you when you are with your teacher during Natural science and Technology period and conduct interview with you at school 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 don't 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 don't 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 didn't 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: Limela N

| Your Name | Yes, I will take part  | No, I do not want to take part  |
|---|---|---|
| Name of the researcher: Limela N | | |
| Date | | |
| Witness | | |

APPENDIX G: EDITOR CONFIRMATION LETTER

Shiraz 16

50 Quail Avenue

Thatchfield Close

Centurion, Pretoria

0157

**Date: 10 October 2025**

**To whom it may concern**

This letter confirms that the dissertation entitled "**Investigating effective strategies for integrating littering management Into Education for Sustainable Development in Vhembe East District, Limpopo Province"** written by **RAMBUDA NNDIVHISENI GLORIA** has been edited by Sam Ramaila.

Sincerely,

Sam Ramaila (PhD)

Cell: 0646566387

# APPENDIX H: TURNITIN REPORT