Enhancing the teaching of education for sustainable development in the Foundation Phase through community-based education

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Thesis accepted for the degree *Master of Education* in *Special Needs Education* at the North-West University

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Graduation ceremony: July 2022

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DECLARATION

I, Sandra Fourie, declare that the research reported in this dissertation is my own work, except for parts that are acknowledged and citated accordingly. I confirm that no part of this dissertation has been submitted for examination to any other educational institution or is concurrently being submitted by another student at any other university.

Signed: 

Date: ……7 December 2021……

PREFACE

Thank you, Heavenly Father, for this blessing and opportunity. Thank you for equipping me with wisdom, energy, purpose, and for guiding every word, idea, and action throughout this study.

It was only through Your mercy and love that the right people were sent into my life for guidance, support, gentleness, and kindness. Thank you to my parents, friends, supervisors, colleagues, and participants for your input and influence during this journey.

Thank you, Prof Lesley Wood, for everything I am grateful and humbled.

ABSTRACT

Teacher education for Education for Sustainable Development (ESD) has been neglected in teacher-education programmes and there is a need to improve South African teachers' knowledge and capacity to teach ESD content, values and skills. The aim of this study is to enhance the teaching of ESD in the Foundation Phase by exploring the teaching needs of teachers in terms of ESD, determining what the local environmental issues in the community are and establishing how teachers can link these issues to their teaching. I also aim to provide guidelines to inform the integration of ESD into the Foundation Phase through Community-Based Education (CBE). Suitable teaching approaches for this aim are experiential and transformative learning, which are, therefore, the theoretical frameworks underpinning this study. This critical qualitative study implemented Participatory Action Learning and Action Research (PALAR) as the methodology. Participants were recruited by means of convenience sampling and consisted of two Grade 2 teachers and two Grade 3 teachers. Data generation consisted of two cycles. The aim for cycle one was relationship building, forming a shared vision for our study, negotiating an ethical agreement and then determining what teaching needs in terms of ESD in the Foundation Phase teachers experienced. During cycle two, we determined what knowledge the teachers already had about CBE, discussed the local environmental issues, collaboratively designed action plans to implement ESD using CBE and reflected thereon to determine the impact and usefulness of our action plans. We concluded with our findings and recommendations which were used to create a digital informational brochure to mobilise knowledge on ESD in the school. Data was generated by means of action learning sets (ALS) and various arts-based methods and analysed by myself and the participants using content analysis.

Key words: Education for Sustainable Development, Foundation Phase, Community-Based Education, experiential learning, transformative learning, Participatory Action Learning and Action Research

OPSOMMING

Die opleiding van onderwysers in Onderwys vir Volhoubare Ontwikkeling ("Education for Sustainable Development" of ESD) is nagelaat in onderwyser-opleidingsprogramme en daarom is daar 'n behoefte om Suid-Afrikaanse onderwysers se kennis en kapasiteit om ESD-inhoud, -waardes en -vaardighede te onderrig, op te skerp. Hierdie studie het ten doel om die onderrig van ESD in die Grondslagfase te bevorder deur onderwysers se behoeftes aangaande ESD te ondersoek, vas te stel wat die plaaslike omgewingskwessies in die betrokke gemeenskap is en te bepaal hoe onderwysers hierdie kwessies in verband kan bring met hulle onderrig. Voorts het ek ten doel om riglyne daar te stel vir die integrasie van ESD in die Grondslagfase deur middel van gemeenskapsgebaseerde onderrig ("Community-Based Education" of CBE). Die gepaste onderrigbenaderings vir hierdie doel is eksperiënsiële en transformatiewe leer wat die teoretiese raamwerk vorm wat hierdie studie onderskraag. Hierdie kritiese kwalitatiewe studie het Deelnemende Aksie-Leer en Aksie-Navorsing ("Participatory Action Learning and Action Research" of PALAR) gebruik as metodologie. Deelnemers is gewerf deur middel van gerieflikheidsteekproefneming en bestaan uit twee Graad-2 onderwysers en twee Graad-3 onderwysers. Data-generasie het uit twee siklusse bestaan. Die doel van siklus een was verhoudingbou, om ons gedeelde visie vir die studie daar te stel, om 'n etiese ooreenkoms te onderhandel en om te bepaal watter behoeftes onderwysers met betrekking tot ESD in die Grondslagfase het. Tydens siklus twee het ons bepaal oor watter kennis rakende CBE die onderwysers reeds beskik, ons het die plaaslike omgewingskwessies bespreek, saamgewerk om aksieplanne op te trek vir die implementering van ESD deur middel van CBE en toe oor daardie planne besin om die impak en nuttigheid van die aksieplanne vas te stel. Ons het afgesluit met ons bevindinge en aanbevelings wat ons gebruik het om 'n inligtingsbrosjure saam te stel om sodoende kennis oor ESD in die skool te mobiliseer. Data is gegenereer deur middel van aksie-leer stelle (ALS) en verskeie kunsgebaseerde metodes en is daarna deur my en die deelnemers geanaliseer deur gebruik te maak van inhoudsanalise.

Sleutelwoorde: onderwys vir volhoubare ontwikkeling, grondslagfase, gemeenskapsgebaseerde onderrig, lewensvaardighede, eksperiënsiële leer, transformatiewe leer, deelnemende aksie-leer en aksie-navorsing

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CHAPTER 1: OVERVIEW OF THE STUDY

1.1. Introduction

At the end of my final year of study for my Bachelor of Education degree, I had the opportunity to accompany one of my lecturers to Ontario, Canada. Whilst there we visited multiple schools ranging from a catholic school, a Montessori school to various day-care centres and my personal favourite, a forest school located on the campus of our hosting university. The concept of the forest school was foreign to me as it was not introduced in my undergraduate studies. During our forest school explorations with Grade 1 learners, I witnessed learners treating nature with respect, creating authentic learning experiences with the natural world and its resources and engaging with indigenous knowledge by practicing storytelling of First Nation folktales. The teachers and learners used sticks and stones to create rhythm to dance to and learners were facilitated but also granted freedom to discover for themselves. The school and university formed a community partnership to support each other, solve local environmental issues and take responsibility to contribute meaningfully to the community.

However, when I compared this approach to teaching to that which I experienced during my work-integrated learning in the Foundation Phase, I noticed that learners are most often taught by means of teacher-centred approaches to maintain discipline, are given predetermined and mandatory worksheets for summative assessments and are confined to the four walls of their classrooms. Learners are not connected to nature or involved in the community because these are not concepts that are examinable, however invaluable. Whilst participating in and assessing work-integrated learning (WIL), I found that most teachers simply rely on the Life Skills Rainbow Workbooks that are based on the Curriculum and Assessment Policy Statement (CAPS) framework and developed by the Department of Basic Education (DBE, 2011). The Life Skills Rainbow Workbooks only address the concept of environment as a content reference approach to social and environmental concerns, which focusses on awareness instead of active involvement (Swarts, Rens & de Souza, 2015). Therefore, learners in these classes perceived environment and sustainability to be abstract concepts in workbooks that have no impact on their everyday lived experiences. As a result, learners are not empowered to think that they can make a change and that their actions and voices have merit.

As reported by the United Nations Intergovernmental Panel on Climate Change (IPCC) (2018), we have twelve years to limit global warming before catastrophic environmental devastation. Thus, there is a righteous focus on preventing such devastation within sustainability education. Unfortunately, a human-centric approach is often implemented that is more focused on the wants

and needs of humanity than of planet earth (Tillmanns, Holland, Lorenzi & McDonagh, 2014). Therefore, I wish to conduct further research on the topic of Education for Sustainable Development (ESD) and how Community-Based Education (CBE) can assist to reduce our vulnerability and ignorance and increase our resilience and Ubuntu (indigenous term for humaneness and compassion).

1.2. Concept clarification

The following key concepts comprise the focus of my study and require clarification: Education for Sustainable Development (ESD), Foundation Phase, Community-Based Education (CBE), transformative learning, experiential learning, critical theory and Participatory Action Learning and Action Research (PALAR).

1.2.1. Education for Sustainable Development

Brundtland (1987:292) defines SD as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." ESD involves cooperation, decision-making and an interdisciplinary approach that enables learners to learn from one another as they consider their actions and the consequences of those actions for the future (Tilbury, 2004). The focus of ESD is not exclusively related to the biophysical dimension, but also to the socio-cultural dimension (social justice) (Cebrián, Junyent & Mulà, 2020) and the economic dimension (poverty reduction) (Wals, 2012; Hedefalk, Almqvist & Östman, 2015). In this study, ESD will refer to educating learners about respect for others and for the planet to ensure sustainability for the future by initiating transformative experiences within their local communities.

1.2.2. Foundation Phase

In the South African schooling system, the Foundation Phase forms part of the General Education and Training band and includes learners in Grades R-3 (Department of Basic Education, 2011). Learners in this phase are, thus, anywhere between the ages of five and nine, depending on their age of entry.

1.2.3. Community-Based Education

Community-based education (CBE), also known as place-based education, is interdisciplinary and aimed at establishing a deeper connection between learners and their immediate environments. According to Villani and Atkins (2000), learners must build relationships with caring, knowledgeable adults in their community to recognise and support the needs of their local community. Learners are, consequently, enabled to integrate theory with practice because CBE

seeks to help communities by involving learners that connect their learning to the community issues (Shallcross, Loubser, Le Roux, O'Donoghue & Lupele, 2006) to make their communities a better place to live in (Smith & Sobel, 2010). In this study, CBE will refer to the learners' connection to the place they live in and sense of responsibility towards solving local environmental issues.

1.3. Rationale

The aim of this study is to enhance the teaching of Education for Sustainable Development (ESD) in the Foundation Phase by exploring the teaching needs of teachers in terms of ESD, determining what the local environmental issues in the community are and establishing how teachers can link these issues to their teaching. I also aim to provide guidelines to inform the integration of ESD into the Foundation Phase through CBE.

1.3.1. Environmental Education and Education for Sustainable Development

Environmental education (EE) refers to learning that enhances learners' knowledge about the environment and environmental issues (Agbedahin, 2018). In EE, the total (social and natural) environment is the focus of concern, it is external (resolving environmental issues) to the learners with an emphasis on the ecology curriculum as well as interdisciplinary and experiential learning. According to Hedefalk et al. (2015), ESD can be defined as education *about* the environment (knowledge about natural systems), education *in* the environment (direct experiences in nature), and education *for* the environment (solving environmental problems and making socially just and sustainable decisions). In ESD humans are the focus of concern; it is internal (social development) to learners with an emphasis on the provision of education, the ecology curriculum as well as interdisciplinary and experiential learning (Pavlova, 2011).

The concept of environmental learning in the curriculum policy documents may limit teachers as it implies that environmental knowledge is the only aim (Le Grange, 2004), whereas the concept of environmental education considers culture, knowledge and the local environment to make education more critical, meaningful and transformative (Blanchet-Cohen & Reilly, 2017). Thus, for the purpose of this study I refer to environmental education, as I do not agree that environmental education should solely be informed by policy documents, such as the CAPS.

ESD is also a commitment to the five pillars of holistic education, 1) learning to know, 2) learning to do, 3) learning to be, 4) learning to live together, and 5) learning to transform oneself and society (UNESCO, 2010). Learning to know is a process of discovery that includes the development of imagination, reasoning, problem-solving, and the ability to think coherently and critically to understand nature, mankind and its history, and the environment (Nan-Zhao, 2005; Sinha, 2018). Learning to do is the ability to communicate effectively, engage in teamwork, build

meaningful interpersonal relationships, adapt to change, transform knowledge into innovations and solve problems (Nan-Zhao, 2005; Delors, 2013). Learning to be implies a curriculum aimed at acquiring universally shared human values, developing reasoning, aesthetic awareness, physical and communication skills, critical thinking and independent judgment, and developing personal commitment and responsibility (Nan-Zhao, 2005; Delors, 2013). Learning to live together involves knowledge and understanding of oneself and others, appreciation of diversity and an awareness of similarities between humans and their interdependence, empathy and cooperative social behaviour, respect, conflict resolution through dialogue, and working towards common objectives (Nan-Zhao, 2005; Delors, 2013). Lastly, learning to transform oneself and society includes critical, participatory and collaborative learning that is involved in problem-solving within the community (Cambers, Chapman, Diamond, Down, Griffith & Wiltshire, 2008). When learners are empowered to transform their experiences through critical reflection and experiential learning, they will become active community members who act for the transformation of themselves and society (Makrakis, Gkotzos & Larios, 2012). Cebrián et al. (2020) suggests that ESD is holistic and transformational, therefore, ESD pedagogy should be interactive, learner-centred and action-oriented, which supports self-directed learning, participation and collaboration, problem-solving and must emphasise the development of key sustainability competencies.

Currently EE and ESD co-exist. However, some countries use a narrow interpretation (EE), while others use a broader interpretation that includes social aspects (ESD) (Pavlova, 2011). These interpretations gave rise to three models of EE-ESD relationships: EE equals ESD, EE as a part of ESD, and EE and ESD as distinct, but overlapping (UNESCO, 2010). For the purpose of this study, I will regard EE as a part of ESD, as ESD is broader and, in addition, focuses on the social and economic dimensions without excluding the importance of the environment. Strong attempts have been made internationally to replace the term EE with the newer term ESD (Robottom, 2007). ESD is a more recent and broader term in the sense that it is more than just addressing the values and attitudes of learners, it also develops their proficiency to bring about social change in their local communities to reach sustainable development (Tilbury, 2004; Sankar, 2017). However, both EE and ESD entail commitment to engaging in and changing actions, values, attitudes and knowledge (Shallcross et al., 2006). Some Foundation Phase teachers may not possess the necessary knowledge and skills to implement this ESD pedagogy.

1.3.2. ESD in South Africa

The South African Constitution (1996) states in Section 24 that all citizens have the right to a safe and protected environment for present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and the use of natural resources. The government

supports Agenda 21, adopted at the United Nations Conference on Environment and Development, which declares that “education is critical for sustainable development” (UNCED, 1992:2) and suggests focussing education towards sustainable development, capacity-building, and improving public awareness to create environmentally literate and dynamic citizens, ESD must be interdisciplinary, integrated and active to ensure that all South Africans practise sustainable use of resources (Department of Education and Training, 1996). Teaching approaches that are conducive to this aim are learner-centred, experiential and transformative (UNESCO, 2017; Iliopoulou, 2018; Cebrián et al., 2020). In the Minimum Requirements for Teacher Education Qualifications (MRTEQ) policy document (DHET 2015) the environment and sustainable development are mentioned as concepts that require greater attention in teachers’ professional development in South Africa. If this is addressed ESD may inspire the inclusion of local environmental issues as curriculum content in education programmes (Reddy, 2021). The CAPS focuses on the knowledge, skills and values within each subject. Some challenges that emerged from the CAPS concerning ESD in the curriculum are 1) values regarding the environment and sustainability can become less obvious because values are viewed as pedagogic discourse, 2) the isolated topics produced fragmented representations of environmental knowledge that 3) hindered the integration of ESD across subjects which is crucial to environment and sustainability understanding (Schudel, Songqwaru, Tshiningayamwe & Lotz-Sisitka, 2021).

The principles of the Global Action Programme for sustainable development (UNESCO, 2014) include 1) conscious decision-making and responsible actions to become environmentally literate and responsible citizens, 2) participatory teaching and learning methods that are preferably experiential, 3) valuable and relevant ESD, 4) transformative education, and 5) integrated, balanced and holistic ESD across all subjects. ESD requires transformative education (Pavlova, 2013), thus, playing and learning in nature refers to transformative ECE (Early Childhood Education) that encourages children to take action by pursuing and solving sustainability issues related to their own lives (Davis, 2009). CBE is also a transformative educational approach that is fundamental to ESD because it encourages environmental conservation and creates critical awareness of social, ecological and political influences on places (Kopnina, 2014; Le Grange & Ontong, 2015). A transformative theoretical framework guides this study because it encourages acting for change and developing awareness, and according to Davis (2015) and Lotz-Sisitka (2012), teachers who wish to teach for sustainable development should shift towards a more critical and transformative pedagogy.

1.3.3. Lack of teacher capacity in ESD

Research (Davis, 2009; Wals, 2012; Lotz-Sisitka, 2012; Ramsaroop & Van Rooyen, 2013) indicates that there is poor understanding of sustainable development in schools, and teachers have little capacity for the integration of these issues into teaching and learning. Although the environment and sustainability are curriculum-related issues in Life Skills and mathematics education (DBE, 2011), research has indicated that there is no proper guidance on how teachers should implement ESD in other subjects (Mokhele, 2011). Some Foundation Phase teachers do not have sufficient knowledge, skills and training in ESD and resort to developing tools to assist themselves in interpreting policies and guidelines, which contributes to the confusion and increase of documents and paperwork (Schudel, 2012). Therefore, teachers understand and interpret the policies differently because there is no guidance on how to approach ESD.

Teacher education for ESD has also been neglected in teacher-education programmes over the past years and there is a need to improve South African teachers' knowledge and capacity to teach ESD content, values and skills (Lotz-Sisitka, 2012; Ramsaroop & Van Rooyen, 2013; Theron, 2016). Assessments done by the Department of Environmental Affairs (2010) indicated that teachers have insufficient environmental knowledge, because their tertiary training did not prepare them to teach ESD effectively and the Department of Education did not provide in-service training initiatives aimed at ESD (Ramsaroop & Van Rooyen, 2013). For this reason, a gap exists between theory and practice. Fraser, Gupta and Krasny (2015) identified the need for academics, teachers and communities to work together to develop a mutual understanding of implementing ESD.

UNESCO (2017) suggests curriculum change can be fostered by capacity building and support for teachers (e.g., guidelines for the design and evaluation of ESD resources, methods to share knowledge among local teachers, and ESD facilitators). Schudel (2012) identified that teachers require capacity building on the 1) development of learning and teaching support materials, 2) selection of assessment methods and standards and 3) creation of lesson plans for environmental learning opportunities. Teachers need to learn about the different aspects of ESD, such as environmental literacy, systems thinking skills, and a variety of holistic learner-centred teaching and learning approaches that are grounded in sustainability practices and that accommodate the needs of all learners (Ramsaroop & Van Rooyen, 2013).

Since teachers' knowledge of ESD is superficial, they only teach about the environment using teacher-centred approaches (Shallcross et al., 2006), because they believe it is more time effective and maintains order and discipline in the classroom (Dube, 2012). Furthermore, there is very little time available for experiential learning and problem-solving approaches through

discovery learning. Also, some teachers are resistant to innovation, which may be a barrier to the implementation of new education policies (Dube, 2012; Duhn, 2012). This resistance, according to Orr (2004), may damage learners' sense of wonder and joy because learners are restricted to memorisation, routines, examinations and too much indoor learning.

1.3.4. Implementation of ESD in the Foundation Phase

ESD is best achieved through experiential and inquiry-based approaches that employ active learning as well as critical and creative thinking and emphasise human-nature interactions (Ramsaroop & Van Rooyen, 2013). Environmental writer Will Nixon (1997:31) once said, "Using the real world is the way learning has happened for 99.9% of human existence. Only in the last 100 years have we put it in a little box called a classroom." In terms of ESD, learning outside the classroom is particularly valuable (Orr, 2004). Learners must learn *in/through* the environment, to learn *about* the environment and to be able to act *for* the environment (Lee & Ma 2006; Davis, 2009; Hedefalk et al., 2015). This is not a new idea. Margaret McMillan, an ECE pioneer, famously said: "The best classroom and the richest cupboard are roofed only by the sky" (Sykes, 2016:89). Dewey (1915) emphasised the importance of an intimate relationship with nature, because it provides an opportunity for learners to engage with and manipulate natural things and materials to gain knowledge about their social necessities and uses. When learners are restricted to the four walls of the classroom, a disconnectedness between nature and learners can emerge. Louv (2010) calls this nature-deficit disorder (NDD). CBE may enhance ESD by combatting learners' disconnectedness.

1.3.5. Community-based education to enhance ESD

Learners' understanding of the environment, and their personal and social development, together with life skills, develop a sense of self in society (Rooth, 2005). When learners feel love and responsibility towards a place, they will restore and conserve it, and once a sense of place is established, it creates an opportunity for engagement, problem-solving, and membership (Ault, 2008; Smith & Sobel, 2010). Learners who are unfamiliar with their environment may not be inclined to care for it and protect it (McCurdy, Winterbottom, Mehta & Roberts, 2010). According to Ontong and Le Grange (2014), a sense of place is an understated area of study in ESD.

A sense of place can be fostered through Community-Based Education (CBE) that is interdisciplinary, experiential (McInerney, Smyth & Down, 2011; Roy, 2014), and connects place, person, and the community (Ontong & Le Grange, 2014). Research (Lotz-Sisitka, 2012) shows that CBE improves learner achievement through critical teaching and learning. ESD through CBE is one of the common contemporary efforts that link schools to their communities and allows for

a balance between humans and the natural environment while emphasising experiential learning (Smith & Sobel, 2010; Fraser et al., 2015). When CBE is used to mediate ESD (Salequzzaman & Gorana, 2016), local natural resources are emphasised, and learners learn by observing natural changes over time in their community (Fraser et al., 2015). CBE gives learners the opportunity to apply what they have learned to the issues in their local community (Shallcross et al., 2006), which enables learners to become aware of the meaning and purpose of their learning (Smith & Sobel, 2010). Communities possess indigenous knowledge, which establishes a local knowledge base in sustainable development (Shallcross et al., 2006) and serves as a basis for integrating indigenous philosophies, such as Ubuntu (compassion and humanity), into ESD approaches (Ontong & Le Grange, 2014). CBE is interdisciplinary, experiential (Roy, 2014; McInerney, et al., 2011), critical (Smith & Sobel, 2010), encourages experiences in nature (Fraser et al., 2015) and is in line with all three dimensions (biophysical, socio-cultural, economic) of ESD, therefore, I argue that CBE is conducive to teaching ESD in the Foundation Phase. Ardoin, Clark and Kelsey (2013) also suggest that further research is warranted for ESD through CBE.

1.3.6. Integration of ESD into all subjects

ESD should not be regarded as an add-on to the existing curriculum; sustainability topics should instead be integrated into the curriculum (Orr, 2004; Ramsaroop & Van Rooyen, 2013; UNESCO, 2017). Although teachers may perceive ESD as additional work to their already heavy workloads (O'Connor & Geiger, 2009), ESD can be integrated into all subjects. The National Environmental Management Act (107 of 1998) stipulates that to achieve sustainable development, all people must have the opportunity to increase their awareness of environmental issues and assist in developing knowledge, skills and a commitment to acting. Learners need to be able to question and critique their actions and recognise their capacity to transform society. This is referred to as conscientisation (Freire, 1970; Glassman & Erdem, 2014).

Although all subjects deal with aspects of the environment, it is primarily Life Skills that focuses on intrinsic motivation and the emotional aspects of learners' behaviour (Rooth, 2005) for sustainable development. Life Skills, as one of the three subjects in the Foundation Phase, makes provision for learners to foster relationships with other people and the environment, which will assist them in making educated and morally accountable decisions for the environment. The Department of Basic Education (2011) states that learning is more meaningful in learners' local contexts - the local context may refer to the learners' natural environment that is also linked to place. This subject area addresses the issue of environmental health and will enable learners to develop the skills needed to contribute to their local community in terms of a healthier, safer and more sustainable environment (DBE, 2011). The CAPS (DBE, 2011) emphasises that the world must be understood as a set of related systems by recognising that problem-solving contexts do

not exist in isolation. The interdisciplinary approach in the Foundation Phase must, therefore, not be confined to a specific subject, but must rather be integrated into all subjects. Mathematics in the Foundation Phase aims to develop a critical awareness of how mathematical relationships are used in social, environmental, cultural and economic relations and may enhance learners' knowledge and awareness about the environment and environmental issues (DBE, 2011). In the subject of Mathematics in the Foundation Phase, learning is considered to be a human activity that involves observing, representing and investigating patterns and qualitative relationships in physical and social phenomena. Mathematics in the Foundation helps to develop mental processes that enhance logical and critical thinking, accuracy and problem-solving that will contribute to conscious and responsible decision-making (DBE, 2011). The study of space and shape in Mathematics improves understanding and appreciation of the pattern, precision and beauty in natural and cultural forms (DBE, 2011). In the CAPS for Home Language and First Additional Language, which are compulsory subjects in the Foundation Phase, very little mention is made of the environment and sustainability topics (DBE, 2011). It is, therefore, the teacher's responsibility to select children's literature that covers environmental and sustainability topics. Jørgensen (2014) suggests literature that includes the narrative of 'child saving the world' for leaners to become aware that their lives are inseparable from the lives of others and the environment, to foster agency, and a sense of place (Sanders, 2017). Umar, Saidu and Azare (2015) concluded that language is the only means we have to communicate about a specific topic, understand the wants, needs and issues of our community, and to solve local issues collaboratively by expressing opinions and making meaningful suggestions and value judgments. The Foundation Phase teacher must provide learners with a variety of resources, a safe and accessible environment, and routine, as well as structured and free-play activities (DBE, 2011). Although I agree that ESD should be structured, provision should also be made for learner-centred experiential learning, critical thinking, and exploration in the natural environment. Teachers should allow learners to pursue topics and investigate issues of their choice to enable them to become aware of the meaning and purpose of their learning (Smith & Sobel, 2010). This can be achieved by implementing problem-posing education in which teachers and learners are critical co-investigators of the things about which the learners want to know more (Beckett, 2013).

Smith and Sobel (2010) suggest creating meaningful learning opportunities for learners to contribute to social change in their communities, because it may motivate community engagement for a sustainable environment. Consequently, more environmentally literate learners will become more responsible citizens who take care of their environment and contribute to their community.

1.3.7. Inadequate research about ESD in the Foundation Phase

According to Davis (2009) and Duhn (2012), sustainability research in ECE is inadequate because there is a limited number of research projects aimed specifically at ECE. Pearson and Degotardi (2009) argue that ECE should focus on ESD because attitudes and behaviours relating to place, and responsibility as global citizens, are formed during childhood. There is a need for more work on experiential teaching and learning of ESD in ECE (Hedefalk et al., 2015; Dube, 2012). Kaldi, Filippatou and Govaris (2011) stress the importance of including experiential, field-based and investigative learning in daily Foundation Phase teaching. For this reason, I wish to focus on the Foundation Phase and how CBE, which emphasises the importance of experiential learning (Smith & Sobel, 2010), can be used to encourage critical thinking, nature experiences, social change, and transformative and interdisciplinary teaching and learning in and for ESD.

1.4. Research questions

The central research question guiding this study is: How can Foundation Phase teachers enhance their capacity for ESD through Community-Based Education?

The sub-questions of the study are as follows:

1) What teaching needs in terms of ESD do Foundation Phase teachers experience?

2) Which strategies and guidelines can teachers in the Foundation Phase implement to enhance ESD through CBE?

1.5. Theoretical framework

Ocholla and Le Roux (2011:1) define a theoretical framework as “the structure that holds and supports the theory of a research work”. The two structures used in this study are transformative learning theory and experiential learning theory.

1.5.1. Transformative learning theory

Transformative learning is the act of initiating change in thinking (Mezirow, 1997) when people become critically aware of their perceptions, understanding and feelings about the world (Mezirow, 1990). Mezirow (1991) identified critical reflection, dialogue and experience as constructs of transformative learning. Based on Mezirow’s transformative constructs, Taylor and Cranton (2013) identified empathy, experience and desire to change. All constructs are also applicable to ESD (Barth, Godemann, Rieckmann & Stoltenberg, 2007). I draw from this theory in my study, because ESD has transformative teaching and learning potential (Pavlova, 2013;

UNESCO, 2017), and according to Leal Filho et al. (2018), transformation towards a sustainable future is not yet apparent in schools or universities. When ESD is strongly committed to transformative learning, it can mediate a critical teaching approach (Ontong & Le Grange, 2014) and establish sustainable living (Pavlova, 2013). Emancipatory transformation in terms of ESD refers specifically to planetary consciousness, social change and individual transformation (Pavlova, 2013), which are all crucial factors for sustainable development. According to the UNESCO (2013) definition of Life Skills, education expands learners' abilities to live a life they value and to transform the societies in which they live. One of the disciplines in the beginning knowledge study area of Life Skills in the Foundation Phase is social change (DBE, 2011). For transformative learning to occur in ESD, teachers must engage their learners in critical thought and help learners to recognise the importance and impact of their learning and actions (Pavlova, 2013). Teachers should create opportunities for learners to experience the impact of their learning and actions on their immediate environment.

1.5.2. Experiential learning theory

Experiential learning is knowledge created through the transformation of experience, therefore, education should be conducted based on experience (Kolb & Kolb, 2005). Kolb published the experiential learning model, which describes learning as an ongoing cyclical process (McLeod, 2017), in 1984. Experiential learning is conscious, but unintentional, learning that occurs after an experience and involves reflection upon earlier experiences to transform thought and achieve deeper understanding (Barth et al., 2007).

Experiential learning is built on six propositions: 1) learning is a process, with little emphasis on outcomes, 2) all learning is relearning, 3) conflict resolution is involved, 4) learning is a holistic process, 5) learning is the process of creating knowledge, and 6) learning is a result of the connection between the person and the environment (Clark, Threeton, & Ewing, 2010). In Life Skills the focus of learning is on the holistic development of skills through enjoyable and meaningful experiential learning (DBE, 2011). The methods for Life Skills education have to be practical, active and participatory methods that are all experiential (Rooth, 2005). Learners' environmental sensitivity will be developed through experiential learning because once they experience a connection with their environment, they will feel empathy and responsibility towards taking care of it (Pearson & Degotardi, 2009; Kaldi et al., 2011).

1.6. Research Methodology

A methodology is a broad strategy, action plan or process of choosing certain methods (data collection and data analysis tools) and justifying their use (Roelvink, 2020). The research methodology includes the paradigm and design of the study.

1.6.1. Paradigm

A paradigm is a set of beliefs about fundamental aspects of reality and suggests that the way we think is the way we act (Maree, 2016). In this study, I adopt a critical paradigm. Critical theory is concerned with transformative learning and empowers learners to contribute to a just society by questioning the issues in their lives (Aliakbari & Faraji, 2011; Loubser, 2014). Critical theory employs normative and practical thinking to explain what the current social issues are, identify actors to change them, and provide practical goals for the future (Brodanský, 2016). The curriculum, according to critical theory, is socio-constructivist, meaning the curriculum is negotiated with role players in the community to serve the needs and objectives of that community (Loubser, 2014), just like in CBE. ESD should draw on the body of critical theory (Huckle & Sterling, 1996; Kopnina, 2014), as it is said to have originated from critical theory (Elliot & Davis, 2009). Dube (2012) proposes critical theory as a paradigm for ESD, because critical theory promotes the teaching and learning of positive attitudes and values for sustainable development. The paradigm that informed this study was critical theory because ESD has a transformative function (Huckle & Sterling, 1996; Walker, 1997), and critical theory demonstrates how such transformation can occur through active participation in societal change (Walker, 1997; Makrakis & Kostoulas-Makrakis, 2012; Loubser, 2014). Critical theory can empower teachers to be change agents through knowledge and skills development (Loubser, 2014). I aimed to create opportunity for Foundation Phase teachers to implement ESD through CBE.

1.6.2. Research design

A research design is a plan or strategy that moves from the underlying research paradigm to specifying the selection of participants, the data generation methods to be used and the data analysis to be done (Maree, 2016). This critical qualitative study will implement Participatory Action Learning and Action Research (PALAR) as its research design.

Walker (1997) recommends action research for teacher professional development in ESD, because it is also a method of learning. Participatory designs, such as PALAR, facilitate transformative learning (Ontong & Le Grange, 2014) within a group of teachers. PALAR is: 1) learner centred, 2) process and project based, 3) interdisciplinary, 4) problem oriented, 5) based

in reality, 6) inclusive, 7) aimed at social justice, 8) learning is self-directed, and 9) involves collaboration with and cooperation from the community (Zuber-Skerritt, 2015).

Dube (2012) and Loubser (2014) suggest implementing action research in which teachers are co-researchers, because it will enable participants to design critical teaching and learning programmes that focus on local environmental issues in the community and sustainable livelihoods. PALAR in particular provides an opportunity for participants to create knowledge based on their experiences, critically reflect on these experiences, form abstract theories and generalisations, and test the implications of these newly created theories in new situations (Zuber-Skerritt, 2015) – just as the experiential learning model proposes. Participatory action research (PAR) enables purposeful action in ESD, however, action-centred processes, such as critical engagement and reflexive change, are under-theorised in ESD (Ontong & Le Grange, 2014). According to Glassman and Erdem (2014), PAR and conscientisation are inseparable because the combination leads to greater self-awareness, which eventually changes individuals' actions. Bywater (2014) indicates that when PAR is incorporated into ESD, learners increase their environmental consciousness, promote sustainability, and improve their understanding of how their actions affect environmental health. PALAR incorporates action learning in small groups called action learning sets (ALS) to bring about change in the thinking and actions of participants.

The research process comprised a cyclical process. These cycles are briefly discussed below.

Cycle One

In cycle one, relationship-building took place during our first meeting, in which we got to know one another better and shared our collaborative vision for this study. An ALS was formed with the participants in which we discussed how ESD is perceived, the feelings of each teacher towards ESD, and the teaching needs of each teacher in terms of ESD. We determined if the teachers integrated ESD in other subjects, and if they did, in which subjects and why. We then reflected on all the teachers' opinions and suggestions for how ESD can be integrated and how the teachers currently implement ESD both in their classrooms and outdoors. Symbolic drawings were used to generate the perceptions and feelings of the teachers about ESD. The aim for cycle one was relationship-building, forming our shared vision for our study and negotiating an ethical agreement and then determining what teaching needs in terms of ESD the Foundation Phase teachers experienced.

Cycle Two

We started by forming a mutual understanding of what CBE entails, thereafter we discussed the local environmental issues that the community faced by means of collages. The data generated

in the first cycle was used to plan and design action plans for how teachers' teaching needs in terms of ESD can be met and how teachers can integrate ESD into their teaching using Community-Based Education. The participants and I collaboratively designed the action plans and they implemented it in their classrooms. Thereafter, we had another ALS in which we reflected on the changes, to determine the usefulness and impact of our action plans on the teaching of ESD. We also reflected on the challenges that the teachers faced when implementing the new teaching strategies in their classrooms. The aim for cycle two was to reflect on and determine which strategies to utilise in CBE to facilitate the integration of ESD into the Foundation Phase curriculum. Then we proceeded to summarise our findings and guidelines for implementing ESD in the Foundation Phase using CBE. These findings and guidelines were recorded and used to create a digital informational brochure to mobilise knowledge about ESD in the Foundation Phase.

1.6.2.1. Research methods

The research methods indicate the study's participant recruitment, data generation and data analysis that correlate with a PALAR study. These methods are discussed below.

1.6.2.1.1. Participant recruitment

According to Robinson (2014), sampling entails setting a target population based on inclusion or exclusion criteria, selecting a sample size, and selecting an appropriate sample strategy. Non-probability sampling does not attempt to select a random sample from the population of interest (Battaglia, 2011), therefore, it is dangerous to make important conclusions about the population from the data collected (Maree, 2016). I selected certain inclusion criteria and, thus, made use of convenience sampling. Purposive sampling is the deliberate selection of a participant because of the qualities the participant possesses (Etikan, Musa & Alkassim, 2016). These qualities had to meet the predetermined inclusion criteria established by the research aims and questions. The following inclusion criteria were applied to identify the target population in my study: the teachers had to be able to speak English, must teach in Klerksdorp in the North West province, have a BEd Foundation Phase qualification from an accredited institution or have teaching experience in the Foundation Phase, all of the teachers had to be employed at the same school, and possess experience in implementing environmental education or teaching sustainability topics. Convenience sampling occurs when participants are recruited for the purpose of the study if they meet certain practical criteria, such as geographical proximity, availability of time, and accessibility (Farrokhi & Mahmoudi-Hamidabad, 2012). The school is situated in Klerksdorp, which made the research site convenient and accessible for all the participants. Because of Foundation Phase teachers' lack of knowledge about ESD, I initiated the study based on my own experiences and

reviewed literature. Participants participated in my study by setting their own questions, which reflected mine, and generating data through reflecting on their own experiences.

Practical considerations, such as time and cost, were taken into account when considering the sample size. Three teachers volunteered to be participants in my study, they comprised one Grade 2 teacher and two Grade 3 teachers. Having a single research site and participants who are familiar with each other assisted in the relationship-building aspect of the project. The participants all taught at the same school as that school was the research site which was most convenient for us all. One research site was beneficial because the teachers were familiar and comfortable with one another and had already established relationships.

1.6.2.1.2. Data generation

In data generation, the researcher must give a clear and specific explanation of how data are generated, the instruments used, and the reasons for these decisions (Maree, 2016). Romm (2018) suggests making data generation decisions in collaboration with community participants to involve them in interpreting and evaluating the use of the generated data, since this may promote social change and social justice. This allows the researcher and community participants to build relationships and to learn from and relate respectfully to people of all cultures (Romm, 2018). Participants will feel respected and safe to express their opinions when they have built relationships with the researcher (Wood & Zuber-Skerritt, 2013).

PALAR motivates participants to commit to the research by creating an ALS which is a transformative learning experience that builds relationships for participant learning and sustainable results (Wood & Zuber-Skerritt, 2013; Wood, 2020). An ALS is a critical approach to learning that involves a small group (researcher and participants) who recognise similar issues and strive to learn with and from each other by confessing their incompetence and sharing their success (Trehan & Pedler, 2016). According to Haith and Whittingham (2012), ALS can be based on Kolb's experiential learning model, individual representation of issues, the re-representation of updates and progress (create knowledge), supportive and challenging discussion (critically reflect), personal summary and planned actions (form abstract theories), and practical actions beyond the group (experiment) which were generated using transcribed discussions.

I formed an ALS with the participants and we set specific aims for each meeting that allowed me to be properly prepared and ensured that time was used effectively. The aims for each meeting reflected our research aims and contributed to answering our research questions. I introduced the topic and aim of each meeting, facilitated the discussion, and learned with the participants. Specific dates for each meeting were negotiated with all participants beforehand to enable them

to arrange a schedule without conflicts. These ALS do not aim to solve the participants' problems (Haith & Whittingham, 2012), but it is hoped that they will facilitate personal learning by creating an atmosphere that is conducive to participants resolving their own issues. It is crucial to ensure that the participants (teachers) can apply the knowledge created when new issues arise, and I am no longer involved in the process.

Arts-based research is a critical, participatory methodology and is often implemented in community-based research (Theron, Mitchell, Smith & Stuart, 2011). In cycle one and two, various arts-based methods of data generation were used, such as symbolic drawings, collages, an object medley and photovoice (refer to § 3.5.2.). These arts-based methods were used to determine what perceptions, feelings and teaching needs teachers experience in terms of ESD (cycle one) and how teachers can use CBE to enhance their teaching of ESD in the Foundation Phase (cycle two). The generated data was discussed in the ALS to apply the meanings that participants gave to their own creations, rather than making my own interpretations (De Lange, Mitchell, Moletsane, Theron, Wood & Stuart, 2011). The discussions of the visual data were recorded and transcribed for data analysis.

1.6.2.1.3. Data analysis

Data analysis is a non-linear process, implying that data generation, data processing, data analysis and reporting are intertwined (Maree, 2016). Data analysis involves obtaining raw data and converting it into useful information for decision-making, answering questions, and making interpretations (Gandomi & Haider, 2015). For this study, I made use of content analysis, which refers to data derived from communicative practices that are analysed to understand the meanings of issues in a certain context to identify patterns that are not immediately observable (Saraisky, 2017). From these patterns, themes were extracted, on which I based my findings. In this study, the communicative practices are the ALS that were transcribed and then analysed to make sense of the implementation of ESD in the Foundation Phase. This provided me with a more holistic picture of the issues and, thus, a more accurate analysis of data. In order for themes to emerge from data, coding is required. Coding is the collection of codes under potential themes and comparing the emerged clusters of codes in relation to the entire set of data (Vaismoradi, Jones, Turunen & Snelgrove, 2016). The following cyclical process was followed to identify and develop themes in the generated data.

During initialisation I read and reread, referred to as a back-and-forth movement by Merriam and Tisdell (2009), the transcriptions of the ALS to identify the trends of the participants' perspectives and then I highlighted the meaningful units to determine recurring codes in the data. In the construction phase, I classified the codes under certain groups and then labels, in the form of

keywords and phrases, to ensure that the complete idea of each has been captured. The codes, groups of codes, and labels were combined to form the themes of my data. In the third phase, I had to verify if my themes relate to the literature, which would make it possible for me to formulate more accurate themes that can be substantiated. In the final phase, a story line was created to provide a holistic view of ESD implementation in the Foundation Phase.

1.7. Quality Criteria to Enhance Trustworthiness

The trustworthiness of data includes credibility (confidence in the truth of the research findings), dependability (fixedness of findings over time), confirmability (degree of corroboration), and transferability (the degree to which research can be relocated to other contexts) (Anney, 2015).

The following criteria were applied to ensure the validity of my study: 1) outcome validity, 2) process validity, 3) democratic validity, 4) catalytic validity, and 5) dialogic validity (Herr & Anderson, 2015). These criteria are discussed in more detail in Chapter 3 of this study.

1.8. Ethical Considerations

Research ethics entails confidentiality of information, participant's anonymity, and consent by participants (Ritchie, Lewis, Nicholls & Ormston, 2013). There are three principles of ethics stated in the Belmont Report that need to be adhered to: respect for persons (acknowledge autonomy), beneficence (maximum benefits whilst protecting participants from harm), and justice (participants volunteered and benefitted equally) (United States, 1978). These principles were operationalised for PALAR and are discussed in Chapter 3 of this study.

1.9. Chapter summary

In this chapter the statement, rationale and research design were discussed. The introduction included my personal experience with environmental and sustainability topics and the lack of teacher capacity in ESD. All key concepts were clarified to enable the reader to read with better understanding. I compared and explained the terms EE and ESD and stated that for the purpose of this study, I regarded EE as a part of ESD. The importance of learning in the natural environment was emphasised in the implementation of ESD in the Foundation Phase. I argued that CBE is conducive to ESD in the Foundation Phase, because CBE is interdisciplinary, experiential, encourages nature experiences, and is in line with all three dimensions of ESD. There are limited research projects aimed specifically at the Foundation Phase even though it is crucial to forming attitudes, behaviours and responsibility during childhood. In the South African context, there are policies and agendas that have been adopted to foster ESD, however, there are no guidelines or support for the implementation thereof. ESD is also regarded as an add-on

to the curriculum that is mainly rooted in Life Skills. I argue that ESD should be integrated into all subjects.

The theoretical frameworks underpinning this study are transformative learning theory and experiential learning theory. The research methodology and the suitability thereof were briefly discussed. The quality criteria to ensure trustworthiness were discussed together with the ethical considerations of this study.

In Chapter 2, I critically discuss the theories, models and conceptual framework that underpin this study.

CHAPTER 2: A CRITICAL DISCUSSION OF THE THEORIES, MODELS AND CONCEPTUAL FRAMEWORK UNDERPINNING THIS STUDY

2.1. Introduction

The theoretical framework forms the foundation to construct knowledge, supports the rationale, problem statement and the research questions and provides a lens through which we examine a topic (Grant & Osanloo, 2014). Wals (2010), Ryan and Cotton (2013) and Cebrián (2017) highlight the importance of using transformative learning, interdisciplinary learning and experiential learning as pedagogies for Education for Sustainable Development (ESD). ESD should, therefore, be based on experiential learning, action learning, Community-Based Education (CBE) and transformative learning, whilst working in and with the local community (Morgan, 2009). Transformative and experiential learning theories underpin my study and, in this chapter, I will critically discuss each theory, model and concept as well as the relevance of each.

2.2. Transformative learning theory: Background and origin

In 1978, Jack Mezirow introduced transformative learning theory, which he defined as "… learning that transforms problematic frames of reference – sets of fixed assumptions and expectations (habits of mind, meaning perspectives, mindsets) – to make them more inclusive, discriminating, open, reflective, and emotionally able to change" (Mezirow, 2003:58). ESD should educate learners to recognise the causes and effects of their actions and educate them on the appropriate responses to the consequences of those actions (Glasser, 2019). ESD, thus, prioritises the changing of mindsets (Tilbury, 2011), which is the aim of transformative learning theory, yet this learning theory is lacking in many current ESD pedagogies (Pretorius, Brand & Brown, 2016; Balsiger, Förster, Mader, Nagel, Sironi, Wilhelm & Zimmermann, 2017).

Transformative learning has three dimensions: 1) psychological (changes in self-awareness), 2) convictional (revision of beliefs), and 3) behavioural (sustainable actions and decisions) (Clark, 1991; Nino, Cuevas & Loya (2011). The aims of my study reiterate these dimensions as I aim to create a space that could bring about changes in teachers' perspectives on teaching ESD using CBE, support them in the revision of their current ESD beliefs, and transform their actions and decisions regarding the teaching of ESD. Mezirow (1997) also divided knowledge into three types: instrumental (task-oriented, problem-solving, relationship of cause and effect), communicative (how we impart our feelings and needs), and emancipatory (ability to transform our own lives). Transformation occurs once one has critically reflected on one's actions and experiences regarding teaching and learning and discussed these with other relevant people, generating knowledge based on experiences. Transformative learning influenced my selection of experiential

learning, transforming thoughts and mindsets by critically reflecting on experiences to form theories and take action to enable social change. Nino et al. (2011) also identified increased empowerment, compassion, creativity and courage as characteristics that emanate from transformative learning. Although these researchers may differ in the naming of constructs, the types of knowledge, constructs and characteristics can all be categorised under the dimensions of transformative learning theory. The *psychological dimension* deals with feelings that relate to communicative knowledge of how we convey our emotions and needs. This may include feelings such as compassion and courage as characteristics and empathy as a construct.

The *convictional dimension* comprises our beliefs, which may affect how we solve problems and approach the consequences of our actions, and for this instrumental knowledge is activated. Our belief systems are influenced by the construct of our lived experiences, which may lead to transformed mindsets and increased empowerment.

Lastly, the *behavioural dimension* is concerned with our actions and decisions, which are determined by emancipatory knowledge that inspires creativity and a desire to change that gives us the ability to transform our lives. Emancipatory knowledge may allow us to free ourselves from the limitations of our current actions, mindsets and feelings toward ESD to enable transformation and the reconstruction thereof. Once this transformation has occurred, we are able to share our new understandings with others to influence their actions, mindsets and feelings towards the environment and ESD.

A study conducted by Khabanyane, Maimane and Ramabenyane (2014) discussed four approaches to transformative learning with specific reference to the South African context. Firstly, transformation as conscientisation, where teachers are empowered to reframe their mindsets about ESD in the Foundation Phase and recognise their capacity to transform the mindset of their learners and diverse society (Freire, 1970; Glassman & Erdem, 2014). Secondly, transformation as critical reflection (Taylor, 1997; Van Woerkom, 2010), where teachers must be made aware of the contexts that inform their mindsets, because learning occurs when we transform our mindsets and change our points of view and habits of mind (Nino, et al., 2011). Teachers need to critically reflect on their current teaching of ESD to determine what needs and shortcomings they experience. Thirdly, transformation as development, when new experiences develop and enable teachers to make new meaning, which can change their mindsets. This may lead to teachers being more open-minded to implement ESD across all subjects by means of CBE strategies and reframe their mindset that considers ESD merely as an add-on to the curriculum (O'Connor & Geiger, 2009). Lastly, transformation as self-awareness may include the forging of compassionate relationships with others and the environment (Vandeyar & Swart, 2016), as our self-awareness keeps us in tune with our feelings, thoughts and actions. However, Khabanyane

et al. (2014) concluded that a fifth approach to transformative learning, an experiential approach, is more appropriate to South African classrooms as it assists teachers and learners to become change agents for social justice (Gross & Rutland, 2017) and environmental issues.

Taylor and Cranton (2013) discuss four important issues of transformative learning theory, namely: 1) the role of experience (convictional dimension), 2) empathy (psychological dimension), 3) change agency (behavioural dimension), and 4) the need for critical approaches in methodology. Therefore, the experiential learning theory (refer to § 2.3) forms part of the theoretical framework as it addresses the issue of experience and the important role experience plays in constructing new knowledge and reframing mindsets (Kolb & Kolb, 2005). I believe that ESD as a concept will encourage empathy because learners' environmental sensitivity will be developed through experiential learning (Pearson & Degotardi, 2009; Kaldi et al., 2011) and indigenous philosophies, such as Ubuntu (compassion and humanity), are integrated into ESD approaches (Ontong & Le Grange, 2014) as well as Life Skills. CBE will also assist in fostering empathy as CBE enables learners to feel love and responsibility towards a place and creates an opportunity for engagement (Ault, 2008; Smith & Sobel, 2010). Pavlova (2013) also suggests emancipatory transformation, which in the case of ESD, refers specifically to planetary consciousness, social change and individual transformation. Lastly, Ontong and Le Grange (2014) suggest that transformative learning should implement creative and critical methodologies, such as arts-based research and PALAR (Theron et al., 2011), which are both employed in this study.

2.2.1. Transformative learning in Foundation Phase Education for Sustainable Development

In terms of ESD, teachers should recognise the value of learning about sustainability from the community and aim to transform uninformed or ignorant mindsets that exploit the environment (Tillmanns et al., 2014). Education plays a significant role in the transition to a sustainable future, however, the overall challenge encountered by teachers in ESD is to empower learners to reframe their mindsets to become change agents (Harring, Torbjörnsson & Lundholm, 2018) and considerate citizens (Singh, 2011). Teaching-learning approaches conducive to ESD include the incorporation of the environment, society and economy, implementation of formal and informal education practices, adaption to the evolving concept of sustainability, and the use of interdisciplinary teaching-learning approaches that encourage participatory learning. All of these have been proven by Grierson and Munro (2018) to be transformative for learners as well as the community.

Tillmanns et al. (2014) propose the concept of a rhizome as a framework for the reconceptualisation of ESD processes and the transformation of teachers and learners' mindsets and actions. A rhizome represents the complexity of concepts and creates changeability that facilitates the transformation of mindsets towards sustainability and living in harmony with each other and the world (Tillmanns et al., 2014). A tree is often used as a metaphor for a rhizome to describe how knowledge is understood and constructed (Deleuze & Guattari, 1987; Robinson & Maguire, 2009; Tillmanns et al., 2014), and how this knowledge can bring about transformative thinking in ESD (Le Grange, 2011; Bjurström, 2012; Bengtsson, 2014). Trees have a rhizome, from which multiple roots grow, as an anchorage and stems also sprout up from the rhizome, which ultimately produces a seedling that grows branches and produces leaves and blossoms (Lacey & Johnston, 1990) (see Figure 2-1).

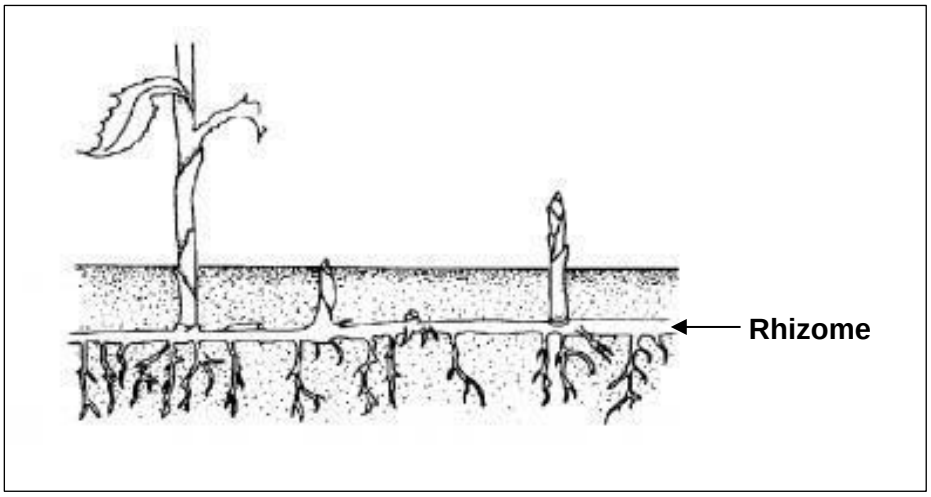


Figure 2-1: Sketch of a rhizome (Adapted from Moore & Bradley, 2018)

Deleuze and Guattari (1987:21), who coined this metaphor, state that

> Unlike a structure, which is defined by a set of points and positions with binary relations between the positions, the rhizome is made only of lines. The rhizome pertains to a map that must be produced, constructed, a map that is always detachable, connectable, reversible, modifiable and has multiple entryways and exits and its own lines of flight.

O'Riley (2003) argues that a rhizomatic view of knowledge is dynamic, diverse and unified as diverse knowledge is connected, distributed and transferred. In this study, I view ESD rhizomatically to produce such a connected and distributed knowledge system, which may open up dialogue for including local knowledge. Such a knowledge system will enable ESD to connect, distribute and transfer knowledge, skills and experiences of teachers, learners and community members in diverse ways to produce new knowledge and mindsets (Le Grange, 2016), much like the tree where the rhizome has the ability to produce a new stem for a new tree to grow from as in Figure 2-2.

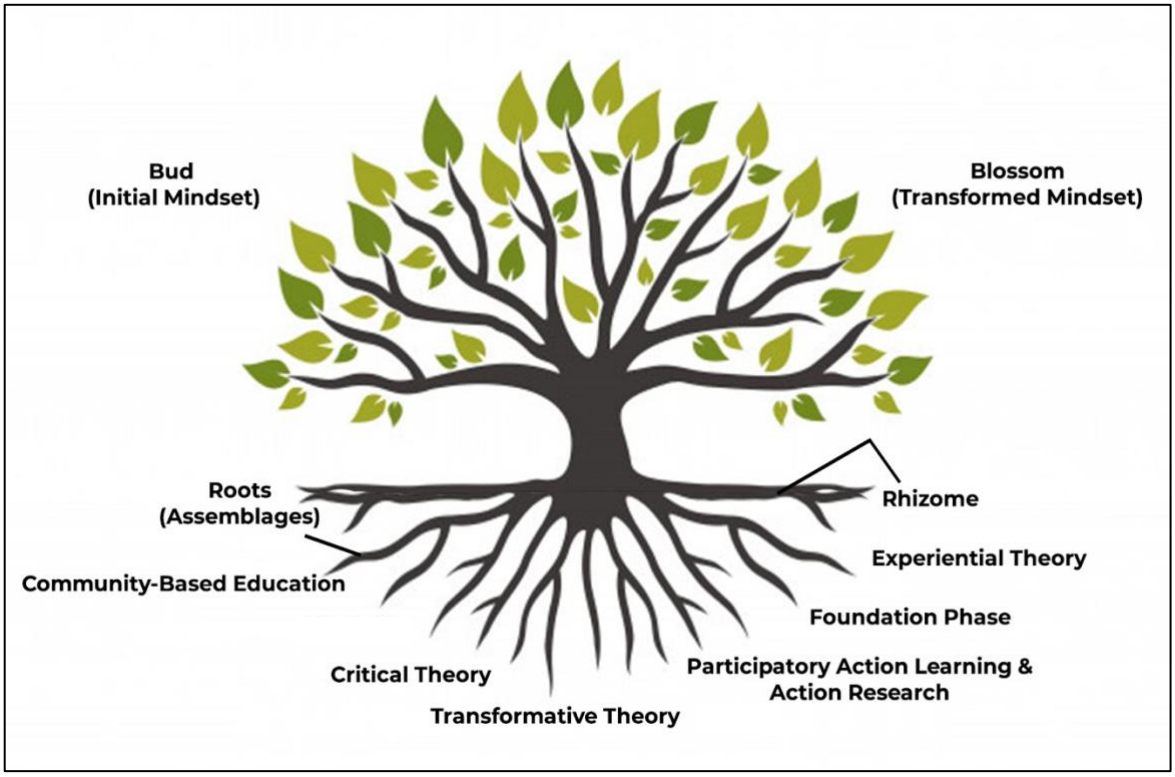


Figure 2-2: Framework of Rhizomatic Education for Sustainable Development (FoRESD)

For the purpose of this study, ESD was the rhizome and the main constructs of a rhizome include 1) assemblages, 2) nomadism, 3) war machines, and 4) lines of flight (Deleuze & Guattari, 1987), which are all relevant to ESD (McKenzie, Hart, Bai & Jickling, 2009; Scoffham, 2011; Tillmanns et al., 2014). *Assemblages* can be seen as the roots of the tree emanating from the rhizome that are all connected, these roots anchor the tree as well as the rhizome. If we adapt the tree metaphor to make it suitable for my study, ESD would be the rhizome and the assemblages emanating from ESD would include Foundation Phase, Life Skills, CBE, transformative learning, experiential learning, critical theory, and Participatory Action Learning and Action Research (PALAR). These interconnected assemblages anchor and stabilise my study in ESD, but can evolve and resprout at any time, creating new assemblages.

Nomadism implies boundless spaces for thinking and becoming to inspire imaginative frames of mind that may bud new assemblages. This may be the case in my study once data generation has begun and the participants start sharing their frames of mind, knowledge and experiences of ESD. Once these imaginative frames of mind have taken form, *war machines* emerge to initiate the transformation of mindsets, "becoming different, to think and act differently" (Deuchars, 2011:3). Sustainability education can convey alternative possibilities of being and becoming, and when joined with collective action from the local community, such as in CBE, may affect change and bring about the realisation that it is not solely the responsibility of the government to address local environmental issues (Le Grange, 2016). *War machines* can also be referred to as

“metamorphosis machines” (Patton, 2000:110) and will be used as such in my study and pose the following question: How might we teach about, in and for the environment in ways that go beyond our current pedagogical practices? *Metamorphosis machines* are revealed through objects and actions that provoke creative responses to local issues by means of transformed mindsets and enable us to become aware of our responsibility to each other and the Earth (Gould, 2009). When the metamorphosis machine is driven by nomadic thought it can result in emancipation (Hipwell, 2004) from current rigid ESD learning and teaching practises (Dube, 2012; Wals, 2012). Once again referring to the tree as metaphor, I see the buds on a branch blooming and associate this process with the metamorphosis machine, which triggers the transformation of initial mindsets (bud) into something new and different (blossom) that is continually evolving and becoming.

Once thinking has become nomadic and evolving mindsets trigger transformation, action needs to be taken, also referred to by Deleuze and Guattari (1987) as *lines of flight*, which can only appear through the presence of a metamorphosis machine. A line of flight is a split of an assemblage from the main rhizome and may lead to the formation of new assemblages. It emerges from transformative moments or experiences that lead to shifts in frames of mind. “The transformative experience of lines of flight offers much hope in ESD, precisely because of its potential in reorienting learners’ ways of thinking and acting” (Tillmanns et al., 2014:9). A rhizomatic view of ESD allows the curriculum to be “spontaneously shaped, constructed and then reconstructed” (Deleuze and Guattari, 1987:21) by experiences that develop lines of flight and create space for experimentation, creativity and the unearthing of potentialities (Bamber & Bullivant, 2015). In order for the buds on branches to bloom into blossoms, lines of flight (actions) need to be performed for the final transformation to occur and new potential assemblages to sprout. A hope I have for my study is that the participants will ultimately develop their own lines of flight that will enable us to have insightful conversations in our action learning sets (ALS) for a shared ownership of this study. This metaphor is also applicable to my own mindset shift as I initially perceived the Foundation Phase, CBE, transformative learning, experiential learning, critical theory and PALAR as individual entities related to ESD. As I generated new knowledge and experience on these topics, I realised that every concept is detachable, yet also connectable and modifiable.

Deleuze and Guattari (1987) furthermore identified six principles of a rhizome: 1) connection, 2) heterogeneity, 3) multiplicity, 4) assigning rupture, 5) cartography, and 6) decalcomania. Connection and heterogeneity imply that any point of a rhizome can be connected to another, regardless of their differences. This principle indicates that theory and practice should be related in lived experiences (Carrington, 2011). In ESD, theory of sustainability and the practice of

environmental sensitivity can be perceived through teachers, learners and community members taking responsibility to be more environmentally literate, considerate and responsible citizens. The principle of multiplicity explains how new mindsets can evolve through the interconnections of assemblages (Le Grange, 2007) between current knowledge, skills and experiences, and new ones acquired through experiential learning in the community (CBE). The assigning rupture refers to a broken rhizome that can resprout in another assemblage or form a new assemblage (Kaspary, 2014). Cartography refers to a rhizome as a map, focused on real-life experimentation and decalcomania is the active resistance of rigid practices, as mindsets transform with the world in an active, ongoing manner (Riley, 2019). As assemblages, the Foundation Phase, Life Skills, CBE, transformative learning, experiential learning, critical theory and PALAR have the capacity to disseminate, take root and become a map for ESD.

Teachers and learners must assist their communities to addresses local issues and recognise concepts such as Ubuntu, democracy and social justice (Bourn, Hunt, Blum & Lawson, 2016). Elliot and Davis (2009) highlighted the transformative potential of ESD in the Foundation Phase by encouraging experiential learning, discovery learning and outdoor play, and emphasising the importance of allowing learners' voices to have merit (Bennell, 2012). In the CAPS document for Life Skills in the Foundation Phase (DBE, 2011), provision is made for outdoor play that offers the opportunity for learners to develop an appreciation of the environment (gardening and caring for animals) (Dube, 2012), to learn to play co-operatively, and to make decisions (Bennell, 2012). Teachers should incorporate these lesson experiences of sustainability, environmental sensitivity (McCurdy et al., 2010) and the choice to transform mindsets by means of outdoor play (Brodanský, 2016) into their teaching, and not solely rely on the classroom and textbooks (Orr, 2004; Sykes, 2016; Breunig, 2017).

2.3. Experiential learning theory

According to the transformation as development approach of transformative learning as proposed by Khabanyana et al. (2014), newly lived experiences facilitate the development of new beliefs which may lead to reframed mindsets. Kolb (1984:41) defines experiential learning theory as "The process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience." Therefore, experiential learning can also transform mindsets, construct new knowledge, and enhance transformative learning. Kolb's (1984) experiential learning model includes the creation of knowledge based on

experiences, critical reflection on said experiences, the formation of abstract theories and generalisations, and the experimentation with newly created theories (see Figure 2-3).

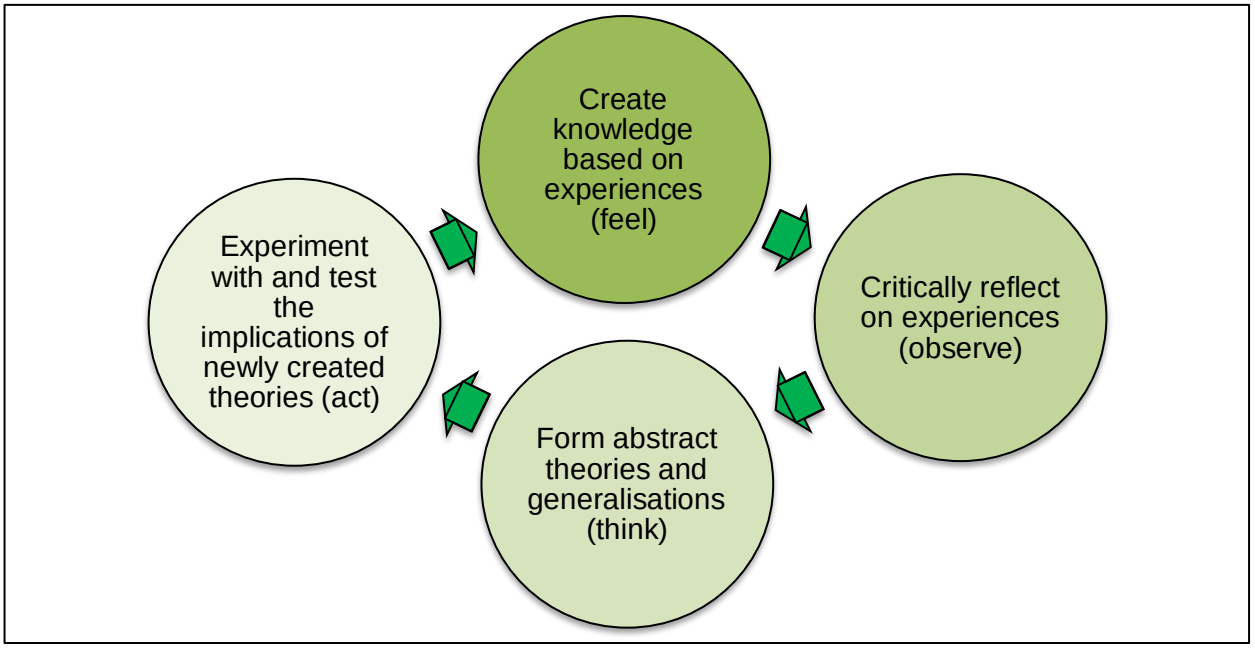


Figure 2-3: Kolb's experiential learning model (adapted from Zuber-Skerritt, 2015)

Drawing from this model, education *about* the environment is the creation of knowledge based on experiences, education *in* the environment is the critical reflection on these experiences in the local community to form theories, and education *for* the environment implies experimentation of theories to enact environmental change in the local community. Experiential learning develops appropriate experiences, attitudes, emotions, skills and knowledge that can contribute to solving local and global sustainability issues (Higgins, 2009). Experiential learning is grounded in two bands, namely: 1) the processing band (active experimentation or reflective observation) and 2) the perception band (abstract conceptualisation or concrete experience) (UNESCO, 2013). The processing band is concerned with actions and interpretations, whereas the perception band is more concerned with reasoning and feeling. Quality education for sustainability requires that teachers transform content knowledge into experiential learning to ensure that learners are engaged in actions that allow them to act responsibly.

The elements of the experiential learning model also relate to the principles of an ALS, which is implemented in PALAR. In an ALS, the participants respect each other's experiences, generate knowledge from experience, and create safe and welcoming environments where dialogue can take place. These environments encourage critical reflection and give participants the opportunity to take action by implementing action plans. When participants brainstorm and implement action plans, they become more competent in the research process and this experimentation creates space for self-directed learning to occur.

2.3.1. Experiential learning in Foundation Phase Education for Sustainable Development

The experiential learning model (Figure 2.3) involves continuous concrete experiences, reflective observations, abstract conceptualisations, and active experimentation (Kolb, 1984). Rooth (2005) suggested that within Life Skills, which is the only subject that currently includes sustainability topics, teachers should focus more on experiential and participatory methods. The CAPS reiterates this as it states that active and critical learning in real-life contexts should be encouraged (DBE, 2011). Many teachers have since shifted to using more experiential, exploratory, active, and self-critical methods in Life Skills (Wals, 2012). The Foundation Phase focuses on experiential learning (DBE, 2011; Dixon, Janks, Botha, Earle, Poo, Oldacre, Pather & Schneider, 2018) and emphasises outdoor learning, because learners' experiences in the outdoors are direct and assist in solving real-life issues and learning about conservation and sustainability (Lovell, O'Brien & Owen, 2010). Therefore, the Foundation Phase teaching environment cannot be confined to the four walls of the classroom, but should rather include the learner's local environment (DBE, 2011).

Learners in the Foundation Phase find experiential learning more valuable than traditional teaching and they have developed environmental sensitivity and positive attitudes towards their peers from different cultural backgrounds (Kaldi et al., 2011). These positive attitudes may contribute to Ubuntu and democracy, which are aligned with critical theory (Tsevreni, 2011) as well as transformative learning (Bourn et al., 2016). Experiential learning enhances the physical togetherness between people and nature (critical pedagogy of place), which has strong ties with local traditions and authentic learning experiences (Leather, 2016). Researchers noted that experiential learning is an important aspect of ECE as learners' learning and development is significantly improved by direct experiences with nature and natural resources (Maynard, 2007; Anderson, Anderson, Hare & McTavish, 2015; Bender, 2017).

2.3.2. Experiential theories underpinning Education for Sustainable Development

Experiential learning, specifically in the outdoors, can enhance ESD (Elliot & Davis, 2009; Hill, 2013) as it encourages experiences with and in nature (Ramsaroop & van Rooyen, 2013) and establishes a connection with the environment (McCurdy et al., 2010; Sankar, 2017). Rieckmann (2017) and Iliopoulou (2018) agree that ESD requires an action-oriented interdisciplinary approach, transformative and experiential learning, and CBE to empower learners to become knowledgeable and active change agents who solve actual issues that are relevant to their lives (Wals, 2012). All these requirements align with Foundation Phase education (Elliot & Davis, 2009; DBE, 2011), specifically Life Skills. The Association for Experiential Education (AEE) (2013) defines experiential learning as education that engages learners in direct experience and

reflection to develop their capacity to contribute meaningfully to their communities, so it is directly linked to CBE that engages learners in community-based activities to address issues in their local community (Labuschagne, 2015). To engage learners in these real-world learning experiences, Moore (2005), Thomas (2009) and Cebrián, Grace and Humphris (2014) advocate using learner-centred approaches, such as CBE, experiential learning, participatory learning, discovery learning, engagement with real-life issues, and learning collaboratively within a community. These approaches create empowered and responsible citizens who have the capacity to become active change agents by fostering the required skills to manage sustainability, such as critical and creative thinking, problem-solving skills, collaboration and conscientisation (Barth et al., 2007; Wals, 2010; Cebrián et al., 2014). Figure 2-4 indicates the relationship of the theoretical framework on this study.

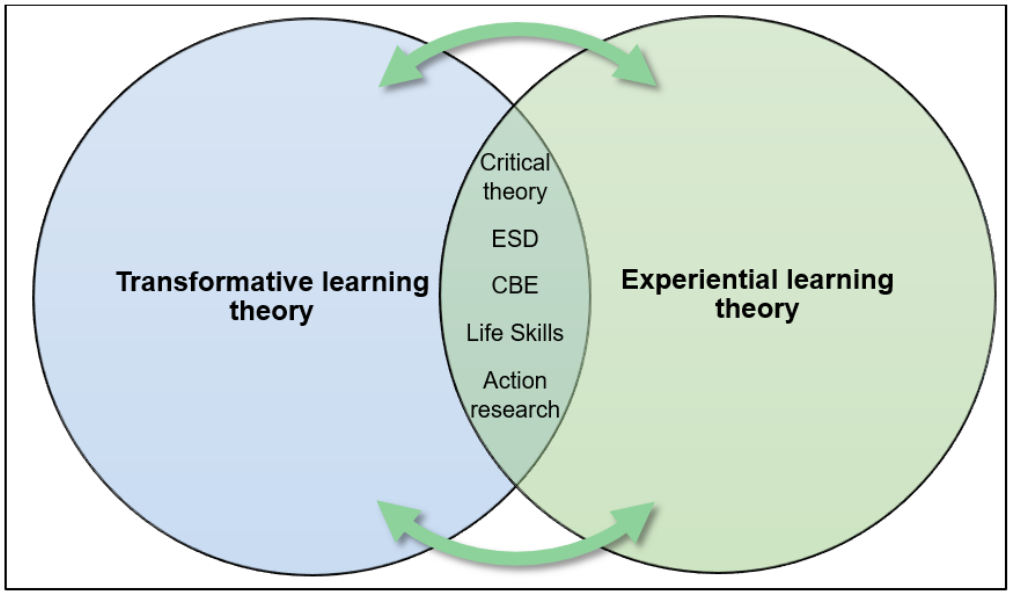


Figure 2-4: Relationship of the theoretical framework

2.4. Chapter summary

In this chapter I discussed the Framework of Rhizomatic Education for Sustainable Development (FoRESD) for the reconceptualisation of ESD processes and the transformation of teachers and learners' mindsets and actions. ESD should be based on experiential learning, action learning, Community-Based Education (CBE), and transformative learning whilst working in and with the local community, therefore, the theories that underpin my study are transformative and experiential learning, which were critically discussed. I also summarised the relationship between each theory and model that constitute the theoretical and conceptual framework. In the next chapter, the research methodology will be discussed and justified.

CHAPTER 3: THEORETICAL JUSTIFICATION OF THE METHODOLOGY

3.1. Introduction

My study aimed to enhance the teaching of Education for Sustainable Development (ESD) in the Foundation Phase through Community-Based Education (CBE). In Chapter 2, I discussed the theoretical and conceptual framework that underpins my study, and how each of the theories, models and concepts anchor my study. The research design must be motivated by the purpose of the research questions (Creswell & Creswell, 2017). The selected research design supported my research questions and aims, which guided my study. The choice of research design depends on the paradigms of the researcher (Wood, 2020). In this chapter, I explain my choice of methodology and methods (research design, participant recruitment, data generation and data analysis) that enabled me to answer my research questions to reach the study's research aims.

Table 3-1: Research methodology and design

3.2. Methodology	
3.2.1. Paradigm	Critical theory
3.2.2. Design	Participatory Action Learning and Action Research (PALAR)
3.3. Research methods	
3.3.1. Participant recruitment	Non-probability sampling: Purposive sampling Convenience sampling
3.3.2. Data generation	Arts-based methods: Symbolic drawings Collages Object medley Photovoice
3.3.3. Data analysis	Content analysis
3.4. Trustworthiness	Validity

3.2. Research methodology

Qualitative research is concerned with developing explanations of social phenomena to help us understand the social world in which we live and why things are the way they are (Hancock, Ockleford & Windridge, 2009). The researcher is interested in describing using words and not numbers, the research is concerned with individuals and their setting and how these individuals make sense of their surroundings (Maree et al., 2016) Qualitative research was conducted as an inquiry process with the aim of understanding how Foundation Phase teachers understand and feel about ESD, what teaching needs they experience in terms of ESD, how they integrate ESD

in the subject areas, and which strategies/methodologies they can implement to enhance ESD through CBE.

I now discuss the research paradigm that underpins this study, the research design, research methods, data analysis, how I ensured quality criteria and trustworthiness, and the ethical considerations that were adhered to.

3.2.1. Research paradigm

In educational research, the term paradigm is used to describe the researcher's perspectives, philosophy or beliefs that inform the interpretation of research data (Kivunja & Kuyini, 2017). I believe we learn from one another by establishing meaningful relationships wherein we empower each other to be change agents through critical reflection that allows us to contribute to a just society. This study was based on the relationships that I established with my participants through continuous critical reflections. These relationships enabled us to bring about better understanding and practical change in the approach to the teaching of ESD.

As seen in Figure 2: Framework of Rhizomatic Education for Sustainable Development (FoRESD), this study is anchored in critical theory. Participatory Action Learning and Action Research (PALAR) is based on a critical, emancipatory paradigm (Wood, 2020). Linking ESD and experiential learning with critical theory fit within the United Nation's framework of Education for Sustainable Development (ESD) (Umholtz, 2013).

ESD is said to emerge from critical theory, as critical theory investigates the power relationships of groups who are perceived as insignificant, such as future generations, non-human species, places, and natural elements (water, air, earth) and how the education system has contributed to this perception (Elliot & Davis, 2009). Action research is embedded in critical theory as a way to pursue transformation in theory and practice (Lambrechts, Liedekerke & Van Petegem, 2018). Critical theory in ESD enables us to develop a pedagogy for empowerment and transformation, and when combined with action research, it can lead to participatory resource development and curriculum change (O'Donoghue, 2018). In critical theory, communal action is necessary to deal with communal issues, which can be better understood through mutual empowerment to appreciate each other's situation and be able to work towards solving communal issues (Lotz-Sisitka, 2004). This is also an aim of CBE and PALAR, which are both assemblages (Figure 2) supporting my study. Therefore, PALAR was chosen as the research design in my study to generate knowledge, perceptions and ideas on ESD from the participants to assist them in recognising and solving the issues they encounter when teaching ESD, using CBE.

3.2.2. Participatory Action Learning and Action Research (PALAR) Design

PALAR is my chosen research design for this qualitative study as it aims to generate transformation in assumptions, feelings and behaviour (Wood, 2020). PALAR is an effective method to integrate experiential learning and social justice to boost empowerment and reframe mindsets for social change in communities (Bywater, 2014; Zuber-Skerritt, 2018). Action research and critical reflection are crucial to developing environmental awareness, and the agency for change is required to deal with sustainability issues (Cebrián, 2017). The University of Plymouth (2016) identified participatory action learning as a learning element of ESD – with an emphasis on cooperative learning, dialogue development, experiential learning, action research, and the development of partnerships with the local community. Implementing PALAR as the research design in this study will lead to dialogue and experiential learning of ESD teaching strategies/methodologies in the Foundation Phase that will assist the integration of sustainability topics into other subjects using CBE.

PALAR and experiential learning can be used to assist teachers in applying acquired knowledge and skills in their local community (CBE) (Marriott, Lipus, Choate, Smith, Coppola, Cameron & Shannon, 2015). The three approaches of ESD – education *about, in* and *for* the environment – relate to experiential learning as knowledge about the environment is accompanied by active learning and experiences in the local environment to solve local environmental issues (Zwelibanzi, 2016). The goal of experiential learning is, thus, to facilitate transformative learning to reframe mindsets to not only focus on education *about* and *in* the environment, but also to use this knowledge to consider what is possible *for* the environment through PALAR. PALAR will be led by the belief that ESD is not only education *for* the environment, but also education focused on reframing mindsets (Eames, Sund, Gasparetto Higuchi, Torres de Oliveira & O'Donoghue, 2016), as does experiential learning (Breunig, 2005; Rose & Paisley, 2012).

Zuber-Skerritt (2011) identified the 7 Cs and 3 Rs as principles of PALAR. Firstly, we had to be transparent and inclusive in our ***communication*** with the participants. We had to prove our ***commitment*** to the project and take responsibility for the process to ensure that our aims were reached and the transformation we envisioned came to fruition. We had to reflect on our ***competence*** in this project by identifying what we needed to learn and discovering ways that would enable us to achieve that learning and I had to reflect on my strengths and shortcomings as a facilitator. During this inquiry, we realised that ***compromise*** is crucial to come to a mutual agreement by listening to, acknowledging and respecting the perspectives of the participants. PALAR is subjective as the researcher's and participants' feelings, thoughts, motives and values influence the process, making ***critical reflection*** imperative to try and avoid the formation of any biases in the study. There was also a need to reflect and assess the success of our ***collaboration***

throughout the study to ensure no one was excluded or felt inferior. Finally, I encouraged all the participants to view each other as mentors and friends who critically reflect together, and I had to improve my ***coaching*** skills to take on the role of facilitator and let go of any sense of authority. The 3 Rs (Zuber-Skerritt, 2011) refer to ***relationships*** built on democracy, transparency, trust and encouragement. It entails assisting participants to continuously ***reflect*** critically on their learning in a safe and supportive learning environment. ***Recognition*** of the participants' revelations, newly gained knowledge, and achievements motivated participants and subsequently, relationship building increased.

The PALAR process Figure eight in Figure 3-1 was used to design this PALAR project.

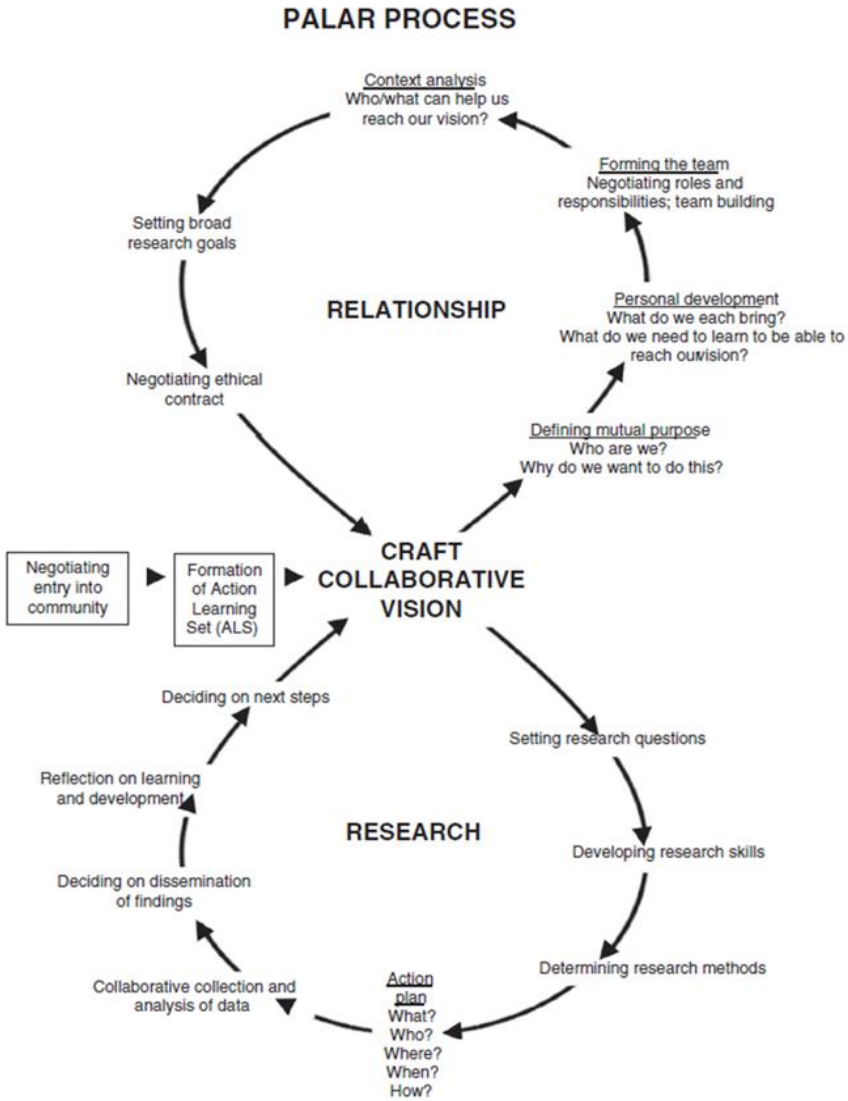


Figure 3-1: The PALAR process (Wood, 2020)

Cycle One

Research question: What teaching needs in terms of ESD do Foundation Phase teachers experience?

Participants were recruited using purposive and convenience sampling. The project was introduced in cycle one during our first meeting, and we discussed our roles and responsibilities in terms of co-designing the research project. I explained that the research process provided learning opportunities for all participants through the arts-based methods that they would take part in and I made it clear that I was also a participant and would participate in all these activities as well. During relationship building, we got to know one another better and shared our collaborative vision for this study. Relationships were formed through the participants' sharing and reflecting on their experiences of current practices as well as the practices envisioned for ESD. An ALS was formed with the participants in which we discussed how ESD is perceived, the feelings of each teacher towards ESD, and the teaching needs of each teacher in terms of ESD. We determined if the teachers integrated ESD into other subjects, and if they did, in which subjects, and why. We then reflected on all the teachers' opinions and suggestions for how ESD can be integrated as well as how the teachers currently implement ESD in their classrooms and outdoors. Multiple arts-based methods of data generation were used to generate the data and reflective journals were kept throughout the project (to be discussed in § 3.3.2.). Cycle one also included the setting of research aims and questions that everyone could agree on, and negotiating the ethical contract that we would adhere to. The aim for cycle one was relationship building, forming our shared vision for our study and negotiating an ethical agreement, and then determining what teaching needs in terms of ESD the Foundation Phase teachers experienced.

Cycle Two

During cycle two, we revisited the research questions and aims that we set in cycle one to ensure that everyone was still committed and in agreement with our vision.

Research question: Which strategies/methodologies can teachers in the Foundation Phase implement to enhance ESD through CBE?

Due to the participatory nature of PALAR, we started with relationship building again in our second cycle and then moved on to the research itself. The data generated in the first cycle was used to devise and design action plans for how teachers' teaching needs in terms of ESD can be met and how teachers can integrate ESD into their teaching using CBE. The first step was to determine what knowledge the teachers already had about CBE and to learn more about CBE from one another. We also discussed the local environmental issues that the community faced, which enabled us to choose our teaching methodologies for ESD using CBE more wisely. Considering the local environment in our teaching methodologies afforded us the opportunity to create awareness of these environmental issues and work towards devising an action plan aimed at assisting the community in solving these issues. The participants and I collaboratively designed

the action plans and they implemented them in their classrooms. Each teacher implemented a different teaching strategy in their classroom. Thereafter, we had another ALS in which we reflected on the changes to determine the impact and usefulness of our action plans on the teaching of ESD. We also reflected on the challenges that the teachers were experiencing during the implementation of the new teaching strategies. The aim for cycle two was to reflect on and determine which strategies to utilise in CBE to enable the integration of ESD into the Foundation Phase curriculum. We recorded our findings and recommendations for implementation in the form of a digital informational brochure to mobilise knowledge on ESD. See Figure 3-2 for the research cycles.

3.3. Research methods

Participatory research methods are versatile as these methods can be used as data-generation tools and as a method to document the generated data (artefacts) (Wood, 2020). Research methods include participant recruitment, data generation, and data analysis.

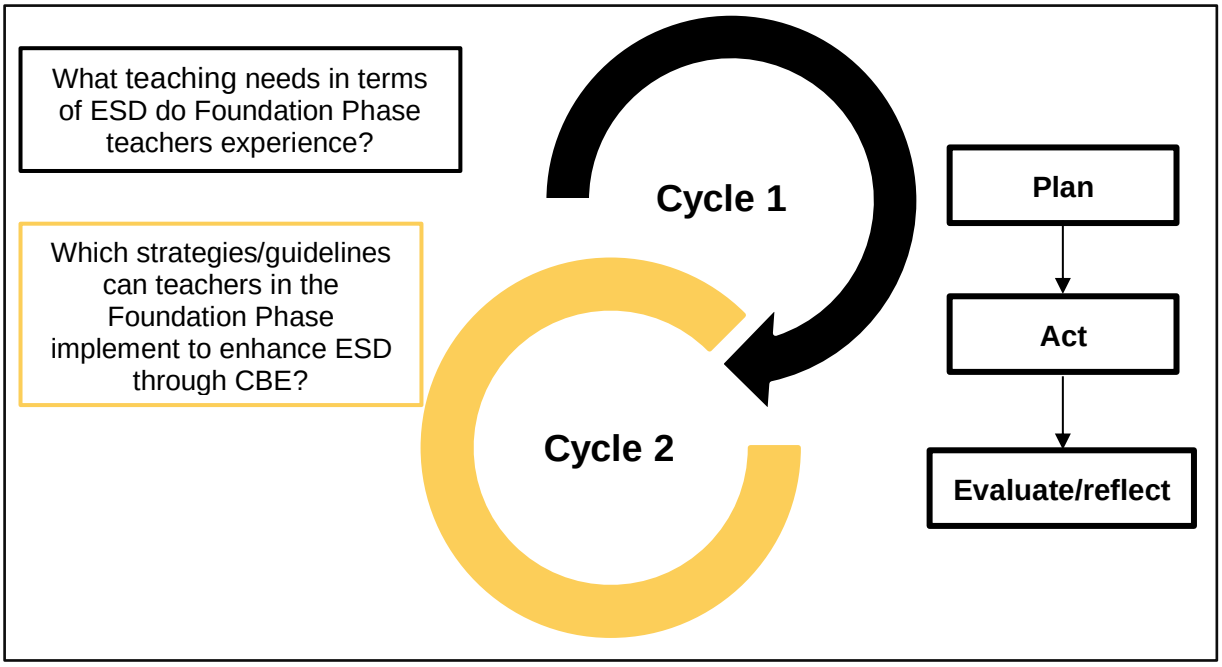


Figure 3-2: Research cycles

3.3.1. Participant recruitment

Purposive sampling is the deliberate choice of participants due to the qualities the participants possess that make them most likely to be able to contribute to answering the research questions (Etikan et al., 2016). The criteria that I selected for sampling were that all the teachers must be able to speak English, teach Foundation Phase education in Klerksdorp at the same school, and must have experience teaching environmental education and sustainability topics. Convenience sampling was selected as a recruitment method as this type of sampling involves the researcher

announcing the study and participants self-selecting if they wish to participate (Stratton, 2021). The teachers had to teach at the same school to make the research site as convenient as possible for all. Three teachers volunteered to be participants, they comprised one Grade 2 teacher and two Grade 3 teachers. Having a single research site and participants who are familiar with each other will assist with the relationship building aspect of the project.

Action learning sets (ALS)

An ALS is a small group of people who meet regularly to self-reflect, set aims, develop action plans, and critically assess the action plans to determine what further change is needed. During our ALS, we collaboratively set research questions and aims to ensure that our study aligns with the needs of the participants.

In PALAR, an ALS is formed between the researcher and the participants who regularly meet to discuss workplace issues using a variety of approaches according to the participants' needs (Haith & Whittingham, 2012). PALAR requires participants to commit to the research by creating an ALS, a transformative learning experience, that builds relationships for participant learning and sustainable results (Wood & Zuber-Skerritt, 2013; Wood, 2020). PALAR incorporates action learning (AL) in small groups with Participatory Action Research (PAR). The research site was a school in Klerksdorp, which I frequent, and an independent person approached the teachers to explain the research project and determine which teachers met the predetermined criteria and were willing to participate. This school was selected as the research site because the location is convenient for the teachers and me. During our first ALS meeting, we worked on formulating research questions according to our objectives for this study. Throughout this study, we answered these research questions. The ALS enabled us to learn from real-life experiences as I facilitated action learning and provided the necessary support for critical reflection after the implementation of new ideas. Participation in an ALS enhances achievement, skills development and trusting relationships for individual and communal transformation (Seobi & Wood, 2016). During our ALS, everyone’s contributions were acknowledged, and a safe environment was established to ensure trust and participation throughout the study. The focus of an ALS is to build trusting relationships and gain an understanding of the participants’ needs as regards capacity development and resources to improve their teaching by contributing valuable knowledge to the project (Wood, 2020). The aim of an ALS is not to solve the participants’ issues, but to create an environment that is conducive to facilitating personal learning so that participants are empowered to solve their issues (Haith & Whittingham, 2012). Therefore, they will be empowered to continue solving their issues once I am no longer part of the process.

3.3.2. Data generation

We used multiple arts-based methods to generate data. Data was collaboratively generated, instead of collected, by the participants using reflective journals, an object medley, symbolic drawings, photovoice, collages, and transcribed notes from each ALS meeting. See Table 3-2 for the data generation methods, purpose of each session and documentation of data.

Table 3-2: Data generation methods

ALS meeting	Purpose of the session	Data generation method	Documentation of data
Session 1	Relationship building	Check-in session Head, heart and hands	Activity sheet and narrative
	Discussion of our roles and responsibilities	Summarise roles and responsibilities	Written summary
	Share our collaborative vision for this study and set research questions Design logo representing our vision for the project	Object medley	Written summary Logo of vision
	Negotiate an ethical agreement	Discuss rules for ethical agreement Check out session	Written ethical agreement
Session 2	Relationship building based on session 1	Symbolic drawing	Drawings Reflective notes
	Explain the perceptions and feelings of the teachers towards ESD		
	Discover and summarise the teaching needs of the teachers in terms of ESD		
Session 3	Relationship building based on session 2	Photovoice	Photographs Reflective notes
	Determine the environmental issues in the school/community		
Session 4	Relationship building based on session 3	Collages	Collages Reflective notes
	Generate a collaborative understanding of CBE		
	Creating action plans for how teachers can use		

	CBE to enhance ESD in the Foundation Phase		
Session 5	Critical reflection on the action plans that were implemented	Object medley	Written summary
	Consolidation of the research project		We recapped all the research findings together and then the participants had to make notes on the printed summary of our research findings

Reflective journal

Mezirow (1990), who developed transformative learning theory, perceived critical reflection as the trigger for transformative learning. We critically reflect when reading new information, listening to different opinions, engaging in problem-solving, or when we self-reflect by assessing our ideas and beliefs (Mezirow, 1997). Similarly, during our ALS we were immersed in dialogue, sharing our knowledge and opinions, which led to critical reflection on the newly received information. We set our research questions and aims, which could be seen as the problem that needs solving, and the participants had the opportunity to reflect on their current practices of ESD as well as the action plan that was created. A reflective journal enabled the participants to reflect on their ideas, thoughts and experiences of the ALS meetings, their participation and my facilitation. These reflections were discussed in the check-in sessions of each ALS meeting to improve participation and facilitation.

Object medley

Object medleys require participants to engage with selected objects and assist them in reflecting on and interpreting the meaning these objects hold for them from multiple perspectives. This enables researchers to illustrate how the participants' lived experiences, explained through objects, can be reimagined in their roles as agents of change (Pillay, Pithouse-Morgan & Naicker, 2017). Pahl (2017) emphasises the potential that object medleys have to make education more socially just where people can enter on their terms to share their stories and thoughts on a specific topic. An object medley was used to assist us in sharing our collaborative vision for this study and set research questions and aims. Each participant chose one object out of an assortment of objects and used the object as a metaphor to express what they wanted this project to accomplish.

All the responses were noted on a sheet, which became the vision for this project and then the research questions were compiled from the vision. The participants' interpretations of the objects were also used to design a logo for the research project. The prompt for the object medley was: "What does this object represent to you when you think of your vision for ESD?" Ultimately, the logo was used on the cover page when we created a digital informational brochure on ESD in the Foundation Phase. The brochure was disseminated to all the teachers in the school and community. We also named our research project, Project Communitree which gave our project and ALS a sense of identity. Our final reflection at the end of cycle two consisted of an object medley with the prompt: "How does this object represent what you have learned about implementing ESD through CBE?"

Symbolic drawing

Drawing encourages active engagement and concrete proof of participants' memories, thoughts and feelings, which empower participants to identify social issues and to take action to bring about social change (Theron et al., 2011). It is important to reassure participants that how well they draw is unimportant, give them the choice of drawing tools, create a safe space, and set a comfortable pace and encourage narratives of drawings (Theron et al., 2011). Drawing is a good method to use at the beginning of the project, as some participants may still be shy or unsure and drawing will make it easier for them to individually organise and gather their thoughts. Symbolic drawings have the potential to disseminate knowledge and allow participants to communicate their individual experiences in an appealing non-technical manner, especially for participants who are unfamiliar with scientific language (Gameiro, de Guevara, El Refaie & Payson, 2018). The prompt for the symbolic drawings was: "Draw what you already know/feel about ESD and indicate what you still want to know about ESD (teaching needs)." This provided us with one holistic drawing for each participant that was used to determine what the most reoccurring teaching needs of the participants were, in terms of ESD. Symbolic drawings were also used to discover how the teachers currently implement ESD in their classrooms and outdoors. The prompt was: "Draw your current ESD teaching strategy." This included drawings of locations, classroom layouts, resources and learner activities.

Photovoice

Photovoice is a participatory method, which utilises photo imagery through which participants illustrate their lived experiences and contexts, that gives the participants a voice and a sense of agency (Stevens, 2019). Through photovoice, participants can capture their perspectives as well as reflect on and share these perspectives with colleagues and community members to bring about positive social change (HIV & AIDS Education Community of Practice, 2011). Bellino and

Adams (2014) used photovoice for its participatory nature that enabled participants to explore their environments (social, physical and built spaces), and use their knowledge and experiences to critically reflect on their interpretation of these spaces. The prompt for photovoice was: “Identify environmental issues in the school/community.” These photos helped participants to identify challenges in their teaching strategy and indicate what they wanted to change. So, the participants had the freedom to take photographs inside and outdoors to identify the local environmental issues and to write a caption underneath the photographs to explain their interpretation of the objects and spaces captured. I explained to all the participants that people were not allowed to be photographed due to ethical reasons.

Collage

Raht, Smith and MacEntee (2009:229) explain a collage as “separate images that are cut from magazines, news articles and/or books and glued together to create new images”. Masinga, Myende, Marais, Singh-Pillay, Kortjass, Chirikure & Mweli (2016) propose using this creative arts-based method to assist participants in the visual creation of a holistic portrayal of their knowledge and thoughts that may encourage active participation, critical engagement and reflexivity. Even though CBE was theoretically explained to the participants before the first ALS, I felt it was still necessary to generate a collaborative understanding of CBE before choosing or developing strategies/methodologies that teachers could implement to enhance ESD through CBE. The prompt for the collages was: “What do you envision contextualised CBE to be?” The participants were encouraged to create a collage that summarised their knowledge of CBE and by discussing each collage, we gained new knowledge and insights from each other that expanded our understanding of CBE. Once we had discussed each participant’s collage, we formulated a collaborative understanding of CBE for our research project. We also revisited the local environmental issues that we identified during our second ALS meeting and that enabled us to choose our teaching methodologies for ESD using CBE more wisely.

3.3.3. Data analysis

The purpose of data analysis is the process of finding answers to my research questions (Merriam, 2009). For this study, I made use of content analysis, which refers to data derived from communicative practices that are analysed to understand the meanings of issues within a certain context to identify patterns that are not immediately observable (Saraisky, 2017). From these patterns, themes were extracted from which I made my findings. In this study, the communicative practices were the ALS that were transcribed and then analysed to make meaning of the implementation of ESD in the Foundation Phase. For themes to emerge from data, coding is required. Coding is the collection of codes under potential themes and comparing the emerged

clusters of codes to the entire set of data (Vaismoradi, et al., 2016). The following cyclical process in Figure 3-3, adapted from Vaismoradi et al. (2016) was followed to identify and develop themes in the generated data:

Phase 1: Initialisation

I read and reread the transcriptions of the ALS as well as the journal reflections noted by the participants to describe the trends of the participants' perspectives. I then highlighted the meaningful units by employing colour coding to better organise our data and to make it easier to

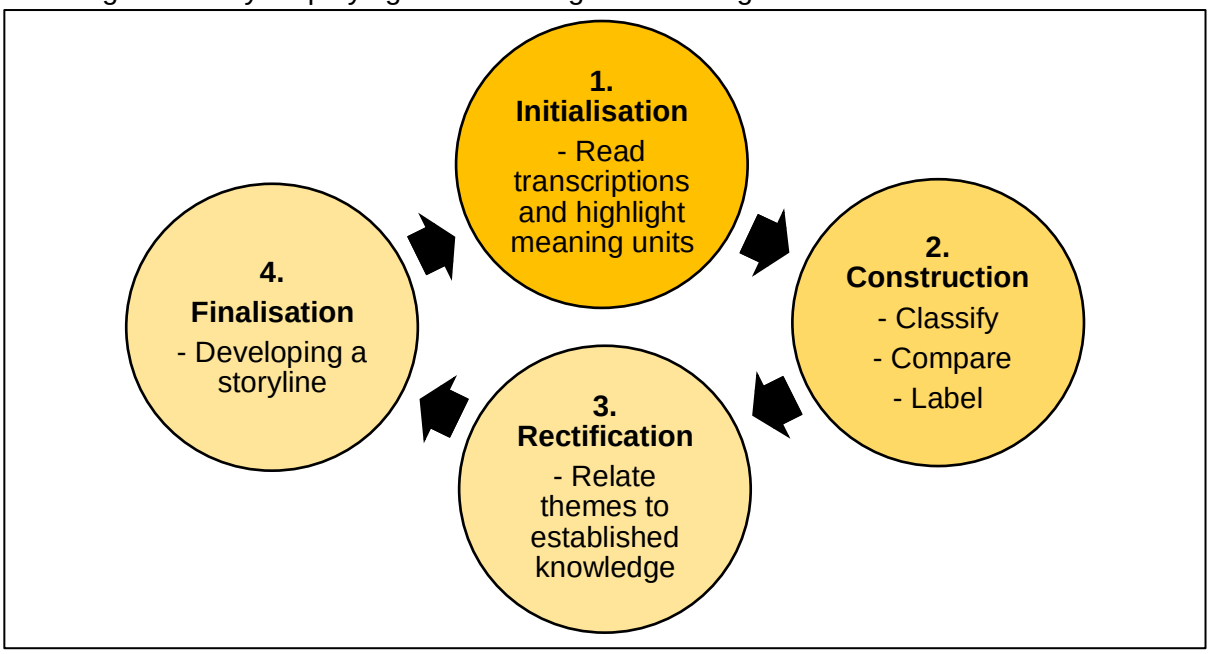


Figure 3-3: Phases and stages of theme development in qualitative content analysis

determine reoccurring codes within the data in phase 2. These colour codes were further coded into short but meaningful keywords and phrases.

Phase 2: Construction

The coded data were then compared to create a list of reoccurring codes, in other words, the reoccurring responses and reoccurring reflections of participants. I classified the codes under certain groups, namely teaching needs, ESD subject integration, and ESD through CBE. Thereafter, I divided my codes into the corresponding groups and compared the codes of each group to determine the most reoccurring codes per group. These reoccurring codes were labelled in the form of keywords and phrases to ensure that the complete idea of each was captured. The codes, groups of codes and labels were combined to form the themes of our data, from which sub-themes could also develop. We continuously and roughly analysed the data sets during our ALS meetings and then we analysed the data through a theoretical lens.

Phase 3: Rectification

In the third phase, I verified if our themes related to the literature, which made it possible for me to form more accurate themes that can be substantiated. To stabilise data, you have to describe the connections between the themes and sub-themes and how they work together to accurately explain ESD in the Foundation Phase. The sub-themes consist of summaries and examples from participants' accounts.

Phase 4: Finalisation phase

In this phase, a storyline was created to provide a holistic view of ESD implementation in the Foundation Phase. The storyline consisted of written accounts that described and connected various themes, and answers the research questions. I linked this storyline to the literature to show how ESD in the Foundation Phase could be advanced and to facilitate a better understanding of ESD.

3.4. Validity

Brookhart and Nitko (2019) define validity as the soundness of your interpretations and uses of generated data. Validity involves determining if researchers' claims about knowledge correspond to the participants' generation of knowledge (Cho, 2020).

Herr and Anderson's (2015) criteria for validity include: 1) outcome validity (reaching the identified goals of the study), 2) process validity (relationships among participants), 3) democratic validity (considering multiple perspectives and relevance of data), 4) catalytic validity (participant transformation and self-awareness) and 5) dialogic validity (safe space for dialogue).

These criteria were used to enhance the validity of my study in the following ways:

Outcome validity ensured that our research aims, set during our ALS meetings, were met by providing evidence of the participants' change in perspectives, beliefs and ideas. These changes enabled participants to improve and adjust their ability and skills to enhance their teaching of ESD through CBE.

Process validity is concerned with participant relationships, and a continuous cycle of action and reflection was pursued to ensure ongoing learning and teamwork during our ALS meetings. During these meetings, we utilised different methods to generate data to meet our research aims and this added variety to our data generation.

Democratic validity ensured that every participant was heard and treated fairly. We worked collaboratively to meet our research aims and every participant's perspective was considered. We had continuous participation, collaboration and dialogue during our ALS meetings within a

safe space. We regularly discussed the relevance of the generated data to our research questions so as to not waste time and deviate from our aims.

Catalytic validity was established by the participants becoming aware of their ESD teaching needs. Once they became aware of their teaching needs, their perceptions and teaching practices were transformed to bring about change in their school. It was a requirement for the participants to reflect on their learning after each ALS meeting, which aided them to think critically and remain aware of their learning.

Dialogic validity is demonstrated through the artefacts of our ALS meetings, as these artefacts provide evidence that the participants' contributed to the study and were acknowledged. We created a safe space for all of us to learn and act together to develop new knowledge and skills. The dialogue was true and the data were checked by all the participants throughout the study.

A researcher should not only aim to ensure quality and trustworthiness, but there are also ethical considerations that need to be taken into account to improve trustworthiness. These considerations will be discussed in the following section.

3.5. Ethical considerations

Research ethics entails confidentiality of information, participant's anonymity, and consent by participants (Ritchie et al., 2013). There are three principles of ethics stated in the Belmont Report that need to be adhered to and they are respect for persons, beneficence and justice (United States, 1978). I will explain how they were operationalised for PALAR by referring to the principles of PALAR: communication, critical reflection, collaboration, commitment, coaching, competence, and compromise, operationalized through relationship, reflection and recognition.

Respect for persons

Participants' autonomy and choices were respected by creating equitable partnerships (relationship) that enabled us to collaboratively set the research question and aims and generate and analyse the data (collaboration). All participants entered into the research voluntarily and with adequate information regarding all the possible risks and benefits. At the start of the project, we negotiated our roles and responsibilities, determined what we wanted to research, and designed the research process accordingly. We treated each other with respect, compassion and gratitude for each participants' contribution to our study, as we were all recognised as the main contributors to achieving our goals (recognition). We continuously reflected on the research process and our feelings, attitudes and actions, and how they might affect the partnership and our commitment to reach our aims (critical reflection).

Beneficence

I ensured beneficence in the study when we assessed the potential risks and benefits that we foresaw for our study and then participants chose to give voluntary consent. We collaboratively decided what the teaching needs were to make sure that the benefits of our study would be valuable to all the participants and the school (compromise). The participants learnt arts-based methods of research and acknowledged that they could use this in their classrooms to generate new knowledge from the learners on any other topic. They felt competent to engage in these arts-based methods, as they felt comfortable expressing themselves in creative ways that are less intimidating than one-on-one interviews. All the participants were protected from any potential harm (physical, emotional and psychological) and their identities remained anonymous by providing them with pseudonyms. In our ethical agreement, we stated that we agree to create a safe space for open and honest expression, in an understandable language. Everyone was treated with respect, sensitivity, equality, gratitude and compassion. During our ALS meetings and reflections, each participant's voice was heard and acknowledged without judgement (communication).

Justice

To ensure that the research was just, we agreed to treat each other as equals and we were all considered participants who learn from each other and act as mentors (coaching). In PALAR, participants are self-selected. In my study, the principal and teachers identified a need to address how ESD is being implemented in the Foundation Phase at their school by finding ways to improve on their practice. I invited specific teachers on the advice of the principal and they volunteered to take part in the study. Participants negotiated their ethical agreement by determining what they regarded as the risks and benefits of the study. The benefits of the study were shared among each participant equally and we all took ownership of the generated knowledge. We mobilised our generated knowledge by creating a digital informational brochure that was made available to the entire school and community free of charge.

3.6. Chapter summary

This chapter discussed the methodology of the study. ESD is said to emerge out of critical theory and, therefore, this study is rooted and anchored in critical theory. Participatory Action Learning and Action Research (PALAR) is based on a critical, emancipatory paradigm and was, therefore, chosen as research design for my study to generate knowledge, perceptions and ideas on ESD from the participants to assist them in recognising and solving the issues they encounter when teaching ESD, using CBE.

The selection of participants and the criteria for selecting the participants, through purposeful and convenience sampling, were discussed next. Four participants took part in the study and the necessary ethical guidelines, namely informed consent, anonymity and voluntary participation, were followed.

Next, the data generation process was discussed, justifying the significance of the selected techniques. We used ALS, arts-based and visual methods of data generation. We used reflective journals, head, heart and hands, an object medley, drawings, photovoice and collages. In a PALAR study, the data generation and data analysis take place concurrently in cycles. In cycle one, we aimed to answer our first research question – what teaching needs in terms of ESD do Foundation Phase teachers experience – and the emphasis was also on relationship building, forming our shared vision for our study and negotiating an ethical agreement. During cycle two, we reflected on and determined which strategies to utilise in CBE to enable the integration of ESD into the Foundation Phase curriculum. During the final cycle, we summarised our findings and recommendations for implementing ESD in the Foundation Phase using CBE and developed a digital informational brochure to mobilise the generated knowledge.

I made use of content analysis, thus, we identified patterns in the generated data and then themes were extracted during the two cycles. The participants gave informed consent to participate in the study, and the identities of all the participants and the school were always kept anonymous. In chapter 4, I discuss the findings of the study.

CHAPTER 4: DISCUSSION OF FINDINGS

4.1. Introduction

In Chapter 3, I explained how Participatory Action Learning and Action Research (PALAR) informed this study and I justified the recruitment of participants, data generation methods, and how the data was analysed to ensure valid findings. The ethical considerations and trustworthiness measures of this study were also discussed. In this chapter, I critically discuss each of the themes that were identified by content analysis, referring to direct quotations from the data, the artefacts generated during the ALS meetings, and the reflective journals. The analytical lenses I used to make sense of the data were transformative learning theory, experiential learning theory, and the Framework of Rhizomatic Education for Sustainable Development (FoRESD) (see Figure 2.2).

The aim of cycle one was relationship building, forming our shared vision for our study, and negotiating an ethical agreement and then determining what teaching needs in terms of ESD the Foundation Phase teachers experienced. During each cycle we planned, acted and then reflected on our actions.

4.2. Discussion of themes

Five main themes emerged from the data. Each of these themes will be discussed with supporting evidence from the data and then justified by referring to relevant literature. The research question guiding cycle one was: *What teaching needs in terms of ESD do Foundation Phase teachers experience?* During cycle two the research question was: *Which strategies and guidelines can teachers in the Foundation Phase implement to enhance ESD through CBE?*

Table 4-1: PALAR-cycles linked to the research themes of this study

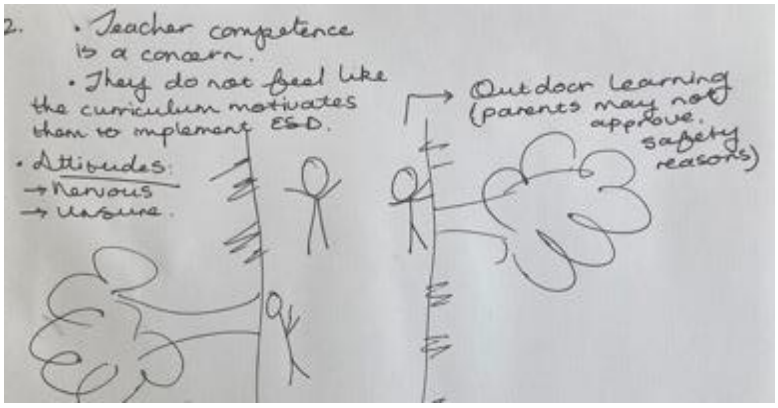
PALAR Cycle	Emerged themes
1	Teachers' fears that lead to misconceptions about their competence and awareness with regard to teaching ESD
1	Integration of ESD into the daily Foundation Phase curriculum
2	Local environmental issues that informed ESD teaching strategies
2	Teachers' vision for contextualised CBE in ESD
2	Identified teaching strategies to enhance ESD through contextualised CBE

4.2.1. Cycle one: Identifying the teachers' feelings and needs of ESD

This cycle focused on the feelings and attitudes that the teachers have towards implementing ESD in all the subjects in the Foundation Phase. The implementation of ESD was the most reoccurring need amongst the participants, as participants felt incompetent, "*unsure*", and "*nervous*" (P2) and unmotivated to implement ESD: "*the curriculum doesn't motivate us to implement ESD".* (P3). I now discuss the themes, justified by verbatim quotations and controlled against relevant literature.

4.2.1.1. Theme 1: Teachers' fears that lead to misconceptions about their competence and awareness with regard to teaching ESD

This theme encompassed the fears, feelings of incompetence and other negative emotions of the teachers regarding teaching ESD in the Foundation Phase. It was helpful for them to identify these concerns as they provide a clear indication of how they need to improve their teaching.



Teacher competence is a concern.

Do not feel like the curriculum motivates them to implement ESD.

Attitude:

- *Nervous*
- *Unsure (P2)*

Figure 4-1: Drawing activity – Teachers feel uncertain and incompetent to teach ESD

The participants' fears and feelings stemmed from their experiences of teaching in the Foundation Phase. P2 drew how she envisions ESD implementation. P2's main concern is her lack of competence to teach ESD. P2 already recognised the importance of including the outdoors as a means to teach ESD. In Figure 4-1, she drew a teacher and learners exploring the outdoors. However, she feels "*incompetent to teach ESD in the outdoors*" (P2).

> *I definitely feel nervous because I am unsure how to teach ESD. I am concerned that most of us teachers feel incompetent to teach ESD, it is disheartening and intimidating because we realise that we should know more and do more to implement it. (P2)*

A major concern for the participants was the safety of learners when they implement outdoor learning and exploration. P2 expressed that "*parents may not approve*" of outdoor learning because of "*safety reasons*". Thereafter, the other participants revealed that safety concerns are

the reason why they did not consider outdoor learning as they do not feel confident to take the learners outside.

> *What precautions can we take to ensure that learners are safe outside? I don't think the principal and parents will want the learners to learn outside. I will feel more confident to teach outside if I know she has my back and will support me when parents are concerned or complain. (P1)*

> *I don't think the principal will approve of outdoor education because she may fear the parents' disapproval. (P4)*

Although I agree that the learners' safety is a major concern I think teachers have become too risk-averse; learners are exposed to the same risks whether they are learning or playing outside during break. Teachers should view safety concerns as an opportunity to teach the learners to evaluate possible safety risks and how to avoid them, resulting in more responsible and resilient learners. Principals may be against outdoor learning because they are ignorant of what it entails (Oberle, Zeni, Munday & Brussoni, 2021), but this can be mitigated by teachers developing guidelines on how they will manage learners' safety. However, the participants were not aware that they could do this:

> *Are there guidelines to follow to, like, keep the kids safe? (P2)*

Although it is the principal and SGB's responsibility to ensure that the school environment is safe and adheres to all safety regulations, Harper and Obee (2021) suggest that teachers should be firm in their justification of outdoor learning, implement continuous risk assessments that involve the learners and invite principals and parents to outdoor learning activities to navigate the risks of the outdoors. The participating teachers were also not sure of how ESD is included in the CAPS and what their responsibilities are regarding its implementation. They were concerned that ESD is not mentioned in important policy documents and therefore, dubious of the need to implement it.

> *… not expected of us to implement ESD in the Foundation Phase. ESD is not stipulated in the CAPS documents for any of the subject areas. (P3)*

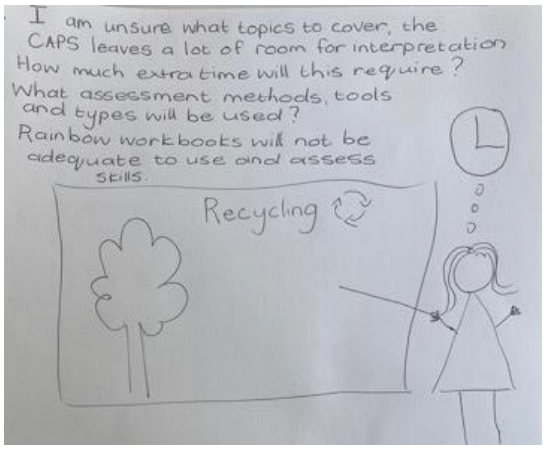
The term Education for Sustainable Development (ESD) is not mentioned explicitly in any of the Foundation Phase CAPS documents. However, it is implied as numerous topics relate to ESD which can be implemented across all four subjects and as a part of learners' daily routines. It seems teachers were unmotivated and scared to implement ESD, because they do not have a

frame of reference for implementation nor do they have specific ESD requirements stated in policy documents:

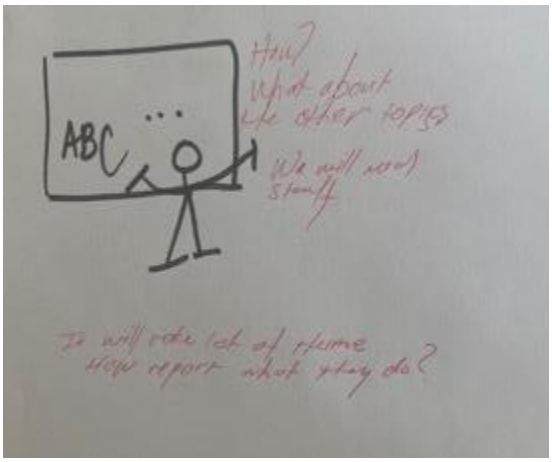
> *We have not seen how to do this. I have not read about this term before we discussed it in our first meeting. (P3)*

Understandably, based on South African policies (see 1.3.2), the participants thought there is not enough emphasis on explicitly stating ESD in the policy documents. The curriculum is a broad plan that connects all the subjects in an integrated structure (Marais & Wessels, 2020) and teachers need to see the CAPS as a guide, rather than a step-by-step teaching plan. They have to bring the curriculum to life for their learners, in their context, using the broad integrated structure of the curriculum (Strachan et al., 2021).

Participants were also worried about time constraints, because they viewed ESD as an additional subject rather than something they could integrate into existing subject content.



How much extra time will this require? (P1)



It will take a lot of time. (P4)

Figure 4-2: Drawing activity – Teachers are worried that ESD is too time-consuming

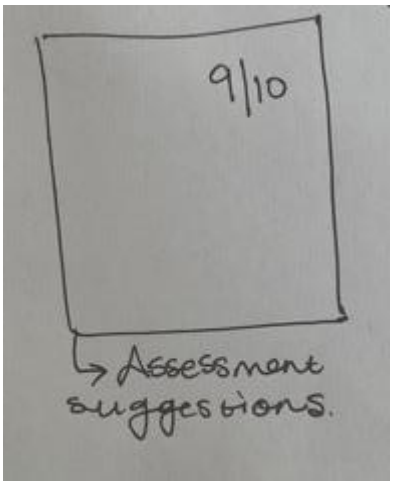
In Figure 4-2, P1 drew herself thinking and stressing about time while she is teaching her learners about recycling as an ESD topic. She was afraid that teaching ESD would require too much extra time and that she would not have enough time to teach and assess the other subjects, as did P4.

Brandt et al. (2021) discovered that teachers' ability to plan and implement ESD at school level is contestable and that there is a lack of adequate assessment tools for ESD. When ESD is integrated across subjects, teachers need to consider how ESD will be assessed in these subjects. The participants were unsure what to assess and how to record their assessment of ESD.

> *Should we assess the ESD topics, learners knowledge or their skills? (P1)*

Do we assess ESD as we assess other subjects? (P2)

ESD in the Foundation Phase should not be assessed as a separate subject (Heystek, 2021), but as an integral component of the four subjects. Assessing ESD involves the learners' knowledge, skills and values that they acquire *about, in* and *for* the environment. The CAPS recommends that in the Foundation Phase, learners should be assessed using ongoing and planned observations during their daily routine, structured and free play activities, and through discussion, role-play, demonstration and written recording (DBE, 2011). The focus should be more on implementing ESD strategies than on assessing ESD, as it is challenging to assess abstract values such as responsibility, sensitivity, awareness and respect.



What suggestions are there to assess ESD and give the learners a mark for ESD on their reports? Like, can we assign a numerical value to the knowledge and skills we teach them? I think observation will be the most likely form of assessment, but I'm not sure how to record that. (P2)

Figure 4-3: Drawing activity – Reporting the assessment of ESD

In Figure 4-3, P2 wondered if ESD could be assessed using numerical values, as she is unsure which form of assessment to use and how to record the data. This concern was echoed by P4:

How will we report what they (learners) have done? (P4)

Since the curriculum is brought to life by each individual teacher, they should also be afforded freedom when assessing ESD. We discussed that ESD should be integrated into daily learning and, therefore, informal assessment would be the most appropriate form of assessment. Bourn et al. (2016) agree that more informal ways of assessment are beneficial for ESD, as standardised formal assessment posed challenges for a topic that requires greater attention to learning processes than to measurable outcomes. ESD should be informally assessed under each subject because, since it is not a stand-alone subject, it does not require a numerical value for each achieved outcome. Informal assessment is used to provide feedback to the learners and to inform planning for teaching. However, the results of informal daily assessment tasks do not form part of the learners' formal record (DBE, 2011). Self-and peer assessment should also be considered, to capture learners' insights, encourage engagement and develop learners' ability to monitor their

learning processes (UNESCO, 2017). Peer assessment encourages peer learning which can also alleviate the teachers' workload because they can act as facilitators of learner-centred learning.

It was evident that their fear of implementing ESD stemmed from a lack of knowledge and understanding of ESD, as they were not aware that the CAPS allowed them to implement ESD across subjects, which also led to the misconception that ESD is extra and time-consuming. The next theme explains how ESD can be integrated into all the Foundation Phase subjects on a daily basis.

4.2.1.2. Theme 2: Integration of ESD into the daily Foundation Phase curriculum

ESD knowledge, skills and values are covered in important South African documents (see 1.3.2). Teachers must infer from these documents what is related to ESD and teachers inferences may also differ, based on their values and beliefs, which may lead to different interpretations of the documents. However, the participants were unsure how to do this.

> *The CAPS leaves a lot of room for interpretation and there is no steps to follow or a structure. It is scary not knowing what to do because we don't want to do it wrongly and disadvantage the learners in some way. Maybe this is why we block ESD out and focus on other things that we know how to do well. (P1)*

The FoRESD is inspired by a rhizomatic view of ESD, which encourages the curriculum to be "spontaneously shaped, constructed and then reconstructed" (Deleuze & Guattari, 1987:21). The curriculum should be shaped and constructed by teachers' and learners' experiences that develop new lines of flight (transformed mindsets). The FoRESD recommends that teachers should experiment to inspire imaginative frames of mind. Therefore, it is to the benefit of teachers in the Foundation Phase that there is freedom for interpretation and no rigid prescriptions in terms of implementing ESD. This freedom allows teachers to bring the curriculum to life and not rely on the curriculum to motivate their teaching. The experiential learning theory enables us to construct new knowledge based on experience and can transform mindsets (Kolb, 1984). It was evident from the analysis that teachers did not feel comfortable experimenting with implementing ESD, and indeed did not know where to start.

> *Which topics should be covered for ESD? (P1)*

Therefore, this study aimed to create opportunities for teachers to implement ESD so that they could evaluate and reflect on their experiences thereof to ultimately construct new knowledge and improve their practice.

There are various ESD topics listed in the CAPS: seasons, saving water, plants and seeds, soil, healthy environment, recycling, pollution etc. (DBE, 2011). The aforementioned topics are all obvious environmental topics, however, ESD also encapsulates two other dimensions, namely the socio-cultural dimension (Cebrián et al., 2020) and the economic dimension (Wals, 2012; Hedefalk et al., 2015). Teachers have to use their own discretion to identify topics and themes that relate to all three dimensions of ESD, as they are not explicitly stated in the CAPS. Moreover, research has found that teachers, if they address these issues, only transmit knowledge about them, rather than engaging learners in efforts to find out how their actions affect the environment and how the environmental issues impact their lives (Rieckmann, 2018). Swarts et al. (2015) agree that education concerning social and environmental issues should focus on education *in* and *for* the environment, as knowledge *about* the environment becomes rooted in practice through learners' experiences with real-life social and environmental issues. There was an indication, however, that the teachers were beginning to understand the importance of adopting more experiential learning when integrating ESD, as indicated by a participant's drawing of an outdoor learning experience (see Figure 4-1):

> *The learners may not be interested in the environmental topics allocated in the CAPS, so we have to like make it interesting and engaging for them so that they are not bored or unmotivated. (P2)*

According to critical theory, an educational intervention should be negotiated with role players to serve the needs and objectives of their community (Loubser, 2014). It is, thus, crucial that the teachers identify the interests and needs of the learners and local community to incorporate relevant and meaningful topics into ESD. Teachers should allow learners to pursue topics and investigate issues of their choice to enable them to become aware of the meaning and purpose of their learning (Smith & Sobel, 2010), even in the Foundation Phase. Young learners must have the opportunity to express and document their lived experiences and their daily realities to process their feelings and develop confidence in participating in community life to embody learners' citizenship (Pascal & Bertram, 2021). ESD should be relevant to the learners' real-life experiences and issues, which differ based on the context of the school. When ESD is relevant to the learners' context, they will experience these issues daily and once learners feel love and responsibility towards a place, they will want to restore and conserve it (Smith & Sobel, 2010). Learners are citizens and have voices that need to be considered and listened to. Garcia-Quiroga and Agoglia (2020) consider young learners to be social actors who are involved in the construction of their own lives and the communities in which they live. Experiential learning engages learners in direct experiences and reflections to develop their capacity to contribute meaningfully to their communities (Labuschagne, 2015) and become responsible citizens.

One of the principles of the Global Action Program for sustainable development (UNESCO, 2014) is integrated, balanced and holistic ESD across all subjects. ESD is committed to the five pillars of holistic education, 1) learning to know, 2) learning to do, 3) learning to be, 4) learning to live together, and 5) learning to transform oneself and society (UNESCO, 2010). These pillars also align with the definition of ESD, education *about* the environment (learning to know), education *in* the environment (learning to do), and education *for* the environment (learning to be, learning to live together, and learning to transform oneself and society) (Hedefalk et al., 2015). The holistic implementation of ESD is more attainable when ESD is integrated into all the subjects because there is a larger variety of content, skills and values that can contribute to holistic education. The Foundation Phase follows an integrated and interdisciplinary approach that enables teachers to distribute ESD topics across the subjects whilst teaching the content and skills of each subject to avoid neglecting the subject content.

Sustainability topics should be integrated into the curriculum (Ramsaroop & Van Rooyen, 2013; UNESCO, 2017). Teachers need to transform their mindsets in this regard and view ESD as a tool to enhance their teaching and benefit the learners. However, as indicated by the findings of this study, one of the major concerns teachers have about ESD is that it is time-consuming and adds to their heavy workloads (Dzerefos, 2020). This does not have to be the case when the appropriate approaches are implemented. Cebrián et al. (2014) advocate for learner-centred approaches such as CBE, experiential learning and discovery learning to engage learners in real-life learning experiences. Through discovery learning and experiential learning learners foster an ability to act *for* and *in* the environment to solve local issues and apply their knowledge (Backman, Pitt, Marsden, Mehmood & Mathijs, 2019). It is, therefore, crucial that teachers use learner-centred teaching approaches, discovery learning and experiential learning to minimise their efforts and allow learners to participate in self-directed learning. Then the teachers' responsibility becomes the facilitation of learning, thereby reducing their workload.

After we discussed what ESD entails, the participants realised that they do implement ESD occasionally and sometimes unintentionally. They understood that one of their teaching needs was to implement ESD more consistently.

> *ESD should be integrated into daily activities and not be isolated instances. (P3)*

> *ESD must be integrated daily and not sporadically so that habits can form. (P2)*

Richter and De Sousa (2019) emphasised that it is the teachers' responsibility to ensure that their teaching of ESD fosters sustainable development values among learners and teachers. This is linked to education *for* the environment because teaching learners about sustainable

development values allows them to assess their values, beliefs and routines (Swarts et al., 2015), hopefully giving rise to transformed mindsets in terms of their contribution towards sustainability. The participants suggested that we design a daily programme for implementing ESD with a focus on real-life experiences and forming sustainable habits through repetition. A daily programme was preferred to lesson plans, as the participants thought lesson plans restrict ESD to occasional lessons, certain topics (knowledge) and education *about* the environment. CBE was chosen as a medium to implement ESD, as it is based on experiential learning and learner-centred activities in and for the environment. In cycle two, appropriate teaching strategies were discussed to integrate ESD into their teaching through CBE. The local environmental issues and their vision for CBE in ESD inspired their actions plans. Afterwards, the teachers reflected on their teaching and learning.

4.2.2. Cycle two: Teaching strategies to enhance ESD through CBE

The aim for cycle two was to reflect on and determine which strategies to utilise in CBE to enable the integration of ESD into the Foundation Phase curriculum. Teachers first identified the local environmental issues and clarified their vision for contextualised CBE in ESD as both informed the teaching strategies that were selected and utilised.

4.2.2.1. Theme 3: Local environmental issues that informed ESD teaching strategies

We identified the local environmental issues that the community faced and chose the teaching strategies for ESD using CBE accordingly. Teachers were particularly concerned that there was only limited opportunity for learners to explore and discover in a natural setting with natural resources.

The playground has very little natural resources it is mostly brick and man-made equipment, but it is very neat and tidy. Ironically, even the pot plant is made of plastic. It is safe but restricts us, there is not really a lot of opportunity for exploring and discovering nature outside. (P1)

The playing equipment is boring and mostly metal. It is too hot to play on during the day. The kids don't have a lot of chance for possible roleplay or solving problems in a natural setting. There is a small patch of grass visible. (P3)

Figure 4-4: Man-made equipment

P1 and P3 photographed the outdoor playing area (see Figure 4-4), where the majority of the equipment is man-made. P1 also highlighted that the pot plant is fake. Teachers felt restricted because their playground had little potential to encourage outdoor learning experiences as natural resources were lacking.

> *Experiential learning and problem-solving approaches are not implemented outdoors and there are like very little environmental resources available for discovery learning to occur. (P2)*

Learners mostly grow up in artificial environments because they are restricted to their homes, classrooms and made-made playgrounds, largely due to safety concerns. However, Wishart and Rouse (2019) suggested that learners prefer a natural outdoor environment to manufactured equipment because the unboundedness of nature increases their imaginative play and leads to increased concentration, improved academic performance and the reduction of stress and aggression levels. It is recommended that learners receive daily exposure to playing and learning in natural settings to develop positive perceptions about their natural environment (Cooper, 2015). Yildirim and Akamca (2017) concluded that when learners are not exposed to the natural environment they possess little sensitivity towards nature. In Figure 4-5, it is evident that learners are not encouraged to care for or appreciate their natural environment. Consequently, an element of P1's vision for CBE in ESD is to "*learn from nature"* and to *"learn how to take better care of it "* as indicated in Figure 4-5.

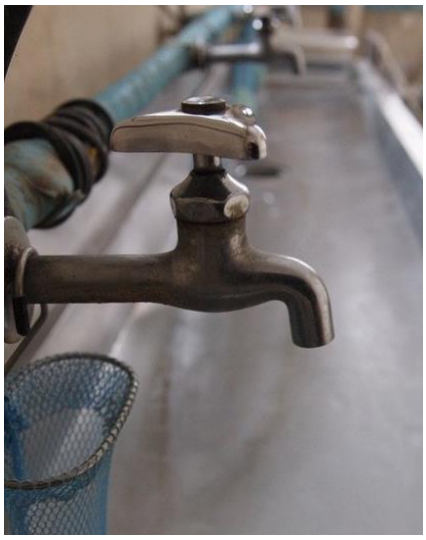
There are like very few plants and flowers in the entire school and even in the classrooms. Some of the outdoor plants are fake plastic plants. Most plants are not taken care of and it is the responsibility of the staff, not the learners. They don't have to take responsibility for it and I don't notice that any of the learners acknowledge or admire the plants. (P2)

Figure 4-5: Neglected plant

Experiential learning enhances the physical togetherness between people and nature to foster a sense of place by creating direct experiences in nature and with natural resources (McCurdy et al., 2010; Leather, 2016; Bender, 2017; Sankar, 2017). ESD is best achieved through experiential and discovery learning that encourages experiences with and in nature (Elliot & Davis, 2009; Ramsaroop & Van Rooyen, 2013; Hill, 2013). Natural resources can assist with integrating ESD across all the subjects as these resources have the potential to initiate various activities such as creating experiments, drawing, writing, calculating and measuring (Tuuling, Õun & Ugaste, 2019).

In Figure 4-6, P2 and P4 identified water waste as an environmental issue in the school.

Water is being wasted. (P2)



Learners take water for granted and often leave the taps running. (P4)

Figure 4-6: Water wastage

Learners are uneducated about the effects their actions have on the environment and how to act more sustainably. As explained by P3, in Figure 4-7, learners are encouraged to recycle but are not educated on what would happen if they do not.

Recycling bins are not properly labelled for the learners. They don't understand the purpose of the bins, it is more like a fun game to them. They were not informed how it may help the environment. Learners were not made aware of the impact their actions and choices will have on the environment. (P3)

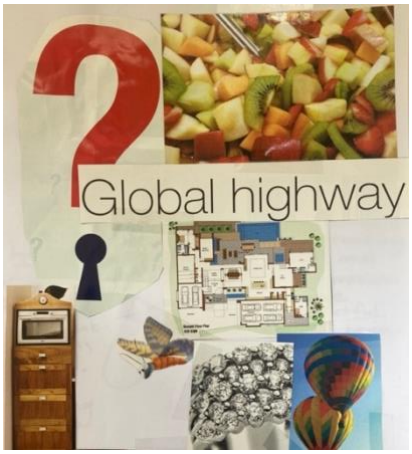
Figure 4-7: Unlabelled recycling bins

Both of these examples speak to the learners' lack of awareness of how their actions impact the environment. The first principle of the Global Action Program for sustainable development (UNESCO, 2014) is to ensure that learners become conscious decision-makers who take responsibility for their actions to become more sustainable citizens. To cultivate sustainable thinking and behaviour, learners must have the opportunity to increase their awareness of environmental issues and develop a commitment to acting *for* the environment (National Environmental Management Act 107, 1998). Learners must develop their conscientisation to evaluate their actions and recognise their ability to transform their community (Freire, 1970; Glassman & Erdem, 2014). Khabanyane et al. (2014) suggest transformative learning, specifically the transformation as conscientisation approach, where teachers can help learners become more

aware of the consequences of their actions. Cliffe and Solvason (2016) suggest that new thoughts are triggered when learners consider what is remarkable or important in unfamiliar experiences. ESD must teach learners to recognise the causes and effects of their actions and the appropriate responses to the consequences of those actions (Glasser, 2019). The teachers realised the importance of making learners' aware of why they need to participate in water conservation and recycling in their community to inspire a sense of place in them. A sense of place is fostered by CBE and a collaborative vision for CBE was established by the participants.

4.2.2.2. Theme 4: Teachers' vision for contextualised CBE in ESD

During cycle two, teachers created collages to represent a collaborative understanding of CBE. We discussed how we envision contextualised CBE in ESD.

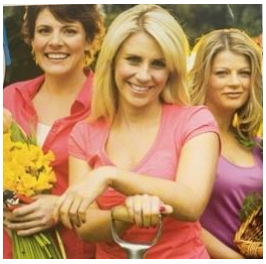


Question mark *– solving mutual problems together.*

Global highway *– solutions to problems should be relevant to other contexts (environmental, social and economic issues).*

Ring *– commitment to solve problems together.*

Fruit salad *- all people should work together, regardless of their race, gender, religion, SES, education. We all have valuable inputs to contribute. (P1)*



Work together towards a goal. (P3)

We are all connected and work together. (P4)

Figure 4-8: Snapshots from collages – Solving local issues collaboratively

Figure 4-8, indicates that participants thought that the main goal of CBE is to solve local issues collaboratively and give all stakeholders a voice.

All stakeholders possess knowledge and skills that have the potential to enrich the learning of the entire community once recognised. Referring to the UNESCO (2010) pillar, learning to live together, learning involves the appreciation of human diversity, our interdependence, empathy, respect, conflict resolution through dialogue and working towards solving mutual issues (Nan-Zhao, 2005; Delors, 2013). A rhizomatic view (see 2.2.1) of knowledge, is unified as diverse knowledge is connected, distributed and transferred (O'Riley, 2003) amongst the teachers,

learners and the community to produce new knowledge and mindsets (Le Grange, 2016), to the benefit of everyone.

We need to move and go into the community. (P4)

Figure 4-9: Snapshots from collages – Learning in the community

In Figure 4-9, P4 emphasised the need to "*move*" out of the classroom and "*go into the community*" which also includes the natural environment. CBE connects place, person, and the community (Ontong & Le Grange, 2014) as the curriculum is negotiated with role players in the community to serve the needs and objectives of that community (Loubser, 2014). Learner-centred approaches are encouraged, as these approaches incorporate learning collaboratively within a community (Moore, 2005; Thomas, 2009; Cebrián et al., 2014) which fosters skills to manage sustainability, inspire critical and creative thinking for problem-solving, collaboration and conscientisation (Barth et al., 2007; Wals, 2010; Cebrián et al., 2014). Zwelibanzi (2016) recommends experiential learning as it creates experiences in the local environment to solve environmental issues collaboratively. To ensure effective collaboration with the community there must be clear communication and relationship building.

> *Education that brings people together to have deep and insightful conversations. Communication is essential and we must all be open and honest about our needs and feelings. Like we need to set clear expectations to make sure that like there is minimal disappointment if expectations aren't met. (P2)*

According to another pillar, learning to do, learners must be able to communicate effectively, collaborate, build meaningful relationships and solve problems innovatively (Nan-Zhao, 2005; Delors, 2013). The pillar learning to be implies acquiring shared human values and effective communication skills (Nan-Zhao, 2005; Delors, 2013). Two of the five pillars are concerned with effective communication and solving mutual problems. Communicative knowledge is a type of knowledge) that constitutes how we impart our feelings and needs (Mezirow, 1997). This implies that when teachers and learners share their feelings and needs with the community and vice versa, they can generate sufficient knowledge to collaboratively solve local issues. The psychological dimension (see 2.2) of transformative learning theory deals with feelings and relates to communicative knowledge. Transformation as self-awareness, specifically, includes the formation of compassionate relationships with others and the environment (Vandeyar & Swart,

2016). Communication amongst stakeholders must be positive and encouraging to facilitate respectful and empathetic relationships. P1 agrees that communities must "*evolve and grow together, education must be uplifting and supportive*". When the community reflects on their teaching and learning, their ideas have the potential to evolve to taking action and making a difference. P4 feels that it is important to:

> *…talk a lot and listen to each other, but make sure to stop and reflect a lot.*

Applying the experiential learning theory (Kolb, 1984), education *in* the environment includes critical reflection on experiences in the local community to develop learners' capacity to make a meaningful contribution. Critical reflection is crucial to developing environmental awareness to deal with local sustainability issues (Cebrián, 2017). Reflections also enable stakeholders to evaluate their action plans and to determine if their mutual goals have been met.

P1 highlighted the importance of *"indigenous inspirations"* and explained that we must *"draw knowledge, insights and experience from the local community".* Shallcross et al. (2006) agree that communities should transfer indigenous knowledge which enables the school to establish a sustainable development knowledge base to integrate indigenous philosophies, such as Ubuntu (compassion and humanity) into ESD approaches (Ontong & Le Grange, 2014). When teachers allow the community to inspire their teaching the community's voices are heard. The CAPS states that when we value indigenous knowledge we acknowledge the "rich history and heritage of this country as important contributors to nurturing the values contained in the Constitution" (DBE, 2011:5), giving rise to more responsible citizens that will bring out the best in people and the environment.

Figure 4-10, represents an overarching vision to ensure that the community and the environment must benefit from the teaching of ESD through CBE. P3 reiterated that in CBE we must "*bring out the best in each other*" in such a way that we *"serve each other and the environment".* Loubser (2014) likewise believes the curriculum must be negotiated with role players in the community to serve their needs and goals. Participants emphasised the need to "*spend time in nature*" (P4) and "*use nature as a resource*" (P2) to teach ESD. Therefore, outdoor learning was proposed as a strategy to teach ESD through CBE (Elliot & Davis, 2009; Lovell et al., 2010; Bennell, 2012; Hill, 2013; Brodanský, 2016), as outdoor learning benefits the learners, community and environment.

Superhero *- bring about change and do good for the community.*

Footprint *– leave a legacy, make a real impact in the community.*

Leaves *– change, transformation and growth. (P2)*

Polar bear *– help, solve problems to the benefit of everyone. Serve each other and the environment. (P3)*

Stairs *– everyone involved should be left better than how they were found. (P3)*

Trees *- Grow together. (P3)*

Figure 4-10: Snapshots from collages – Improving the local community

Based on the analysis of the collages, we developed the following statement about CBE:

"*CBE enables us to collaboratively solve mutual problems in the local community. We acknowledge that every person has valuable input that transforms and equips the community when teachers utilise the environment.*"

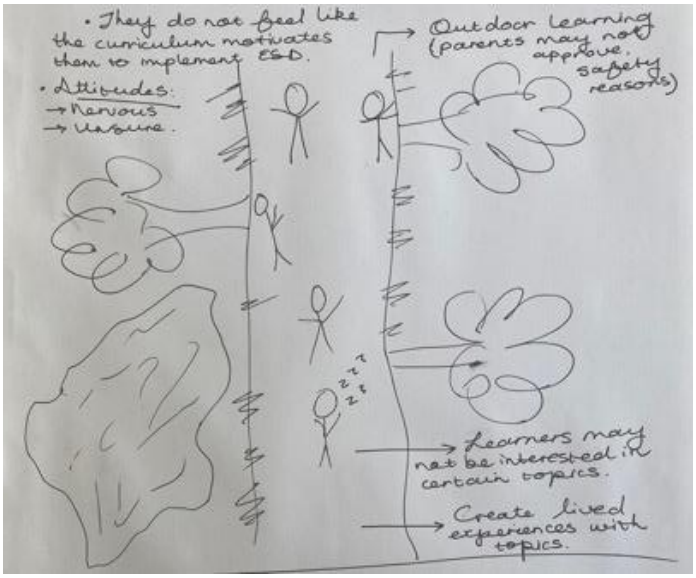
Fraser et al. (2015) agree that academics, teachers and communities must collaboratively develop a mutual understanding of implementing ESD. We drew from the identified local environmental issues and the vision for contextualised CBE in ESD to brainstorm and implement teaching strategies.

4.2.2.3. Theme 5: Identified teaching strategies to enhance ESD through contextualised CBE

The final theme centred on which teaching strategies were implemented and how we experimented to meet the participants' needs identified in cycle one. The participants also evaluated and reflected on their implementation of these teaching strategies to determine which were the most effective.

It is important to acknowledge that participants were already thinking of teaching ESD using outdoor and experiential learning, before cycle two, as can be seen in Figures 4-11 and 4-12 which were done in cycle one. This finding indicated that the teachers were not only unsure, but

also unaware of their competence to teach ESD. They already had creative ideas for how to implement ESD, but were not confident enough to implement these ideas in their teaching and they did not know that it was referred to as ESD.



The outdoors is free, easily accessible and can bring so much joy and peace. We need to take the kids outside, they feel like prisoners in the class sometimes. We need to create lived experiences outside. Learners should explore and discover for themselves, but parents must be made aware of all outdoor activities and the safety measures put into place. (P2)

Figure 4-11: Lived experiences in the outdoors

Learners have to experience the outdoors to develop a sense of place to foster love and respect towards their environment through CBE, which encourages experiential learning and discovery learning (Roy, 2014; Ontong & Le Grange, 2014; Card & Burke, 2021). Utilising the outdoors as a resource is not solely suggested for ESD topics, but for all subjects in the Foundation Phase, while ESD is incorporated to enhance these subjects. Tinney (2020) agrees that when outdoor activities are planned through a sustainability lens, these activities can be integrated across all subjects because the outdoors can provide a natural setting for teaching science, mathematics, language, art and drama.

P2 and P3 were innovative and creative when thinking about the outdoors as a resource for teaching ESD. This inspired the other participants to think about the outdoor environment as initially, they did not consider it because of safety concerns. After identifying and discussing theme 2 the participants concurred that they want to learn how to safely utilise the outdoors for ESD and other subjects.

Show them.

Let them do.

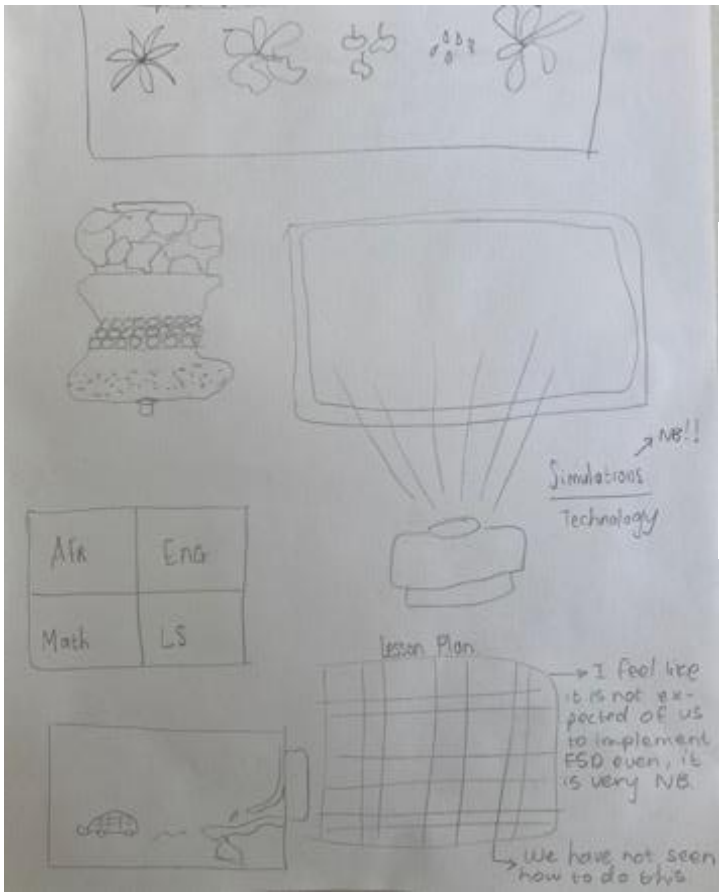
Teach them outside, but first show them and prepare them because they are not used to it. Also let them take the lead and don't be too prescriptive. (P4)

Figure 4-12: Implementing outdoor learning

In Figure 4-12, P4 drew a flower that represented the outdoors and specified that teachers must show the learners how to learn in the outdoors and must allow them to take the lead in their learning through learner-centred teaching approaches.

> *Show them outside and let them learn there. They have to go outside more. If they can play outside they can also learn outside. They get very restless in the classroom. (P4)*

Learners cannot foster a sense of place if they just remain in a classroom as that detaches them from nature. Outdoor learning can motivate and excite learners to learn because it is a change of pace and scenery and can develop a multitude of skills and values. Learning in nature increases their physical activity and concentration which reduces their stress because they don't have to suppress the tendency to move (Wainwright, 2021). When learners have the freedom to move in an environment where they usually play they may be more likely to perceive what they are learning as play. Learning through play encourages participation and intrinsic motivation in learners (Hartmann & Gommer, 2021). Outdoor learning can assist teachers to bring the curriculum alive because learners can engage in problem-solving and discovery learning.



Kids should do activities daily, not isolated instances. I want to learn how to assess these activities, and know how to use them across the board. (P3)

Figure 4-13: Examples of how to implement ESD

The discussion of teachers' needs resulted in P3 already being innovative and thinking of ways to creatively implement ESD. She suggested three ways in which ESD can be implemented daily to form sustainable values, habits and routines. These suggestions and ideas lead into and informed cycle two, where action plans were developed to implement ESD. As seen in Figure 4-12, P3 drew a vegetable garden, a water filtration system and a tortoise in a tank. Thus, during cycle one, P2 and P3 discovered that they were already implementing ESD unintentionally.

> *"To me, a big part of understanding ESD is the care and compassion we must have towards the environment and all living things. A vegetable garden and class pet will teach children to take care of something else and responsibility. These things also require a lot of attention and effort every single day. It is hands-on and doesn't require a book and pencil or memorisation of facts. This is boring to children already. The water filtration system should be made with the children and used in the class so that they can see that they also help and make a difference in the class and for their friends and teacher."*

Kaldi et al. (2011) stress the importance of including experiential, discovery and outdoor learning in daily Foundation Phase teaching. Wang, Zhou and Cui (2019) agree that ESD content should be integrated into the daily routines of the learners to subconsciously foster ESD ideas, skills and values. Therefore, a daily programme is more appropriate for ESD in the Foundation Phase, as learners remain in the same class all year for all subjects. It is easier to establish sustainable daily routines when the environment, the teacher and the responsibilities remain the same. Learners want to see that their contributions are valued and that the focus of learning is not solely on knowledge retention. When ESD is integrated across all the subjects it can help to make ESD more relevant in learners' everyday engagement with sustainability because they are continuously immersed in ESD knowledge or skills or values (Sund & Gericke, 2020). Learners learn to respect and love nature when they learn outdoors, which is also one of the goals of ESD (Engelmann, 2019).

During cycle one, the participants expressed their need for daily ESD integration into all the Foundation Phase subjects and suggested a daily programme to accomplish this. The CAPS document includes such a daily programme, but exclusively for Grade R. The focus in Grade R, regardless of the subject, is on informal and spontaneous learning. This implied that teachers must use their discernment to identify "teachable moments" that predominantly arise out of the learners' interests, curiosity and creativity (DBE, 2011:20). This approach was considered by participants as it encapsulates features of outdoor learning, experiential learning, transformative learning and CBE. We collaboratively designed a daily programme that can be used for Grade R to Grade 3 to inspire the integration of ESD across all subjects (Figure 4-14).

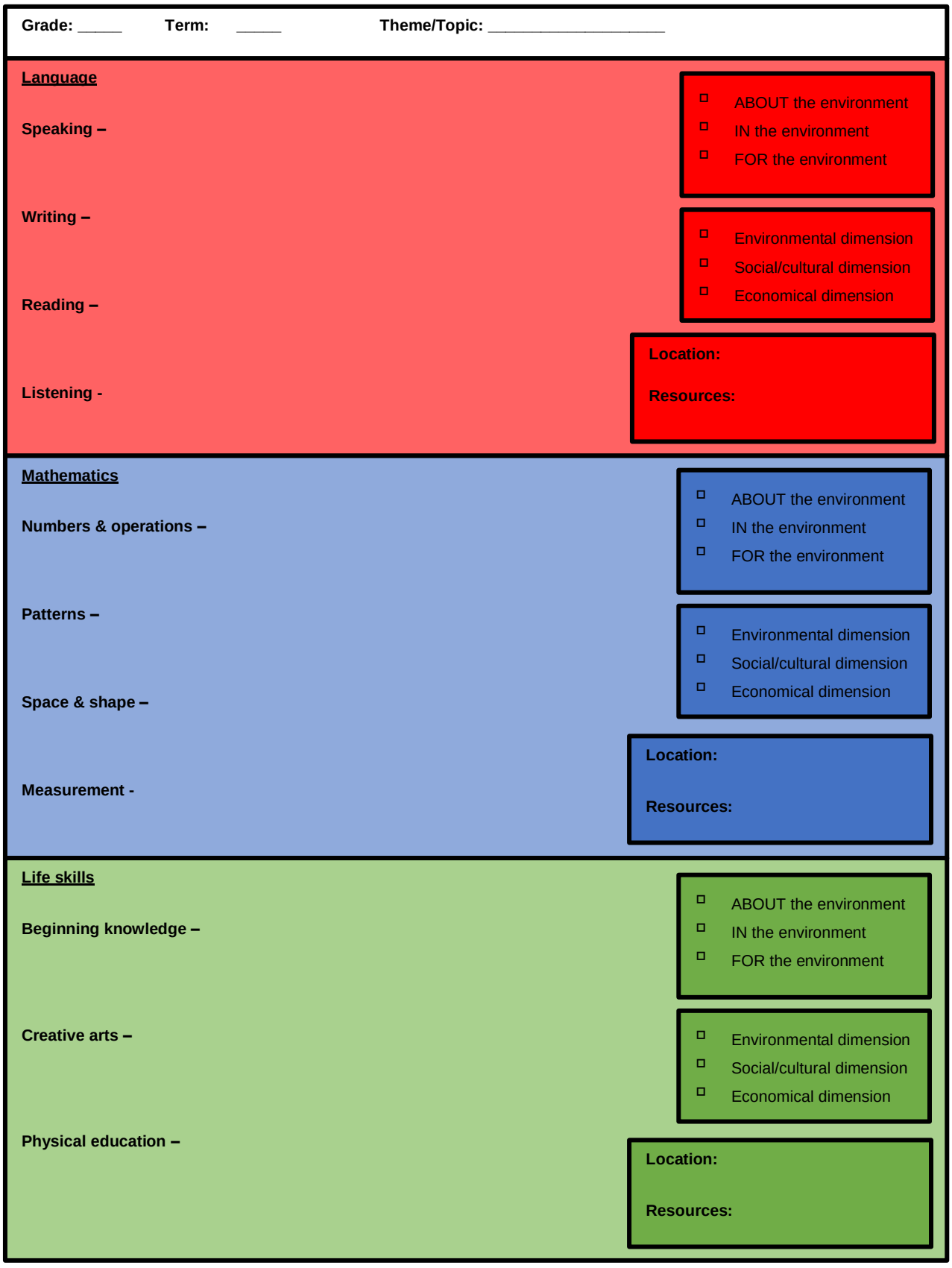


Figure 4-14: Daily programme to implement ESD in the Foundation Phase (P1, P2, P3, P4)

The sections of each subject were taken from each of the CAPS documents and indicate the skills that should be developed in each subject. Participants agreed that the positions of ESD (*about, in* and *for* the environment) and the ESD dimensions must be added to the programme, as a reminder to incorporate them. Participants made it clear that daily ESD implementation does not necessarily mean it has to be integrated into each subject every day.

> *We can integrate our daily programme, but we don't have to do it for every single subject every single day. I think the more we do it, we will find a good balance of when, and in which subject. (P1)*

> *I am so proud of our daily programme but feel like it is important that we all understand ESD doesn't have to be done in each subject each day, we can vary it accordingly. (P4)*

The daily programme, in Figure 4-14, was used to design the ESD lessons that were implemented and reflected on by participants. The teaching strategies that informed the design of our lessons were learner-centred, experiential learning, and outdoor learning through CBE. All the teacher participants implemented the lessons based on the environmental issues that were identified: 1) caring for nature, 2) water wastage, and 3) recycling. These environmental issues were integrated across all three Foundation Phase subjects: Language, Mathematics and Life Skills.

Caring for nature was implemented as a classroom routine, where learners in the classes were divided into teams that were responsible for watering and pruning the classroom and outdoor plants. The teachers worked out a weekly schedule for each team and they plan on implementing this on a rotational basis, throughout the year. Learners were made aware of the effects that water wastage has on the environment by reading informational storybooks. The books encouraged the one class to design posters for the school to make the other learners aware of water wastage. The other class gathered ice cream containers from home to place under the taps to catch excess water. They then used this water to water the plants in their classroom, making sure the water does not go to waste. Once learners were aware of the effects and benefits of recycling, one class decided to label the recycling bins outside to ensure that all the learners knew how to use the bins. Another class started to collect all the waste paper in a bin in the classroom to use during creative art activities. Based on the described activities these innovative ideas can become daily routines that have the potential to transform into sustainable habits. In table 4-2, the integration of these activities was described according to the skills of each Foundation Phase subject.

Table 4-2: Integration of ESD activities across the Foundation Phase subjects

	Language	Mathematics	Life Skills
Caring for nature	Reading informational books.	Measuring the growth of the classroom plants.	Discussing what products and processes people get from plants.
	Asking questions about the care of the plants.	Appreciation for the natural environment.	Discovering what the plants need, water, sunlight, soil.
	Documenting the growth of the plants on a chart.	Measuring how much water each plant needs.	
		Observing the changes in plants over time.	
Water wastage	Creating posters for water wastage awareness.	Measuring if water wastage was increasing/decreasing.	Creative arts for designing water wastage posters.
	Listening to stories about the effects of water wastage.	Counting how many containers are necessary to collect excess water.	Gross motor skills were used to collect water outside.
	Discussing how to conserve water.	Problem-solving.	Discussing the effects of water pollution.
Recycling	Labelling the recycling bins outside.	Sorting and categorising the trash in the schoolyard for recycling.	Observing the effects of pollution on the environment.
	Discussing where the waste goes.	Appreciation for the natural environment.	Picking up trash in the schoolyard.
		Problem-solving.	Discussing where the waste goes.
			Fostering a sense of responsibility in learners.

Our reflection at the end of cycle two consisted of an object medley exercise with the prompt: “How does this object represent what you have learned about implementing ESD through CBE?” The objects the participants chose included a pencil (P1), Lego block (P3), battery (P2) and rose essential oils (P4).

There was consensus amongst all the participants that working together to achieve our goals was valuable and empowering:

> *This experience has energised me and made me excited. It has been lovely to see how we empowered each other through this. There really is power in teamwork. Knowing that you were all a little nervous and unsure at the start made me feel like better about my own competence. (P2)*

I have learnt so much from all of you, we kinda sharpen each other like this pencil. (P1)

I am so extremely grateful to all of you. I feel like we "built" something worthy and sustainable. (P3)

In Figure 4-15, P4 concurred that their teaching strategies will be sustainable because they worked collaboratively. *"When we worked together we saved time because we could share responsibilities and ideas."*

When I think of essential oils I think of calmness. When we started I was really anxious, but now I am relieved. I was actually silly in the beginning because I thought I didn't know much, but we all encouraged each other. Just like a collection of rose petals we worked together to solve our own problems and meet our own needs. (P4)

Figure 4-15: Rose essential oil

The participants' feelings transformed from "*nervous*", "*unsure*" (P2), and "*unmotivated*" (P3) to positive proclamations of "*energised*", "*excited*", "*empowered*" (P2), "*grateful*" (P3) and "*relieved*" (P4). Being unawareness of their knowledge and skills in terms of ESD resulted in them having misconceptions of incompetence. Participants felt reassured that there is room to make mistakes and learn from them.

We get to make mistakes, but we can erase it and start over. There is room to evolve because our teaching doesn't have to be permanent and stay the same forever. (P1)

Participants' started to take ownership of their teaching and relied less on policy documents for motivation and guidance. They realised that they could inform their own teaching of ESD.

Our teaching was built on our teaching needs and we could work together to better our teaching. It is relevant and attainable for us because it was created by us. (P3)

P1 and P3 agreed that they do not have to stick to the ESD topics in the CAPS, but that their local environment can inspire their teaching of ESD through CBE. The focus of teaching must be learner-centred and oriented towards solving local issues, see Figure 4-16.

This pencil makes me feel hopeful, because I have become more open-minded, and adaptable and flexible with my teaching. Noticing how we don't have to stick to certain topics to teach ESD, but rather focus on real-life concerns to address. (P1)

Figure 4-16: Pencil

> *The biggest lesson I learnt was that I don't have to rely on national documents to tell me how and what to teach. That won't motivate me anymore. The learners motivate my teaching now because I am so proud of the ideas that they came up with and made a reality. They have surprised me with their brilliance in solving problems. (P3)*

Initially, teachers were concerned that implementing ESD would be time-consuming and additional to their already heavy workloads. However, after implementing the action plans they recognised that when ESD is integrated across subjects, learner-centred, experiential and integrated across subjects, it did not require additional time, see Figure 4-17.

This battery is energy-saving and I only realise now that if we let the learners choose what they want to learn and how to do it, it takes pressure off of us and we have more time. They also enjoy it more if they have a say in it. Recognising how easy the integration into all the subjects are also saves time because we don't like have to work out separate lessons for each. (P2)

Figure 4-17: Energizer battery

> *Once I allowed the kids to think and plan how they wanted to do things, I felt lighter because I didn't have to take time and come up with something for them. (P1)*

> *It is not an extra subject, so it doesn't take extra time. We could see this clearly, how well ESD fits into the other subjects when we used our daily programme. (P2)*

P3 stated that more time will be saved when "*these activities can become daily habits for the learners",* as it will not require daily instruction from the teacher. Kaldi et al. (2011) stress the importance of including experiential, field-based and investigative learning in daily Foundation Phase teaching. The participants now acknowledge nature as a resource to teaching that will also

save time because teachers won't have to make or purchase resources to teach ESD. When learners explore and discover the natural environment the teachers do not have to design formal lesson plans. The teachers were hesitant to utilise the outdoors initially, but eventually recognised that learners need these experiences to become more "independent and responsible" citizens (Smith & Sobel, 2010; Singh, 2011; Cebrián et al., 2014).

> *The smell of the wood makes me think of nature, and trees, how we really have nature to learn from and learn in. Even though I was scared to use the outdoors in the beginning, but now I understand that it is useful. I can't keep the kids in a bubble, they have to learn to be independent and responsible. They must realise the consequences of their actions on people and nature. (P1)*

Although the largely man-made outdoor learning area was one of the environmental issues identified by the participants, they found alternative ways to incorporate the limited natural environment in their teaching. They encouraged learners to collect wastewater outside, pick up and sort the trash that they found in the environment and start to care for the plants. Teachers expressed that the learners were more excited and interested to participate in these activities than they had anticipated. They also realised that the learners do indeed care for nature and want to improve their environment, see Figure 4-18.

The green made me think of the environment and how incorporating that in my teaching has made the learners more interested and invested. It became clear to me how much my learners care about the environment and how they want to make it better. (P3)

Figure 4-18: Green Lego block

> *Integrating ESD and using the outdoors actually like makes teaching the subjects more interesting and exciting. Taking care of the environment is close to my heart. (P2)*

Grierson and Munro (2018) have proven that when teachers incorporate the natural environment, explain the concept of sustainability and encourage participatory learning in teaching ESD, the learning is transformative for learners and the community. Since the learners normally want to make their environment a better place teachers must allow learners to pursue such topics and investigate issues of their choice (Smith & Sobel, 2010), thus spontaneously shaping the curriculum with the teacher. Consequently, teachers and learners become critical co-investigators of the topics that the learners want to know more about (Beckett, 2013) and learners are

empowered and encouraged to take responsibility for their environment. P4 and her learners realised that they want to help restore their environment and bring about change (see Figure 4-15):

> *This is nature in a bottle. Nature helps us heal, but I have realised how it is our responsibility to help nature heal. Going outside and making a difference in the environment gave me and the learners so much joy. Something that cannot be assessed with percentages and reports.*

Responsibility, consciousness, care and joy are values and emotions that cannot be assessed for recording marks. Bourn et al. (2016) agree that ESD must be focused on the learning processes rather than on measurable outcomes. P1 and P2 transformed their thinking regarding assessment, from expressing the need to allocate numerical marks for ESD to appreciating that observation and informal assessment are sufficient.

> *There is no need to assess ESD we just assess the subject and observe how the learners implement sustainable knowledge, skills and values to it. (P2)*

> *It isn't necessary to focus so much on assessing ESD if we get to see how the kids help better the environment. They have already achieved something then. (P1)*

P1 felt that the process of learning and then acting on that learning indicates that the learners have achieved their goals. Learners sense of place began to awaken regarding their environment, as they became more inclined to care for and protect it (McCurdy, et al., 2010). Therefore, implementing learner-centred experiential learning in the outdoors in ESD practices have proven to enable learners to act on their learning by identifying environmental issues, discussing possible solutions and then experimenting with ideas to take action (Haith & Whittingham, 2012).

4.3. Chapter summary

In this chapter, I reported on the findings of the study. The research question guiding cycle one was: *What teaching needs in terms of ESD do Foundation Phase teachers experience?* Teachers identified their fears that lead to misconceptions about their competence and awareness with regard to teaching ESD. The implementation of ESD was the most reoccurring need amongst the participants.

During cycle two the research question was: *Which strategies and guidelines can teachers in the Foundation Phase implement to enhance ESD through CBE?,* to determine which strategies to utilise in CBE to enable the integration of ESD into the curriculum. The teaching strategies that informed the design of our lessons were learner-centred pedagogy, experiential learning, and

outdoor learning through CBE. Teachers identified the local environmental issues and clarified their vision for contextualised CBE in ESD as both informed the teaching strategies that were selected and utilised. Three environmental issues were identified 1) caring for nature, 2) water wastage, and 3) recycling, and were integrated across all three Foundation Phase subjects. During each cycle we planned, acted and then reflected on our actions. In the next chapter, I revisit the research questions, provide conclusions and suggest questions for further study.

CHAPTER 5: SUMMARY, CONCLUSIONS AND SUGGESTIONS FOR FURTHER STUDY

5.1. Introduction

My experiences in Canada inspired this study, as I witnessed learners in their natural environment being sensitive to and conscious of the impact of their actions on nature. The teachers drew from indigenous knowledge and local natural resources to enhance their teaching. The learners were granted freedom to discover for themselves but were facilitated by the teachers. The school was situated on the university grounds and they formed a community partnership to learn from each other and solve local environmental issues together.

By contrast, my experiences of teaching during work-integrated learning in South Africa, were teacher-centred approaches, predetermined and mandatory worksheets for summative assessments and learners who were confined to the classrooms. Learners were mostly taught *about* the environment and education *in* and *for* the environment was neglected. Learners were made aware of environmental issues, but were not actively involved or empowered to think that they can make a change and that their actions and voices have merit. Thus, in this study, I aimed to enhance the teaching of Education for Sustainable Development (ESD) in the Foundation Phase through Community-Based Education (CBE). This study took place at a school in the North-West province and four Foundation Phase teachers participated in the data generation and analysis.

The findings of cycles one and two were discussed in the previous chapter and in this chapter, I revisit the research questions that guided this study to arrive at conclusions, provide guidelines for enhancing ESD through CBE, make suggestions as to how the findings might be implemented, and suggest questions for further study.

5.2. Summary of chapters

A summary of chapters one to four follows.

5.2.1. Chapter 1: Overview of the study

This chapter served to orientate the study by providing the rationale and the problem statement that determined the research questions for this study. My personal experience with environmental and sustainability topics and Foundation Phase teachers' lack of capacity to teach ESD were discussed. I briefly discussed the theoretical frameworks underpinning this study, the research methodology, quality criteria to ensure trustworthiness and ethical considerations.

5.2.2. Chapter 2: A critical discussion of the theories, models and conceptual framework underpinning this study

In this chapter, I discussed the Framework of Rhizomatic Education for Sustainable Development (FoRESD) for the reconceptualisation of ESD processes and the transformation of teachers and learners' mindsets and actions. Transformative and experiential learning were justified as the theories that underpinned my study.

5.2.3. Chapter 3: Theoretical justification of the methodology

In Chapter 3, I explained my choice of methodology and methods (research design, participant recruitment, data generation and data analysis) which enabled me to answer my research questions to reach the study's research aims. Participatory Action Learning and Action Research (PALAR) was discussed as a research design with two cycles of action and reflection. I outlined the validity measures and ethical considerations for the study.

5.2.4. Chapter 4: Discussion of findings

This chapter reported on the findings of the study. Each of these findings was discussed and justified with supporting literature according to the two PALAR-cycles. Five themes emerged from the findings:

1) Teachers' fears that lead to misconceptions about their competence and awareness with regard to teaching ESD
2) Integration of ESD into the daily Foundation Phase curriculum
3) Local environmental issues that informed ESD teaching strategies
4) Teachers' vision for contextualised CBE in ESD
5) Identified teaching strategies to enhance ESD through contextualised CBE

5.3. Answering the research questions

The main research question guiding this study was: "How can Foundation Phase teachers enhance their capacity for ESD through CBE?"

The following discussion of the sub-research questions presents my conclusions regarding the findings.

5.3.1. What teaching needs in terms of ESD do Foundation Phase teachers experience?

The implementation of ESD was the most reiterated need amongst the participants, as participants felt incompetent and unmotivated to implement ESD. It was helpful for them to identify their concerns as those concerns served as indications of how they needed to improve their teaching. The teachers' fears lead to misconceptions about their competence and knowledge to teach ESD. Initially, the participants expressed that they were unaware of how to implement ESD in the Foundation Phase because they did not know which topics to cover. Yet, after our second Action Learning Set (ALS) meeting some of the teachers unintentionally suggested strategies to implement ESD. They recognised the importance of including the outdoors as a means to teach ESD, however they were sceptical because of safety concerns. The participants identified the need for guidelines on safely implementing ESD outdoors, as the policy documents are not explicit in this regard. These guidelines had to integrate all the subjects because teachers did not want ESD to be time-consuming, as they already had heavy workloads. The teachers also needed guidance on how to assess ESD when integrated across the subjects. After several ALS meetings, the teachers also indicated their need for a daily programme to implement ESD through CBE.

The ALS became a safe space for the participants to build collaborative relationships and share their needs, frustrations and ideas. We all participated collaboratively to achieve our research aims and learnt from each other. Teachers are thus able to create their knowledge with facilitation and support. Once the teachers identified their teaching needs we could collaboratively design action plans to improve and enhance their current teaching practices.

5.3.2. Which strategies and guidelines can teachers in the Foundation Phase implement to enhance ESD through CBE?

It was important to ensure that the participating teachers understood what ESD and CBE entailed. Therefore, we clarified our vision for contextualised CBE in ESD and then identified the local environmental issues, as both informed the teaching strategies that were selected and utilised. Based on the teachers' vision we discovered that 1) learner-centred pedagogy, 2) experiential learning, and 3) outdoor learning were the most desired teaching strategies to teach ESD and therefore inspired the design of our action plans. All three strategies proved to be effective and easily implemented by all the participants with the aim of improving the community. We collaboratively designed a daily programme that can be used for Grade R to Grade 3 learners to inspire the integration of ESD across all subjects. The participants agreed that these teaching strategies would be sustainable because they are time efficient, the teachers worked collaboratively and they realised that they could inform their own teaching of ESD.

It can be concluded that the process of PALAR facilitated transformative and experiential learning among the participants. The process study was project-based in reality, self-directed, interdisciplinary, included the voices of all the teachers and involved collaboration with the community to solve local issues. The teachers identified their needs and concerns and worked collaboratively to learn, reflect and improve their practice.

When teachers implemented learner-centred experiential learning in the outdoors in their ESD practices, learners were enabled to act on their learning by identifying environmental issues, discussing possible solutions and then experimenting with ideas to take action.

5.4. Personal reflection

The first step of this study was to establish a relationship among the participants and craft a collaborative vision, ethical agreement and research questions. Our ALS was a safe space for the participants to share their fears, concerns, and frustrations, as we all agreed to treat each other with respect, sensitivity, equity, and compassion. This study challenged me to be flexible and open-minded, as I listened to the participants' feelings and thoughts, as to not force my perspectives and ideas onto them. It was evident from the start that the participants saw me as an authoritative Figure because of my position at the university, but I reassured them that I was there to learn from them and with them as well.

Initially, I was excited to start this study, but then quickly realised I was nervous and doubted my competence to facilitate the ALS effectively, as I had little experience participating in PALAR, not to mention initiating PALAR. After our first ALS meeting I wrote in my reflective journal:

> *I feel overwhelmed and incompetent to facilitate these teachers. I was so nervous, but I realise that I have put too much pressure on myself to lead well. This was the wrong mindset, as I needed to surrender control. It was encouraging to see how the teachers took lead and were eager to learn and share. This made me feel more at ease and I could relax and we could have a conversation with each other. (24 August 2021).*

Novice researchers need to prepare themselves for these feelings when they first undertake an action research study. I was naïve assuming that the teachers already knew ESD, but that was remediated in our ALS when I explained the concept and encouraged the participants to draw how they envision ESD implementation. At first, they were also cautious to admit their lack of capacity of teaching ESD, but once I admitted that I also had little experience teaching ESD it encouraged them to share their views without fear of judgement. They then realised that everyone had fears and insecurities, but that that shouldn't stop them from contributing, as they all had valuable inputs and their voices were acknowledged.

We employed art-based methods as critical pedagogical tools to generate data. This approach enabled the participants to engage more in the learning process, as they are Foundation Phase teachers who enjoy being creative. The participants weren't concerned or ashamed about the quality of their art once but were in awe of how well the arts-based methods worked to elicit feelings and thoughts. One participant explained how she has a few learners in her class who are shy and struggle to express themselves verbally. She recognised how arts-based methods can encourage conversations that will enable her to understand the needs and feelings of her learners better. I will also use arts-based methods with my education students in the future.

Once we determined the teaching needs of the participants I realised that their fears and concerns also became mine. This speaks to how powerful the relationships in PALAR can be, as we transferred our feelings onto each other. These fears lead participants to misconceptions regarding their competence and knowledge to teach ESD, but we discovered that we all had existing knowledge that could inform our action plans.

I introduced the concept of using CBE to enhance ESD, as I thought it would be suitable because of how CBE aligns with ESD, experiential learning, and transformative learning (as discussed in chapter 2). I witnessed how the participants started to take ownership of the new teaching strategies, as they were determined and positive about experimenting with CBE in ESD. While we were identifying the local environmental issues we realised how confined the learners are to the classroom. I thought that introducing outdoor learning during our ALS meeting would be met with hesitance, but the participants confessed that the learners are confined to the classroom because the teachers are afraid of their safety. There was a mutual awareness that we shouldn't place learners in bubbles because we are afraid, but rather embrace the potential of the outdoors to teach the learners responsibility and life skills. I observed how the participants started to think more learner-centred by focussing on the facilitation of learning and helping the learners to think critically for themselves.

During cycle two when the participants designed and implemented the actions plans and I could see how we brought our study to life which was rewarding and stressful at the same time, as I wrote in my reflective journal:

> *I must remind myself that even if the action plans are not effective we have gained knowledge and experience. (22 October 2021).*

When I had all the data and I had to analyse it to write my conclusions I became frustrated and discouraged because I was struggling to find patterns in the findings, but a critical friend made me aware that I wasn't looking at the big picture but at segments of the data. Once I changed my

view of the data the patterns became clearer. Representing the importance of collaborating with mentors and friends who critically reflect together during the learning process.

This study was an enriching experience, as I observed how teachers crave to be life-long learners and improve their teaching and how a bond can be created between people who share mutual goals. There is a need for continuous learning to occur even after a degree has been obtained, as teaching is always evolving. Teachers can achieve this in their communities by initiating PALAR, per their teaching needs, using ALS.

In the following sections, the limitations and contributions of the study will be discussed.

5.5. Limitations of study

The study involved a relatively small number of participants, as the generated data were based on the fears, feelings and experiences of only four participants. Therefore, it could be possible that the reported view of ESD is very limited due to the participants' similar contexts and cannot be generalised to all teachers. The duration of implementing CBE in ESD was too short, as the effects of the CBE on the environment could not be determined yet.

5.6. Conclusions

This study aimed to enhance the teaching of ESD in the Foundation Phase. We explored the teaching needs of teachers, determined the local environmental issues in the community and established how they could link these in their teaching. We also explored how ESD can be assessed and provided guidelines to inform the integration of ESD in the Foundation Phase through CBE. We concluded that learner-centred experiential learning in the outdoors is conducive to teaching ESD through CBE because it teaches learners *about* the environment and engages learners *in* the environment and to take action *for* the environment.

A significant discovery of this study was that teachers thought they were incompetent to teach ESD but then realised that they were already implementing aspects of ESD when we discussed their current teaching strategies. Teachers were already thinking of teaching ESD using outdoor and experiential learning, as they had developed creative ideas for how to implement ESD. However, they did not feel confident enough to implement these ideas in their teaching and they did not know that it was referred to as ESD.

Based on the findings, it can be concluded that teachers need to see the policy documents as a guide, rather than a step-by-step teaching plan. When teachers draw from the FoRESD they can experiment with their teaching strategies to inspire new imaginative frames of mind. Therefore, it is to the benefit of teachers in the Foundation Phase that there is freedom for interpretation in

ESD, as it allows them to bring the curriculum to life and not rely on the curriculum for motivation. CBE was a suitable strategy for implementing ESD, as it is important that the teachers identify the interests and needs of the learners and local community to incorporate relevant and meaningful topics into ESD. CBE is learner-centred and experiential, as it allows learners to pursue topics and investigate issues of their choice to enable them to become aware of the meaning and purpose of their learning.

Teachers can turn concerns about safety issues related to CBE into an opportunity to teach the learners to evaluate possible safety risks and make decisions about how to avoid them. Outdoor learning should always be justified and include continuous risk assessments that involve the learners, the principals and the parents to navigate the risks of the outdoors. Teachers should develop their own guidelines on how they will manage learners' safety, as risk assessments will differ depending on the outdoor learning activity and outdoor environment of the school. It may be more realistic for each school to draw up outdoor learning guidelines that are specific and relevant to their context and environment.

Teachers found that it is challenging to assess abstract values and feelings such as responsibility, sensitivity, awareness and respect. The curriculum should be brought to life by each teacher and therefore, they also have freedom when assessing ESD. Informal assessment, such as observation, was the most appropriate form of assessment, as ESD should be assessed under each subject and does not require a numerical value for each achieved outcome. Peer assessment is recommended as it is learner-centred and encourages peer learning which can also alleviate the teachers' workload because they act as facilitators.

A daily programme for ESD was thought to be best as it enables teachers to see how well ESD fits into the other subjects. The daily programme makes it easier for Foundation Phase learners to establish sustainable daily routines when the environment, the teacher and the responsibilities remain the same throughout the year. The daily programme does not mean ESD has to be integrated into each subject every day and it can be revised as needed. When ESD is integrated into all the subjects daily, through learner-centred teaching approaches, outdoor learning, and experiential learning it will save time and allow learners to participate in self-directed learning. It was found that teachers saved time when they participated in PALAR because they shared responsibilities and ideas, integrated ESD into all the subjects and did not have to draw up additional lesson plans or make and purchase resources when they used nature as a resource. Implementing learner-centred approaches to teaching ESD allowed the learners to experiment with self-directed learning in which the teachers acted as facilitators of learning that reduced the need for direct instruction and lesson preparations.

Using PALAR as a research design proved to be valuable and empowering for the participants because they could work together to achieve their teaching and learning goals. This made their teaching strategies more sustainable as they saved time and shared responsibilities and ideas. Participation in the ALS transformed the thinking and actions of the teachers, as they started to take ownership of their teaching. PALAR empowered them to inform their teaching of ESD by implementing learner-centred strategies, finding alternative ways to incorporate the environment into their teaching, and appreciating that informal assessment is sufficient. This kind of experimentation creates space for self-directed learning to occur. The safe space that the ALS created made participants feel reassured that we could make mistakes because we could all learn from them. The participants brainstormed, implemented and reflected on their action plans and became more competent in their teaching of ESD and the research process.

It is beneficial for ESD to be implemented right from the Foundation Phase, as people's attitudes and behaviours relating to place, and responsibility as global citizens, are formed during early childhood. CBE enhances ESD by enabling learners to develop a sense of place and take responsibility for their environment to become sustainable global citizens.

5.7. Contribution of study

Community-based research is ecological, promotes social justice, values indigenous knowledge and involves people in learning how to solve issues through critical learning, participation, and inclusiveness. All these principles relate to my study, which also encourages curriculum principles such as community engagement, ecologically sustainable development, transformation for social change, integration of indigenous knowledge and critical teaching and learning. The study could 1) contribute to a better understanding of ESD in the Foundation Phase, 2) enhance theory with an understanding of teachers' perceptions and teaching needs regarding ESD, and 4) encourage teaching in the outdoors, 4) provoke further research studies to find out how teachers can integrate ESD into their teaching using CBE. A methodological contribution of this study included how PALAR can be used to enable experiential and transformative learning.

5.8. Guidelines for ESD implementation through CBE

Guidelines for ESD implementation will be discussed based on my interpretation of the findings:

- learner-centred experiential learning is best implemented in the outdoors because it teaches learners *about* the environment and engages learners *in* the environment and take action *for* the environment.

- Short learning programmes could be developed to enable teachers to learn how to interpret policy documents, as it was apparent that they did not possess this knowledge and skills at the beginning of the study.
- Teachers should adopt a rhizomatic view of ESD that encourages the curriculum to be spontaneously shaped and collaboratively constructed by the learners using local environmental issues.
- Teachers should develop their own safety guidelines according to the outdoor learning activity and outdoor environment of the school.
- Informal assessment, such as observation, should be implemented for ESD under each subject and does not require a numerical mark.
- Peer assessment should also be implemented as it encourages peer learning.
- A daily programme should be utilised to integrate all the dimensions and aspects of ESD that will assist in forming sustainable habits in learners.
- Teachers should continue to form action learning groups for continuing professional development to improve their teaching of ESD.

These guidelines were used to design our digital informational brochure to mobilise the generated knowledge (see Annexure A).

5.9. Suggestions for further study

I suggest that the following questions can be used as a guide for further study:

- Which transformative teaching strategies can be implemented in the outdoors to teach ESD in the Foundation Phase?
- How can CBE be integrated into the Foundation Phase to build relationships with knowledgeable adults in the community?
- How can Foundation Phase teachers be equipped to interpret policy documents for effective ESD implementation?
- How does a rhizomatic view of ESD encourage teachers to construct a curriculum that involves local environmental issues?
- What general safety guidelines could be compiled for outdoor learning in the Foundation Phase?
- How can teachers involve Foundation Phase learners in the outdoor risk assessment process for outdoor learning?
- How can informal assessment be implemented for ESD under each Foundation Phase subject?

- How can peer assessment in ESD encourage participatory learning among Foundation Phase learners?
- Which teaching approaches are conducive to fostering sustainable habits in Foundation Phase learners?
- Which teaching strategies are required for Foundation Phase learners to become active participants and change agents in their local communities?
- How can PALAR be used by Foundation Phase teachers to participate in action learning about ESD?

5.10. Concluding remarks

By engaging in this study, the participants enhanced their capacity to teach ESD through CBE and established relationships that will hopefully continue to grow. Teachers were equipped to implement learner-centred experiential learning in the outdoors to teach learners *about*, *in* and *for* the environment. This study helped the teachers to become more adaptable and resourceful in their teaching and made them aware that their teaching can also serve the community. This study was beneficial to the participants and myself as a researcher and teacher because we gained insight into our teaching methods and became aware of the power of participatory pedagogical methods to enrich our teaching and learning experiences. Based on my own learning, I think that all education students should be taught to use PALAR to improve their practices, as it is a powerful tool to encourage lifelong learning and development.

BIBLIOGRAPHY

Agbedahin, A.V. 2018. Sustainable development, Education for Sustainable Development, and the 2030 Agenda for Sustainable Development: Emergence, efficacy, eminence, and future. *Sustainable Development*, 27(4):669-680.

Aliakbari, M. & Faraji, E. 2011. Basic principles of critical pedagogy. (*In* 2nd International Conference on Humanities, Historical and Social Sciences IPEDR, Singapore, 17:78-85).

Anderson, A., Anderson, J., Hare, J. & McTavish, M. 2015. Language, learning, and culture in early childhood: Home, school, and community contexts. London, UK: Routledge.

Anney, V.N. 2015. Ensuring the quality of the findings of qualitative research: Looking at trustworthiness criteria. *Journal of Emerging Trends in Educational Research and Policy Studies*, 5(2):272-281.

Ardoin, N.M., Clark, C. & Kelsey, E. 2013. An exploration of future trends in environmental education research. *Environmental Education Research*, 16(5-6):611-627.

Ault, C.R. 2008. Achieving *Querencia*: Integrating a sense of place with disciplined thinking. *Curriculum Inquiry*, 38(5):605-637.

Backman, M., Pitt, H., Marsden, T., Mehmood, A. & Mathijs, E. 2019. Experiential approaches to sustainability education: Towards learning landscapes. *International Journal of Sustainability in Higher Education*, 20(1):139-156.

Balsiger, J., Förster, R., Mader, C., Nagel, U., Sironi, H., Wilhelm, S. & Zimmermann, A.B. 2017. Transformative learning and Education for Sustainable Development. *GAIA-Ecological Perspectives for Science and Society*, 26(4):357-359.

Barth, M., Godemann, J., Rieckmann, M. & Stoltenberg, U. 2007. Developing key competencies for sustainable development in higher education. *International Journal of Sustainability in Higher Education*, 8(4):416-430.

Battaglia, M.P. 2011. Nonprobability sampling. (*In* Lavrakas, P.J., *ed*. Encyclopedia of survey research methods. Thousand Oaks, CA: SAGE Publications. p. 524-526).

Beckett, K.S. 2013. Paulo Freire and the concept of education. *Educational Philosophy and Theory*, 45(1):49–62.

Bellino, M.E. & Adams, J.D. 2014. Reimaging Environmental Education: Urban youths' perceptions and investigations of their communities. *Revista Brasileira de Pesquisa em Educação em Ciências*, 14(2):27-38.

Bender, S.M. 2017. Nature play spaces as learning environments. Victoria, BC: University of Victoria. (Thesis – MEd).

Bengtsson, S.L. 2014. Beyond education and society: On the political life of Education for Sustainable Development. *Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Educational Sciences,* 7(1):15-361.

Bennell, S.J. 2012. ESDGC in primary schools: Exploring practice, development and influences. Wales: Bangor University. (Thesis – PhD).

Bjurström, Å.E. 2012. Trying to make “reality” appear different: Working with drama in an intercultural ESD setting. *Social Alternatives*, 31(4):18-23.

Blanchet-Cohen, N. & Reilly, R.C. 2017. Immigrant children promoting environmental care: Enhancing learning, agency and integration through culturally-responsive environmental education. *Environmental Education Research*, 23(4):553-572.

Bourn, D., Hunt, F., Blum, N. & Lawson, H. 2016. Primary education for global learning and sustainability. Cambridge Primary Review Trust.

Breunig, M. 2005. Turning experiential education and critical pedagogy theory into praxis. *Journal of Experiential Education*, 28(2):106-122.

Brodanský, M. 2016. The role of joy in outdoor adventure educational programs: Exploring the relationship between risk management, joy and learning outcomes within outdoor adventure educational programs. Carlisle, UK: University of Cumbria. (Thesis – Masters).

Brookhart, S. & Nitko, A. 2019. Educational assessment of students. 8th ed. New York, NY: Pearson.

Brundtland, G.H. 1987. Our common future – Call for action. *Environmental Conservation*, 14(4):291-294.

Bywater, K. 2014. Investigating the benefits of participatory action research for environmental education. *Policy Futures in Education*, 12(7):920-932.

Cambers, G., Chapman, G., Diamond, P., Down, L., Griffith, A.D. & Wiltshire, W. 2008. Teachers' guide for Education for Sustainable Development in the Caribbean. Santiago, CL: UNESCO Regional Bureau of Education for Latin America and the Caribbean.

Carrington, S. 2011. Service-learning within higher education: Rhizomatic interconnections between university and the real world. *Australian Journal of Teacher Education*, 36(6):1-14.

Cebrián, G. 2017. A collaborative action research project towards embedding ESD within the higher education curriculum. *International Journal of Sustainability in Higher Education*, 18(6):857-876.

Cebrián, G., Grace, M. & Humphris, D. 2014. Academic staff engagement in Education for Sustainable Development. *Journal of Cleaner Production*, 106:79-86.

Cebrián, G., Junyent, M. & Mulà, I. 2020. Competencies in Education for Sustainable Development: Emerging teaching and research developments. *Sustainability*, 12(579):1-9.

Cho, J. 2020. Validity in Qualitative Research Revisited: 14 Years Later, A Continuing Dialogue.

Clark, C.M. 1991. The restructuring of meaning: An analysis of the impact of context on transformational learning (Unpublished doctoral dissertation). Athens: University of Georgia.

Clark, R.W., Threeton, M.D. & Ewing, J.C. 2010. The potential of experiential learning models and practices in career and technical education and career and technical teacher education. *Journal of Career and Technical Education*, 25(2):46-62.

Constitution of the Republic of South Africa 1996.

Cooper, A. 2015. Nature and the outdoor learning environment: The forgotten resource in early childhood education. *International Journal of Early Childhood Environmental Education*, 3(1):85-97.

Creswell, J.W. & Creswell, J.D. 2017. Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks, CA: Sage.

Davis, J.M. 2009. Revealing the research 'hole' of early childhood education for sustainability: A preliminary survey of the literature. *Environmental Education Research*, 15(2):227-241.

Davis, J.M. 2015. Young children and the environment: Early education for sustainability. 2nd ed. Victoria, AU: Cambridge University Press.

De Lange, N., Mitchell, C., Moletsane, R., Theron, L., Wood, L. & Stuart, J. 2011. Using a different lens for HIV and AIDS education. Port Elizabeth: HIV and AIDS Education Research Chair, Nelson Mandela Metropolitan University.

Deleuze, G. & Guattari, F. 1987. A thousand plateaus: Capitalism and schizophrenia. Minneapolis: University of Minnesota Press.

Delors, J. 2013. The treasure within: Learning to know, learning to do, learning to live together and learning to be. What is the value of that treasure 15 years after its publication? *International Review of Education*, 59(3):319-330.

Department of Basic Education. 2011. National Curriculum Statement. Curriculum and Assessment Policy Frameworks. Foundation Phase Gr. 1-3. English Life Skills. Pretoria: Department of Basic Education.

Department of Education. 1995. White Paper on Education and Training. Pretoria: South Africa.

Department of Environment Affairs and Tourism. 1998. White Paper on Environmental Management Policy. Pretoria: South Africa.

Department of Environmental Affairs. 2010. Environmental Sector Skills Plan for South Africa: A systems approach to human capacity development and sector skills planning. Pretoria: South Africa.

Department of Higher Education and Training. 2015. Revised Policy on the Minimum Requirements for Teacher Education Qualifications. Pretoria: South Africa.

Deuchars, R. 2011. Creating lines of flight and activating resistance: Deleuze and Guattari's war machine. *AntePodium*, 1(1):1-28.

Dewey, J. 1915. The school and society. 2nd ed. Chicago, IL: University of Chicago Press.

Dixon, K., Janks, H., Botha, D., Earle, K., Poo, M., Oldacre, F., Pather, K. & Schneider, K. 2018. A critical analysis of CAPS for Life Skills in the Foundation Phase (Grades R-3). *Journal of Education*, 71:6-23.

Dube, C. 2012. Implementing Education for Sustainable Development: The role of geography in South African secondary schools. Stellenbosch: University of Stellenbosch. (Thesis – PhD).

Duhn, I. 2012. Making 'place' for ecological sustainability in early childhood education. *Environmental Education Research*, 18(1):19-29.

Eames, C., Sund, P., Gasparetto Higuchi, M.I., Torres de Oliveira, H. & O'Donoghue, R. 2016. Exploring the constitution of environmental education as situated, critical processes of learning and change: A collaborative synthesis across diverse regional contexts. *Brazilian Journal of Environmental Education*, 13:42-60.

Elliott, S. & Davis, J.M. 2009. Exploring the resistance: An Australian perspective on educating for sustainability in early childhood. *International Journal of Early Childhood*, 41(2):65-77.

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K. & Kyngäs, H. 2014. Qualitative content analysis: A focus on trustworthiness. *SAGE open*, 4(1):1-10.

Etikan, I., Musa, S.A. & Alkassim, R.S. 2016. Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1):1-4.

Farrokhi, F. & Mahmoudi-Hamidabad, A. 2012. Rethinking convenience sampling: Defining quality criteria. *Theory and Practice in Language Studies*, 2(4):784-792.

Fraser, J., Gupta, R. & Krasny, M.E. 2015. Practitioners' perspectives on the purpose of environmental education. *Environmental Education Research*, 21(5):777-800.

Freire, P. 1970. Pedagogy of the oppressed. New York, NY: Continuum International Publishing.

Gameiro, S., De Guevara, B.B., El Refaie, E. & Payson, A. 2018. DrawingOut – An innovative drawing workshop method to support the generation and dissemination of research findings. *PloS one*, 13(9):1-19.

Gandomi, A. & Haider, M. 2015. Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, 35:137-144.

Garcia-Quiroga, M. & Agoglia, I.S. 2020. Too vulnerable to participate? Challenges for meaningful participation in research with children in alternative care and adoption. *International Journal of Qualitative Methods*, 19(1):1-11.

Glasser, H. 2019. Toward robust foundations for sustainable well-being societies: Learning to change by changing how we learn. (*In* Cook, J., *ed.* Sustainability, human well-being, and the future of education. Cham: Palgrave Macmillan. p. 31-89.)

Gould, E. 2009. Women working in music education: The war machine. *Philosophy of Music Education Review*, 17(2):126-143.

Grant, C. & Osanloo, A. 2014. Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for your "house". *Administrative Issues Journal*, 4(2):12-26.

Grierson, D. & Munro, K. 2018. Transformative learning methods in interdisciplinary postgraduate Education for Sustainable Development (ESD). *International Journal of Architectural Research*, 12(1):209-227.

Glassman, M. & Erdem, G. 2014. Participatory action research and its meanings: Vivencia, praxis, conscientization. *Adult Education Quarterly*, 64(3):206-221.

Gross, Z. & Rutland, S.D. 2017. Experiential learning in informal educational settings. *International Review of Education: Journal of Lifelong Learning*, 63:1-8.

Haith, M.P. & Whittingham, K.A. 2012. The impact of being part of an action learning set for new lecturers: A reflective analysis. *Action Learning: Research and Practice*, 9(2):111-123.

Harring, N., Torbjörnsson, T. & Lundholm, C. 2018. Solving environmental problems together? The roles of value orientations and trust in the state in environmental policy support among Swedish undergraduate students. *Education Sciences*, 8(3):124.

Hedefalk, M., Almqvist, J. & Östman, L. 2015. Education for sustainable development in early childhood education: A review of the research literature. *Environmental Education Research*, 21(7):975-990.

Herr, K. & Anderson, G.L. 2015. The Action Research Dissertation: A Guide for Students and Faculty. 2nd ed. Los Angeles, CA: Sage.

Heystek, S.E. 2021. The implementation of problem-based learning to foster pre-service teachers' critical thinking in Education for Sustainable Development. (PhD-thesis, North-West University, South Africa).

Higgins, P. 2009. Into the big wide world: Sustainable experiential education for the 21st century. *Journal of Experiential Education*, 32(1):44-60.

Hill, A. 2013. The place of experience and the experience of place: Intersections between sustainability education and outdoor learning. *Australian Journal of Environmental Education*, 29(1):18-32.

Hipwell, W.T. 2004. Preventing ecological decline in the Bras d'or bioregion: The state versus the Mi'kmaq 'metamorphosis machine'. *The Canadian Journal of Native Studies*, 24(2):253-281.

HIV & AIDS Education Community of Practice. 2011. Using a different lens for HIV and AIDS Education. Port Elizabeth: HIV and AIDS Education Research Chair, Nelson Mandela Metropolitan University.

Huckle, J. & Sterling, S. 1996. Education for sustainability. London, UK: Earthscan Publications.

Iliopoulou, I. 2018. Children's thinking about environmental issues. *Educational Research*, 60(2):241-254.

Intergovernmental Panel on Climate Change (IPCC). 8 Oct. 2018. Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments. https://www.ipcc.ch/news_and_events/pr_181008_P48_spm.shtml Date of access: 14 Oct. 2018.

Jørgensen, K.A. 2014. What is going on out there? What does it mean for children's experiences when the kindergarten is moving their everyday activities into the nature-landscapes and its places. Sweden: University of Gothenburg.

Kaldi, S., Filippatou, D. & Govaris, C. 2011. Project-based learning in primary schools: Effects on pupils' learning and attitudes. *Education 3-13,* 39(1):35-47.

Kaspary, M.C. 2014. Complex thought and systems thinking connecting group process and team management: New lenses for social transformation in the workplace. *Systems Research and Behavioral Science*, 31(5), p.655-665.

Khabanyane, K.E., Maimane, J.R. & Ramabenyane, M.J. 2014. A critical reflection on transformative learning as experienced by student-teachers during school-based learning. *Mediterranean Journal of Social Sciences*, 5(27):452-459.

Kivunja, C. & Kuyini, A.B. 2017. Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, 6(5):26-41.

Kolb, D.A. 1984. Experiential learning: Experience as the source of learning and development. New Jersey, NJ: Prentice-Hall.

Kolb, A.Y. & Kolb, D.A. 2005. Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education,* 4(2):193-212.

Kopnina, H. 2014. Future scenarios and environmental education. *The Journal of Environmental Education*, 45(4):217-231.

Labuschagne, M. 2015. Promoting quality learning environments at Early Childhood Centres through Service Learning. Potchefstroom: North-West University. (Dissertation – Masters).

Lacey, C.J. & Johnston, R.D. 1990. Woody clumps and clumpwoods. *Australian Journal of Botany*, 38(3):299-334.

Lambrechts, W., Van Liedekerke, L. & Van Petegem, P. 2018. Higher Education for Sustainable Development in Flanders: Balancing between normative and transformative approaches. *Environmental Education Research*, 24(9):1284-1300.

Leal Filho, W., Raath, S., Lazzarini, B., Vargas, V.R., de Souza, L., Anholon, R., Quelhas, O.L.G., Haddad, R., Klavins, M. & Orlovic, V.L. 2018. The role of transformation in learning and education for sustainability. *Journal of Cleaner Production*, 199(1):286-295.

Leather, M. 2016. A critique of forest school: Something lost in translation. *Journal of Outdoor and Environmental Education*, 21(1):5-18.

Le Grange, L. 2004. Against environmental learning: Why we need a language of environmental education. *Southern African Journal of Environmental Education*, 21(1):134-140.

Le Grange, L. 2011. Sustainability and Higher Education: From arborescent to rhizomatic thinking. *Educational Philosophy and Theory*, 43(7):742-754.

Le Grange, L. 2016. Think piece: Sustainability education and (curriculum) improvisation. *Southern African Journal of Environmental Education*, 32(1):26-36.

Le Grange, L. & Ontong, K. 2015. The need for place-based education in South African schools: The case of Greenfields Primary. *Perspectives in Education*, 33(3):42-57.

Lee, J.C. & Ma, W.H.T. 2006. Early childhood environmental education: A Hong Kong example. *Applied Environmental Education and Communication*, 5(2):83-94.

Lotz-Sisitka, H. 2004. Editorial: Rhizome connections. *Southern African Journal of Environmental Education*, 21(1):5-11.

Lotz-Sisitka, H. 2012. National case study: Teacher professional development within an Education for Sustainable Development focus in South Africa: Development of a network, curriculum framework and resources for teacher education. Paper presented at the African (ADEA) Triennale on Education and Training in Africa, Ouagadougou, Burkina Faso, 7–12 February 2011.

Loubser, C.P. 2014. Environmental education and education for sustainability: Some South African perspectives. Pretoria: Van Schaik Publishers.

Louv, R. 2010. Do our kids have nature-deficit disorder? *Educational Leadership*, 67(4):24-30.

Lovell, R., O'Brien, L. & Owen, R. 2010. Review of the research evidence in relation to the role of trees and woods in formal education and learning. Wales: The research agency of the Forestry Commission.

Makrakis, V., Gkotzos, D. & Larios, N. 2012. ICT-enabled climate change education and children's rights. *Journal of Teacher Education for Sustainability*, 14(2):89-110.

Makrakis, V. & Kostoulas-Makrakis, N. 2012. Course curricular design and development of the M.Sc. programme in the field of ICT in education for sustainable development. *Journal of Teacher Education for Sustainability*, 14(2):5-40.

Maree, K. 2016. First steps in research. 2nd ed. Pretoria: Van Schaik Publishers.

Marais, A.M. & Wessels, E. 2020. Investigating the interpretation and implementation of policies that guide the teaching of reading in the Foundation Phase. *Reading & Writing: Journal of the Reading Association of South Africa*, 11(1):277.

Marriott, L.K., Lipus, A.C., Choate, L., Smith, J., Coppola, L., Cameron, W.E. & Shannon, J. 2015. Experiential learning through participatory action research in public health supports community-based training of future health professionals. *Pedagogy Health Promotion*, 1(4):220-232.

Masinga, L., Myende, P., Marais, A., Singh-Pillay, A., Kortjass, M., Chirikure, T. & Mweli, P. 2016. "Hear our voices": A collective arts-based self-study of early-career academics on our learning and growth in a research-intensive university. *Educational Research for Social Change*, 5(2):117-135.

Maynard, T. 2007. Forest schools in Great Britain: An initial exploration. *Contemporary Issues in Early Childhood*, 8(4):320-331.

McCurdy, L.E., Winterbottom, K.E., Mehta, S.S. & Roberts, J.R. 2010. Using nature and outdoor activity to improve children's health. *Current Problems in Paediatric and Adolescent Health Care*, 40(5):102-117.

McInerney, P., Smyth, J. & Down, B. 2011. 'Coming to a place near you?' The politics and possibilities of a critical pedagogy of place-based education. *Asia-Pacific Journal of Teacher Education*, 39(1):3-16.

McKenzie, M., Hart, P., Bai, H. & Jickling, B. 2009. Fields of green. Cresskill, NJ: Hampton Press Inc.

McLeod, S.A. 2017. Kolb-learning styles. Simply psychology. https://www.simply psychology.org/simplypsychology.org-Kolb-Learning-Styles.pdf Date of access: 20 Jul. 2018.

Merriam, S.B. 2009. Qualitative research. A guide to design and implementation. 3rd ed. San Francisco, CA: John Wiley & Sons.

Merriam, S.B. & Tisdell, E.J. 2009. Qualitative research: A guide to design and implementation. San Francisco, CA: Jossey-Bass.

Mezirow, J. 1990. How critical reflection triggers transformative learning. (*In* Mezirow, J., *ed*. Fostering critical reflection in adulthood: A guide to transformative and emancipatory learning. San Francisco, CA: Jossey-Bass. p. 1-20).

Mezirow, J. 1991. Transformative dimensions of adult learning. San Francisco, CA: Jossey-Bass.

Mezirow, J. 1997. Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, 1997(74):5-12.

Mezirow, J. 2003. Transformative learning as discourse. *Journal of Transformative Education*, 1(1), 58-63.

Mokhele, M.L. 2011. Integrated environmental teaching in South Africa: An impossible dream? *Perspectives in Education*, 29(4):78-86.

Moore, J. 2005. Barriers and pathways to creating sustainability education programs: Policy, rhetoric and reality. *Environmental Educational Research*, 11(5):537-555.

Moore, K.A. & Bradley, L.K. eds. 2018. North Carolina extension gardener handbook. Raleigh, NC: State Extension. http://content.ces.ncsu.edu/3-botany Date of access: 10 Aug. 2019.

Morgan, A.D. 2009. Learning communities, cities and regions for sustainable development and global citizenship. *Local Environment*, 14(5):443-459.

Nan-Zhao, Z. 2005. Four 'pillars of learning' for the reorientation and reorganization of curriculum: Reflections and discussions. International Bureau of Education - UNESCO.

Nino, M., Cuevas, M. & Loya, M. 2011. Transformational effects of service-learning in a university developed community-based agency. *Advances in Social Work*, 12(1):33-48.

Nixon, W. 1997. Letting nature shape childhood. *The Amicus Journal*, 19(3):31.

Ocholla, D. & Le Roux, J. 2011. Conceptions and misconceptions of theoretical frameworks in library and information science research: A case study of selected theses and dissertations from Eastern and Southern Universities. *Mousaion*, 29(2):61-74.

O'Connor, J. & Geiger, M. 2009. Challenges facing primary school educators of English second (or other) language learners in the Western Cape. *South African Journal of Education*, 29:253-269.

O'Donoghue, R. 2018. Critical theory in environmental education: A situated review of emerging critical processes for mediating learning-led change. *Pesquisa em Educação Ambiental*, 13:23-41.

Ontong, K. & Le Grange, L. 2014. The role of place-based education in developing sustainability as a frame of mind. *Southern African Journal of Environmental Education*, 30:27-38.

Orr, D.W. 2004. Earth in mind: On education, environment, and the human prospect. Washington, DC: Island Press.

Pahl, K. 2017. Dialogic objects: Material knowledge as a challenge to educational practice. (*In* Pillay, D., Pithouse-Morgan, K. & Naicker, I. *eds*. Object medleys: Interpretive possibilities for educational research. Rotterdam, NL: Sense. p. 29-44).

Pascal, C. & Bertram, T. 2021. What do young children have to say? Recognising their voices, wisdom, agency and need for companionship during the COVID pandemic. *European Early Childhood Education Research Journal*, 29(1):21-34.

Patton, P. 2000. Deleuze and the political. London, UK: Routledge.

Pavlova, M. 2011. Environmental education and/or Education for Sustainable Development: What role for technology education? (*In* Stables, K., Benson, C. & De Vries, M., *eds*. Perspectives on learning in design and technology education: 2011 PATT 25: CRIPT8 Conference organised by the University of London, New Cross: London. London, UK: Goldsmiths. p. 333-339).

Pavlova, M. 2013. Towards using transformative education as a benchmark for clarifying differences and similarities between environmental education and Education for Sustainable Development. *Environmental Education Research*, 19(5):656-672.

Pearson, E. & Degotardi, S. 2009. Education for sustainable development in early childhood education: A global solution to local concerns*?* *International Journal of Early Childhood*, 41(2):97.

Pretorius, R.W., Brand, M.E. & Brown, L.R. 2016. Engaging ODL students with biodiversity issues: A South African case study on the role of ESD. (*In* Castro, P., Azeiteiro, U.M., Bacelar-Nicolau, P., Leal Filho, W. & Azul, A.M., e*ds*. Biodiversity and Education for Sustainable Development. Cham: Springer. p. 289-304).

Raht, D., Smith, J. & MacEntee, K. 2009. Engaging youth in addressing HIV & AIDS: Creative and participatory methods in the classroom. (*In* C. Mitchell & K. Pithouse *eds.*, Teaching and HIV & AIDS. Johannesburg, South Africa: MacMillan. p. 219-236).

Ramsaroop, S. & Van Rooyen, H. 2013. Exploring educator competence in teaching environmental education in schools in Gauteng. *Africa Education Review*, 10(3):595-613.

Reddy, C. 2021. Environmental education, social justice and teacher education: enabling meaningful environmental learning in local contexts. *South African Journal of Higher Education*, 35(1):161-177.

Richter, B.W. & De Sousa, L.O. 2019. The implementation of environmental education to promote sustainability: an overview of the processes and challenges. *International Journal of Sustainable Development & World Ecology,* 26(8):721-731.

Rieckmann, M. 2017. Education for sustainable development goals: Learning objectives. Paris, FR: UNESCO.

Ritchie, J., Lewis, J., Nicholls, C.M. & Ormston, R. 2013. Qualitative research practice: A guide for social science students and researchers. 2nd ed. Los Angeles, CA: Sage Publications.

Robinson, O.C. 2014. Sampling in interview-based qualitative research: A theoretical and practical guide. *Qualitative Research in Psychology*, 11(1):25-41.

Robottom, I. 2007. Re-badged environmental education: Is ESD more than just a slogan? *Southern African Journal of Environmental Education*, 24:90-96.

Roelvink, G. 2020. Framing essay: Diverse economies methodology. Edward Elgar Publishing.

Romm, N.R.A. 2018. Responsible research practice: Revisiting transformative paradigm in social research. Cham: Springer.

Rooth, E. 2005. An investigation of the status and practice of Life Orientation in South African schools in two provinces. Cape Town, University of the Western Cape. (PhD – Thesis).

Rose, J. & Paisley, K. 2012. White privilege in experiential education: A critical reflection. *Leisure Sciences*, 34(2):136-154.

Roy, R. 2014. Place-based environmental education: A fieldhouse feasibility study for the Vancouver Park board. Board of Parks and Recreation, Vancouver, BC. https://sustain.ubc.ca/sites/sustain.ubc.ca/files/Sustainability%20Scholars/GCS%20reports%202014/GCS%20Environmental%20Ed%20report%20Sept.%202014.pdf Date of access: 18 Jun. 2018.

Ryan, A. & Cotton, D. 2013. Times of change: shifting pedagogy and curricula for future sustainability. (*In* Sterling, S., Maxey, L. & Luna, H., *eds.* The sustainable university: Progress and prospects. Abingdon, UK: Routledge. p. 151-167).

Salequzzaman, M. & Gorana, R.N. 2016. Education for sustainable development (ESD) initiatives and programmes in Bangladesh. (*In* Gorana, R.N. & Kanaujia, P.R., eds. Reorienting educational efforts for sustainable development. Dordrecht: Springer. p. 53-70).

Sanders, D.L. 2017. Windows on a changing world: Using children's literature as an aesth/ethical trope in early years education for sustainability. (*In* Franck, O. & Osbeck, C., *eds*. Ethical Literacies and Education for Sustainable Development: Young People, Subjectivity and Democratic Participation. Cham, Switzerland: Palgrave Macmillan. p. 127-136).

Sankar, C.S. 2017. Education for Sustainability: A paradigm for thinking and doing. *International Journal on Arts, Management and Humanities*, 6(2):51-54.

Saraisky, N.G. 2016. Analyzing public discourse: Using media content analysis to understand the policy process. *Current Issues in Comparative Education*, 18(1):26-41.

Schudel, I.J. 2012. Examining emergent active learning processes as transformative praxis: The case of the schools and sustainability professional development programme. Grahamstown, Rhodes University. (PhD - Thesis).

Schudel, I. & Lotz-Sisitka, H. 2021. Strengthening Environment and Sustainability Subject Knowledge: Curriculum Challenges and Opportunities. (*In* Schudel, I., Songqwaru, Z., Tshiningayamwe, S. & Lotz-Sisitka, H. *eds*. Teaching and Learning for Change: Education and Sustainability in South Africa. Cape Town, South Africa: African Minds. pp. 25-48.)

Scoffham, S. 2011. A 'wicked' approach to a 'wicked problem': Developing ESD in the curriculum at Canterbury Christ Church University. (*In* Shiel, C. *ed*. Global Vision, Local Action: Education for Sustainable Development and Global Citizenship, Bournemouth. pp. 67-76).

Seobi, B.A. & Wood, L. 2016. Improving the instructional leadership of heads of department in under-resourced schools: A collaborative action-learning approach. *South African Journal of Education*, 36(4):1-14.

Shallcross, T., Loubser, C., Le Roux, C., O'Donoghue, R. & Lupele, J. 2006. Promoting sustainable development through whole school approaches: An international, intercultural teacher education research and development project. *Journal of Education for Teaching*, 32(3):283-301.

Singh, P. 2011. Developing a community of thinking: Assessment of environmental education. *Environmental Education Research*, 17(1):113-123.

Sinha, S. 2018. Fundamentals of education. Raleigh, NC: Lulu Publication.

Smith, G.A. & Sobel, D. 2010. Place-and Community-Based Education in schools. New York, NY: Routledge.

Stevens, N. 2019. Photo-Voice as a reflexive method. https://digitalcommons.library.tru.ca/tpc/2019/program/6/ Date of access: 18 Jan. 2020.

Stratton, S.J. 2021. Population Research: Convenience Sampling Strategies. *Prehospital and Disaster Medicine*, 36(4):373-374.

Swarts, P., Rens, J. & De Sousa, L. 2015. Viewpoint working with environmental education pedagogies in Life Orientation to enhance social and environmental responsibility. *Southern African Journal of Environmental Education*, 31(1):94-109.

Sund, P. & Gericke, N. 2020. Teaching contributions from secondary school subject areas to Education for Sustainable Development - a comparative study of science, social science and language teachers. *Environmental Education Research*, 26(6):772-794

Sykes, G. 2016. You as a landscape architect. (*In* Cox, A. & Sykes, G., *eds*. The multiple identities of the reception teacher: Pedagogy and purpose. London, UK: SAGE. p. 88-110).

Taylor, E.W. 1997. Building up the theoretical debate: A critical review of the empirical studies of Mezirow's transformative learning theory. *Adult Education Quarterly*, 48(1):139-156.

Taylor, E.W. & Cranton, P. 2013. A theory in progress?: Issues in transformative learning theory. *European journal for research on the education and learning of adults*, 4(1):35-47.

Theron, J. 2016. Eco education for teachers a major gap in SA. *Green Times*, 5 Feb. http://thegreentimes.co.za/eco-education-for-teachers-a-major-gap-in-sa/ Date of access: 29 Jun. 2018.

Theron, L., Mitchell, C., Smith, A.L. & Stuart, J. 2011. Picturing research. Rotterdam: Sense Publishers.

Thomas, I. 2009. Critical thinking, transformative learning, sustainable education, and problem-based learning in universities. *Transformative Education*, 7(3):245-264.

Tilbury, D. 2004. Rising to the challenge: Education for sustainability in Australia. *Australian Journal of environmental education*, 20(2):103-114.

Tilbury, D. 2011. Education for sustainable development: An expert review of processes and learning. Paris, FR: UNESCO.

Tillmanns, T., Holland, C., Lorenzi, F. & McDonagh, P. 2014. Interplay of rhizome and Education for Sustainable Development. *Journal of Teacher Education for Sustainability*, 16(2):5-17.

Tinney, G.T. 2020. Early Years Education, Education for Sustainable Development and Global Citizenship and the Principles of Harmony. Wales, UK.

Trehan, K. & Pedler, M. 2016. Critical action learning. (*In* Gold, J., Thorpe, R. & Mumford, A., *eds*. Gower handbook of leadership and management development. Abingdon, UK: Routledge. p. 405-422).

Tsevreni, I. 2011. Towards an environmental education without scientific knowledge: An attempt to create an action model based on children's experiences, emotions and perceptions about their environment. *Environmental Education Research*, 17(1):53-67.

Umar, M., Saidu, S. & Azare, Y.G. 2015. The impact of language and literature education in quality inclusive Education for Sustainable Development in Nigeria. *National Journal of Inclusive Education*, 3(1):99-106.

Umholtz, J. 2013, 11 May. Re-engaging youth through environmental-based Education for Sustainable Development. *The Journal of Sustainability Education*. http://www.jsedimensions.org/wordpress/content/re-engaging-youth-through-environmental-based-education-for-sustainable-development_2013_05/ Date of access: 13 Nov. 2018.

UNCED (United Nations Conference on Environment and Development). 1992. Earth Summit, Chapter 36. Conches, Switzerland: UNCED.

UNESCO. 2010. Education for sustainable development lens: A policy and practice review tool. Education for sustainable development in action: learning and training tools. Paris, FRA: Section for Education for Sustainable Development.

UNESCO. 2013. Glossary of curriculum terminology. UNESCO International Bureau of Education.

UNESCO. 2014. Global Action Programme on Education for Sustainable Development as follow-up to the United Nations Decade of Education for Sustainable Development after 2014. UNESCO.

University of Plymouth. 2016. What is Education for Sustainable Development: Enabling every human being to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future. https://www.plymouth.ac.uk/your-university/sustainability/sustainability-education/esd Date of access: 2 Dec. 2018.

Vaismoradi, M., Jones, J., Turunen, H. & Snelgrove, S. 2016. Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*, 6(5):100-110.

Vandeyar, S. & Swart, R. 2016. Educational change: A case for a 'pedagogy of compassion'. *Education as Change*, 20(3):141-159.

Van Woerkom, M. 2010. Critical reflection as a rationalistic ideal. *Adult Education Quarterly*, 60(4):339-356.

Villani, C.J. & Atkins, D. 2000. Community-based education. *School Community Journal*, 10(1):39-44.

Walker, K. 1997. Challenging critical theory in environmental education. *Environmental Education Research*, 3(2):155-162.

Wals, A.E.J. 2010. Mirroring, Gestalt switching and transformative social learning: Stepping stones for developing sustainability competence. *International Journal of Sustainable Higher Education*, 11(4):380-390.

Wals, A.E.J. 2012. Learning for a Sustainable World: Review of contexts and structures for ESD. Paris, FR: UNESCO.

Wang, G., Zhou, X. & Cui, H. 2019. Exploring Education for Sustainable Development in a Chinese kindergarten: An action research. *ECNU Review of Education*, 2(4):497-514.

Wood, L. 2020. Participatory action learning and action research: Theory, practice and process. New York, NY: Routledge.

Wood, L. & Zuber-Skerritt, O. 2013. PALAR as a methodology for community engagement by faculties of education. *South African Journal of Education*, 33(4):1-15.

Yildirim, G. & Akamca, G.Ö. 2017. The effect of outdoor learning activities on the development of preschool children. *South African Journal of Education*, 37(2):1-10.

Zwelibanzi, C.M. 2016. An investigation into issues and challenges in implementing environmental education in special schools in South Africa. Pretoria: University of South Africa. (PhD - Thesis).

Zuber-Skerritt, O. 2011. Action leadership: Towards a participatory paradigm. London, UK: Springer.

Zuber-Skerritt, O. 2015. Participatory Action Learning and Action Research (PALAR) for community engagement: A theoretical framework. *Educational Research for Social Change*, 4(1):5-25.

Zuber-Skerritt, O. 2018. An educational framework for Participatory Action Learning and Action Research (PALAR). *Educational Action Research*, 26(4):513-532.

ANNEXURES

Annexure A: Digital informational brochure on ESD implementation through CBE

Annexure B: Declaration by language editor

to the point
LANGUAGE SERVICES

DECLARATION OF LANGUAGE EDITING

I, Therina van der Westhuizen, ID nr 861007 0057 086, hereby declare that I have language edited the dissertation of Sandra Fourie (24095354), entitled

Enhancing the teaching of education for sustainable development in the Foundation Phase through community-based education

Regards,

T. van der Westhuizen

Note: The edited work described here may not be identical to that submitted. The author, at its sole discretion, has the prerogative to accept, delete, or change amendments made by the editor before submission. And it is submitted without me viewing the final product.

Therina van der Westhuizen • B.A. Humanities, B.A. Hons English, M.A. English, PGCE
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Annexure C: Informed consent

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PARTICIPANT INFORMATION AND CONSENT FORM

I herewith wish to request your consent to participate in this research, which involves teachers from primary schools. Before you give consent, please acquaint yourself with the information below.

The details of the research are as follows:

TITLE OF THE RESEARCH PROJECT:

Enhancing the teaching of education for sustainable development in the Foundation Phase through community-based education

PROJECT SUPERVISOR: Prof Lesley Wood
CO-SUPERVISOR: Dr Pieter Swarts, Dr Schalk Raath
ADDRESS: 11 Hoffman Street, Potchefstroom
CONTACT NUMBER: 018 299 4770

MEMBER OF PROJECT TEAM MEd-Student: Sandra Fourie
ADDRESS: 11 Hoffman Street, Potchefstroom
CONTACT NUMBER: 084 905 8750

FACULTY OF EDUCATION RESEARCH ETHICS COMMITTEE
Contact person: Ms Erna Greyling, E-mail: Erna.Greyling@nwu.ac.za, Tel. (018) 299 4656

This study has been approved by the Ethics committee of the Faculty of Education Sciences of the North-West University and will be conducted according to the ethical guidelines of this committee. Permission was also asked from the Department of Basic Education as well as the school principal.

What is this research about?
The aims of this research is:

- To enhance the teaching of ESD in the Foundation Phase by exploring the learning needs of teachers in terms of ESD.
- To determine what the local environmental issues in the community are and establishing how teachers can link these issues in their teaching.
- To provide guidelines to inform the integration of ESD in the Foundation Phase through community-based education.

Participants

What is expected of you as participant?
The research questions will be set by the participants based on their learning needs. It will be expected of the teachers to plan and attend scheduled meetings in the form of action learning sets in which we will set specific aims for each meeting which will reflect our research aims and contribute to answering our research questions.

In the first Cycle of data generation the teachers are expected to discuss how they perceive ESD, their feelings towards ESD, and their learning needs in terms of ESD. They will make use of drawings to discuss these perceptions, feelings and needs. Together we will determine if the teachers integrate ESD in other subjects, if they do in which subjects, and why? The teachers will reflect on all of their opinions and suggestions of how ESD can be integrated and how they currently implement ESD in their classrooms and outdoors.

In the second Cycle the teachers and I will plan and design action plans of how teachers' learning needs in terms of ESD can be met and how teachers can integrate ESD into their teaching using community-based education. Once the teachers and I have collaboratively designed these action plans they will be implemented by the teachers in their classrooms. Thereafter, we will have another action learning set in which we reflect on the changes to determine the impact of our action plans on the teaching of ESD.

The teachers will also be expected to participate in data analysis to evaluate interpretations and to suggest changes if they are unsatisfied or have been misunderstood. These member checks will take place within the action learning sets.

Benefits to you as participant
- Gain insights and better self-esteem because they feel that they will bring about change.
- Gain new pedagogical skills and learn about new teaching approaches.
- Supportive and collaborative relationship building between the participants.
- Improved relationships between the participants and members of the community.
- Opportunity for participants to talk about something they find meaningful.
- Participants may learn something critical about their character and abilities which may lead them to feel empowered.
- Citizens who are more involved in trying to make the community a better place to live in for all.
- Citizens who are more aware of their actions and the consequences of those actions on their local environment.
- The institution will be able to better prepare pre-service teachers to teach about environmental and sustainability topics.
- The researcher may infuse the coursework of certain modules in the undergraduate programmes.

Risks involved for participants
- Negative effects of interactions.
- Participants behaving unethically in terms of confidentiality and anonymity.

Confidentiality and protection of identity
The participants will determine to what extent they want their privacy to be ensured and under what conditions. Privacy will also be discussed during the introduction meeting when informed consent is explained. I will encourage all participants to contribute to mutual respect and the creation of a safe space in which all are free to express their opinions and feelings.

If participants wish to be acknowledge for their contribution to the study I will seek permission to use their names however, if they wish to remain anonymous they will be provided with pseudonyms. Participants are expected to keep the discussions of the action learning sets confidential in order to ensure the protection of all the participants. Member checks will also allow participants to determine whether or not their privacy was respected, and confidentiality adhered to.

Dissemination of findings
The transcriptions and visual data, from the action learning sets, that will be analysed by both me and the participants will be disseminated. I will share all the findings, recommendations and guidelines that were generated. Data will be disseminated during action learning sets as the study progresses the participants will be informed of the results and this will be done for the entire duration of the study. Data will be disseminated to all participants, the school principal, community members involved and the university.

If you have any further questions or enquiries regarding your participation in this research, please contact the researchers for more information.

DECLARATION BY PARTICIPANT:

By signing below, I ..... agree to take part in a research study entitled:

The relationship between the professional wellbeing of teachers and principals' leadership styles.

I declare that:

- I have read this information and consent form and understand what is expected of me in the research.
- I have had a chance to ask questions to the researcher and all my questions have been adequately answered.
- I understand that taking part in this study is voluntary and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the research process before it has finished, if the researcher feels it is in my best interests, or if I do not follow the research procedures, as agreed to.

Signed at (place)_____on (date) _____/_____/20____

_____ _____

Signature of participant **Signature of witness**

Annexure D: Ethics approval

NORTH-WEST UNIVERSITY
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6 March 2020

To Whom It May Concern

I hereby confirm that the ethics application, as stated below, was approved at the Ethics Committee meeting of the Faculty of Education of 27 February 2020.

Ethics number: NWU-01649-19-A2

Project head: Prof L Wood

Project team: S Fourie (MEd student - 24095354); Dr P Swarts; Dr S Raath

Title of study: Enhancing the teaching of education for sustainable development in the Foundation Phase through community-based education

Period: 27 February 2020 – 27 February 2021

Risk level: Low

Should you have further enquiries in this regard, you are welcome to contact Prof Jako Olivier at 018 285 2078 or by email at Jako.Olivier@nwu.ac.za or Ms Erna Greyling at 018 299 4656 or by email at Erna.Greyling@nwu.ac.za .

Yours sincerely

Prof J Olivier
Chair Edu-REC