AN INVESTIGATION OF HOW ENQUIRY-BASED FIELDWORK DEVELOPS ACTION COMPETENCE IN GRADE 12 GEOGRAPHY: A NAMIBIAN CASE STUDY

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DECLARATION

I, the undersigned, hereby declare that the work depicted in this thesis is my own original work and has not previously been submitted at any university for a degree or for any other academic purpose.

Signature:..... **Date:.....**

ABSTRACT

The goal of the study was twofold: firstly to investigate and describe how senior secondary school geography teachers were implementing enquiry-based learning through fieldwork. Secondly, to investigate and document how enquiry-based learning through fieldwork facilitated the development of action competence amongst learners in a geography classroom.

In order to address the first goal, a survey questionnaire was utilised to generate descriptive data from a sample of seven geography teachers in the Hardap region of Namibia. Although teachers engaged learners with enquiry-based fieldwork learning activities it is suggested, based on the findings of data of this goal, that teachers face severe limitations in terms of integrating environmental learning into the geography curriculum. The main limitations of the teachers include: limited practical knowledge of and training in how to teach fieldwork skills; a lack of teaching resource materials; time constraints; heavy personal loads; and lack of school support for environmental education.

In addressing the second goal an enquiry-based fieldwork learning unit was planned and implemented in the researcher's classroom. Observation, focus group interviews, and audio records of learning interactions, were used as data generation methods for this cycle of the study. An indicator framework for identifying action competence in learners was constructed as a data analysis tool. In terms of the findings of goal two it is evident that enquiry-based learning through fieldwork facilitated the development of action competence amongst learners. Six overarching benefits of this type of learning were identified in this study, namely:

- It empowered learners to develop contextual knowledge and understanding of issues that they investigated.
- It facilitated commitment thus motivated learners to take indirect action.
- It promoted social interaction and group cohesion amongst learners thus enhanced their decision-making ability for problem-solving and action taking.
- It elicited emotional responses and a greater understanding of learners' own and others' attitudes and values towards issues.

- It fostered critical thinking thus permitted learners to envisage a future based on their learning experiences.
- It enabled learners to plan and take indirect action during the learning process.

Based on the research findings, some lessons learned are presented in an attempt to contribute to the effective implementation of enquiry-based fieldwork at the classroom level.

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LIST OF ACRONYMS

EEASA	Environmental Education Association of Southern Africa
ESD	Education for Sustainable Development
IVAC	Investigation-Vision-Action and Change: acronym for a pedagogical framework for developing action competence
MDGs	Millennium Development Goals
MOE	Ministry Of Education
NEEN	Namibia Environmental Education Network
NIED	National Institute for Educational Development
NSSC-O	Namibia Senior Secondary Certificate- Ordinary Level
SADC	Southern Africa Development Community
UNDESD	United Nations Decade of Education for Sustainable Development
UNESCO	United Nations Educational Scientific and Cultural Organisation

CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

This chapter covers the background to the research as well as the motivation that underpinned the need to investigate environmental learning within the Namibia senior secondary school geography curriculum. A brief introduction to the research context is presented in order to outline the characteristics of the settings under which the study was conducted. The research question and goals are introduced. Finally, the chapter concludes with an overview of the research chapters.

1.2 BACKGROUND TO THE STUDY

The researcher is a senior secondary school geography teacher in the town of Tsumeb, in the Oshikoto region of Namibia. He is in charge of teaching geography at the senior secondary phase (Grades 11 & 12).

He was previously employed as an environmental educator for the Namib Desert Environmental Education Trust (NaDEET) which is a nongovernmental organisation (NGO) in Namibia. NaDEET (2006:3) objectives are to provide environmental education for Namibian children and educator groups by:

- Addressing relevant environmental issues through hands-on, experiential learning;
- Supporting the Namibian school curriculum in a practical learner-centred way;
- Providing an opportunity for learners and educators to experience the Namib Desert firsthand.

Environmental educators at NaDEET are responsible for mediating environmental education learning programmes for both learners and educator groups. The researcher developed an interest in mediating fieldwork learning experiences in view of his exposure to fieldwork learning activities within the programme. As an environmental educator the researcher was intrigued by the enthusiasm the learners showed for hands-on-experiential learning activities; this resulted in him being interested in investigating the educational relevance of such activities for young

people. This formed the basis of this study, namely, to investigate how integrating fieldwork learning experiences, in the formal school curriculum, could provide meaningful real-life practical learning in learners' local environment. Schools are a central setting in which fieldwork should be utilised in promoting real-life environmental learning amongst young people.

On the other hand, effective fieldwork implementation in school curricula suffers constraints at the teaching-learning interface in classroom settings. Internationally it is normally not integrated in most geography classroom lessons. In the Netherlands for instance, Swaan and Wijnsteekers (1999) revealed that fieldwork does not have a strong position in the secondary school geography curriculum and has never been a feature of teacher training. In the United States of America (USA), geography fieldwork has largely been ignored in curriculum development, and in many countries in Europe the role of fieldwork has been marginal. In most less-developed countries, resource constraints have meant fieldwork development has been a very low priority (Foskett, 1999). Zhang (1999) reported that fieldwork is largely absent from the mainstream geography curriculum in most Chinese secondary schools as a result of the time demands of the curriculum and most teachers' inexperience in fieldwork. Chew (2008) noted that in Singapore there is a lack of critical focus on fieldwork as an essential part of geography education. Smith (1999) identified factors that constrained the implementation of fieldwork in England, namely the time taken up in travelling and the time required to carry out fieldwork.

Most importantly, Kanyimba (2002) revealed that fieldwork, as an instructional technique, is hardly utilised in most Namibian secondary school classrooms. He suggested: "Given the importance of fieldwork [as an instructional technique in environmental education] it is obligatory that it be made part of secondary schools' instructional strategy and teachers need support in the process of managing and preparing fieldwork instructional strategies" (Kanyimba, 2002:81). This study is an attempt to contribute to his call by probing how the Namibia senior secondary school geography curriculum can promote fieldwork instruction at the classroom level.

The researcher was also introduced to the concept of action competence while enrolled in the masters' programme of environmental education at Rhodes

University. He was interested in finding out how his practice was contributing towards meaningful environmental learning amongst young people. These factors led to this study.

1.3 BRIEF INTRODUCTION TO THE CONTEXT OF STUDY

This investigation was undertaken in Namibia as an action research case study. Cycle 1 of the research process involved a survey of seven accessible senior secondary school geography teachers. Cycle 2 was carried out at Tsumeb Secondary School. It is a well resourced school situated in the town of Tsumeb and comprises 685 learners and 25 teachers.

The town of Tsumeb is located in the north-central part of Namibia within the Oshikoto region, 440 kilometres (km) north of Windhoek, the capital city of Namibia. Tsumeb is well known for its rich copper deposits. Copper has been of pre-eminent importance since the origination of the town in 1905 (Tsumeb Agenda, 2010). These rich copper deposits have not only contributed to the socio-economic development of the town but, also currently contribute to the environmental challenges being faced by the town. One such challenge is the high rate of migration to the town as it has introduced environmental problems emanating from the mushrooming of informal settlements. Cycle 2 of this action research study was undertaken in one of the recently established informal settlements in the town. Improper sanitation, poor housing, limited water supply, poor waste management methods, and a lack of electricity, are some of the challenges facing residents of this informal settlement. The majority of residents in this informal settlement are unemployed and cannot afford to pay their municipal bills.

Cycle 1 of the action research process involved undertaking a baseline study which was conducted in a survey questionnaire involving seven senior secondary school geography teachers. The main purpose of carrying out the survey was to find out how other geography teachers were involving their learners in fieldwork. This was necessary because the researcher wanted to learn from other teachers how they were using fieldwork in geography in order to inform his classroom intervention (Cycle 2). In Cycle 2 of the action research process, the researcher carried out a classroom intervention that involved planning and implementing a series of enquiry-

based fieldwork lessons during his geography lessons. This enabled the researcher to generate data of how enquiry-based fieldwork facilitated the development of action competence amongst his geography learners.

1.4 MOTIVATION FOR THE STUDY

As stated above the motivation for the study was the researcher's quest to investigate how integrating real-life local environmental issues in the formal school curriculum could support the development of action competence in learners.

Premised on the above motivation, one of the overall objectives of environmental education is to build up students' abilities to act with reference to environmental concerns (Jensen & Schnack, 1997). Developing action competence in learners requires "a form of teaching from which pupils acquires the courage, commitment and desire to get involved in the social interests concerning them and their communities" (Jensen & Schnack, 1997:472). As an approach to teaching and learning in schools, enquiry-based learning has a similar purpose to that proposed by the preceding authors. This is evident in Eames, Law, Barker, Lles, McKenzie and Patterson's (2006) view of enquiry-based learning as "a process of identifying and solving problems, thinking critically, and reflecting to gain understanding or make informed decisions" (2006:12).

Premised on the above insights, the use of teaching approaches, such as enquiry-based learning, can enhance the development of action competence amongst learners in schools. Developing action competence in learners is consistent with the environmental education policy in Namibia. This said policy states: "Environmental learning programmes should aim to empower Namibians from all sectors to critically evaluate environmental information and options, to make informed decisions and to take actions that will contribute to the goal of environmental and economic sustainability" (Namibia. Ministry of Education [MOE], 2005a:10). The policy further emphasises creating "environmentally literate and responsible citizens who are able to fully participate in decision-making at a local level (MOE, 2005a: 10). These statements can be supported by using approaches to teaching and learning that aim to develop learners' problem solving and decision-making skills for action taking in the environment.

The researcher is interested in working with the concept of action competence in environmental education in order to find out how learners could be empowered in order to take action for the environment through teaching and learning. Enquiry-based learning is well suited to achieve this because it is a learner-centred approach to teaching and learning that focuses on active engagement in learning by students (Kahn & O'Rourke, 2004).

1.5 RESEARCH QUESTION AND GOALS

This study is designed to answer the question: How can enquiry-based fieldwork facilitate the development of action competence amongst learners in the Namibia Senior Secondary School Geography curriculum? In order to answer this research question, two goals were formulated, namely

1. To investigate and document senior secondary school geography teachers' implementation of enquiry-based learning through fieldwork.
2. To develop and implement an enquiry-based fieldwork learning unit and investigate how it facilitates the development of action competence amongst learners.

1.6 AN OVERVIEW OF THE THESIS CHAPTERS

Chapter 1 provides an introduction, a brief background, and motivation, to this study. The chapter presents the context in which this study was conducted; it also introduces the research site. The chapter concludes by introducing the research question and articulates the research goals.

Chapter 2 explores the action competence approach to environmental education. It introduces an enquiry-based approach to teaching and learning and then describes enquiry-based learning through fieldwork in geography. Furthermore, the investigation-visions-action-change (IVAC) model of pedagogy for developing action competence is introduced and described. This chapter then explores some broad international literature pertaining to enquiry-based learning and action competence approaches in the education for sustainable development policy. It then describes environmental education in a formal Namibia school context and then discusses enquiry-based learning and action competence in geography. Finally the chapter

concludes by discussing the teaching and learning of geography in a Namibia senior secondary school context and how it offers opportunities for enquiry-based learning through fieldwork.

Chapter 3 examines and justifies the research methodology and orientation that underpin this study. The chapter begins by describing the action research case study methodology and methods of data collection that were deployed in this study. The chapter then goes on to describe how the data were analysed and interpreted. Finally, a discussion on issues of ethics and validity are discussed in relation to this study.

Chapter 4 is a presentation of the data. It contains the findings of the survey (Cycle 1) in relation to how geography teachers implement enquiry-based fieldwork in their classroom practices. This chapter also presents a reflection on Cycle 1 which provided the researcher with an insight on how to plan and implement Cycle 2 of the action research process. The chapter also provides a detailed description of the enquiry-based fieldwork learning activities that were planned and implemented in the researcher's classroom during Cycle 2. Data are presented as narratives detailing how learners participated when an enquiry-based fieldwork learning unit was being implemented in a geography classroom. Finally, the chapter concludes by presenting an analysis of enquiry-based fieldwork learning activities according to the indicators of action competence.

Chapter 5 discusses the research findings of Cycle 2 which are presented in relation to the literature review in chapter 2. The chapter reports the findings of how enquiry-based fieldwork facilitated the development of action competence amongst senior secondary school learners in a geography classroom.

Chapter 6 draws attention to the key findings of the study presented in chapters 4 and 5. It also presents a reflexive review of the methodology and makes recommendations for further research.

CHAPTER 2

KEY IDEAS INFORMING THE STUDY

2.1 INTRODUCTION

This chapter begins by presenting the action competence approach to environmental education. An overview of an enquiry-based approach to teaching and learning is then presented. Enquiry-based learning through a fieldwork method to geography teaching and learning is described. Thereafter the chapter introduces the investigation-visions-action-change (IVAC) model of pedagogy which is used to illustrate links between enquiry-based learning and action competence in relation to environmental learning. A discussion of enquiry-based learning and action competence approaches in education for sustainable development policy highlights some international perspectives. The implementation of environmental education in the Namibia formal school context is explained. The chapter concludes by examining the Namibia senior secondary school geography curriculum and how it provides opportunities for enquiry-based learning through fieldwork at the classroom level.

2.2 THE ACTION COMPETENCE APPROACH TO ENVIRONMENTAL EDUCATION

2.2.1 The meaning of action competence

Action competence is the ability to act with reference to environmental concerns (Jensen & Schnack, 1997; Breiting & Mogensen, 1999). Jensen and Schnack (1997) maintain that the aim of environmental education is to make students capable of acting on a societal and personal level as active participants in environmental education. Action competence includes the ability to identify problems, make decisions about solutions, and take action that develops the students' competence to participate in future action and environmental issues (Jensen & Schnack, 1997). They further enunciate that action competence is an interdisciplinary type of knowledge that focuses on students' abilities to envision a future they want, and reflect on and respond to current health and environmental concerns (Jensen & Schnack, 1997).

Palmer (1995) emphasised that it is important that children not only take action but also understand why they are taking that action. Breiting and Mogensen (1999) differentiate a behaviour modification approach from an action competence approach to environmental education. They alluded to the fact that action competence approach is related to developing a critical, reflective, participatory approach by which the developing adult can cope with future environmental problems; the behaviour modification approach aims at prescribing behavioural patterns which we believe will contribute to solving current environmental problems (Breiting & Mogensen, 1999).

Promoting the development of students' critical thinking through teaching and learning contributes to the development of their action competence. Mogensen (1997) identified four aspects of critical thinking: epistemological; transformation; dialogical; holistic perspectives. In this discourse the researcher emphasises the holistic perspective of critical thinking because it relates directly to developing action competence in learners. Mogensen (1997: 434-5) asserts that:

> The holistic perspective on critical thinking is important in relation to developing action competence because it articulates that to transform an intention to act into actual action, one needs to be what is called a 'holistic person'... thus, critical thinking involves the integration of reason and feelings, a unity of cognition and emotion.

Four aspects of action competence were identified by Jensen and Schnack (1997) and further elaborated by UNESCO (2007:3) as being:

- Broad and coherent knowledge of the nature and scope of the problems (e.g. health and sanitation issues), how they arose, who and what is affected by the problems and knowledge of what can be done;
- Commitment and values that motivate them to participate in contributing to changes in society;
- An interest in the future and capacity to predict what change might be possible in a given context;
- Social, critical and creative thinking skills, in order to question why things are as they are and what needs to be done;
- Experiences of real-life situations gained through participating individually or collectively in facilitating change

These skills encapsulate a decision making capacity. Action competent learners are also able to evaluate, reflect on and restructure their actions within an on-going process of learning and change (UNESCO, 2007). Breiting and Mogensen (1999) stated that students' confidence to influence an environmental outcome is another aspect of action competence. Jensen and Schnack (1997) pointed out that environmental actions could be direct or indirect. Action competence is a process in which students identify environmental issues, determine solutions, and take actions in ways that develop their competence for future action to solve or avoid environmental problems (Jensen & Schnack, 1997).

2.2.2. Teaching and learning: an action competence approach

Jensen (2004:5) pointed out that "if environmental problems are to be solved in the long run; teaching is needed that contributes to the development of students' abilities to influence local and global environmental problems". Teaching should develop students' abilities to take action themselves. In a broad sense, the notion refers to an educational approach that:

- Is critical of moralistic tendencies in environmental education and health education;
- Emphasises the educational aims of environmental education and health education, instead of reducing education to a technical means to solve certain political problems;
- Works with democratic and participatory ideas in relation to teaching-learning;
- Conceives of environmental education and health education as problem-oriented and cross-curricular, even holistic, without losing interest in academic knowledge and fundamental concepts;
- Regards environmental problems as societal issues that involve conflicting interests (Mogensen & Schnack, 2010:60).

Environmental education in schools should emphasise teaching and learning that supports the development of action competence in students when dealing with

environmental issues. It can be argued, that if education is perceived as the process of preparing students for participation in a democratic society, then teaching and learning in schools should prepare students to come up with their own answers and decisions rather than educators doing it for their students. Education in schools must empower students to be inquisitive and critical towards societal concerns and activities rather than being prescriptive.

The concept of action competence is difficult to assess and evaluate in learners and this amounts to challenges on the side of educators. However, a number of ways exist for the qualification of action competence (Jensen & Schnack, 1997; UNESCO, 2007 section 2.2.1). Eames et al. (2006) investigated teachers' pedagogical approaches in selected New Zealand schools that promoted students' action competence in environmental education. Their study identified five indicators/aspects that underpinned the development of action competence in students.

1. Knowledge and understanding for decision making: Students require knowledge on which to base soundly reasoned decisions. This knowledge could include technical, social, political, historical and economic factors.
2. Planning and taking action: Students require the skills and confidence to identify and solve problems, set goals, gather information, communicate, and manage time and logistics to take action
3. Participation: Students require skills in making decisions in a way that is consultative, democratic, collaborative, and co-operative.
4. Emotional response: To be able to decide on the appropriate action to take, and their own personal responsibility and commitment, students need to understand their own attitudes and values towards issues.
5. Critical thinking and reflection: Students require the skills to be able to think critically about the causes of issues and the possible actions that could be taken, and to make meaning by reflecting on their knowledge, actions, participation, attitudes, and values (Eames et al., 2006:12).

2.3 ENQUIRY-BASED APPROACH TO TEACHING AND LEARNING

2.3.1 An overview of enquiry-based teaching and learning

Enquiry-based learning is a term that includes a range of educational approaches which focus on active engagement in learning by students (Kahn & O'Rourke, 2004). Enquiry-based learning is also viewed as an approach to teaching that is question-driven, and involves active, student-centred learning (Spronken-Smith, Bullard, Ray, Roberts, & Keiffer, 2008). It is further described as a pedagogy which best enables students to experience the processes of knowledge creation (Spronken-Smith, Angelo, Matthews, O' Steen, & Robertson, 2007). They postulate that the core ingredients of an enquiry-based learning approach are:

- Learning stimulated by enquiry, which is driven by questions or problems.
- Learning based on a process of seeking knowledge and new understanding.
- A learner-centred approach to teaching in which the role of the teacher is to act as a facilitator.
- A move to self-directed learning with students taking increasing responsibility for their learning and the development of skills in self-reflection.
- An active approach to learning whereby students are responsible for processing the data they are working with in order to reach their own conclusions (Spronken-Smith et al., 2007:2-3).

Enquiry-based learning can go from a rather structured and guided activity, particularly at lower levels through independent research where the students generate the questions and determine how to research them. Kahn and O'Rourke (2005) add that enquiry-based learning stimulates students to follow up interesting lines of enquiry and supports them in concentrating their efforts where they need to undertake further work. It is usually organised around collaborative work in small groups or with structured support from others, thus promoting the social interaction and cohesion that can be difficult to achieve in a mass system (Kahn & O'Rourke 2005).

Group learning is considered vital in enquiry-based learning because it places heavy emphasis on collaborative learning and activity. It allows students to be cognitively engaged in sense making, developing evidence-based explanations, and communicating their ideas (Hmelo-Silver; Duncan & Chinn 2007:100). Spronken-Smith et al. (2007) noted that "facilitated, or scaffold learning is also a requirement

for enquiry-based learning...specifically, following the initiation of enquiry, learners are provided with guidance, resources or feedback when and where appropriate" (Spronken-Smith et al., 2007:73*)*. Kirschner, Sweller and Clark (2006:77) concur that "the goal of instruction [in enquiry-based learning] is rarely simply to search for or discover information....but the goal is to give learners specific guidance about how to cognitively manipulate information in ways that are consistent with a learning goal, and store the result in long-term memory".

Moreover, the central goal of enquiry-based learning is for students to develop valuable research skills and be prepared for lifelong learning (Lee, Greene & Odom, 2004). They add that through enquiry-based learning, students should also achieve learning outcomes that include: critical thinking; an ability for independent enquiry; responsibility for own learning and intellectual growth and maturity. Enquiry-based learning also contributes to the process of enabling students to develop soft skills, such as, leadership, teamwork, and communication skills, which further contributes to students' personal and social development (Hall, Healey & Harrison, 2002). "Enquiry-based learning encourages learners to examine the complexity of their world and form concepts and generalisations instead of being told simple answers to more complex problems" (Jan & Wilson, 2003:10).

2.3.2 Enquiry-based learning through fieldwork in geography

Lonergan and Andersen (1988:64) define 'the field' as any place "where supervised learning can take place via first-hand experience, outside the constraints of the four-wall classroom setting". In teaching and learning terms, Gold, Jenkins, Lee, Monk, Riley, Shepherd et al. (1991) define fieldwork as any component of the curriculum that involves leaving the classroom and learning through first-hand experience. Dummer, Cook, Parker, Barrett, and Hull (2008) assert that fieldwork provides students with the opportunity to test ideas and concepts from the literature against the 'real world' of the field, to apply methods and techniques of data collection and observation, and to work effectively in groups with one's peers.

> Geography without fieldwork is like science without experiments: the field is the geographer's laboratory where young people experience at first hand landscapes, places, people and issues, and where they can learn and practice geographical skills in a real environment (Bland, Chambers, Donert, & Thomas, 1996:165).

Bednarz (1999) describes fieldwork as purposeful, enquiry driven, outside-the-classroom instruction in geography. Furthermore, McMorrow (2005:223) wrote that "fieldwork provides the opportunity for student-centred, experiential 'learning by, allowing students to engage with places and environments". Stoddart (1986) suggests that the acquisition of 'real' geographical knowledge takes place in the field as a result of an interaction of physical, mental and emotional experiences. Thus learning through fieldwork encourages students to explore their emotional responses to environments and help them to develop a sense of place (Job, Day, & Smyth, 1999). This happens because fieldwork is underpinned by experiential learning. Joshi, Davis, Kathuria and Weidner (2005:674) state that experiential learning has the potential to expand the learners' portfolios of skills because students have greater confidence in the knowledge they have discovered through an active process as learners rather than the knowledge that is presented to them when they are treated as passive students.

Healey and Roberts (2004) noted that fieldwork provides an ideal arena for supporting active and experiential learning in geography thereby promoting active and critical engagement in the learning process and encouraging students to link experience with theory in order to generate knowledge. Furthermore, learning through fieldwork permits learners to develop their own visions for the future. This happens because students develop their understanding of different perspectives on social, political or ecological issues, enabling them to clarify and justify their own values whilst learning to acknowledge and respect values for other people (Job et al., 1999). When learners engage in fieldwork activities they become actively engaged in investigating real-life environmental issues that are of concern to their local communities. Learners become actively involved because fieldwork gives them the opportunity to experience 'real' research (Hall et al., 2002).

Enquiry-based learning in geography can offer opportunities for active learning, thus enabling students to experience the complexities of issues of environmental governance in practice as well as the challenges of finding sustainable solutions framed in environmental and social justice (Dengler, 2008). Additionally, engagement in active learning promotes students' critical thinking skills necessary for addressing issues of sustainability at different spatial scales and in varied socio-

cultural contexts (Calder & Clugston, 2005). Through active learning, students also come to realise that decision-making for sustainability requires the mobilization of different types of knowledge. Through fieldwork, learners develop a broad variety of enquiry skills. These include observational, data collection, data analysis, map work and investigative skills (Job et al., 1999). Students may also have the opportunity to practise and apply technical skills.

2.4 ENQUIRY-BASED LEARNING AND ACTION COMPETENCE TEACHING AND LEARNING APPROACHES IN EDUCATION FOR SUSTAINABLE DEVELOPMENT POLICY: INTERNATIONAL PERSPECTIVES

According to Chikunda (2007:159):

> The international conceptualisation of Education for Sustainable Development (ESD) proposes that education at all levels and in all forms should help people of all ages better understand the world in which they live and the complexity and interrelationship of problems such as poverty, wasteful consumption, environmental degradation, population growth, gender inequality, health problems, conflict, and the violation of human rights - all which threaten our future.

Furthermore, the first international gathering of the United Nations Decade of Education for Sustainable Development (UNDESD) confirmed the potential of action education to move people towards sustainable lifestyles and policies (Centre for Environment Education homepage, 2005). The delegates declared that “a key to sustainable development is the empowerment of all people; according to the principles of equity and social justice, and that a key to such empowerment is action-oriented education” (Centre for Environment Education homepage, 2005). Another key theme that featured on the conference agenda was the role of youth participation in sustainable development. The delegates affirmed that:

> They support the participation of youth in developing the plan of implementation for the Decade, with the belief that they are uniquely equipped to do so, and urge the system to facilitate these inputs (Centre for Environment Education homepage, 2005).

Additionally, the Council of Europe (2003, cited in Simovska & Jensen, 2009:6) re-affirmed that:

> The active participation of young people in decision-making and actions at local and regional levels is essential if they are to build more democratic, inclusive and

> prosperous societies. Participation in the democratic life of any community is about more than voting or standing for election. Participation and active citizenship is about having the right, the means, the space, and the opportunity − and where necessary the support − to participate in and influence decisions and engage in actions and activities so as to contribute to building a better society.

ESD (education for sustainable development) advocates that "schools should be implementing approaches to teaching and learning that integrate goals for conservation, social justice, appropriate development and democracy into a vision and a mission of personal and social change" (Gough, 2006:48). According to Gough (2006) ESD also involves developing the kinds of civic virtues and skills that can empower all citizens and, through them, our social institutions, to play leading roles in the transition to a sustainable future.

Therefore environmental education and ESD programmes can play a significant role in empowering the youth through active participation in schools thus contributing to the goals of sustainable development. Enquiry-based learning and action competence approaches to teaching and learning in schools offer opportunities for active learner participation in environmental education and in ESD. However, the implementation of enquiry-based learning and action competence approaches has been difficult to enact by teachers in formal school systems globally. That is the case because:

> The gap between policy rhetoric and school practices in environmental education has not only persisted but probably increased over the past twenty years, given the contested advent of ESD as the dominant international policy discourse in this area, and an increased focus in schools on didactic teaching in traditional content areas resulting from narrowly defined accountability measures in many national educational policies (Stevenson, 2007:265).

In the same way, participants who attended the 20th Annual Regional Conference of the Environmental Education Association of Southern Africa (EEASA) identified that in the Southern African Development Community (SADC) region "educators often lack the skills to implement action-oriented, enquiry-based approaches to learning" (EEASA, 2002:176).

The concepts of enquiry-based learning and action competence offer potential for understanding and supporting student learning in ESD because “the discourses of EE and ESD emphasise holistic and interdisciplinary teaching and learning by engaging students in critical enquiries into real issues of environment and development and in actions addressing those issues” (Stevenson, 2007:273). Hutchings (2006) took this discussion further by suggesting that “enquiry-based learning is particularly well-suited to tackling inter-disciplinary and cross-disciplinary issues, which is the case in ESD” (Hutchings 2006, cited in Ellis & Weekes, 2008:486). Mogensen and Schnack (2010) called attention to how action competence oriented teaching and learning processes in schools can contribute to the goals of ESD. They elaborated by stating that “action competence refers to an educational approach that conceives environmental education and health education as problem-oriented and cross-curricular, even holistic, without losing interest in academic knowledge and fundamental concepts” (Mogensen & Schnack, 2010:60). Based on the above insights, enquiry-based learning, and action competence approaches to teaching and learning, are well positioned in guiding young people to engage with ESD in formal school curricula.

Additionally, UNESCO (2007) stated that in developing countries ESD can contribute to the achievement of all the ‘Millennium Development Goals’ (MDGs). According to UNESCO (2007) ESD, through education and training, can contribute to the achievement of the MDGs by enabling children and adult learners everywhere to investigate MDG issues such as:

- Strategies for addressing poverty and hunger;
- Issues affecting maternal and children’s health;
- Factors leading to and sustaining gender inequalities;
- Issues affecting the empowerment of women;
- Human rights, social justice and environmental issues (UNESCO, 2007:2).

Taking into cognisance the preceding UNESCO issues, enquiry-based learning concepts and action competence in schools offer opportunities for learners to engage with the challenges that are associated with the MDGs. Fien (2001 cited in Taylor, Nathan & Coll, 2003:293) stressed that, “the important aspects of pedagogy

includes encouraging students to explore questions, issues and problems of sustainability, especially in contexts relevant to them and their communities" (Cited in Taylor; Nathan & Coll, 2003:293). The goal of enhancing critical thinking is pivotal to environmental educators' efforts to create an environmentally conscious populace (Ernst & Munroe, 2004). UNESCO (1978) maintained that:

> In the face of complex environmental issues, environmental education does not advocate a particular solution or action, but instead facilitates student's ability to draw on and synthesise knowledge and skills from a variety of subject areas to conduct enquiries, solve problems, and make decisions that lead to informed and responsible actions (Cited in Ernst & Monroe, 2004:431).

Moreover, from a southern African perspective, Lotz-Sisitka, Gumede, Olvitt and Pesanayi (2006) argue that sustainability challenges, such as, poverty, environmental degradation, increased health risk, and food insecurity, have been rightfully assessed to require an educational response for their alleviation. This requires pedagogical approaches, such as enquiry-based learning and action competence that underline an educational response in exploring local sustainability challenges, and issues, such as those listed above, to critically engage learners in ways that lead to finding solutions to their alleviation through teaching and learning.

UNESCO (2007:2) further outlined that:

> ESD can contribute to the quality agenda in education, because it helps to close the gap between everyday and school knowledge, between intellectual and personified activity, between concepts and experience.

It also closes the gap between the curriculum, formal learning and the social context, because "...ESD, through education and training, enables children and adult learners everywhere to investigate MDG issues" (UNESCO (2007: 2). Enquiry-based learning and action competence approaches to teaching and learning have the potential to bridge the gap between the formal school curriculum and the social context thus enabling learners to investigate MDG issues through school learning.

> ESD offers the opportunity for students to utilise active learning and problem solving approaches [such as enquiry-based learning and action competence] to develop critical thinking; linking curriculum content with real life, developing forward thinking and involving children in planning, monitoring and evaluation" (Symons, 1996; Tilbury, 1995, cited in Taylor et al., 2003:293).

In southern Africa:

> Environmental learning is best mediated with active learners in a local environment. With a relevant risk, issue or concern as a focus, learners can find out '*about* the environment', undertake investigation '*in* their local surroundings' and do things '*for*' a healthier environment. Young learners need to come to know about things as they are, but they also need to develop the ability to critically reflect on issues and risks and conceptualise how things might be better (O'Donoghue, 2001:7).

According to Mogensen and Schnack (2010:62) "one key role for ESD in an action competence approach becomes that of developing the students' ability, motivation and desire to play an active role in finding democratic solutions to problems and issues connected to sustainable development" (2010:68). They add that ESD, without a democratic action competence perspective, very easily becomes dogmatic and moralistic (Mogensen & Schnack, 2010).

The next section covers the IVAC model of pedagogy (Jensen, 2004) to exemplify how enquiry-based learning extends the action competence approach to environmental education.

2.5 LINKS BETWEEN ENQUIRY-BASED LEARNING AND ACTION COMPETENCE

As previously noted in section 2.2.2, an enquiry-based approach to teaching and learning is one of six approaches to teaching and learning that supports the development of action competence in learners (Eames et al., 2006). This section intends to shed light on the pedagogical relationship between enquiry-based learning and the action competence approach to environmental education. The discussion is necessary because it describes how an enquiry-based approach to teaching and learning through fieldwork supports the development of certain aspects of action competence in learners. This will be established by means of engaging with the IVAC model of pedagogy.

The IVAC model (see Table 2.1 below) is a practical pedagogical framework that promotes the development of action competence in learners. It offers learners an opportunity to define a local health or environmental problem of significance to them, to acquire knowledge about the problem, to envision possible solutions and then,

based on these, to take some action to address the problem (Ferreira & Welsh, 1997).

Table 2.1: The IVAC model of pedagogy (Investigation, Visions, Action and Change)*

A. Investigation of a theme	B. Development of visions	C. Action and change
➢ Why is this important to us? ➢ What is its significance to us/others?–now/in the future? ➢ What influence do life style and living conditions have? ➢ What influences are we exposed to and why? ➢ How were things before and why have they changed?	➢ What alternatives are imaginable? ➢ How are the conditions in other schools, countries, and cultures? ➢ What alternatives do we prefer and why?	➢ What changes will bring us closer to the visions? ➢ Changes within ourselves, in the classroom, in the society? ➢ What action possibilities exist for realizing these changes? ➢ What barriers might prevent the undertaking of these actions? ➢ What barriers might prevent actions from resulting in change? ➢ What actions will we initiate? ➢ How will we evaluate those actions?

***Adapted from Jensen (1994)**

In terms of the IVAC model of pedagogy, enquiry-based learning through fieldwork provides an ideal opportunity for learners to work towards the goal of developing their action competence through teaching and learning. This is because enquiry-based learning through geographical fieldwork enables learners to come face-to-face with environmental issues in their local contexts (see section 2.3.2).

Components of the IVAC model of pedagogy, and how enquiry-based learning through fieldwork promotes the attainment of each component of the IVAC model, are unpacked below.

2.5.1 Investigation

Investigation, according to Jensen (2004), refers to looking for knowledge to gain insight into a problem and thus creating a willingness to act. Investigation also deals with reaching a common perception of the theme and getting the students/pupils actively involved in choosing a problem to investigate and coming up with an answer as to why this problem is important to them (Jensen, 2004). When learners engage with investigations in enquiry-based fieldwork activities, they become actively engaged in investigating real-life environmental issues that are of concern to them or to their local communities (see sections 2.3.2 & 2.4). In addition to the above, widening and broadening learners' abilities to acquire knowledge independently is central to developing their action competence because knowledge acquisition through first-hand investigations, such as fieldwork, aids learners to acquire coherent knowledge of the problem that they are working on. Knowledge acquisition through first-hand encounters also enables learners to gain knowledge about the nature and scope of the problem, how it arose, who it affects and the range of possibilities that exist for solving it (Jensen & Schnack, 1997).

Optimal results occur when the learners themselves explore these dimensions rather than the educator dispensing cold, hard facts (Carlsson & Jensen, 2006). Furthermore, Eames et al. (2006) maintain that, when dealing with the concept of action competence 'knowledge and understanding for decision making' is one of the five components that underpin the development of action competence in learners They add that students require knowledge on which to base soundly reasoned decisions to take action for the environment; knowledge could include technical, social, political, historical and economic factors (Eames et al., 2006). Active engagement in the learning process when conducting enquiries in fieldwork provides learners with an opportunity for planning and taking action during the learning process (see Healey & Roberts, 2004, section 2.3.2). Planning and taking action through investigations is another aspect that underpins the development of action competence in students (Eames et al., 2006, see also section 2.2.2).

2.5.2 Development of visions

This second component of the IVAC model of pedagogy deals with developing visions of how the conditions which one works with and would like to change might look in the future (Jensen & Schnack, 1997). They add that this point deals with the development of learners' ideas, dreams and perceptions about their future lives and the society in which they will be growing up and living. Learning through enquiry-based methods, such as fieldwork, permits learners to develop their own visions for the future (see Job et al., 1999, section 2.3.2). This happens because enquiry-based fieldwork learning activities enable learners to develop their own alternative views on different issues in the community that learners are a part (see also Job et al., 1999 section 2.3.2).

Jensen and Schnack (1997) maintain that having visions about the good life and future worlds is an important part of being action competent. An important aspect here is the experience and insights gained from communication and collaboration with others-peers, adults, other cultures and contexts (Simovska & Jensen, 2009). Enquiry-based learning through fieldwork contributes to the process of enabling learners to develop their visions for a sustainable future because it provides them with opportunities to develop soft skills (see sections 2.3.1 & 2.3.2) such as leadership, teamwork and communication skills which further contributes to their personal and social development. Fien (2000) posits that envisioning is the ability to negotiate and justify the choices that may become imaginable.

2.5.3 Action and change

This third component of the IVAC model of pedagogy deals with choosing and justifying plans for action to be taken to bring about positive changes with regard to the problem in question, including the analysis of possible barriers and strategies for overcoming them (Simovska & Jensen, 2009). They further outline that it is very important that young people's visions are taken into account when planning so that the actions serve as a bridge between their dreams and reality and bring the reality closer to their ideals (Simovska & Jensen, 2009). An important aspect of action competence is to avoid trying to change behaviour in learners. Rather, Jensen and Schnack (1997) emphasise that teaching increases students' abilities to create their

own visions for the future, and make choices based on those visions rather than advocating particular behaviours where the action or outcome is already pre-determined by the teacher. The above-stated is achievable when teaching and learning processes are undertaken through enquiry-based learning methods such as fieldwork (see for instance Jan & Wilson, 2003 section 2.3.1). This may be realised because enquiry-based fieldwork provides opportunities for learners to experience the processes of knowledge creation and problem solving while taking meaningful action for the environment during the learning process (see sections 2.3.1 & 2.3.2).

One important aspect of the IVAC approach is the stage of critical reflection or self-evaluation which, according to Simovska and Jensen (2009), will often follow the IVAC process. According to them, critical reflection/self-evaluation aims to assess the achievements, analyse the reasons for eventual failures and promote learning from experience. In elaborating the above they maintained that it is important to note that, even if young people do not manage to bring about their desired changes, the reflection and self-evaluation phase can show that the project was successful; that is, that they have learnt a lot and have gained valuable experience they can use in future actions (Simovska & Jensen, 2009:19). To take the discussion further Eames et al. (2006) maintained that critical thinking and reflection is one of the components that underpin the development of action competence in learners. In their words they emphasised that “students require the skills to be able to think critically about the causes of issues and the possible actions that could be taken, and to make meaning by reflecting on their knowledge, actions, participation, attitudes and values” (Eames et al., 2006:12).

2.6 ENVIRONMENTAL EDUCATION IN THE NAMIBIA FORMAL SCHOOL SYSTEM: THE POLICY CONTEXT

This section presents Namibia’s environmental education policy. The discussion describes how the policy is being implemented in the formal school system. This discussion begins by providing a background to Namibia’s environmental education policy. The discussion then examines a learner-centred approach to environmental education in the Namibian formal school context. The section also relates how a learner-centred approach to environmental education in Namibia is influenced by a constructivist theory of teaching and learning. Finally, the section offers an account

of how Namibia's environmental education policy provides opportunities for enquiry-based learning and action competence teaching and learning in schools.

2.6.1 A background to environmental education in Namibia

Global trends and developments in the field of environmental education and, most recently ESD, have contributed significantly to the emergence of environmental education in Namibia. Education reform efforts in Namibia began in 1990 during the country's shift to independence. Environmental education was also introduced as part of the reform process. This was facilitated by the adoption of the Namibian Constitution which made provision for the introduction of environmental education in the country. Article 95 of the Namibian Constitution notes that:

> The state shall actively promote and maintain the welfare of the people by adopting, 'inter alia', policies aimed at …maintenance of ecosystems, essentially ecological processes and biological diversity of Namibia and utilisation of living natural resources and on a sustainable basis for the benefit of all Namibians, present and future (Article 95 of the *Namibian Constitution*, cited in Namibia. MOE, 2005a:1)

Namibia is also a signatory to international treaties on the environment which have influenced and informed the introduction of environmental education in the country (Kanyimba, 2002).

The Namibia Environmental Education Network (NEEN) stated that the aims of Namibia's environmental education policy were to:

- Develop an understanding of the local, regional and global environment; its associated benefits, problems, solutions and procedures for implementing those solutions;
- Foster attitudes and values that develop environmental responsibility and active participation in achieving a higher quality of "being";
- Share and develop skills for identifying, critically evaluating and solving environmental problems;
- Actively encourage participation of individuals, groups and government in acting positively in the prevention and solution of environmental problems and support mechanisms which enable people to take control of their lives and environment;

- Be flexible and dynamic, thereby adapting as new problems and issues arise;
- Where appropriate, follow guidelines and recommendations set out in those international treaties, conventions and agreements ratified by Namibian parliament;
- Recognise and incorporate local and traditional knowledge and take cognisance of cultural and religious beliefs (NEEN, 1999:3).

Enquiry-based learning and action competence approaches to environmental education also emphasise active participation of learners and finding solutions to environmental problems through teaching and learning processes (see sections 2.3.1 & 2.2.1). These approaches are consistent with Namibia's environmental community's vision for environmental learning.

Ministerial documents also show support for the implementation of environmental education policy in the country. In 2005, the Ministry of Education and Culture in Namibia declared that environmental learning principles formed a strong part of the Ministry's policy and are implemented through the curriculum at three different levels:

- Across the whole curriculum through the curriculum goals and principles;
- Integrated within individual subject syllabi through their rationales, aims and learning assessment objectives;
- As part of a 'whole school' approach involving management, organisation, ethos and operations of the school (Namibia. MOE, 2005a).

2.6.2 A learner-centred approach to teaching and learning in schools

The Ministry of Education and Culture views a learner-centred methodology as the best way to approach learning in Namibian schools (Namibia. MOE, 1993). It maintains that a learner-centred approach to teaching and learning in the Namibian context means that:

- The starting point is the learners' existing knowledge, skills, interests and understanding, derived from previous experience in and out of school;

- The natural curiosity, and eagerness of all young people to learn to investigate and to make sense of a widening world must be nourished and encouraged by challenging and meaningful tasks;
- The learners' perspective needs to be appreciated and considered in the work of the school;
- Learners should be empowered to think and take responsibility not only for their own, but also for one another's learning and total development. (Namibia. MOE, 1993:60).

Furthermore, the National Institute for Educational Development (NIED) stated: "The learner and learning described in the Namibian formal school curriculum is within broad parameters of constructivism, tending towards social constructivism" (NIED, 2003:8). The Ministry of Education and Culture presented the term learner-centred education (LCE) as incorporating terms, such as, active learning, exploration, and self-responsibility, consideration of learners' prior knowledge and skills, and construction of knowledge rather than passive participation of students (Namibia. MOE, 1993).

Klein and Merritt (1994) drew parallels between constructivism and environmental education in that both require students to take an active role in learning and building on factual knowledge to improve investigation and critical thinking skills. Environmental learning experiences should expose students in the "real world which they can see, touch, and smell in order for them to develop the knowledge and skills necessary to investigate and seek alternative solutions to environmental and societal issues" (Klein & Merritt, 1994:20).

In light of this Lerman (1989) described constructivism as consisting of two main hypotheses.

> Knowledge is actively constructed by the cognizing subject, not passively received from the environment," and "coming to know is an adaptive process that organizes one's experiential world; it does not discover an independent, pre-existing world outside the mind of the knower (Cited in Klein & Merritt, 1994:15).

Of significance to this study are the roles of the teacher and the learner in the teaching and learning process when planning and implementing lessons. The

learning unit that the researcher planned for the class made provision for active learner participation and opportunities for learners to solve problems during the learning process. Learners were also given opportunities to work in groups (see section 4.4.3). As indicated above, enquiry-based learning and action competence approaches to environmental education meet the goals of learner-centred education (see sections 2.2.2 & 2.3.1). This is because they are both participant centred and advocate active problem solving and learning processes amongst learners (see sections 2.2.2 & 2.3.1).

Klein and Merritt (1994) identified the four main components of a successful constructivist lesson/learning unit that classroom teachers can use. According to them, such a lesson/learning unit should include the following:

1. Introduction of a real life problem by the students or teacher for the students to resolve;
2. Student-centred instruction facilitated by the teacher;
3. Productive group interaction during the learning process, and
4. Authentic assessment and demonstration of student progress.

(Klein & Merritt, 1994:16)

During the enquiry-based fieldwork learning unit implementation in the researcher's classroom, learners were required to investigate real life issues that formed part of their formal geography school curriculum programme (see section 4.4.2). This was necessary so as to enable active leaner participation and engagement into real-life local environmental issues, because "as students engage in investigating problems, they are responsible for making sense of their world and constructing new relationships" (Klein & Merritt, 1994:16). According to Klein and Merritt (1994), successful implementation of a constructivist lesson requires that students should be actively engaged in classroom learning tasks, such as, experimentation, investigation, observation, and discussion. Chaille and Britain (1991) suggested that

> Teachers can facilitate this kind of learning by setting up the physical environment in a way that is conducive to the construction of knowledge, assigning appropriate tasks, providing guidance, making resources and materials available to students, and supporting students in their interactions with others (Cited in Klein & Merritt, 1994:16).

The information presented in this section was vital in assisting the researcher to develop a learner-centred learning unit that was taught to his learners in the classroom (see section 4.3). The literature presented in this section assisted the researcher to plan and to implement a learner-centred learning unit in relation to the learner-centred education policy for Namibia.

2.7 ENQUIRY-BASED LEARNING AND ACTION COMPETENCE APPROACHES IN SCHOOL GEOGRAPHY

In this section the role of enquiry-based learning and action competence approaches in the teaching of school geography is explained. The discussion illustrates the significant role that geography, as a school subject, can play in developing action competence through engaging learners with enquiry-based learning activities. This section also provides a discussion of how geography, as a school subject, contributes to the goals of ESD in the formal school context.

Geography is the study of the interaction of people and their varied environments; it includes the description of the earth and the varying character of its surface, and the patterns and processes of its spatial organisation (Gerber, 1992). The significant role of geography in the implementation of ESD has recently been acknowledged as illustrated below.

In response to the United Nations Decade of Education for Sustainable Development (UNDESD), the *Lucerne Declaration* was formulated in an attempt to integrate sustainable development into the teaching of geography at all levels and in all regions of the world (Reinfried, 2009). It is based on the conviction that knowledge, skills, attitudes and values learned in a geography classroom inspire decisions and actions contributing to the goals of UNDESD thereby making sustainable development a more attainable ideal (Reinfried, 2009:229). This is imperative because

> Nearly all of the 'action themes' highlighted in the UNDESD, including *environment, water, rural development, sustainable consumption, sustainable tourism, intercultural understanding, cultural diversity, climate change, disaster reduction, biodiversity, and the market economy,* have a geographical dimension (Haubrich, Reinfried & Schleicher, 2007:243).

Roberts (2003:6) observed that:

> If geography is to be worth learning, then geographical enquiry should help students make sense of the world they live in and to make sense of what they hear, see and read about their everyday lives; geography should help them make sense of their personal worlds... Geographical enquiry should be focused on real issues, on places and spaces that mean something to students and on real data of the kind that students are likely to encounter in the world outside the classroom.

This form of geography teaching and learning proposed by Roberts runs parallel with Jensen and Shnack's (1997) articulation of the role of action competence in environmental education teaching and learning processes (section 2.2). This is because enquiry-based learning in geography provides active learning opportunities necessary to promote critical thinking and environmental problem solving amongst learners (see Calder & Clugstone, 2005, section 2.3.2). Promoting the development of critical thinking skills in learners through enquiry-based teaching and learning in geography contributes to the development of their action competence. This is because the acquisition of geographic knowledge through enquiry-based fieldwork enables critical thinking to develop in learners as a result of the interaction of physical, mental, and emotional experiences that learners are subjected to during the learning process (see Stoddart, 1986, section 2.3.2). This acquisition of geographic knowledge suggested by Stoddart (1986) plays a crucial role in developing action competence in learners. This is because critical thinking is a pre-condition of developing action competence in learners (see Mogensen, 1997, section 2.2.1).

2.8 THE NAMIBIA SENIOR SECONDARY SCHOOL GEOGRAPHY CURRICULLUM

The Namibia Senior Secondary Certificate Ordinary level (NSSCO) syllabus for geography is designed as a two-year course for examination after completion of the Junior Secondary Certificate (Namibia. MOE, 2005b). The senior secondary school geography learning area contributes directly to the development of the eight (8) key skills, namely:

- Communication skills
- Numeracy skills

- Information skills
- Problem-solving skills
- Self-management and competitive skills
- Social and co-operative skills
- Work and study skills
- Critical and creative thinking (Namibia. MOE, 2005b).

It necessitates teachers to adhere to the philosophy of learner-centred education (section 2.6.2.) as prescribed by the Namibian Ministry of Education. Teachers are also required to integrate environmental learning when they develop and implement lessons at the classroom level. The senior secondary school geography curriculum makes provision for environmental learning in a number of ways as indicated in table 2.3 below.

Table 2.2: Environmental learning in the senior secondary school geography curriculum

Learning theme	**Sub-themes**
Natural resources	• People and resources • Systems • Biodiversity • Resource damage • Response to damage
Poverty and inequality	• Tolerance • Access to resources • Issues related to poverty • Responses to poverty • Systems of oppression • Supporting poverty
Development and the environment	• Economic activity • Consumption and production patterns • Waste • Environmental products and services • Population dynamics • Development

Society and governance	• Democratic society • Violation of human rights and violence • Political structures and processes • Political responses • Regional issues
Health and the environment	• Personal health • Health services and prevention • Resources and health • Disease • HIV/AIDS • Social health issues
Globalisation	• Global economy • Global ideologies • Global environmental issues • Dominance and violence • Global responses

Source: Namibia. Ministry of Education, 2005a

There is a dearth of research regarding the teaching and learning of geography in the Namibia senior secondary school formal curriculum. Nevertheless, a study was carried out by Kanyimba (2002) to establish how environmental education was incorporated in the said curriculum. The study identified several factors that negatively affected the implementation of environmental education at the secondary school level. Kanyimba (2002) identified a lack of teacher training especially for the senior secondary school phase; a shortage of environmental education coordinators in schools and a deficiency in school environmental education policies. In addition the study highlighted a lack of inter-departmental collaboration at school level, textbook learning, need of knowledge of how to incorporate environmental education into all subjects, resistance to change, heavy reliance on donor support and emphasis on carrier subjects, as barriers that negatively affected the effective implementation of environmental education at the secondary school level in Namibia.

Despite the above, there are opportunities that support the implementation of enquiry-based learning in the senior secondary school geography curriculum. Enquiry-based learning is supported throughout the formal school curriculum from Grades 1-12, and specifically identified and encouraged, in subjects such as environmental studies, science, geography, social studies and development studies (Namibia. MOE, 2005a:50). It provides an 'open learning' framework that encourages learner choice and negotiation, reflection on the learning and teaching process, an emphasis on critical thinking and active 'real life' learning (Namibia. MOE, 2005a:50). Since it is based on problem solving, it encourages learners to research their own questions, present and analyse data and identify possible solutions that they or others may be able to implement (Namibia. MOE, 2005a:50). Figure 2.1 below illustrates how enquiry-based learning is being implemented in different subjects in Namibian schools as recommended by the Ministry of Education and Culture.

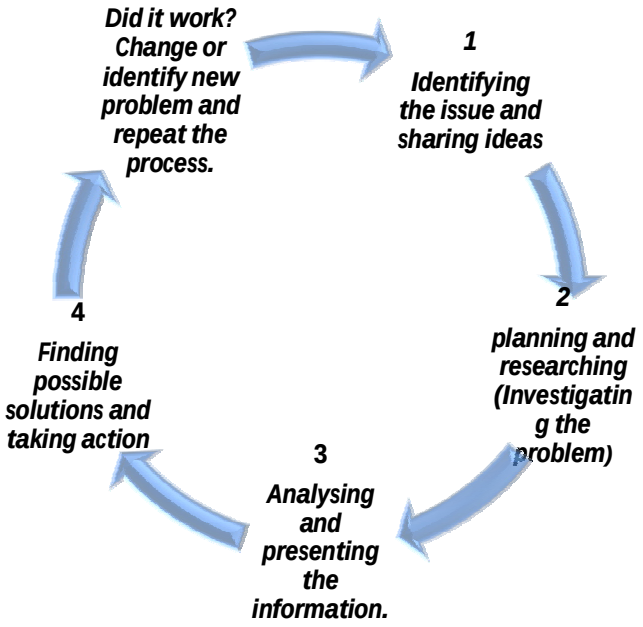


Figure 2.1. Enquiry-based learning (Namibia. MOE, 2005a)

In the senior secondary school geography curriculum, enquiry-based teaching and learning is promoted in the learning component 'research technique skills' which require learners to carry out research projects (geographical enquiries) in order to:

- Identify a problem area/research topic and state the objectives;

- Apply methods of data collection such as interviews, questionnaires, sampling, observations, simple surveys (counts and measurements) and document studies;
- Demonstrate the ability to use and access information from Information Technology (where available) for data analysis and interpretation;
- Demonstrate the ability to analyse and present data collected in appropriate form using for instance maps, graphs, and tables;
- Make effective conclusions and evaluations, suggesting where appropriate (Namibia. MOE, 2005b:13).

The geography curriculum further outlines that it is important that 'research technique skills' are not taught in isolation but are integrated into teaching of the three senior secondary school geography themes, namely:

1. The physical world.
2. Economic development and the use of resources.
3. Population and settlement studies (Namibia. MOE, 2005b: 2).

However, no curriculum guidelines exist on how to implement enquiry-based fieldwork in the geography curriculum. This study seeks to identify classroom factors affecting the implementation of enquiry-based fieldwork in the Namibia senior secondary school geography curriculum at the classroom level (see section 4.2).

2.9 SUMMARY

In this chapter, literature on action competence and how enquiry-based fieldwork acts as an instructional method in geography is reviewed. Factors affecting the implementation of enquiry-based fieldwork in the school context are identified. In terms of the reviewed literature it is shown how an action competence approach to environmental education in the formal school context is beneficial in empowering young people towards a sustainable future. The discussion of literature also covers how the Namibia formal school system makes provision for the implementation of environmental education through enquiry-based teaching and learning in the senior secondary school geography curriculum.

CHAPTER 3

RESEARCH DESIGN

3.1 INTRODUCTION

The research design decisions that guided this study are presented in this chapter. The chapter begins with a description of the action research processes which is followed by the research orientation and the methods used to generate relevant data during the research process. Data generation in this study was spread over two action research cycles. Cycle 1 (a baseline survey) investigated how teachers in the Hardap region of Namibia were implementing enquiry-based fieldwork in their classroom teaching. Cycle 2 (a classroom intervention phase) explored enquiry-based fieldwork in the researcher's geography classroom in the town of Tsumeb. Cycle 1 of the study was undertaken in the Hardap region where the researcher was previously employed while working for NaDEET. Cycle 2 of the study was carried out in the town of Tsumeb (Oshikoto region) where the researcher was subsequently employed during that period. This change in the study site did not compromise the study because the respondents in Cycle 1 raised the issues which were also relevant in the school where the researcher was ultimately working.

The data analysis process for Cycle 2 involved the use of an indicator framework for action competence (section 3.5). In this chapter the researcher further explains why the specific data generation and analysis techniques were selected and how they were used. Validity issues and ethical implications are contextualised and discussed.

3.2 RESEARCH DESIGN AND METHODOLOGY

This section presents the orientation of the research. It describes the rationale for the selection of an interpretive action research case study approach in answering the research question. Section 3.2.1 describes the action research process as a method and clarifies its appropriateness for this study. The section presents an account of what was undertaken during the two action research cycles.

3.2.1 Action research

McMillan and Schumacher (2006) define action research as a process of using research principles to provide information that educational professionals use to improve aspects of day-to-day practice. The research questions posed in action research "are rooted in practice, perhaps by K-12 teachers working in classrooms, administrators identifying and implementing guidelines, counsellors practicing in schools and colleges, or faculty teaching at colleges and universities" (McMillan & Schumacher, 2006:414). Cohen, Manion and Morrison (2000) noted: "action research is a powerful tool for change and improvement at the local level" (2000:226). Koutselini (2008) added that educational action research:

> Is generally considered to be a process of teaching and learning that facilitates teachers' involvement in authentic, context bound problems and supports the generation of new knowledge, which can emancipate them from imposed curriculum delivery (2008:31).

McMillan and Schumacher (2006) wrote: "In K-12 education, the terms *teacher/researcher, teacher research, research practitioner, and teacher-as-researcher* are all used to focus on the action research of a single teacher" (2006:414). Action research is beneficial for teachers because "it can be used for continuous professional development of teachers to improve teaching skills, develop new methods of learning, increase powers of analysis and heighten self-awareness" (Cohen et al., 2000:226).

In addition to the above, McMillan and Schumacher (2006:415) maintain that action research is undertaken in four phases: selecting a focus, topic, or issue to study; collecting data; analysing data; and taking action based on the results. Action research operates in cycles or spirals as one cycle builds on the other and this leads to spirals of action (McNiff, 1996:21-23). A diagram, illustrating the action research cycles used in this study, is presented in Figure 3.1.

Cycle	Plan:	Act:	Reflect:
1. Baseline study	Designed questionnaire.	No workplace-based action in this cycle	• Conducted survey (see section 4.2) Reflected on how survey could inform enquiry-based fieldwork in the Geography curriculum (see section 4.3).
2. Classroom intervention	Developed enquiry-based fieldwork plan and data collection instrument (focus group interview schedule) (see section 4.3).	Implemented a series of enquiry-based fieldwork lessons (see section 4.4).	• Learner observation and analysis of learners' work (recorded in research journal, photographs and audio transcripts) • Focus group discussion with learners (recorded as audio transcripts) Reflect on how enquiry-based fieldwork learning facilitated the development of action competence amongst learners (see section 4.5).

Figure 3.1: Action research cycles

The action research cycles presented above were applied in this study and are discussed below.

3.2.1.1 Description of the action research cycles

This study involved the two aforementioned action research cycles. The purpose of this action research was two-fold: Cycle 1 (a baseline study) was used to find out geography teachers' understanding and implementation of enquiry-based fieldwork as informed by the Namibia senior secondary school geography curriculum. The role of Cycle 2 (the classroom intervention) was to investigate and document how enquiry-based learning through fieldwork in a geography classroom facilitated the development of action competence amongst learners.

Cycle 1: Baseline survey

A questionnaire was designed (Appendix 1) and a survey was carried out in Cycle 1 with geography teachers in order to find out their understanding and how they were implementing enquiry-based fieldwork in their classroom practices. The Namibia senior secondary school formal curriculum documents were reviewed to find out how the curriculum offered opportunities for enquiry-based fieldwork (see section 4.2). It was also necessary to review relevant literature on how best to implement enquiry-based fieldwork in geography in terms of underpinning implementation of this research method at the classroom level.

Cycle 2: Classroom intervention

For Cycle 2, the researcher planned an enquiry-based fieldwork learning unit (section 4.3) consisting of a series of ten 'population and settlement' themed lessons for his grade 12 learners (see table 4.1 in the next chapter).

The first lesson was planned and implemented by initially consulting a research guide from the Namib Desert Environmental Education Trust entitled *Environmental research and inquiry skills programme for secondary schools* (Simasiku, 2009). The focus of this lesson was on introducing the learners to environmental research, enquiry skills and various data collection techniques, such as field investigations and secondary data collection (Appendices 3 & 4). The learners were placed into three different groups during the fieldwork learning unit implementation. In the second

lesson they were taught about the importance of carrying out a secondary data search when conducting research projects. The third lesson introduced them to primary data collection methods. The learners formulated their research project hypothesis, objectives and research questions in the fourth lesson. In the fifth lesson, the three groups' project objectives were presented to the class by a presenter from each group. The learners developed their data collection tools during the sixth lesson and then proceeded to collect data in the Tsumeb informal resettlement during the seventh lesson. In the eighth lesson the learners were introduced to ways of how to analyse, interpret and to present fieldwork data. They opted to present their fieldwork data on posters using various data presentation techniques. This was carried out in the ninth lesson. In the final lesson in this cycle the learners communicated their group project findings, within a classroom setting, to a Tsumeb town councillor. The rest of the learning activities undertaken in the geography classroom are detailed in section 4.3. The data generation techniques used during the two action research process are presented in section 3.3.

3.2.2 A qualitative, interpretive case study

This study was an interpretive case study because it aimed at 'understanding the subjective world of the human experience' (Cohen et al., 2000). This orientation, according to Terre Blanche, Painter and Durrheim (1999) is characterized by a particular ontology, epistemology and methodology. In other words, according to them:

> Researchers working in this tradition assume that people's subjective experiences are real and should be taken seriously (ontology) that we can understand other's experiences by interacting with them and listening to what they tell us (epistemology), and, that qualitative research techniques are best suited to this task (methodology) (1999:6).

Terre Blanche, Painter and Durrheim (1999) believe that interpretive research strives to make sense of feelings, experiences and social situations by studying their natural settings. In this study the researcher wanted to find out how enquiry-based learning through fieldwork facilitated the development of action competence amongst learners in a geography classroom.

Patton (2001) mentions that case studies become particularly useful where one needs to understand a particular group of people, a particular problem or unique situation in great depth. Case studies also bring out the context and history of the issue under investigation. According to Janse van Rensburg (2001:16):

> A researcher can take a close look at individuals or small groups in naturalistic settings, using in-depth case studies…and would look for rich, detailed information of a qualitative nature through in-depth interviews or the interpretation of documents.

Yin (1984:24) defines the case study research method as:

> Empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.

Against this background it is necessary to contextualise case study research in terms of the focus in this study. Namely, to find out how a teaching method when used in a Namibian school context contributed to environmental learning at a classroom level. Bassey (1999:58) listed three types of educational case studies:

- Theory-seeking and theory-testing case studies: Particular studies of general issues-aiming to lead to fuzzy propositions (more tentative) or fuzzy generalisations (less tentative) and conveying these, their context and evidence leading to them to interested audiences.
- Story-telling and picture-drawing case studies: Narrative stories and descriptive accounts of educational events, projects, programmes, institutions or systems which deserve to be told to interested audience, after careful analysis.
- Evaluative case studies: Enquiries into educational programmes, systems, projects or events to determine their worthwhileness, as judged by analysis by researchers, and convey this to interested audiences.

This study can be labelled as a ‘story-telling and picture-drawing’ case study. It tells a story in terms of presenting a description of how geography teachers in Namibia implemented enquiry-based fieldwork (see section 4.2). The picture-drawing dimension involves the use of visual data of how enquiry-based fieldwork in

geography facilitated the development of action competence amongst learners (see chapter 5). The case in this study is Tsumeb Secondary School in Namibia, focusing on a Grade 12 geography classroom.

3.3 DATA GENERATION PROCESS

In order to gather relevant data and answer the research question in this study, the following data generation tools and methods were used. It was important to use multiple data sources for both cycles so that triangulation would be possible. The following methods were used in the data collection process:

- Questionnaire (Cycle 1)
- Observation (Cycle 2)
- Focus group interviews (Cycle 2)
- Research journal (Cycle 2)

3.3.1. Questionnaire

A questionnaire (Appendix 1) was designed and used to gather data on how geography teachers were implementing enquiry-based learning through fieldwork (Cycle 1). Prior to using the questionnaire for data collection a pilot test was conducted. The latter, according to McMillan and Schumacher (2006), allows researchers to check and test their proposed research tool. In order to do so they recommend "…it is best to locate a sample of subjects with characteristics similar to those that will be used in the study" (McMillan & Schumacher, 2006:202). The proposed questionnaire was tested on four senior secondary school geography teachers. The outcome of the pilot test was deemed satisfactory in a sense that recommendations were made about the length of the questionnaire. The researcher had to reduce the number of questions to 10 instead of the original 15. Some questions were rewritten in order to remove ambiguity so that they can be deciphered. The final questionnaire was distributed to the seven geography teachers who participated in the research survey. A purposeful sample comprised of seven senior secondary school geography teachers from the Hardap education region in south Namibia. Purposeful sampling was applicable in this study because "the researcher selects particular elements from the population that will be representative

or informative about the topic of interest" (McMillan & Schumacher, 2006:126). The main purpose of the questionnaire was to generate descriptive data that could inform insights into how enquiry-based fieldwork was being administered by geography teachers. McMillan and Schumacher (2006:233) maintain: "Surveys are used to learn about people's attitudes, beliefs, values, demographics, behaviour, opinions, habits, desires, ideas, and other types of information".

3.3.2 Observations

Cohen, Manion and Morrison (2007:396) explain: "The distinctive feature of observation as a research process is that it offers an investigator the opportunity to gather 'live' data from naturally occurring social situations". Since the researcher was also a teacher during the study it was necessary for him to find out what events were unfolding in the geography classroom when learners were engaged with enquiry-based fieldwork activities that were planned and implemented in the classroom (Cycle 2). In this study learners were observed in their natural settings. According to Cohen et al. (2007:404) an observer "… is part of the social life of participants and documents and records what is happening for research purposes". They add that a participant observer studies and stays with the participants for a substantial period of time to reduce reactivity effects recording what is happening, while taking a role in that situation.

On the other hand observation is: "Closely watching and noting classroom events, happenings or interactions, either as a participant in the classroom or as an observer of another teacher's classroom" (Freeman, 1998:94). In this study, photographs, digital voice tracer and a research journal were used as supplementary methods of data collection. Participant observation is often combined with other forms of data collection that, together, elicit the participants' definitions of the situation and their organising constructs in accounting for situations and behaviour (Cohen et al., 2007:405). The researcher took photographs during the research process (Cycle 2) to provide evidence that learning took place. The said photographs were numbered from 1 to 13 (see Chapter 4 for photographs 1B to 13 and 3.3.3 below for photograph 1A). The researcher also noted some comments that the learners made

during the learning process in the classroom and during the fieldwork investigation exercise. This data were recorded in the research journal as field notes. The lessons were each coded according to the dates on which they were implemented in the classroom. The following codes from the first lesson to the last lesson were used and recorded in a research journal (Appendix 2) FN 07/07; FN 08/07; FN 09/07; FN 13/07; FN 14/07; FN 15/07; FN 16/07; FN 19/07; FN 21/07 and FN 22/07. For example, FN 07/07 was the lesson implemented on 7 July 2010 and the last lesson (FN 22/07) took place on 22 July 2010. No lessons were recorded on 12 and 20 July 2010 because learners at the school were involved in other activities and classes were temporarily suspended on those occasions (FN 12/07 & FN 20/07). A digital voice tracer was also used as a tool to record learner interactions; this tool supplemented other sources of evidence. The researcher recorded the session on a digital audio voice tracer and the data were later colour coded and transcribed (Appendix 5).

The code 'LWG' was used to represent learners' work (audio transcripts) done by the three respective groups and they were numbered LWG 1; LWG 2 and LWG 3. A Tsumeb town councillor was also invited to the classroom, where learners presented their fieldwork investigation data. The researcher recorded the classroom presentations using a digital voice tracer thereafter the audio data were transcribed (see Appendix 5). The code 'TRC' was used to represent the data generated from the classroom guest (the Tsumeb town councillor) in order to represent his interactions with learners. Thereafter the researcher reviewed learners' work (audio transcripts) to find out how action competence developed in learners (Chapter 5).

3.3.3 Focus group interviews

Focus group interviews are used to obtain a better understanding of a problem or an assessment of a problem, concern, new product, programme, or idea (McMillan & Schumacher, 2006). According to Cohen et al. (2007:376) "Focus groups are a form of group interview, though not in the sense of backwards and forwards between interviewer and group". A set of questions was drawn up to guide the focus group interviews (Appendix 6). The purpose of the focus group questions was to allow learners from the researcher's geography class to express their views, perceptions and experiences of the enquiry-based fieldwork activities that were undertaken

during Cycle 2. McMillan and Schumacher (2006) opinioned that focus group interviews in research are much more beneficial compared to one-on-one interviews.

Fifteen learners took part in the focus group interviews. Two focus group sessions were planned and conducted. The first focus group interview session took place on 26 July 2010. Five learners took part in this session. The second focus group interview session was conducted on 27July 2010 and comprised the remaining 10 learners. Photographs were taken during the two focus group interview sessions (see Photograph 1A). The focus group interview recordings were captured using a digital voice tracer and then transcribed later (see Appendix 15). One learner who was not part of the focus group interview was requested by the researcher to take photographs of both focus group interview sessions.

Photograph 1A: Focus group interviews with learners

3.3.4 Research journal

The researcher kept a research journal (Appendix 2) where interactions with learners were recorded as they unfolded in the classroom. The researcher deemed it necessary to record his reflective observations in the research journal because it

was the best way to record informal observations. Notes were made during the lesson implementation in the classroom and during the fieldwork investigations. Ezzy (2002:71-72) is of the view that "Keeping a journal and regularly writing memos encourages researchers to reflect on their emerging understanding of the data"

3.4 SUMMARY OF DATA GENERATED

The matrix of data generated for this study during the data generation process is presented in table 3.1. This table also shows what data collection methods were used to collect the data and from whom that data were collected. It also illustrates the type of data, source, purpose and the code allocated to the data.

Table 3.1 Matrix of data generated

Data collection tool	**Source of data**	**Purpose**	**Code**
CYCLE 1 Teacher questionnaire	Geography teachers (seven)	To understand how they implemented enquiry-based learning through fieldwork.	TQ 1 - TQ7
CYCLE 2 Photographs	Geography learners in the researcher's class	Evidence of undertaking enquiry-based fieldwork learning activities, focus group interviews and evidence of action competence.	Photographs 1A & B - 13
Classroom guest interaction with learners (audio transcript) lesson 10	Classroom guest engaging with learners during classroom presentations.	Evidence of action competence.	TRC (Tsumeb town councillor)
Learners' group work activities (audio transcript) lessons 5 & 10	Geography learners working in groups	Evidence of action competence.	LWG 1; LWG 2 and LWG 3
Research journal Classroom observations (lessons 1-10) and fieldwork	Personal writings	For self reflection and observations.	FN 07/07 To FN 22/07

observation of learners in the Tsumeb informal settlement			
Focus group interview (audio transcript)	15 Geography learners in the researcher's class	For evidence of action competence.	FGI 1 #L1 to FGI 1 #L5 & FGI 2 #L1 to FGI 2 #L10

3.5 DATA ANALYSIS

The data analysis process commenced when the initial data were collected from the survey. This study employed a qualitative data analysis method, which according to McMillan and Schumacher (2006:364): "Is a relatively systematic process of coding, categorizing, and interpreting data to provide explanations of a single phenomenon". The analysis of data in this study was undertaken in two cycles. Cycle 1 data analysis involved analysing survey data generated from completed questionnaires which resulted in analytical memorandum (memo 1) (see Appendix 7). The data analysis process for Cycle 2 involved a synthesis of data generated from multiple data sources that were utilised during the action research process. This data analysis process resulted in analytical memo 2 (see Appendix 8). The two data analysis cycles are presented and described below.

3.5.1 Cycle 1 data analysis: Resulting in analytical memo 1

The main purpose of data analysis for this cycle was to present descriptive data on how enquiry-based fieldwork was being implemented by teachers. Questionnaire data were analysed by grouping respondents' answers. The responses of the seven respondents (teachers) for each of the selected questions were represented in analytical memo 1 (Appendix 7). The responses were organised according to the following categories (see section 4.2):

- Teachers' practical knowledge of teaching fieldwork skills.
- Geography topics/themes teachers integrate research technique skills with.
- A summary of practical activities teachers engage learners in.
- Factors affecting the integration of environmental education into research technique skills.
- Possible ways of integrating teaching enquiry-based fieldwork in the research technique skills component of the geography curriculum in schools.

The main purpose of data analysis during Cycle 1 was to inform Cycle 2, namely classroom intervention. The researcher wanted to find out how other geography teachers were implementing enquiry-based fieldwork in their respective classes. This reflection is presented in section 4.3.

3.5.2 Cycle 2 data analysis: Resulting in analytical memo 2

Data analysis for this cycle involved the merging of the rest of the data generated during Cycle 2 (Appendix 8). This included data obtained from focus group interview transcripts, observations, photographs, learners' work (audio transcripts). Analysis of this data aimed at seeking evidence of the development of action competence amongst learners. The analytic categories for this cycle of data analysis were framed through the construction of an indicator framework for identifying the development of action competence based on Jensen and Schnack's (1997) action competence framework (see section 2.2.1) and indicators that underpin the development of action competence in learners as identified by Eames et al. (2006) (see section 2.2.2). Thereafter, an inductive data analysis method was employed. This was necessary because in inductive analysis categories are selected from a researcher's theoretical knowledge and the data are then searched for (Schwartzman & Strauss, 1973).Table 3.2 depicts the categories.

Table 3.2: Indicator framework for identifying the development of action competence in learners*

➢ **Knowledge and understanding of the problem:** Students require knowledge on which to base sound reasoned decisions. This knowledge could include technical, social, political, historical and economic factors.
➢ **Commitment to solve the problem:** Students require commitment and values that motivate them to participate in contributing to changes in society.
➢ **Participation:** Students require skills in making decisions in a way that is consultative, democratic, collaborative, and co-operative.
➢ **Emotional response:** In order to be able to decide the appropriate action to take, and their own personal responsibility and commitment, students need to understand their attitudes and values towards issues.
➢ **Interest in the future:** An interest in the future and capacity to predict what change might be possible in a given context.
➢ **Planning and taking action:** Students require the skills and confidence to identify and solve problems, set goals, gather information, communicate, and manage time and logistics to take action (indirect or direct).

*****Adapted from Jensen & Schnack, (1997) and Eames et al. (2006)

A summary of the two analytical memos is presented in Table 3.3.

Table 3.3: A summary of analytical memos developed

Analytical memo	**Focus**
Analytical memo 1	Geography teachers' understanding and implementation of enquiry-based learning through fieldwork.
Analytical memo 2	How enquiry-based learning through fieldwork facilitated the development of action competence in learners.

3.6 VALIDITY AND TRUSTWORTHINESS

Validity refers to the degree of congruence between the explanations of the issue being investigated and the realities of the world (McMillan & Schumacher, 2006). It also means “The degree to which the interpenetrations have mutual meaning between the participants and the researcher” (McMillan & Schumacher, 2006:324).

Maxwell (1992: 285) identified five types of validity: descriptive; interpretive; theoretical; generalisability; and evaluative validity. Descriptive validity was used in this study as the researcher constantly presented factual, accurate descriptions of data generated. The researcher used multiple sources of evidence to ensure congruence (triangulation). Merriam (2002) suggests the use of triangulation to support validity in qualitative research. McMillan and Schumacher (2006: 374) describe triangulation as “The cross-validation among data sources, data collection strategies, time periods, and theoretical schemes”. In Cycle 1, the survey questionnaire permitted triangulation of data generated among data sources. Seven respondents participated in the survey and that enabled the interpretation of data from all sources (seven respondents) thus allowing cross-validation among data sources.

In Cycle 2, triangulation was enabled through the use of several data collection techniques. Focus group interviews, observation, audio transcripts, and a research journal, were all used as data generation techniques and were supplemented by photographs and digital voice tracer recordings. These data generation techniques ensured that descriptive validity was enhanced. “Triangulation is essential because it allows the researcher to compare different sources, situations, and methods to see whether the same pattern keeps recurring” (McMillan & Schumacher, 2006:374). The researcher also tried to ensure interpretive validity by capturing and reporting data that reflected the participants’ perspectives of events. Valid accounts, according to Maxwell (1992:290) “Must respect the perspectives of the actors in that situation”.

Based on the above explanation, direct quotations from participants’ own language and description of events are used when the data are presented and discussed in

the next two chapters. For example, direct quotations from focus group interview transcripts and from questionnaires are used to ensure a reliable representation of participants' meaning and description of events. The researcher's observations were also noted in a research journal and photographs were also taken in order to interpret participants' actions.

3.7 ETHICAL IMPLICATIONS

During Cycle 1, the researcher began by obtaining permission from different school principals in order to enable teachers at their respective schools to participate in the survey. Telephonic appointments were made with the school principals. Once permission was granted, the researcher visited the respective schools and introduced himself by producing an introductory letter (Appendix 9). Thereafter, he was referred to the respective teachers who had agreed to take part in the survey. All the participating teachers were required to read the letter that accompanied the questionnaire (Appendix 10).

Teachers who agreed to take part in the survey were also requested to complete a consent form (Appendix 11). According to Cohen et al. (2000:51) "All participants in a research process should sign consent forms so as to protect and respect the right of self determination as well as placing some of the responsibility on the participants should anything go wrong with the study". Participating teachers were then each handed a copy of the questionnaire and were requested to complete the questionnaire within ten working days. Leaving the questionnaires for teachers to complete in private was deemed necessary since Cohen et al. (2007:375) maintain:

> The absence of the researcher is helpful in that it enables respondents to complete the questionnaire in private, to devote as much time as they wish to its completion, to be in familiar surroundings, and to avoid the potential threat or pressure to participate caused by the researcher's presence.

The participants were also informed that they were free to discontinue from taking part in the study should they wish to do so prior to returning the questionnaires to the researcher.

Before data collection commenced in Cycle 2, permission was requested from the principal of the school of the study site (see Appendix 12). The researcher requested permission to collect data during normal school hours in his geography classroom. The parents of learners in the researcher's geography class were sent letters requesting that they grant permission for their respective children to participate in the study (Appendix 13). In Cycle 2, a Tsumeb town councillor was invited to the classroom and he was informed about the researcher's intentions of recording the session audibly on a digital voice tracer and that photographs would be taken during the class session. The Tsumeb town councillor permitted the researcher to record the session on a digital voice tracer and to take photographs of him with learners in the classroom.

3.8 CONCLUSION

A qualitative interpretive research method was chosen to carry out the investigation for this research. An action research case study approach was used as a research methodology to answer the research question and address the research goals. One method of data collection technique was used in Cycle 1 of the action research process, namely a survey questionnaire. Three methods of data collection techniques were used in Cycle 2 of the action research process of this study, namely focus group interviews, observations, and research journal. The main purpose of data analysis for Cycle 1 was to generate descriptive data of how geography teachers implemented enquiry-based fieldwork in their respective classrooms. An interpretation of data during Cycle 2 was undertaken using an inductive data analysis technique. It was possible to capture a more in-depth understanding of how enquiry-based fieldwork facilitated the development of action competence amongst learners during data analysis. Details of validity and ethics pertaining to this study were also presented and described in this chapter.

CHAPTER 4

DATA PRESENTATION

4.1 INTRODUCTION

This chapter presents the findings of the action research process captured by the data generation tools presented in the preceding chapter. Section 4.2 presents data generated from Cycle 1, namely the baseline survey detailing geography teachers' implementation of enquiry-based fieldwork. In section 4.3 data are presented on how the researcher planned and implemented a series of enquiry-based fieldwork learning activities in his geography classroom. Based on the information gathered from reflections on Cycle 1, section 4.4 presents a brief description of enquiry-based fieldwork learning activities that were implemented in the geography classroom. The last part of the chapter (section 4.5) provides an analysis of enquiry-based fieldwork activities according to the indicators of action competence. The verbatim comments, from the respondents (the seven teachers), the learners, and a town councillor, respectively, are presented in italics.

4.2 CYCLE 1: REPORTING THE SURVEY OF TEACHERS' UNDERSTANDING AND IMPLEMENTATION OF ENQUIRY-BASED FIELDWORK IN THE NAMIBIA SENIOR SECONDARY SCHOOL GEOGRAPHY CURRICULUM

The data presented in this section outline the research findings regarding geography teachers' implementation of enquiry-based fieldwork (see also figure 3.1). The data are represented in an analytical memorandum (memo) 1 (Appendix 7). As discussed in sections 2.8 and 3.2.1.1 the Namibia senior secondary school geography curriculum provides opportunities for teachers to integrate the teaching of fieldwork skills into the 'research technique' skills component. In this section a description of how teachers implement research technique skills in their classroom practice is presented.

The section begins with a discussion of the teachers' practical knowledge of teaching fieldwork skills. It then describes geography topics/themes teachers integrate with

research technique skills. A summary of practical activities that teachers engage learners in is also presented. This section covers factors affecting the teaching of fieldwork skills at the classroom level. Factors affecting the inclusion of environmental learning into the 'research technique' skills in the geography curriculum are discussed. Finally, the section concludes by presenting the teachers' recommendations of how the teaching of enquiry-based fieldwork can be improved and integrated into the 'research technique' skills component of the senior secondary school geography curriculum.

4.2.1 Teachers' practical knowledge of teaching fieldwork skills

In trying to understand the teachers' practical knowledge in teaching fieldwork skills (data collection and field investigation) question 3 (C) on the questionnaire (Appendix 1) required the seven respondents to comment on how knowledgeable they were in teaching fieldwork skills. In answering the question they noted that they face challenges to teach fieldwork activities in their respective classes. For example, they indicated the challenges by stating: *"I am not very good in doing research in general and I struggle to explain it to learners" (TQ1); "I lack practical experience" (TQ4); "The teaching materials needed for fieldwork are not always available" (TQ7).*

4.2.2 Geography topics/themes teachers integrate research technique skills with

In trying to understand the types of topics/themes in the geography syllabus that teachers integrate research technique skills with the researcher posed a specific question in the research tool. Question four (Appendix 1) required the respondents to name the topics/themes that they use when teaching research technique skills in their classes. The question also required them to provide a description of activities that they do within the themes/topics that they integrate research technique skills into.

They stated, as respondents, that they use different topics and themes to teach research technique skills in their geography classes and the topics are drawn from both human and physical geography themes. The topics that they use to teach 'research technique' skills include pollution; migration; river processes; population studies; climatology; ecology; traffic counts and geomorphology

(TQ1;TQ3;TQ4;TQ5;TQ6;TQ7). A description of activities that the respondents conduct in their lessons include getting learners involved in measuring the depth and width of river streams; conducting census or sample surveys; observing and recording traffic flows near schools, and environmental surveys (TQ1-TQ7).

4.2.3 A summary of practical activities teachers engage learners in

Questions five and six on the questionnaire (Appendix 1) required the respondents to provide a description of how they actively engage learners in the learning process. Examples of their responses are presented below:

- *"Allowing learners to voluntarily formulate their own hypothesis on topics of their choice"* (TQ 2).
- *"Taking learners out of the class and let them see and do activities such as measuring, recording, and counting and do class presentations and work in pairs allows them to be actively involved in the learning process"* (TQ4).
- *"Learners have to collect their own information in the field, analyse the data and have to do presentation of their findings to the class allows learners to be actively involved"* (TQ7).

Although the respondents did not specifically identify many aspects of fieldwork in their teaching, their descriptions of how they teach research technique skills and how they involve learners included some of the features of fieldwork learning (see section 2.3.2).

4.2.4 Factors affecting the inclusion of environmental learning into research technique skills

As indicated earlier, Namibia's environmental education policy requires teachers to integrate environmental learning principles in all school subjects when planning and implementing lessons at the classroom level (see sections 2.6.1 & 2.8). Given this understanding, the researcher wanted to find out how geography teachers were including environmental learning into their teaching of 'research technique' skills in the geography curriculum. Question eight on the questionnaire (Appendix 1) focused on identifying factors that negatively affect the inclusion of environmental learning into research technique skills.

Based on the responses provided by teachers, it became noticeable that those who took part in this study were not fully aware of the environmental education policy that calls for the implementation of environmental learning principles into all school subjects (see sections 2.6.1 & 2.8). This may be due to the fact that the senior secondary school geography syllabus does not contain information to guide teachers on how to integrate environmental learning principles in the subject. The other reason could be due to the fact that teachers are uninformed or are unaware of the existence of a curriculum guideline document entitled *Environmental learning in Namibia: Curriculum guidelines for educators* that guide teachers on how to integrate environmental learning principles in different school subjects.

Several factors were reported as negatively affecting the inclusion of environmental learning into research technique skills: lack of teaching resource materials; not emphasised in curriculum (Geography syllabus) (see section 4.3.2.2); teachers lack knowledge/training in environmental education; time constraints; heavy personal loads; and lack of school support for environmental education.

Three of the respondents revealed that a lack of emphasis on how to teach research technique skills in the geography curriculum has some negative effect on teaching, while four respondents stated that the lack of emphasis has a strong negative effect on teaching it in their classes. Below are some comments that the respondents provided with regard to how environmental learning features with respect to 'research technique' skills in the curriculum: *"It is partially covered but I feel it can still be expanded in the curriculum, there is no way [*a teacher*] can include it if it is not in the curriculum"* (TQ3). *"It is not included in the curriculum"* (TQ5); *"The curriculum does not show the importance/significance of* [integrating environmental learning into research technique skills*] at all"* (TQ6). One respondent commented that *"There is little information [teaching and learning content] available in the syllabus for teachers to present to learners on how to integrate environmental learning into research technique skills*" (TQ 7).

A lack of relevant teaching-learning resources was also mentioned by the respondents as a factor negatively affecting the integration of environmental learning into research technique skills. They stated that the available resource materials do not emphasise the integration of environmental learning into research technique

skills therefore teachers cannot emphasise environmental learning when teaching research technique skills (TQ1 & TQ7).

A lack of sufficient training in environmental education and teachers' limited practical knowledge of how to implement research technique skills were other factors with a strong negative effect on the integration of environmental learning into research technique skills in geography. The respondents revealed that *"Teachers lack knowledge on research techniques in general"* (TQ1); *"The teacher cannot do it effectively* [integrate environmental learning] *without the knowledge*" (TQ3); *"Teachers lack knowledge and training in environmental education"* (TQ5); and *"It is not possible to teach the content which is not at your level of understanding"* (TQ7).

Time constraints and personal heavy loads were also identified as having a strong negative effect on the teaching of research technique skills. These in turn negatively affect the inclusion of environmental learning into research technique skills. Examples of responses are listed below:

- "*There is too little time to cover certain topics especially those that are not in the syllabus"* (TQ1);
- "*There is not enough time to give activities to the learners especially if they do fieldwork"* (TQ6);
- *"Some teachers are given too many classes and no free periods to concentrate and to prepare for some topics like research"* (TQ5).

The other contributing factor that negatively affects the inclusion of environmental learning into the teaching of research technique skills in the geography curriculum stated by teachers was the lack of support in certain learning activities. In elaborating this some feel that: *"The school does not really support environmental related activities"* (TQ1); *"The school can discourage some activities"* (TQ3); and *"Sometimes it might be difficult [to teach some activities] especially if learners need to travel for their studies if there is no transport"* (TQ7).

The next section describes possible ways of how to integrate enquiry-based fieldwork into the 'research technique' skills component of the Namibian senior secondary school geography curriculum.

4.2.5 Possible ways of integrating enquiry-based fieldwork into the research technique skills component of the geography curriculum

The last question on the questionnaire focused on finding out teachers' suggestions and recommendations on ways of improving the integration of enquiry-based fieldwork into research technique skills in the Namibian senior secondary school geography curriculum (See Appendix 1 question 10).

The following suggestions were made by the respondents: *"Enquiry-based learning should be strongly emphasised in the geography curriculum and teachers should be trained on how best to teach it to the learners as that will motivate learners to do research in environment related issues"* (TQ1); *"It should be included in the syllabus once it is in the curriculum so that every teacher will find it important, carry out workshops/training to educate teachers about it because I believe most teachers lack understanding of this concept including myself"* (TQ3); *"The syllabus should change in order to accommodate much enquiry-based environmental learning so that it will be covered as per syllabus requirement"* (TQ6).

Another aspect that teachers would like to see improved is that there should be adequate time allocated on timetables for practical activities during the lessons so that learners and teachers become involved in fieldwork activities. The following comments were noted by two respondents: *"Time allocation for practical work is needed, some work needs to be scaled down to get lessons for practical work"* (TQ4); and "*More time for practical activities should be encouraged in the field"* (TQ7).

4.3 REFLECTIONS ON CYCLE 1 AND PLANNING FOR CYCLE 2

4.3.1 Introduction

This section represents the 'reflection' component of the action research in Cycle 1 (see section 3.2.1 figure 3.1). The baseline survey was of great significance in guiding the researcher on how to plan and implement a series of enquiry-based fieldwork lessons in his geography classroom for Cycle 2.

4.3.2 Reflections on the pedagogical issues that emerged from baseline survey data

Based on the responses in the baseline survey, the following emerging issues required to be addressed before implementing Cycle 2:

- Limited teaching-learning resource materials available for teachers.
- Challenges of how to integrate environmental learning into 'research technique' skills.
- Using suggestions of how to teach 'research technique' skills outlined in the geography syllabus.
- Geography syllabus requires learners to carry out research projects
- The challenge of time constraints, personal heavy loads and lack of transport.

4.3.2.1 Limited teaching-learning resource materials available for teachers

It emerged from the survey data that there was limited teaching-learning resource materials available for teachers on how to implement 'research technique' skills (section 4.2.4). This finding led the researcher to examine the Namibia senior secondary school geography textbook to look for activities on teaching 'research technique skills' and fieldwork activities. The textbook contained information on research technique skills but it offered very little opportunities for practical fieldwork activities for learners. The Namibia senior secondary school geography syllabus was also consulted in order to look for ideas on how to undertake practical fieldwork activities with learners. The issue of limited teaching-learning resource materials was addressed by consulting a research guide booklet from the Namib Desert Environmental Education Trust: *Environmental research and inquiry skills programme for secondary schools* (Simasiku, 2009) (see Appendix 3). This booklet contained relevant information on how to teach research techniques and enquiry skills to learners. It contained practical information on how learners could use research technique skills in geography outside the classroom. The information included fieldwork data collection strategies, data analysis, methods of sampling, formulating research objectives and it also contained a proposal writing worksheet (see extracts Appendices 3, 4 & 13).

The researcher made facsimiles of the research project guide booklet and provided each learner with a copy to address the problem of a lack of teaching-learning resources materials mentioned by the survey respondents (teachers). Learners were introduced to various research skills, such as data collection, data analysis, sampling methods, questionnaires, interviewing and proposal writing (FN 19/07). The researcher also provided guidance to learners on how to use the internet in order to gather additional information as part of secondary data collection (see photograph 1B section 4.4.2). The environmental research booklet mentioned above enabled the researcher to scaffold learners by guiding them on how they could use research technique skills in order to facilitate their learning in the geography classroom (also see Kirschner et al., 2006 & Spronken-Smith et al., 2007 section 2.3.1). Scaffolding learners was necessary because as a facilitator, the researcher had to create a learning environment that was conducive for them to acquire knowledge by providing them with appropriate resources (see also Chaille & Britain, 1991, section 2.6.2).

4.3.2.2 Challenges of how to integrate environmental learning into research technique skills

It also emerged from the survey data that teachers faced challenges on how to integrate environmental learning into the 'research technique skills' in their classrooms (section 4.2.4).

In order to overcome this challenge, the researcher consulted the Namibia senior secondary school geography curriculum documents and searched the geography syllabus for suggestions and ideas to integrate environmental learning into the 'research technique skills'. The geography syllabus did not, however, contain guidelines or suggestions of how to integrate environmental learning into the 'research technique skills'. Nor did it contain guidelines on how to integrate environmental learning into the senior secondary school geography curriculum. The environmental educational policy document, however, advocates for a cross-curricular approach (see section 2.6.1) to environmental education in the school curriculum. This policy supports the integration of environmental learning into all school subjects in the Namibia formal school system. The above guidelines were followed by the researcher (see figure 2.2 section 2.8).

4.3.2.3 Using suggestions on how to teach 'research technique skills' outlined in the geography syllabus

The geography syllabus did contain suggestions that the researcher could follow on how 'research technique skills could be taught. According to the syllabus 'research technique skills' should not be taught in isolation but should be integrated with other three themes in the syllabus (see section 2.8).

In trying to meet this requirement the researcher selected the theme 'population and settlement' from the syllabus to integrate it with research technique skills. The general objectives of the selected topic are that:

> Learners will understand the dynamic nature of settlements in less economically developed countries and in more economically developed countries (Namibia. MOE, 2005b:12).

In planning the fieldwork learning activities for the topic the researcher wanted learners to meet the specific curriculum learning objectives that are prescribed in the syllabus. The specific objective of the topic is that:

> Learners should be able to analyse and discuss problems associated with the growth of urban areas such as congestion in the Central Business District (CBD), housing shortage, informal settlements and traffic congestion, the learning unit also suggests finding solutions to the mentioned problems (Namibia. MOE, 2005b:12).

This was necessary in order to adhere to the prescription suggested by the leaner-centred policy of Namibia (section 2.6.2) as it advocates:

> The learner brings to the school a wealth of knowledge and social experience gained from the family, the community and interaction with the environment. This knowledge and experience is a benefit which can be utilized and drawn upon in teaching and learning. (Namibia. MOE, 1998:7).

4.3.2.4 Geography syllabus requires learners to carry out research projects

It also transpired from the survey data that some of the respondents engaged their learners with group work activities when teaching research technique skills in their classrooms (see 4.2.3). The researcher also looked for other ways that the geography syllabus recommended for teachers to ensure that learners could be meaningfully engaged in the teaching-learning process when teaching research technique skills. Drawing on survey data (section 4.2.3) learners were divided into

three groups comprising both girls and boys. There were seven to eight members per group and they were instructed to select a leader for their respective group. Since the researcher wanted learners to have greater responsibility for their learning he instructed each group to conduct research projects (see also Kahn & O' Rourke, 2005, section 2.3.1).

4.3.2.5 The challenge of time constraints, personal heavy loads and lack of transport

An analysis of survey data showed that time constraints, personal heavy loads, and a lack of transport, negatively affect the inclusion of environmental learning into 'research technique skills'. This challenge was addressed by allocating sufficient time for fieldwork activities. The researcher requested permission from the school principal to allocate one day on the school timetable for his geography class to undertake fieldwork investigations in the Tsumeb informal settlement (see Appendix 11). Transport was not a problem because Tsumeb Secondary School is a well resourced school thus it has a bus to cater for transport requirements at the school. In other words these challenges were considered by the researcher when he worked on the lesson planning and implementation for Cycle 2.

4.4 CYCLE 2: A BRIEF DESCRIPTION OF ENQUIRY-BASED FIELDWORK ACTIVITIES.

4.4.1 Introduction

Table 4.1 is a summary of the 10 enquiry-based fieldwork lessons that the researcher planned and implemented in his geography classroom. These lessons are detailed in sections 4.4.2 to 4.4.7.

Table 4.1: Series of lessons implemented during Cycle 2

Enquiry-based fieldwork lessons

Lesson 1 – Wednesday, 7 July 2010

- The lesson introduced learners to research technique skills.
- Learners were also introduced to the topic of informal settlements.
- Learners were also divided into 3 groups.
- Each group was requested to choose a research topic to research in the informal settlement.
- Researcher requested learners to conduct a secondary data search.

Lesson 2- Thursday, 8 July 2010

- Researcher instructed learners to move into their groups in order for them to work with the secondary data.
- Learners were taught about the importance of carrying out a secondary data search when conducting research projects.

Lesson 3- Friday, 9 July 2010

- Learners wrote down their secondary data search results into their books.
- Researcher introduced primary data collection methods to learners such as questionnaires, observation counts and interviews.

Lesson 4- Tuesday, 13 July 2010

- Learners formulated their project hypothesis, objectives and research questions.
- Learners were given homework to complete the tasks for presentation on the next day.

Lesson 5- Wednesday, 14 July 2010

- Learners moved into their groups.
- Learners were instructed to introduce their project objectives.
- All the 3 groups selected a presenter that presented the group project objectives to the whole class.

Lesson 6- Thursday, 15 July 2010

- Learners developed the data collection tools in their groups.
- A discussion of how to collect data in the fieldwork was looked at.
- Copies of questionnaires were made in order to be used for fieldwork.

Lesson 7- Friday, 16 July 2010

- Learners collected data in the Tsumeb informal settlement.
- Learners interviewed residents and took pictures.

Lesson 8- Monday, 19 July 2010

- Learners received hand-outs of how to analyse fieldwork data.
- Data presentation methods were also discussed in the classroom.
- Learners analysed data in their groups.

Lesson 9- Wednesday, 21 July 2010

- Learners presented their fieldwork data on posters
- Researcher assisted learners choose the best data presentation methods for their groups.
- A class guest (town councillor) was invited after the lesson.

Lesson 10- Thursday, 22 July 2010

- Learners presented the fieldwork work results in the classroom.

4.4.2 Learning unit planning and implementation (Lesson 1)

After selecting the learning theme and the specific topic on informal settlements, the researcher also introduced learners to 'research technique skills' as outlined in the syllabus (see section 4.3.2.3). The topic of informal settlement was also introduced to the learners by outlining the syllabus' objectives. Learners were divided into three groups in this lesson (see section 4.3.2.4).

The learners were given homework, at the end of lesson 1, which required them to find out about problems affecting informal settlements in developing countries. The researcher also requested them to consult different secondary sources of information and to conduct internet searches on problems affecting informal settlements in developing countries (photograph 1B).

The aim of the first lesson was two-fold. Firstly, the researcher wanted to provide the learners with information on how to search for their own data. Secondly, the researcher also wanted the learners to start thinking about what they wanted to investigate in the Tsumeb informal settlement.

Photograph 1B: Group 1 conducting a secondary data search

4.4.3 A description of learning activities undertaken by learners in the classroom (Lessons 2 to 6)

Lessons 2 and 3 focussed on the learners working together in their respective groups in order for them to plan what they wanted to investigate in the Tsumeb informal settlement.

The following topics were selected by the three groups:

- Group 1: An investigation of water demand in the Tsumeb informal settlement
- Group 2: An investigation of energy and electricity demand in the Tsumeb informal settlement
- Group 3: An investigation of waste management in the Tsumeb informal settlement

In lesson 4, the researcher requested the three groups to write up what they would like to investigate in the informal settlement. The learners were also informed that each group would do a class presentation on what they would be investigating in the informal settlement (FN 13/07). All three groups were provided with hand-outs on how to state the objectives or hypothesis of their investigations (Appendix 4). The researcher commenced lesson 5 by requesting each group to select a group member who would introduce their respective project title, objectives and hypotheses to the rest of the class (FN 14/07). The projects were:

- Group 1: An investigation of water demands in the Tsumeb informal settlement class presentation

The group planned to investigate the water demands in the informal settlement and they had the following objectives that guided their project investigation:

1. To find out the sources of water supply in the Tsumeb informal settlement.
2. To find out the water related problems affecting the residents.
3. To find out possible solutions to the water problems (LWG1).

The objectives were presented to the class by one group member (photograph 2).

Photograph 2: Group 1 presenting objectives of their project investigation

- Group 2: Energy and electricity demand in the Tsumeb informal settlement

The learners from group two decided to conduct an investigation of energy and electricity demand in the Tsumeb informal settlement (photograph 3) and their objectives were:

1. To find out the sources of energy used in the Tsumeb informal settlement.
2. To find out the problems affecting people without electricity in the informal settlement.
3. To find out from the residents how the problem can be solved (LWG2).

Photograph 3: Group 2 presenting objectives of their project investigation

- Group 3: Waste management in the Tsumeb informal settlement

Group three (photograph 4) indicated that they wanted to investigate waste management in the Tsumeb informal settlement and their objectives were:

1. To find out the most common type of waste in the informal settlement.
2. To find out how waste is managed in the Tsumeb informal settlement.
3. To find out how the problem associated with waste management can be solved (LWG2).

Photograph 4: Group 3 presenting objectives of their project investigation

All three groups wrote their group project titles and objectives on a project guide sheet (Appendix 4). The three groups then developed questionnaires that were to be used in the field to interview residents in the informal settlement. During lesson 6, the three groups were allowed time to prepare well for the fieldwork investigations (FN 15/07). The researcher informed all learners to have all the necessary tools, such as pens and data recording sheets that were needed for fieldwork data collection. The learners were also advised to equally allocate tasks amongst group members in order to promote participation so that all learners in different groups would be involved in interviewing the residents (FN 15/07). Transport arrangements were made by making the school bus available for the fieldwork trip.

4.4.4 Fieldwork investigations by learners in the Tsumeb informal settlement (Lesson 7)

Lesson 7 was the fieldwork investigation and all learners in the class took part (FN 16/07). The class showed great interest in carrying out the fieldwork investigations (FN 16/07). Photograph 5 shows the class departing the school premises for the Tsumeb informal settlement. The short trip to the informal settlement lasted fifteen

minutes. Photograph 6 shows learners arriving at the Tsumeb informal settlement with questionnaires and data recording sheets in their hands.

Photograph 5: Learners departing the school for a fieldwork investigation

Photograph 6: The class arrive in the informal settlement for fieldwork investigations

The researcher observed learners during their fieldwork investigations and noted that they were excited with the data collection process in the field (FN 16/07 & photographs 7- 8).

Photograph 7: Learners interviewing

Photograph 8: Learners interviewing

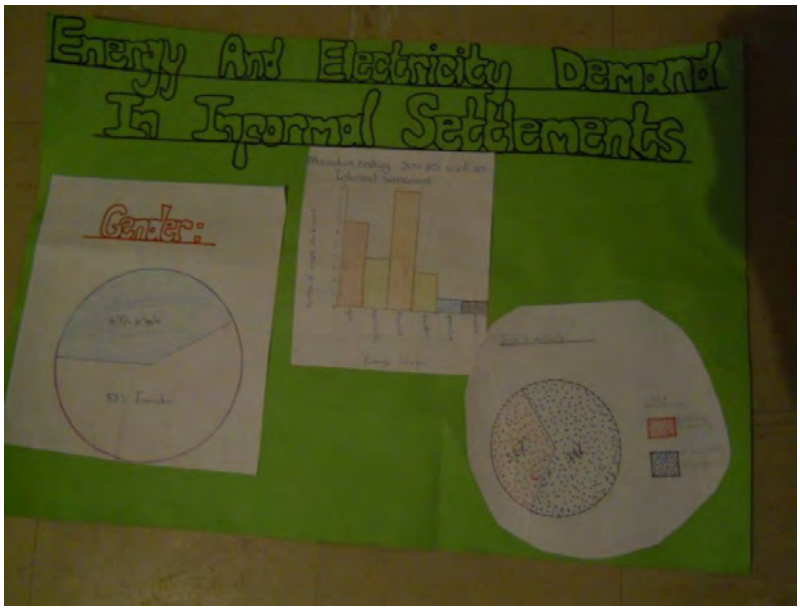
The fieldwork data collection activity lasted for one hour. Thereafter learners were transported back to school. Learners were interested that they managed to collect the data that they needed for their projects (FN 16/07.

4.4.5 Learners working with their fieldwork data in the classroom (Lessons 8 & 9)

This section presents the data collected in the classroom after the fieldwork investigation in the Tsumeb informal settlement. This was spread over three lessons in the classroom.

The researcher briefly presented the purpose of lesson 8 and answered questions that the learners asked about data analysis and presentation methods. After that, learners worked together in their groups and analysed their fieldwork data (photograph 9). The analysis was presented in various formats, such as diagrams, graphs and tables (photograph 10).

Photograph 9: Learners analyse and interpret fieldwork data in their groups



Photograph 10: Learners' fieldwork data presented in various formats on posters

The three groups presented their fieldwork data on posters (FN 21/7). The role of the researcher during this period was to facilitate learning by guiding the learners on how best they could work with their respective fieldwork data that they were analysing.

At the end of the data analysis and presentation phase, the researcher instructed the learners to draw up their conclusions and recommendations for their respective projects. Learners were also requested to think of possible solutions for solving

some of the problems that they identified in the Tsumeb informal settlement (FN 21/07). The learners responded positively to the researcher's request and they recorded all the possible solutions and recommendations on their group posters. Upon formulating the recommendations and possible solutions to the existing problems in the Tsumeb informal settlement, the class decided to invite the officials from the Tsumeb town council to a classroom meeting to address and answer learners' questions regarding the conditions in the Tsumeb informal settlement (FN 21/7). Based on the learners' request, the researcher invited the Tsumeb town councillor to the geography class (FN 21/07).

4.4.6 Learners presenting and communicating their group project results to the Tsumeb town councillor in the classroom (Lesson 10)

In lesson 10 the invited Tsumeb town councillor listened to the learners' presentations about the Tsumeb informal settlement. All three groups had prepared posters for presentations to the town councillor. The posters were displayed on the wall of the classroom. Each group selected a member who reported the project findings of the group to the class (FN 22/07).

They presented their group findings by giving a report to the town councillor according to the objectives that each group formulated prior to the fieldwork investigations (see section 4.4.3).

- Group 1's presentation on water demands in the Tsumeb informal settlement presentation (LWG 1)

The presenter introduced the project objectives to the class (see objectives in section 4.3.3). He read out loud the project findings and also stated: *"People are complaining about the supply of water; apparently it's little and there is only two taps; two main taps for all the people in the informal settlement"* (LWG1). He showed pictures that his group had taken during the fieldwork investigations in the informal settlement (photograph 11). He asked the town councillor why there were only two taps as the main source of water in the Tsumeb informal settlement for so many residents (FN 22/07). He also wanted to find out what the town councillor's office was willing to do in order to improve the situation (FN 22/07).

Photograph 11: Group 1 presenter showing the group poster to the Tsumeb town councillor

- Group 2's presentation on energy and electricity demand in the informal settlement presentation

This group investigated energy and electricity demand in the informal settlement of Tsumeb (see section 4.3.3). The presenter introduced the topic by referring to the group poster (photograph 12). He stated:

> *I and my fellow learners were doing a topic on energy and electricity demand in the informal settlement of Tsumeb, our data showed that people do not have access to electricity in the informal settlement; they mostly use firewood as the main source of energy and the access to electricity is not available at all* (LWG2).

He then asked: *"Sir* [referring to the town councillor] *what can be done in order to provide electricity in the informal settlement? ... What are the possible solutions because the people [in the informal settlement] are suffering without electricity?"* (LWG2).

Photograph 12: Group 2 presenter showing the group poster to the town councillor during presentations

- Group 3's presentation on waste management in the informal settlement

The presenter of this group (photograph 13) stated the following during his presentation *"Good Afternoon! What we actually did is about waste management in the informal settlement, and our research question was 'How is waste managed in the informal areas'?"* (LWG3). He then reported the results of their investigation by mentioning that *"Basically what we found out is that, the waste is either collected by the municipality which is a good thing or burned by the residents"* (LWG3). He also stated that *"33.3% of the residents burn their waste and this can lead to a lot of problems like the health of these residents is affected"* (LWG3).

Photograph 13: Group 3 presenter presenting about waste management

4.4.7 The Tsumeb town councillor's responses to learners' questions

The town councillor commenced answering the questions by providing a brief historical background of the Tsumeb informal settlement (TRC). He stated:

> *The informal settlement was not planned at all...It's because the people* [residents] *wanted places to live in and they were allocated that but forcefully I will say... They forced; they marched and a lot of times they marched to the municipality that they really wanted to be given that land* (TRC).

With regard to the question of less water in the informal settlement that was posed by group 1, the town councillor replied :"*The question of water yes... they have got one* [tap] *there has been one tap only, maybe they are two* [taps] *now but then that is a question of the land*" (TRC). He added that:

> *The land was not yet serviced because it was not meant for people to live on, but then because of this urgency that came up, the municipality*

> *put one tap where everybody has to get water from but it's also too costly for the municipality to put other taps there* (TRC).

He explained that *"It's too costly to put up pipes to there* [informal settlement] *for the municipality*" (TRC). He acknowledged the problem of water shortages in the informal settlement and added that: "*But the problem of water is taken up; it's really true for people to come from home and draw water from far it's too dangerous during the night"* (TRC).

On the question of electricity shortages in the informal settlement posed by group 2 he responded stating:

> *You see they* [informal settlement residents] *will demand those things* [pre-paid electricity vending machines and cheaper electricity] *but they do not know that even pre-paired electricity cannot be* [installed] *in those shacks because there are no electrical wires* [cables] *that go there, so it will take five to ten years from now for those needs to be in the informal settlement, honestly... because it is something that was not planned (*TRC).

In answering a question of crime that is believed to be caused by a lack of street lights in the informal settlement, the town councillor responded by stating:

> *Good ... that is very good that you guys* [learners] *are picking up these things* [the problems of crime]' *so that you can also advise us as leaders...* [On] *what problems we are facing;* [and] *how we* [can] *go about solving them...we have to work together...In terms of crime... I* [have] *already raised the problem to the police... I proposed a temporary police station to be* [established] *there...In terms of the Namibian police rules, the director general of the Namibian police will not allow a structure* [police building/station] *to be there* [in the informal settlement] *without water, electricity,* [and] *all the services* (TRC).

He explained to the geography class that his office was trying to renovate some old buildings that are located near the informal settlement so that they could be used by the police. He maintained:

> *The former Nomtsoub* [a township close to the Tsumeb informal settlement] *municipality offices which now belongs to the Ministry of Lands and Resettlement... we* [Tsumeb town council] *want to upgrade that to be a police station on its own with a station commander so that they* [police] *can cover Omaatara* [township name in Tsumeb], *Nomtsoub* [township name in Tsumeb] *and that informal settlement... that's what we want* [to do] *so we are working on that...then we will also have a station commander, it* [old building] *will became a police station with a station commander and holding cells... so those are the things we are looking at now* (TRC).

He then provided feedback to the group that investigated how waste was managed in the informal settlement. He stated that his office was trying to provide some waste containers that the residents would share and use when disposing their waste. He mentioned that "*We* [town council] *will talk to our contractors. There is one company that is contracted to manage the waste in our town so that the company can provide rubbish bins*" (TRC). While replying to the learners the town councillor advised the class that; *"I think when you are doing research* [in future]; *you should also be able to provide education to our people because in our days our people are only ready to complain* [and] *they don't have any solutions to any problems* [around] *them" (TRC).*

4.5 CYCLE 2: ANALYSIS OF ENQUIRY-BASED FIELDWORK ACTIVITIES ACCORDING TO INDICATORS OF ACTION COMPETENCE

The data presented in this section reveal the research findings for Cycle 2 and includes a synthesis of data from focus group interviews with learners (FGI), audio transcript extracts of learners' work (LWG) photographs and field notes (FN). A focus group interview schedule was arranged to guide the focus group discussion (section 3.3.3) with learners (see also Appendix 6). The structure of this section was guided by the organisation of data according to the following indicators of action competence (see also Appendix 8):

- Knowledge and understanding of the problems
- Commitment to solve the problems
- Participation

- Emotional response
- Interest in the future
- Planning and taking action

4.5.1 Knowledge and understanding of the problems

In all of the three enquiry-based fieldwork projects that were carried out, the learners demonstrated evidence of knowledge and understanding of their research topics. The learners were able to identify the problems associated with the topics that they had worked on. This varied from an understanding of social and economic factors associated with waste management, water demand, to electricity and energy demand in the Tsumeb informal settlement. Learners showed significant knowledge about their respective project topics. During the focus group discussions with learners, it was evident that they gained knowledge and understanding of the issues that they had investigated in the informal settlement. Data from the focus group transcripts below show evidence of learners' knowledge and understanding of issues and problem related to their project topics.

One learner from a group that worked on the project of electricity and energy demand in the Tsumeb informal settlement stated: *"We went in the informal settlement to ask people about electricity but we also found out other problems that they are facing"* (FGI 1#L4). When asked about what caused the lack of electricity in the Tsumeb informal settlement the learner added *"It is simply because the informal settlement was not planned that's why the people really don't have energy and electricity and for some people electricity is too expensive and they can't afford that"* (FGI 1# L4). One learner contributed to this discussion by stating:

> *We came up with recommendations which we thought might be solutions to the issue of people not having electricity in the informal settlement ...we think that the municipality must make sure that they provide pre-paid electricity which can be cheaper for people living there* (FGI 1 #L5).

Another learner stated: "*I think we simply learned something in this case, we saw the problems with our eyes so we had experience and we saw what the people are experiencing"* (FGI 2#L2).

Learners reflected on their experiences of enquiry-based fieldwork activities that they carried out. For instance one learner related that:

> *I think what was good about this topic was that we experienced first-hand on what was going on but again, normally these things we read about them in the textbooks but we have never ever experienced it in our lives but so it's a good way of experiencing first-hand information on certain topics* (FGI 1#L3).

In addition a learner, who had worked on the project of water demand in the Tsumeb informal settlement, explained that *"I have seen that most of the people [in the informal settlement] walk long distances in order to collect water at the taps"* (FGI 2#L6). Another learner noted the following with regard to waste management in the Tsumeb informal settlement, *"The waste is not managed properly like here in residential areas because we have rubbish bins at each house... they have to collect and burn rubbish which is not a good thing"* (FGI 2#L8). Other learners mentioned that "*We experienced what people experience where they live"* (FGI 2#L2); *"I feel that they are not really considered as part of the town because the municipality don't even go there and clean up the place"* (FGI 2# 5); *"I even got to see that development does not take place equally around places"* (FGI 2#L10) and, *"A lack of electricity makes it difficult for them to go and visit the toilets at night"* (FGI 2#L8).

Similarly, the learners' work indicated that they had gained knowledge and understanding of issues that they had investigated through enquiry-based fieldwork activities. The following audio transcript extracts underscore the learners' knowledge and understanding of issues that they investigated: "*Our data showed that people do not have access to electricity in the informal settlement; they mostly use firewood as source of energy"* (LWG 2). The following quote also suggested the same, *"Basically what we found out is that, the waste is being either collected by the municipality which is a good thing or burned by the residents... 33.3% of residents burn their waste"* (LWG 3).

4.5.2 Commitment to solve the problems

While undertaking fieldwork investigations the learners were enthusiastic about their project investigations and they also showed willingness in wanting to contribute positively to the challenges affecting the residents in the informal settlement (FN 16/07). The learners were not only interested in going out of the classroom to carry out fieldwork investigations for fun but they also showed commitment in wanting to contribute towards the well being of the residents in the informal settlement.

Their commitment in wanting to assist in addressing some of the environmental problems that they identified in the Tsumeb informal settlement while undertaking fieldwork investigations is illustrated in the following examples. When asked why the learners wanted to talk to the Tsumeb town councillor one learner commented *"We tried to get answers and see what we can do about the situation... We also wanted to speak on behalf of the people to the* [town] *councillor"* (FGI 1#L1). Other learners wanted to address the challenges affecting the residents in the informal settlement by talking to the Tsumeb town councillor because: *"The public's opinion is also important for the councillor, it was important for us to talk to him about some problems he might not know about"* (FGI 2#L9). Another learner added by stating:

> *I felt that if we as a class don't succeed to make a change those people living in the informal settlement were going to look at us as if we were just there for fun....We were really there for a project but if we don't make a change they are also just going to look at us as spectators* (FGI 2#L5).

Another learner commented, *"What about if they really go and develop that place and make it into a better place? You will feel much happy because you know you did your part making the place look better"* (FGI 2#L4). Similarly, another learner elaborated that:

> *I really wanted to talk to the councillor because when we went there* [in the informal settlement], *we saw the problems with our own eyes. We basically understood it and said that we can maybe pass on the message because probably those people* [residents] *did not get a*

chance to speak to the councillor in person we like felt that we can pass the message and do our part (FGI 2#L1).

Other learners revealed their reasons of wanting to contribute to finding solutions to some problems in the informal settlement by talking to the Tsumeb town councillor. For example, *"We wanted to talk to the councillor for him to pass the message to the mayor"* (FGI 2#L6) and *"For the town council to make some improvements"* (FGI 1#L5).

Audio transcripts of learners' classroom presentation to the Tsumeb town councillor showed that the learners wanted to contribute towards finding solutions to some problems in the informal settlement. For example, a learner stated: *"The people are complaining about the supply of water; apparently it's little and there is only like two taps; two main taps and then we feel for them as to why they are getting less water"* (LWG1).

4.5.3 Participation

The level of participation amongst learners was high during the enquiry-based fieldwork learning activities. Learners were committed to learn and to share their ideas during the enquiry-based fieldwork activities. They demonstrated their skills and abilities of making consultative and democratic decisions during enquiry-based fieldwork group projects. There is evidence of this in the following quotes, "*What was good about it* [research project] *is that we learned how to ask questions and how to interview people"* (FGI 2#L1); *"We had to step up our communication abilities in order to make people understand"* (FGI1#L3), and *"Thanks to my members of the group it was really fun together as a team, we did a lot of work together in a shorter period of time than working alone"* (FGI 1#L1). The learners were interested to work together in groups and delegate tasks amongst each other. The learners' acknowledgement of the benefits of group work is encapsulated in the following quotes taken from the transcripts: *"What was also nice about being in a group is that when you had to form the final part of the project you could get the ideas from others"* (FGI 2#L1) and *"In our group we could speak different languages so it was easier to find out information in different languages"* (FGI 2#L8). Another learner mentioned the following, during the focus group discussions to show how teamwork benefited their group, *"This research has made us to get along like brothers and*

sisters, there was this bond that joined us as one like to share our views based on a topic" (FGI 1#L4).

Apart from focus group discussions, other sources of data also showed evidence of teamwork and collaboration amongst learners. Learners participated collaboratively in group projects on real life issues and topics such as water, waste management and energy demand (FN 19/07 & FN 21/07). Evidence of teamwork and collaboration was also evident when learners were involved in enquiry-based fieldwork learning activities (see photographs 2, 3, 4 & 9).

4.5.4 Emotional responses

There was evidence of the development of emotional response amongst the learners during the enquiry-based fieldwork learning activities. Different learners reacted differently to the fieldwork investigation activity. For example, one of the learners shared her views about the fieldwork investigation experience when she remarked: *"This is not normal, people can't live in such conditions"* (FN 16/7) and another learner commented *"I cannot continue to interview the people because I feel bad"* (FN 16/7).

Learners showed emotional engagement with the learning activities. This was demonstrated by the way some learners reacted to the fieldwork investigation activities in the Tsumeb informal settlement. The following remarks showing emotional engagement also emerged during the focus group discussions. *"We felt pity for the people and sometimes we even felt like crying"* (FGI 2#L2). Moreover, a learner added *"What I did not like about the project is when you go there* [in the informal settlement], *you find small kids not going to kindergarten and school"* (FGI 2#L1). Another learner commented: *"From a human point of view it is really hurting and painful seeing people without electricity*" (FGI 1#L2).

4.5.5 Interest in the future

It is evident from the data captured during Cycle 2 that learners' comments and inputs showed that they had developed an interest in the future. This was illustrated by the learners' ability to visualise a future without problems that they had identified in the informal settlement. Put differently, learners were able to suggest solutions of

how the problems that they identified could be solved or avoided in the informal settlement.

There were various suggestions provided by the learners. Some suggested that the problems in the informal settlement could be prevented in future if the residents are educated. *"We need to educate the people, that's the first step"* (FGI 2#L10) and; *"I think ... before they educate the people they must give them water, clean water at least, adding more taps, electricity for their safety and more rubbish bins to clean away the waste, because there is no [*chance of] *educating the people while they are thirsty"* (FGI 2#L6). One of the learners added: *"It's best to educate them first....at least they will develop ideas of making their community a better place if they are educated"* (FGI 2#L5). Another learner suggested: *"If I have to make some changes in this town I will consider education...we need people to have access to education; whereby they have to know that whatever they do is the cause of the problems"* (FGI 1#L4). One learner had a different opinion on how the problems could be solved in the informal settlement, namely: *"We need to develop the rural areas.... for example things that attract people to come here* [in the town of Tsumeb), *we can just put the same things in the rural areas where the people are coming from"* (FGI 2#L2). One learner felt the informal settlement residents should also be involved: *"And please to those people they should try to take their children to school so that they may have a future one day and try to improve where they stay"* (FGI 1#L3).

The above data illustrate the learners' opinions, suggestions and views on what they think should be done to solve the environmental issues that affect residents in the Tsumeb informal settlement.

4.5.6 Planning and taking action

While implementing the enquiry-fieldwork lessons the researcher wanted to find out how the learners were actively engaged in the learning process. He wanted to find out how the learners themselves were involved in deciding what to do through planning and taking action for their own learning. Put differently, the researcher wanted to find out how the learners were involved in the initiation and planning processes while carrying out and conducting their research projects during the fieldwork learning unit implementation.

The following processes and activities indicate how the learners were involved in planning and taking action for the environment during the learning process. The learners were actively involved and participated in setting up goals and objectives for data collection on topics of interest to them (LWG 1, 2 & 3, see also section 4.4.3). The learners were also actively engaged in searching for secondary information and conducting fieldwork investigations on topics of interest to them during the enquiry-based fieldwork learning unit implementation (FN 16/07; photographs 1, 2, 3 & 4). Some of the learners also managed to capture photographs during the fieldwork investigations in the informal settlement (FN 16/07). Learners did not only set goals and gather information but they also processed primary data that they collected in the field and they also communicated their findings (see sections 4.4.5 & 4.4.6). The data also show evidence of a genuine desire among learners to be involved in deciding what to do and what action to take (see section 4.5.2). While communicating their project findings the learners were also involved in action taking by trying to find solutions when they spoke to the town councillor (see sections 4.4.6; 4.4.7 & 4.5.2).

4.6 CONCLUSION

In this chapter the data, generated from the two action research cycles captured by the data generation tools presented in chapter 3, are presented. The survey findings in Cycle 1 provided an account of how teachers implement enquiry-based fieldwork in their classrooms. The discussion also highlighted the challenges that teachers faced in teaching enquiry-based fieldwork. The findings from Cycle 1 were used to inform lesson planning and implementation for Cycle 2.

Data from an analysis of enquiry-based fieldwork activities that learners were engaged with in Cycle 2 of the action research process are presented in this chapter. Using indicators of action competence the data generated during Cycle 2 were grouped into categories that were based on the themes that emerged from the data. The results of Cycle 2 suggest that learners developed several aspects of action competence.

The next chapter analyses and further discusses the data generated in Cycle 2 in relation to the literature review presented in chapter 2.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

Chapter 4 presented a detailed description of the data generated using various data collection tools in chapter 3, drawing on extracts of the raw data to provide a narrative of the case study. In this chapter Cycle 2 findings, presented in the preceding chapter, are discussed in relation to the literature to establish how enquiry-based fieldwork facilitated the development of action competence amongst geography learners.

The data presented in section 5.2 were analysed using an indicator framework for identifying the development of action competence (Appendix 8) in learners. The discussion in this chapter is aided by employing six analytical statements.

- Analytical statement 1: Enquiry-based fieldwork learning activities empowered learners to develop contextual knowledge and understanding of issues that they investigated.
- Analytical statement 2: Fieldwork investigations facilitated commitment thus motivated learners to take indirect action.
- Analytical statement 3: Participation through group work in enquiry-based fieldwork promoted social interaction and group cohesion amongst learners thus enhanced their decision-making ability for problem-solving and action taking.
- Analytical statement 4: Enquiry-based learning through fieldwork elicited emotional responses and a greater understanding of learners' own and others' attitudes and values towards issues.
- Analytical statement 5: Enquiry-based fieldwork learner's investigations fostered critical thinking thus permitted learners to envisage a future based on their learning experiences.
- Analytical statement 6: Enquiry-based fieldwork activities enabled learners to plan and take indirect action during the learning process.

5.2 HOW ENQUIRY-BASED FIELDWORK FACILITATED THE DEVELOPMENT OF ACTION COMPETENCE AMONGST LEARNERS

5.2.1 Analytical statement 1: Enquiry-based fieldwork learning activities empowered learners to develop contextual knowledge and understanding of issues that they investigated.

Enquiry-based fieldwork empowered learners to develop contextual knowledge and understanding of environmental issues that they investigated during the learning process. The knowledge and understanding aspect of action competence was evident in learners. This is because learners were actively involved with enquiry-based fieldwork learning activities while conducting group projects. Active learning amongst learners was facilitated by scaffolding learners in research technique skills (see section 4.3.2.1) and learners setting up their own learning objectives (see section 4.4.3). Learners were engaged with collecting their own fieldwork data on real-life environmental issues in the Tsumeb informal settlement (section4.4.4). Fieldwork data collection learning activities also enabled learners to analyse and interpret the collected data (see sections 4.4.5 & 4.4.6). Section 4.5.1 provided an account of how learners developed contextual knowledge and understanding of environmental issues that they investigated during enquiry-based fieldwork learning activities.

In view of the above, proponents of constructivism believe that active learning and problem investigations and identification during the learning process provide learners with opportunities to construct knowledge and make sense of their world (see Lerman, 1989; Klein & Merritt, 1994, section 2.6.2). Enquiry-based fieldwork learning activities presented learners with the opportunity to construct knowledge and understanding of issues that they investigated during learning activities. This is because enquiry-based fieldwork learning activities permitted active learning to take effect amongst learners by means of making it possible for them to direct their own learning and investigations of problems through self discovery (see also Spronken-Smith et al., 2007 section 2.3.1). This type of learning activity also empowered learners to have ownership of the learning process as well as to generate knowledge and understanding of issues that they investigated (see also Healey & Roberts, 2004 section 2.3.2). Premised on the above insight, the active learning element of enquiry-

based fieldwork facilitated the development of the 'knowledge and understanding' aspect of action competence in learners.

That was the case because the above illustration is consistent with Jensen and Schnack's (1997) narrative of how the knowledge aspect of action competence develops when learners themselves are engaged with learning activities that require them to conduct investigations as part of the learning process (see Jensen, 2004, section 2.5.1). Through fieldwork investigations, learners gained first-hand knowledge and understanding of how people in the Tsumeb informal settlement are affected by various issues, such as limited water supply, lack of electricity and poor waste management methods (see section 4.5.1). As evidenced by this study, learners demonstrated that they gained first-hand knowledge on the economic and social factors that contributed to the problems affecting the residents in the Tsumeb informal settlement. For example, a learner mentioned the following reason to explain why residents in the Tsumeb informal settlement do not have access to electricity *"It is simply because the informal settlement was not planned that's why the people really don't have energy and electricity , for some people electricity is too expensive and they can't afford it"* (FGI 1#L4 section 4.5.1). Having knowledge and understanding of issues under investigation are vital for developing action competence in learners because having knowledge and an understanding of a problem creates a willingness to act in finding appropriate solutions to the identified problem by learners (see also Jensen, 2004, section 2.5.1 & Eames et al., 2006,section 2.2.2).

5.2.2 Analytical statement 2: Fieldwork investigations facilitated commitment thus motivated learners to take indirect action.

Evidence in this study suggested that fieldwork investigations facilitated commitment which motivated learners to want to contribute towards change in the Tsumeb informal settlement. Some level of commitment and desire, to take part in contributing towards finding solutions to the problems identified during fieldwork investigations by learners, was reported in section 4.5.2. The 'commitment to solve the problem' component of action competence developed in learners as a result of them having knowledge and understanding of issues that they investigated while

undertaking fieldwork learning activities (see sections 4.5.1 & 5.2.1). Since the learners gained knowledge and understanding of problems experienced in the Tsumeb informal settlement meant that they became committed and motivated to contribute towards finding solutions to the problems by taking some form of indirect action. For example, one learner wanted to talk to the Tsumeb town councillor on behalf of the residents of the informal settlement in order to get answers so that the learners could decide what to do afterwards (see FGI 1#L1 section 4.5.2). As evidenced in section 4.5.2 the decision to take action by learners was based on their knowledge and understanding of problems in the informal settlement. According to UNESCO (2007) action competent learners require the commitment that motivates them to participate in contributing to changes in society (see section 2.2.1).This occurred because enquiry-based fieldwork learner investigations enabled learners to participate in learning activities which motivated them to practice the skills of finding solutions to real-life problems as part of the learning process (see also Dengler, 2008, section 2.3 .2).

5.2.3 Analytical statement 3: Participation through group work in enquiry-based fieldwork promoted social interaction and group cohesion amongst learners thus enhanced their decision-making ability for problem-solving and action taking.

As discussed in section 2.3.1 (chapter 2), group work is a key element that contributes to the success of implementing enquiry-based learning. There is significant evidence in this study suggesting that group work activities enhance learner participation by facilitating working together and the development of teamwork among learners. This happened because throughout the enquiry-based fieldwork learning unit implementation, learners were collectively engaged with group work activities in their respective groups (photographs 2, 3, 4 & 9).

Moreover, the focus group discussions the researcher conducted with the learners indicated how group work learning activities enhanced participation among learners. Evidence suggested that group work promoted social interaction and group cohesion amongst learners. For example, from the focus group discussion data (section 4.5.3) the researcher was able to ascertain that through group work, learners were

consultative, collaborative and co-operative in solving learning challenges that they faced during enquiry-based fieldwork activities. Most learners confirmed that a lot of work was done in a shorter period of time during the enquiry-based fieldwork learning activities as a result of being in a group rather than working individually (see for example FGI 1#L1 section 4.5.3). Eames et al. (2006) acknowledge that in order for learners to be action competent they require demonstrating skills in making decisions in ways that are consultative, democratic, collaborative and co-operative (see section 2.3.1). As evidenced by the findings in this study, group work provided opportunities for learners to interact and work together in groups and that motivated them to help and support one another in deciding what to do in their respective groups (section 4.5.3)

5.2.4 Analytical statement 4: Enquiry-based learning through fieldwork elicited emotional responses and a greater understanding of learners' own and others' attitudes and values towards issues.

As discussed in sections 2.5.2 and 2.2.2 an emotional response is a key indicator underpinning the development of action competence in learners. The findings presented in section 4.4.3 give an idea of how learners were emotionally engaged with enquiry-based fieldwork learning tasks. Those findings (section 4.4.3) illustrate the role of enquiry-based fieldwork in facilitating learning necessary for learners to discover their emotional responses as a result of experiential learning (see Job et al., 1999 & Joshi et al., 2005, section 2.3.2). The respective cited authors maintain that experiential learning is a key feature of fieldwork. This is also supportive of the argument put forward by others (Stoddart, 1986; Healey & Roberts, 2004, section 2.3.2) who contend that experiential learning benefits learners in various ways that includes promoting critical engagement and generation of knowledge as a result of the interaction of physical, mental and emotional experiences during the learning process. Evidence in this study suggests that the holistic aspect of critical thinking (accentuated by Mogensen, 1997, section 2.2.1) was accomplished in the learners as a result of experiential learning. That happened because enquiry-based fieldwork learning activities provided learning opportunities necessary for learners to unite their 'commitment to solve problems' aspect (section 4.5.2) with their emotional responses to learning tasks (section 4.5.4). The learners also demonstrated a

greater understanding of their own and others' attitudes and values towards issues, commenting that "*This is not normal people can't live in such conditions"* (FN 16/7) and *"From a human point of view it is really hurting and painful seeing people without electricity"* (FGI 1#L2 section 4.5.4). The findings presented above are consistent with those suggested by UNESCO (2006) which emphasise that in order for learners to be action competent they need to demonstrate social, critical and creative thinking skills, to question why things are as they are and what needs to be done (see section 2.2.1).

5.2.5 Analytical statement 5: Enquiry-based fieldwork learner' investigations fostered critical thinking thus permitted learners to envisage a future based on their learning experiences.

Another key component for promoting the development of action competence in learners is that of providing them with learning opportunities to develop visions based on problems that they work with during the learning process (see section 2.5.2). Evidence from the data generated in this study indicated that enquiry-based fieldwork activities enabled learners to achieve this aspect of action competence (see section 4.5.5).

As mentioned in section 5.2.4, enquiry-based fieldwork investigations aroused interest in learners to question why the environmental issues that they identified in the Tsumeb informal settlement became to be as they were. These prompted learners to actively seek alternative ways of how the environmental problems that they identified could be improved in future (see section 4.5.5). For example, when asked how conditions in the Tsumeb informal settlement could be improved in future, one learner suggested *"I think ... before they educate the people they must give them water, clean water at least, adding more taps, electricity for their safety and more rubbish bins to clean away the waste, because there is no chance of educating the people while they are thirsty"* (FGI 2#L6). As noted in section 2.3.1 (see Lee et al., 2004; Spronken-Smith et al., 2007) enquiry-based learning enables learners to experience and to achieve learning outcomes, such as critical thinking and knowledge creation, during the learning process. Such learning outcomes are also essential in promoting learners' ability to have an interest in the future thus

contributing towards their capacity to predict what changes might be possible in a given context (see also UNESCO, 2006 section 2.2.1). As indicated in section 4.4.5, the focus group transcripts also suggested that learners were able to develop their own ideas, perceptions and visions of how the environmental issues that they investigated about in the Tsumeb informal settlement could be addressed or prevented in future (see also sections 2.5.2 & 4.5.5).

This study demonstrates that enquiry-based fieldwork learning activities enabled learners to envisage a future without the problems that they identified during the learning process. This finding is confirmed by Jensen and Schnack (1997) as it emphasises that having visions about the good life and future worlds is an important part of being action competent (see section 2.5.2). This finding also bares resemblance to that of UNESCO (2006) which highlights the need for learners to demonstrate an interest in the future and their capacity to predict what change might be possible in a given context as an indicator of being action competent (section 4.5.5).

5.2.6 Analytical statement 6: Enquiry-based fieldwork activities enabled learners to plan and take indirect action during the learning process.

As noted in sections 4.4.6 and 5.2.2 learners showed the ability to plan and to take indirect action for the environment during enquiry-based fieldwork group activities. This aspect of action competence was evident in learners because they demonstrated skills in managing to set-up their learning objectives of what to investigate in the Tsumeb informal settlement (section 4.4.3). Learners also conducted group investigations in the field (section 4.4.4). Furthermore, learners exhibited some communication skills by orally presenting the information that was collected during fieldwork to the Tsumeb town councillor (section 4.4.6). This reflects the suggestion put forward by Eames et al. (2006) who state that in order for learners to show evidence in the development of the ‘planning and taking action’ aspect of action competence they need to demonstrate their ability and confidence to identify and solve problems. Through enquiry-based fieldwork group activities, learners also showed time management skills which were highlighted by their ability to delegate learning tasks amongst each other. For example, a learner during the

focus group discussions indicated how his group managed time while collecting data in the Tsumeb informal settlement by, stating *"We didn't have to spend a lot of time there in the informal settlement because we were a lot and could go to different houses and just quickly collect the information"* (FGI 2#L6). The learners also managed logistics such as processing fieldwork data and presenting data on posters (photographs 11, 12 & 13, see section 4.4.6). They also showed commitment to solve the problems that they identified during the learning process which in turn led to a boost in their confidence to undertake indirect action aimed at contributing towards finding appropriate solutions to the identified problems (see sections 4.5.2 & 5.2.2).

These findings confirm the suggestion put forward by others (Hmelo-Silver et al., 2007 & Spronken-Smith et al., 2007) who advocated that enquiry-based learning provide learners with learning opportunities that enable them to take greater responsibility for their own learning (also see section 2.3.1).The role of enquiry-based learning described above is beneficial in promoting certain aspects of action competence in learners. This is because proponents of the action competence approach to environmental education argue that in order for learners to be action competent, learners themselves should be involved in making the decisions to do something, irrespective of whether it is at a personal level or trying to influence others to do something for the environment (Jensen, 2004, section 2.2.2).This idea is also supportive of the argument put forward by Eames et al. (2006) who stated that in order for learners to demonstrate action competence they need to show their ability to plan and take action during the learning process (see section 2.2.2).

5.3 CONCLUSION

In this chapter a critical discussion of the data presented in the preceding chapter is presented to gain a close look into the research question. A set of analytical statements were used to lead the discussion of how enquiry-based fieldwork facilitates the development of action competence amongst learners. This study demonstrates that there are a number of ways of how enquiry based fieldwork facilitates different aspects of action competence amongst learners. The study also shows that learners require scaffolding in a number of ways to facilitate the

development of their action competence during the learning process. In the following chapter a summary of this action research study is presented; lessons learned are also provided and recommendations for future research are proposed.

CHAPTER 6

SUMMARY AND LESSONS LEARNED

6.1 INTRODUCTION

A summary of the research findings in relation to the research question is presented in this chapter. Based on the findings, that are presented in chapters 4 and 5, some lessons learned are presented in an attempt to contribute to the effective implementation of enquiry-based learning through fieldwork in the Namibia senior secondary school geography curriculum. In the light of the findings the researcher presents areas for future research and then provides a spontaneous review of the research process. Recommendations are made with an aim of informing future teaching and learning of environmental education in the Namibia senior secondary school geography curriculum.

6.2 SUMMARY OF THE STUDY

As presented in chapter 1, this study was designed to answer the question: 'How can enquiry-based fieldwork facilitate the development of action competence amongst learners in the Namibia senior secondary school geography curriculum? In order to answer the research question, two research goals were formulated, namely.

1. To investigate and document senior secondary school geography teachers' implementation of enquiry-based learning through fieldwork.
2. To develop and implement an enquiry-based fieldwork learning unit and investigate how it facilitates the development of action competence amongst learners.

The wider purpose of the study was to determine how enquiry-based fieldwork could enhance environmental learning in the Namibia senior secondary school geography curriculum. This study had two action research cycles as indicated in section 3.2.1. Cycle 1 was undertaken to find out how enquiry-based learning through fieldwork was being implemented by teachers in schools. This was achieved by conducting a baseline survey: a questionnaire was administered to seven senior secondary school Geography teachers. The survey was conducted to allow teachers to provide their

views, perceptions and experiences of research technique skills and enquiry-based fieldwork in relation to their classroom practice.

The research findings from Cycle 1 established the following aspects pertaining to geography teachers' implementation of enquiry-based fieldwork:

- Teachers lack practical knowledge of teaching fieldwork skills and research techniques to learners in their respective classrooms. Teachers cited a lack of teaching-learning support materials to undertake fieldwork activities in their respective classes. This study also found that some teachers have limited knowledge of research techniques.

- This study also found that fieldwork, as an instructional strategy, is not explicitly stipulated in both the environmental education policy document and in the senior secondary school geography curriculum. This factor negatively contributes to the effective implementation of enquiry-based fieldwork in the said curriculum because some teachers feel that there is no need of teaching fieldwork skills to their learners if fieldwork is not emphasised in the curriculum.

- This study also found that the Namibia senior secondary school geography curriculum offers opportunities for the integration of fieldwork teaching and learning in the 'research technique skills' component of the geography curriculum. However, the latter's syllabus does not contain any guidelines on how to implement fieldwork at the classroom level. The survey results also indicated that some teachers do engage learners with fieldwork activities in their classes.

- Another important finding in Cycle 1 indicates that some teachers are not familiar with how to integrate environmental learning into the geography curriculum. This also makes it difficult for teachers to integrate environmental learning into research technique skills in their classes. The survey results suggested that teachers faced severe limitations with regard to integrating

environmental learning into 'research technique skills' in the geography curriculum. In addition to teachers' limited practical knowledge of how to teach research technique skills, obstacles, such as a lack of teaching resource materials, lack of emphasis in the curriculum, lack of knowledge/training in environmental education by teachers, time constraints, personal heavy loads, and lack of school support for environmental education, were quoted as main limitations to the integration of environmental learning into research technique skills by teachers at the classroom level.

The findings from the survey provided the researcher with relevant insights that guided him to plan for an enquiry-based fieldwork learning unit that was implemented in his geography classroom during Cycle 2. In planning for the enquiry-based fieldwork learning unit, the following pedagogical issues that emerged from the baseline survey had to be addressed by the researcher as part of the planning process.

- Limited teaching-learning resource materials available for teachers.
- Challenges of how to integrate environmental learning into 'research technique' skills.
- Using suggestions of how to teach 'research technique' skills outlined in the geography syllabus.
- Geography syllabus required learners to carry out research projects.
- The challenge of time constraints, personal heavy loads and lack of transport.

The above-mentioned factors were addressed by acquiring additional teaching-learning support materials on fieldwork and research technique skills. Environmental education policy documents were consulted to identify ways on how to integrate environmental learning with research technique skills in the senior secondary school geography curriculum. The geography syllabus was also consulted and it provided the researcher with appropriate information of how research technique skills could be taught with other learning themes in its curriculum. The researcher followed the geography syllabus guideline which stipulates that learners are required to undertake research projects when engaging with research technique skills in geography.

Based on the above reflection, Cycle 2 involved the implementation of a series of enquiry-based fieldwork lessons in the researcher's Grade 12 geography classroom. Observation, focus group interviews, photographs and audio recordings of learning interactions, were used as data sources. Data collected for this cycle were analysed and interpreted using the action competence indicator framework to provide evidence of how action competence developed amongst learners.

As indicated in section 5.2, evidence in this study suggested that enquiry-based fieldwork facilitated the development of action competence amongst learners' in a number of ways as highlighted by six analytical statements presented below.

- Analytical statement 1: Enquiry-based fieldwork learning activities empowered learners to develop contextual knowledge and understanding of issues that they investigated. Learner' investigations during enquiry-based fieldwork learning activities enabled active learning amongst learners which facilitated the acquisition and development of contextual knowledge of issues that they had investigated. Learners directed their learning which then promoted them to engage with the learning tasks.
- Analytical statement 2: Fieldwork investigations facilitated commitment thus motivated learners to take indirect action. This aspect of action competence was evident in learners as a result of their willingness and commitment to contribute towards change in their local community. Learners' development of this aspect of action competence was fostered in them as a result of them having developed knowledge and understanding of issues that they had investigated. Fieldwork investigations presented learners with opportunities that encouraged them to practice problem-solving skills during the learning process.
- Analytical statement 3: Participation through group work in enquiry-based fieldwork promoted social interaction and group cohesion amongst learners which enhanced their decision-making ability for problem-solving and action taking. Group learning enabled learners to mobilise their respective skills to solve problems and take action during enquiry-based fieldwork group activities. Through collaboration and consultation learners were able to make collective decisions in order to take action.

- Analytical statement 4: Enquiry-based learning through fieldwork elicited emotional responses and a greater understanding of, the learners' attitudes and values towards issues, as well as those of others. This study also found that fieldwork learning experiences facilitated experiential learning amongst learners which promoted emotional engagement with learning tasks. Emotional engagement facilitated critical thinking in the learners thus enabling them to integrate feelings and reasons to understand their own and others' values and attitudes towards issues.
- Analytical statement 5: Enquiry-based fieldwork learner' investigations fostered critical thinking which permitted learners to envisage a future based on their learning experiences. Fieldwork investigations stimulated learner interest in learning tasks thereby challenging them to think critically so that they could generate new ideas and evidence out of their learning experiences. This allowed learners to imagine, and to visualise, a future that is free from problems that they had identified during enquiry-based fieldwork learning activities.
- Analytical statement 6: Enquiry-based fieldwork activities enabled learners to plan and take indirect action during the learning process. Learners' ability to formulate learning objectives, gather information, and to take action by communicating their findings and their ideas, characterised the development of this aspect of action competence in them. This is because learners themselves were involved in taking the decisions to do something for their local environment rather than being prescribed by someone else.

6.3 LESSONS LEARNED

In view of the findings, five overarching lessons learned are provided in an attempt to contribute to the effective implementation of enquiry-based fieldwork teaching and learning at the classroom level. It should also be noted that the lessons learned are unique to this case and may not be generalised but might be useful openings to further examine enquiry-based fieldwork practice in other cases. They are presented below.

6.3.1 Professional development of teachers on the use of enquiry-based approaches to teaching in geography

Teachers identified a lack of practical knowledge and training to teach fieldwork skills in their respective classes (see section 4.2.1). This study further documented that teachers are willing to take part in professional activities aimed at improving their teaching skills in learner-centred approaches such as fieldwork and research technique skills (section 4.2.5). Professional development can be realised through in-service training for serving teachers. Similarly, teacher training institutions in Namibia could also provide practical training to pre-service teachers on how to teach enquiry-based approaches such as fieldwork. This could be beneficial in preparing teachers to effectively implement the learner-centred policy of education at the classroom level in geography.

6.3.2 Fieldwork as an instructional strategy could be supported through explicit inclusion in the geography curriculum documents

Another lesson learned in this study is that, although some teachers engage learners with fieldwork learning activities (section 4.2.3), fieldwork as an instructional strategy is not explicitly mentioned as an instructional strategy in the senior secondary school geography syllabus. From the case study evidence (section 4.2.5) the researcher suggests that teachers could be encouraged and supported to teach fieldwork skills by providing guidelines in the geography syllabus of how to implement fieldwork learning activities in geography. The latter would then offer appropriate instructions and guidelines of how such an instructional strategy to teaching can be appropriately administered by teachers. Such an instructional strategy would also offer opportunities for teachers to effectively implement an enquiry-based approach to environmental learning as prescribed in the Namibia environmental education policy document. The senior secondary school geography syllabus could also provide guidelines for teachers on how to integrate environmental learning in their geography classroom practice.

6.3.3 Provision of teaching and learning resources

This study demonstrated that there is a need to design and to provide teachers and learners with essential teaching-learning resource materials in schools (see sections

4.2.4 & 4.3.2.1). These could include books containing fieldwork activities and instruments for conducting field investigations to mention but a few. Teachers should have easy access to instructional teaching-learning resource materials needed to effectively teach the outlined content on 'research technique' skills and fieldwork in geography. The ministry of education could also facilitate the allocation of sufficient resources in classrooms to support student enquiry. Learning resources could also include books on how to use research technique skills outside the classroom.

6.3.4 Time and support

As noted in this study, an enquiry-based approach to teaching and learning requires more time for learners to construct knowledge and engage in meaningful learning (see section 4.4). It could be beneficial for school authorities to allocate sufficient time on school timetables to enable teachers to plan and carry out practical fieldwork activities. This may assist schools to support teachers in conducting fieldwork activities with learners.

6.3.5 Pedagogical consideration

As evidenced from this study, learner-centred teaching approaches, such as enquiry-based fieldwork, can support the development of a broad variety of transferable skills in learners. Such skills included the development of observational skills; data collection skills; data analysis skills; critical thinking skills, investigative skills, leadership and teamwork skills (see section 5.2). The development of these skills directly contributes towards the overall goal of the Namibia senior secondary school geography curriculum. The latter emphasises that learning outcomes in the geography classroom should have a direct contribution towards the development of eight key skills, namely:

- Communication skills
- Numeracy skills
- Information skills
- Problem-solving skills
- Self-management and competitive skills
- Social and co-operative skills
- Work and study skills

- Critical and creative thinking (Namibia. MOE, 2005b:1).

Even though teachers conveyed their interest, as well as the challenges, that they face to implement enquiry-based fieldwork, it is worth proposing that teachers could utilise the following opportunities to improve environmental learning in their respective geography classrooms.

6.3.5.1 Teachers can emphasise 'learning by doing'

It is important for teachers to plan their research technique skill lessons in such a way that such lessons may provide learners with opportunities for 'learning by doing'. Such learning can allow learners to have 'hands-on' learning experiences such as interviewing people, collecting geographic data in the field, analysing data, as well as allowing learners to present data and to communicate their ideas orally to others.

6.3.5.2 Learning in the local environment amongst learners should be promoted

Classroom teachers can provide learners with learning opportunities in the local environment as that can have an important learning effect on learners. Teachers could also try to provide learning opportunities that enable learners to use the local environment as a learning resource. This may benefit learners by providing them with real-life learning experiences in environments that they are mostly familiar with.

6.3.5.3 Scaffolding learners

Teachers can facilitate active learning amongst learners by ensuring that learners have access to appropriate resource materials that engage them with learning tasks, such as research technique skills, rather than teachers transferring facts to them. This may permit autonomous learning and problem solving abilities in learners thus leading them to have greater control of their learning. Teachers can also support active learning amongst learners by facilitating learning activities that permit learners to undertake individual or group projects in their classrooms. Learner projects could provide learning opportunities that support independent enquiry to learners on geographic topics of interest to them.

6.3.5.4 Utilising group work

As illustrated by this study, group work activities are essential in developing several skills in learners (see section 5.2.3). Teachers can support the development of these skills by using group work in order to enable learners to interact with each other during the learning process. By working in groups learners may be able to acquire and to develop their interpersonal skills.

6.4 RECOMENDATIONS FOR FUTURE RESEARCH

Cycle 1 of this study was limited to seven teachers who responded to the survey. In Cycle 2, one classroom was also studied in order to generate evidence to answer the research question. The findings revealed in this study should offer opportunities for further empirical enquiry. While undertaking this study, the researcher could not locate research on enquiry-based fieldwork teaching-learning approaches to geography in Namibia. This study adds to the body of literature of enquiry-based fieldwork and action competence approaches to environmental learning in the Namibia senior secondary school geography curriculum. The following prospects and possibilities could be utilised for future research.

- A large scale survey similar to the one in this study could be undertaken country wide so as to document how teachers are implementing enquiry-based learning approaches such as fieldwork and research technique skills at the classroom level. This should provide a rich source of data to broaden the findings reported in this study.
- In order to further understand how enquiry-based fieldwork facilitates action competence, this study could be replicated and undertaken in more than one classroom in order to test the validity of the reported findings in this thesis.
- Further research is required to establish how enquiry-based fieldwork contributes towards the acquisition of geographic skills and knowledge in learners.
- It is also necessary to conduct research into how enquiry-based fieldwork may contribute to learner performance in geography.

- Further studies to investigate teachers' knowledge of how they try to develop learners' action competence in the teaching of geography also needs to be explored.
- Further research should also be undertaken to establish how different learner-centred teaching strategies contribute to the development of learners' action competence in the Namibia senior secondary school geography curriculum.

6.5 REFLEXIVE REVIEW OF THE RESEARCH PROCESS

The researcher acknowledges limitations of this study and discusses areas for improvement in a hypothetical repeat study. In Cycle 1, the first step that the researcher would consider doing better is to conduct interviews with teachers rather than administering a questionnaire. This is because interviews would provide richer descriptive data on how teachers implement enquiry-based fieldwork in their classroom practices. Additionally, the researcher would also increase the number of participants to generate richer descriptive data. Another important aspect that the researcher would include would be to undertake a document analysis of teachers' lesson plans, scheme of works, classroom observation and also to look at their learners' work in order to validate the survey data. Interviews with geography advisory teachers would be another aspect that the researcher would consider changing in order to generate additional descriptive data on the factors that affect the implementation of enquiry-based fieldwork in geography from an outsider's perspective.

In Cycle 2, data were collected from a single classroom involving the researcher fulfilling two roles: researcher and facilitator during the research process. This was a challenging experience because the researcher might have not captured some useful data that emerged during the research process. In order to rectify this shortcoming, the researcher would plan and implement the enquiry-based fieldwork unit with another geography teacher. This would enable the two of them to implement the learning units in two classrooms to generate richer data on action competence in two separate classrooms. Having another teacher as a co-researcher and facilitator in such a study would make the data collection process less challenging and more effective.

6.6 CONCLUSION

In short, this study has established how enquiry-based fieldwork to environmental learning in geography provides meaningful learning experiences to learners in the formal school context. This investigation has also confirmed that a number of structural and pedagogical factors need to be addressed to ensure the effective implementation of enquiry-based fieldwork in the Namibia senior secondary school curriculum. It should also be noted that the lessons learned should serve as useful openings to further explore the role of enquiry-based fieldwork in the teaching and learning of environmental education in the Namibia senior secondary school geography curriculum in other classroom situations.

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APPENDICES:

APPENDIX 1: SURVEY QUESTIONNAIRE FOR TEACHERS

Thank you for agreeing to participate in this survey that investigates teachers' implementation of enquiry-based learning through fieldwork. Most importantly it intends to inform the future teaching and learning of environmental education in the Geography school curriculum.

Kindly be informed that your personal information will remain strictly confidential and your responses will purely be used for research purposes. However, you are also requested to be as honest as possible when completing the entire questionnaire.

Name of School: _____

How long have you been involved in teaching Geography: _____ (year/s)

Which Grades are you teaching this year: _____?

Please read each questions carefully, and then fill in your responses in the spaces provided. A pen should be used to complete the survey.

1. What do you understand by the term 'environmental education'?

_____
_____
_____
_____
_____
_____
_____

2. Indicate whether you agree or disagree with the following statements. ***(Cross your response in the appropriate box)***

	Agree	Not sure	Disagree	Comment
A. The aims of environmental education and Geography are similar				
B. Environmental education should be taught in all school subjects				

across the curriculum				

3. How knowledgeable are you in teaching the following components of environmental education in Geography?

	I struggle	I manage well	Please comment
A. Developing environmental knowledge/concepts (natural systems, human impacts)			
B. Developing environmental awareness			
C. Teaching fieldwork skills (data collection and field investigations)			
D. Developing solutions to environmental problems			

4. What Geography Theme/topics do you integrate research techniques with in your lessons?

Theme/topic	Description of activities you do within this theme/topic

5. What practical hands-on activities do you involve learners with, in your Geography lessons?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

6. How do you ensure active participation of learners when teaching ‘research techniques’ in your lessons?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

7. Please indicate how often you use each of the following when teaching ‘research techniques’ in your classroom?

	Seldom	Often	Theme/topic	Activities
A. Teacher presentation				
B. Class discussions				
C. Textbooks				
D. Worksheets				
E. Old examination question papers				
F. Group work				
G. Fieldwork (Outdoor				

experiences)				
H. Investigating local environmental problems				
I. Environmental action taking				
J. Student projects				
K. Other (please specify).....				

8. How is each of the following negatively affecting the inclusion of environmentally-based-learning in the teaching of 'research techniques'?

	No Effect	Some negative Effect	Strong negative Effect	Comment
A. Lack of teaching resource materials				
B. Not emphasised in curriculum				
C. Teachers' lack of knowledge/training in environmental education				
D. Time constraints				
E. Personal heavy loads				
F. Lack of school support for environmental education				
G. Opposition to student involvement in environmental action				
H. Other (Please specify).....				

9. Indicate how each of the following facilitates the integration of environmentally-based learning in the teaching of 'research techniques'?

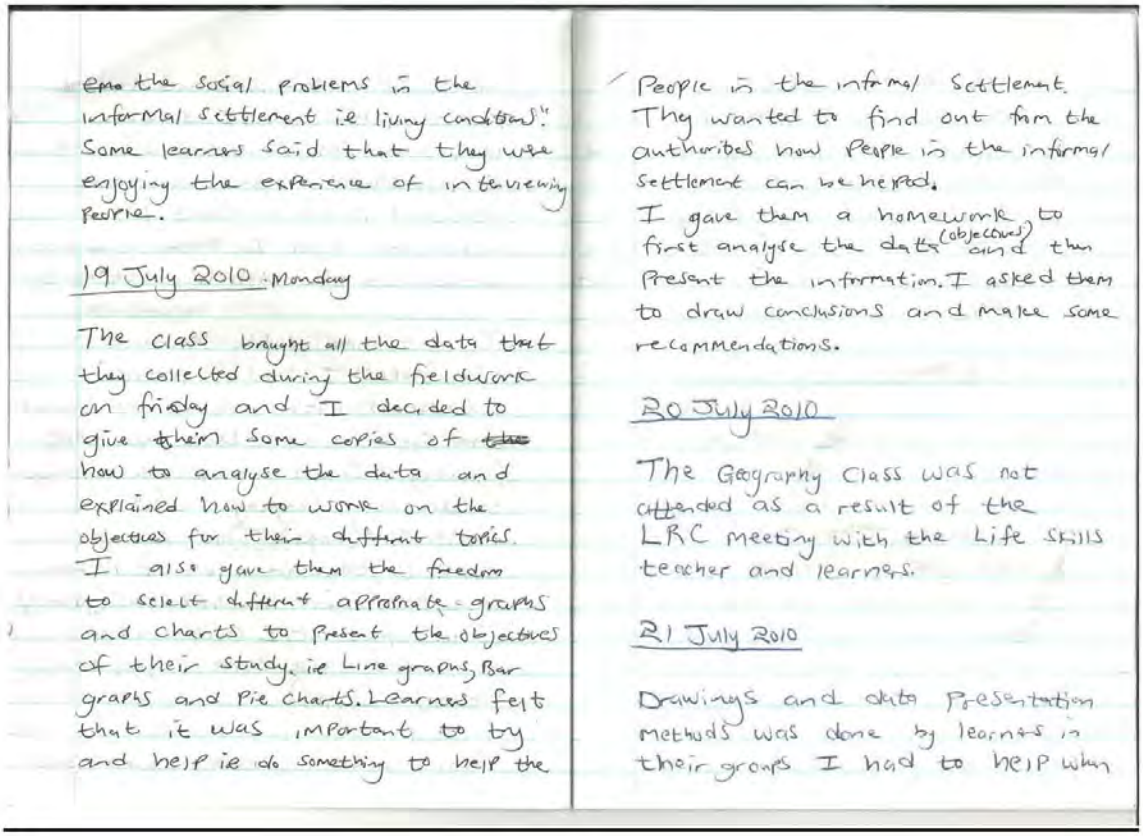
	Comment
A. Geography textbooks	

B. Geography curriculum guides	
D. Geography pre-service teacher education	
E. Geography in-service teacher education	
F. Opportunities for fieldwork	
G. Environmental education centres	
E. Other (please specify).....	

10. In your opinion state the best possible way of integrating enquiry-based fieldwork learning in the research techniques component of the Geography curriculum in schools?

_____
_____
_____
_____
_____
_____
_____
_____
_____

APPENDIX 2: FIELD NOTES EXTRACT



the social problems in the informal settlement ie living conditions". Some learners said that they were enjoying the experience of interviewing people.

19 July 2010 - Monday

The class brought all the data that they collected during the fieldwork on friday and I decided to give ~~them~~ them some copies of ~~the~~ how to analyse the data and explained how to work on the objectives for their different topics. I also gave them the freedom to select different appropriate graphs and charts to present the objectives of their study. ie Line graphs, Bar graphs and Pie charts. Learners felt that it was important to try and help ie do something to help the people in the informal settlement. They wanted to find out from the authorities how people in the informal settlement can be helped.

I gave them a homework to first analyse the data (objectives) and then present the information. I asked them to draw conclusions and make some recommendations.

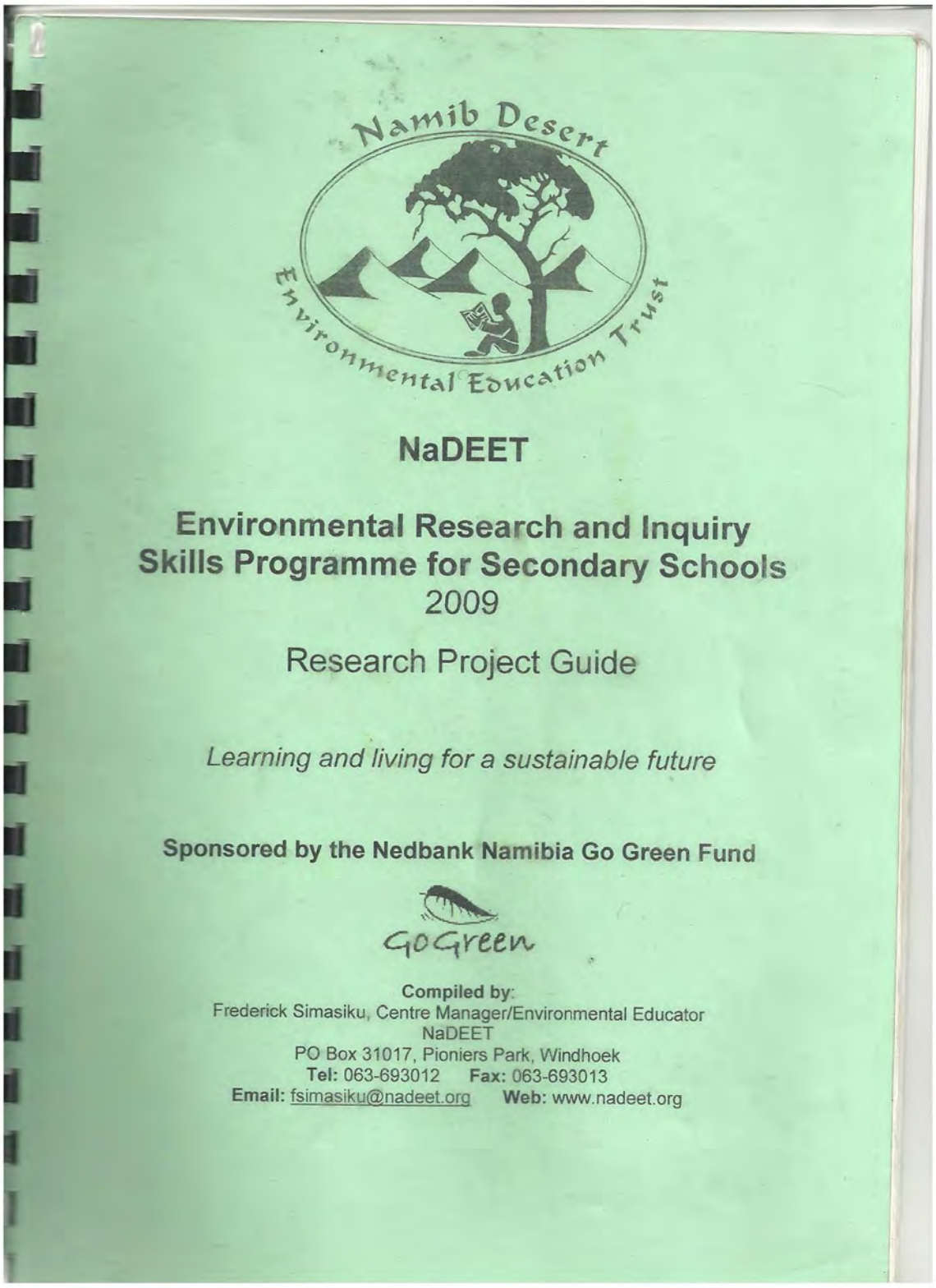
20 July 2010

The Geography class was not attended as a result of the LRC meeting with the Life Skills teacher and learners.

21 July 2010

Drawings and data presentation methods was done by learners in their groups I had to help when

APPENDIX 3: LEARNER' RESEARCH PROJECT GUIDE



APPENDIX 4: PROJECT PROPOSAL HANDOUT FOR LEARNERS

APPENDIX 8: SCHOOL BASED PROJECT PROPOSAL (DRAFT)

Name(s): _____

School: _____ Date: _____

Project title	
Research question/ hypothesis	
Objectives	
Study area	
Subjects	
Methods (sampling)	
Data collection Instruments	
Literature review	

40

APPENDIX 5: TRANSCRIPT OF RECORDINGS: LEARNERS PRESENTING THEIR GROUP PROJECT FINDINGS TO THE TOWN COUNCILLOR OF TSUMEB

22 July 2010

TRC: This is a very small class manageable. Yes, I am here your teacher told me that you wanted to see me; you had some questions for me or discussions with me. Let me see whether I will really satisfy you.

LWG1: Morning class and honourable councillor. First, I just want to thank sir for coming and as a class we chose topics and then we went to see how it affects the informal settlement, with our group we chose water and then we got the problems associated with water. According to our research it says that people are fine. First we went to the area which is behind CDM (the new location) people are complaining about the supply of water; apparently it's little and there is only like two taps; two main taps and then we feel for them that why are they getting less water and or that, they are saying the water is also kind of dirty some, only some are saying that..And in Soweto they are not complaining about the water supply they are just saying that the distance of the taps is very far and all that.

TRC: How do you want me to tackle this? You are on different topics? No thank you very much in fact if I have to first of all just give you a background of that informal settlement is that in fact that was not a planned settlement at all. It was not a planned settlement, well the planning and everything lies with the municipality I am the regional councillor but the fact that they are under my constituency; under my region I have to see to it that everything is fine and I have to know everything but the issue is that, that informal settlement was not planned at all its because the people themselves wanted places to live in and they were allocated that but forcefully I will say; they forced they marched and a lot of times they marched to the municipality that they wanted really to be given and that was the concern of the municipality that there is no water its very much impossible to have water on that site. But they said 'we don't want water, what we want is only a place we will see how to get water there' that's their own decision. Finally, we also decided with the municipality that if the people are forcing give them the place, but then we do not also have land in Tsumeb the land belongs to the mine. I do not know whether you have the information that, Tsumeb was only made for Miners people who came in to mine and then they have to go. Unfortunately later it became a place where everybody is living but the little bit piece of land that we have belongs to the mine if the municipality or myself want something that has to do with the land I have to go the mine and negotiate and sometimes it's not easy the mine does not want to give land. That land (informal settlement) was just the land we negotiated for and they managed to give it to us, but now they (residents) went too far apparently, they cleared a huge land and now the mine is claiming they are sitting on the mine. It can also be possible that ssome of them will be removed again from there we do not know where they have to go. The question of water yes, they have got one, they have been one tap only maybe they are two now but then that is a question of the land was not yet serviced because it was not meant for people to live on but then because of this urgency that came up now the municipality put one tap where everybody has to get water from but it's also too costly for the municipality to put other taps there or further taps. It's too costly to put up pipes up to there for the municipality.

LWG2: Sir! You said the new location was like not really planned so is it possible and the same with Soweto because Soweto is also experiencing the same problem.

TRC: Soweto was planned but it was planned by the old government. I understand that Soweto was build during the 1940's and that is the way we found it from the previous government. Now for the municipality to re-design the location it is very costly, but what they are doing now is they are only doing additional things because they want to bring toilets to every household in Soweto, otherwise they cannot design the whole location any longer. But the problem of water is taken up; it's really true for people to come from home and draw water from far it's too dangerous during the night.

LWG1: But sir I think, they are like also complaining about them getting water from toilets like in Soweto and at the same time the toilet is close to dumping area.

TRC: Yes! but on the other hand you were supposed to ask them why is the toilet surrounded by rubbish? Because they are the ones that are taking rubbish from their houses and dump it, they also in a way should learn how to be tidy "You cannot come dump here you know it's where you get water from and then at the same time you want to complain that the municipality has to do something". But the issue of water there (in the new settlement) and in Soweto it's a concern in the new location there is no way the municipality can put a lot of taps, there is no money. But with time maybe they (municipality) will add, with time they will do that but they can not immediately do that. It's the same with the toilets they cannot build toilets, now my office is trying to build 5 dry toilets, 5 dry toilets on that location but we have identified some houses which are led by elderly people i.e. senior citizens from 60 upwards but the rest they have to still use the bush which is not good but then nobody is to be blamed, the community themselves said they wanted to be there I addressed them two/three times they were also complaining about theses senior citizens but I said 'You yourselves said you wanted to be resettled here, you said you did not care with anything you just wanted the place" but then in terms of being a leader they are also guidelines that are guiding you that you cannot resettle people there with no water, no electricity no toilets, no what....what.

LWG2: Good afternoon class! Ok I and my fellow learners were doing a topic on energy and electricity demand in the informal settlements. Our data showed that people do not have access to electricity in the informal settlement; they mostly use firewood as source of energy and the access to electricity is not available at all and then 68% (sample) of people in the informal settlement do not have access to electricity and the gender mainly showed that more females are the ones suffering when there is no electricity because they have to do a lot of cooking, et cetera.... and the housework but then due to lack of electricity they cannot do what they are suppose to do. Furthermore, we came up with a couple of solutions that we wanted to ask sir or honourable councillor. So sir what can be done in order to provide more electricity in the informal settlements? What are the possible solutions because the people there are suffering they cannot watch news on the television which is important. What are the possible solutions now (question to the councillor).

TRC: Yes! Good but the only thing you should know is that informal settlements are not formal settlements therefore they are called informal, they were not planned those are things that were just done harshly because people as I said were forcing

now the municipality has to plan, to do a proper plan and then to know how people have to settle there and how every house has to be zoned otherwise now, the only thing that can be provided to those people now if the municipality then has money is to put the big street lights. 1 here, 1 there just for temporal and then when the proper design is done everything zoned as well and then they can really get proper electricity because there are no proper structures of houses you cannot put electricity, permanent electricity into a shack it cannot work that way. We know they are suffering but honestly these are some of the challenges that we face as leaders on a daily basis i.e. people need electricity they need water, but those settlements were not really planned people just forced and then they were given what they wanted but with time something will come.

LWG2: And then what they said on their view they wanted the municipality to provide cheaper electricity and then provide the new pre-paid electricity vending machines near the informal settlement to avoid them walking long distances to buy electricity, that's what they wanted.

TRC: You see they will demand those things but they do not know that even pre-paired electricity cannot be put in those shacks because there are no electrical wires that go there, there are no, so it will take 5 to 10 years from now for those needs to be in the informal settlement, honestly because it is something that was not planned it is just something that came up people were forcing but we know and we are aware about it, we do not really want them to suffer that way. But because of their democratic rights they forced their ways and they were put there as I told you it's not easy to be a politician. We are really concerned about that as well but until such a time the proper planning is done then they will get something, otherwise for now they will just get electricity, they will get those big lights here and there, and then even the water maybe the tap will just be provided for, one there one here until such a time then.

LWG2: That now brings me to my last part, the problems now which are experienced there. The rape, crime rate is very high people say they is too much darkness and then since its dark people are beaten up during the night when they go to work like young people are been raped all sorts of criminal activities are been done because of lack of lightning(street lights).

TRC: Good, that is very good that you guys are picking up these things so that you can also advice us as leaders that you know what problems we are facing, how do we go about solving them? We have to work together. In terms of crime I already I raised the problem to the police; I proposed a temporary police station or just something to be put there. In terms of the Namibian police rules, the Director General of the Namibian police will not allow a structure to be put there without water, electricity, all the services there are no enough services they will not allow in terms of police rules for a police structure to be put there. But we are working on that we said the Nomtsob....the former municipality nomtsoub offices they is currently only one office that is or two offices which are too many for them which belongs to the Ministry of Lands and Resettlement if they can just move out we want to upgrade that one to be a police station on its own with a station commander so that they can cover omaatara, Nomtsoub and that new settlement that's what we want so we are working on that and once the Ministry is out there then we will also have a station commander, it will became a station with a station commander and then the former

Home affairs office will be a holding cell, so those are the things we are looking at now. But in terms of as I said, water and electricity we will really just maybe have the municipality putting up things to just assist until the proper planning or zoning is done then it will be a proper location. But by now it was just an urgent location that was formed, I do not know whether I am putting everything to your satisfaction but I am just trying to say what is there.

LWG2: Sir how long have people been staying in the new location, how long have they been there?

TRC: They went there last year (2009) towards the end, November/December.

LWG3: Good Afternoon! What we actually did is waste management in the informal settlement, and our question was or our research question was "How is waste managed in the informal areas?" Basically what we found is that, the majority of how the waste is been either collected by the municipality which is a good thing or burned. We have realised that the municipality is actually doing its part by collecting waste, but only 60% (of the sample interviewed confirm that their waste is collected) of the waste is been collected by the municipality and dealt with, 40% (sample) of the waste is either burned or nothing is been done about it.

TRC: Who burns?

LWG3: These are residents from the informal settlement; this is 33.3% of the resident's burn their waste and this as we know it can lead to a lot of problems like the health of these residents is affected. We also found out (asked residents) what type of health problems this can lead to and they mentioned respiratory problems, influenza, eye problems and so on. And also it is mostly males who are affected by the way waste is been managed in this informal settlement. Problems like I said it's mostly not safe for the environment especially the burning it's not safe for the environment it leads to other problems that we suffer as the world. They also said that they suffer from crime the crime rate is high, this is the extra information they fed us with, the crime rate is high. And then when we were in Soweto we also found that the electricity they are cables that are open and are not been attended to and this can also be a hazard especially to kids this is the extra information they fed us with. What they actually want...what they told us what they want is cleaning of the toilets should be done regularly and people should be employed or they should be employed to clean their toilets once a month, they want to be employed in this way employment is created and at the same time the toilets are been cleaned that one of the solutions they offered. The roads should be cleared, they said that the roads are not been attended to in both areas Soweto and the new location, the roads is not been attended to and they want taps in each house and then the environment is not safe. Our conclusion basically states as follows, with regard to our research we can draw a conclusion that a lot can be done to change the current state of improper waste management. We have found that waste is been managed but the different methods of how it is been done mostly leads to problems like the health of people who burn they waste and are affected by the smoke and a lot of other examples can be used. The most effective way should be put into place when it comes to management of waste not only will this people continue to suffer but we will fail as a country to develop or as a town, thank you.

TRC: Good! Well said. Starting again from the informal settlement, I think that depends on the people themselves, if they are gathering rubbish at the certain point and they are burning the rubbish that is wrong. They only need education; they only need to be educated to know that they cannot really gather those things there and then burn at the same point, it really creates sickness. I think when you are doing these researches; you should also be able to provide education to our people because in our days our people are only ready to complain they don't have any solutions to any problems, for instance 'I create my own problem and then I will go to my friends to solve it for me'. So we just need also to provide education to our people and tell them that tidiness is needed, but the municipality from their part if they are not really doing very well then it's a matter from negligence or laziness. Sometimes they have their own workers (municipality) who get in town and instead of working and cleaning they neglect their job and consume alcohol. During the working time they are drinking instead of working. If the municipality.... those workers are not doing their work, they need to be monitored on a daily basis the people themselves need to be told how to be tidy. So when you do your research, please provide also the education tell that 'you need to clean here yourself'. I think you also need to provide a report to the municipality and to my office and to the office of the C.E.O the information will also help us also.

LWG3: Sir! When we were there (in the informal settlement) I could only see heaps of waste even when you walk around in town or you drive around you see big waste containers where you put your waste in, they need them as well.

TRC: Yes maybe those ones they need to get that is one point. Yes we will talk to our contractors there is one company that is contracted to manage the waste in town so that the company can provide rubbish bins.

LWG3: Sir! When we were conducting an interview in the informal settlement of Tsumeb and some of our interviewees were giving us attitude as if we were working for the municipality. On the issue of health, how often are the Soweto toilets been renovated?

TRC: Soweto toilets are not being renovated not at all because we want to do away with them because we want to put toilets at each household.

LWG3: Sir! People are also saying that the hospitals are too far away from where they leave if one is sick it takes time to reach the hospital and so we were suggesting that the municipality can build a facility to provide transport for the people.

LWG1: I also would like to add on the broken pipes and they remain unfixed for so long and children come and play in dirty sewage water and when they go home they end up getting sick there is a good example of that there is a kid playing (pointing on a picture) and the people were complaining about rubbish bins which was already mentioned that the trash is everywhere and there is no rubbish bins in every street you just find one huge hip of rubbish on the streets.

TRC: Maybe I will be repeating things I said the informal settlement was not planned therefore you will not really have a lot of services or enough services that ht people were suppose to get because it was something that was not planned that is the problem but the municipality can only assist where they can, I told you that nobody was for the idea of those people to live there but they forced they said they wanted to

live there. Therefore we only allocated them that place on their demand because they were demanding but we cannot say we will leave them like that we will just try here and there where we can just assist but they can not immediately really get everything they need now. And in terms of government also the government does not really like anybody to just settle anywhere later it will come back to the leaders if we allow it. When they were going there (moving) was no problem they said 'don't tell us about water or electricity we don't have a problem' but we knew that it's going to be a problem but they said they wanted to be there now that they are there they made a u-turn and said now you give us water and electricity. But now it is too costly for the municipality because the municipality is the government under the local government and housing, there is no money the municipality.

LWG3: One question Mr. councillor! The people basically forced that they wanted to stay there, so was there another alternative from the municipality or from the government was there something else?

TRC: They were told but Tsumeb has no land to expand housing the land belongs to the mine and the mine does not want to give the land they have. They also want to keep it for something else and we do not have power to grab the land from them. What we do not understand is why do people flock from their villages and come to towns. But generally in all countries of the world informal settlements do not and will not have sufficient services because they were just done harshly, but it's a challenge for us as leaders that people are there they are suffering as you mentioned with the hospitals. We also discuss all these things that you are talking about there is a committee in my office called Constituency Development Committee we discuss all these things we also proposed there must be a clinic there, but in terms of the policies of the ministry we should follow the rules of setting up clinics considering the distance..

LWG1: I just want to ask if it will be possible for people to subsidy on a taps, like at least contribute a certain amount of money and then set up new taps from that money.

TRC: Yes they can I even told them to gather money together even if it's not enough they can come to the municipality with the money they put together. They can do that I have also proposed a kinder garden there but the community will also contribute a certain amount.

LWG3: WE really thank you for taking time to hear the voices of the people. Basically, as a group we come up with some objectives to help or direct our investigation and our objectives were to find out the most common toilets in the location, whether it is toilets or the bush; and also to find out the main causes of improper sanitation and then ways to solve the matter from people's view. The people in the new location have a concern caused by human waste lying around there; people are sitting all over the place where they find space. As a result of that the aroma that comes from there is disturbing, so if possibly more toilets or proper toilets will do for them and also ground pollution there is barely any dust bins there especially these orange ones which can prevent the burning of trash. And in Soweto those people have problem with the toilets, but toilets are there the public toilets but they are untreated there is a lot of sewage problems there. So basically just maintaining the toilets will probably do as you said you guys were going to do

something about putting private toilets in each house so that can also help, and I think the rest as you said maybe educating the people about maintaining their facilities themselves instead of talking too much.

LWG3: Sir just to add a few words, the people complained that they go in the bush to relieve themselves maybe because the toilets that are provided for them are blocked. Just to unblock the toilets will help.

LWG3: When we were in Soweto when we checked the toilets and asked people they were suggesting is that probably you can build a female and male toilet which are bigger because those ones are really small or like maybe three houses can share a toilet and then there is always a person in charge to clean the toilet.

Colour code	Data source
	LWG1: Learners work Group 1
	LWG2: Learners' work Group 2
	LWG3: Learners' work Group 3
	TRC: Town Councillor of Tsumeb

APPENDIX 6: FOCUS GROUP INTERVIEW SCHEDULE

1. What was so good about searching for your own information?

2. What problems did you identify with your topic?

3. What do you think is the main cause of the problems that you identified with your topics?

4. What made you try to talk to the councillor or someone from the Municipality?

5. How can the problems that you identified be solved or reduced in the future?

6. How did you find working together in groups?

7. What did you like about the projects in general?

8. What did you not like about the projects?

9. What else would you like to add?

APPENDIX 7: ANALYTICAL MEMO 1:
Geography teachers' implementation of enquiry-based learning through fieldwork (Data obtained from Cycle 1: baseline survey TQ 1- TQ 7)

	Responses	**Data Source**
Teachers' knowledge of teaching fieldwork skills (data collection and field investigations).	Not very much good in doing research in general thus, struggle to explain it to learners. This is clearly indicated in the syllabus and specific suggestions are given on how to do it. I lack practical experience. I have not taught a senior grade before but can/will manage as time goes on and provided resources in form of books and other materials are available. Materials needed for fieldwork are not always available.	TQ1 TQ3 TQ4 TQ6 TQ7
Geography themes/topics which teachers integrate research techniques with in their teaching.	**Description of activities done within themes/topics**	**Data Source**
Pollution Migration	–	TQ1
River processes Marine processes	Determining drainage basin and calculating drainage density. Measuring the depth and width of a stream. Determining sizes of, beach materials and beach profile.	TQ2

Population geography (population data) theme Climatology theme Ecology theme	Learners conduct census or sample surveys within their own areas. Learners' measure and record weather observations and draw and also interpret graphs using data recorded. Vegetation transects and land use transect, learners walk along the transect noting all vegetation that occur there.	TQ3
Population and settlements. Physical Geography. Industries	Environmental surveys; land use patterns and reasons for development of towns. Geomorphology; earthquakes; climatology; soil and map work. Visiting and analysing scales of operation.	TQ4
Traffic counts	Learners are divided into groups and are given different time (hours) to complete the activity of counting cars that are passing by at the south gate of the school.	TQ5
Population	Hypothesise the direction from which many cars come from as they pass in the main road in front of our school gate around a certain time of the day i.e. lunch time	TQ6
Climatology Environmental risk and management. River processes	Analysis of climatic data (secondary data). Investigation of environmental threats within the local areas effects and suggests possible solutions. River studies e.g. gradient, river flow, erosion and deposition process, and landforms.	TQ7
	Responses	**Data source**

Practical hands-on activities teachers involve learners within in lessons.	Depending on the school location we did not so far do any hands-on activities and have only covered few topics that did not require practical or impossible to do it, hopefully we will do more in due course.	TQ 2
	Drawing of graphs (line, bars and composite).cutting of boxes to design contour maps, drawing of various weather instruments on posters, discussions in groups on various topics, presentation of topics based on outcome of researchers. In map work, learners are always given an opportunity to identify various features on maps in groups using atlases or maps e.g. world map. Interpretations of maps, finding directions, debating on various topics are also some of them.	TQ 3
	Working out questions together/internet practical work; Maps and research knowledge. Marking of assignments, explaining diagrams and graphs.	TQ 4
	When doing climatology, learners make models of the weather instruments and do presentations in class. In Geomorphology, teacher collects different types of rocks and learners do activities in class by putting them in their different groups namely igneous, metamorphic and sedimentary and write their physical characteristics.	TQ5 TQ6
	The only activities so far have been theory based exercises, but will do in due course.	TQ7
	Collection of weather information at the school or nearby weather station. Investigation of land use within the home town.Investigation of forms of pollution, causes and possible solutions.	
	Responses	**Respondents**

How teachers promote active participation of learners when teaching 'research techniques' in their lessons.	I give them a lot of group work to do and free them to explore outside classrooms on their findings makes them enthusiastic about the research techniques; seldom drive out into different environments to explore what is happening.	TQ 1
	By allowing learners to voluntarily formulate their own hypothesis or choosing topics of their own interests and explain why they chose them. Also letting them to discuss in groups some of the issues they think will fit in research techniques. In that way if it's their own choices they will actively participate rather than topics imposed on them and also thinking that expose them to hands-on practical will encourage them to actively participate.	TQ 2 TQ3
	I always reward the hardworking ones with stars, sometimes no allocation of marks to those who do not participate in the activities. I also make sure that I choose topics that are of their interest where they can be able to enjoy also. Sometimes I give them positive feedback that will encourage them.	TQ 4
	Take them out to possible areas, let them see and do activities such as measuring, recording and counting. Class presentations and work in pairs (strong and weak learners).	TQ5
	Learners are given marks according to their participation and those who did not do anything they are given zeros and this contributes to active participation because no learner wants to be given a zero.	TQ6
	By incorporating everyday events and activities that are taking place within communities and derive a form of a theoretical research and require them to explain how they would go about finding out certain information on a	TQ7

	given event. Learners have to collect their own information in the field, analyse the data and have to do presentation of their findings.	

APPENDIX 7 continued....

Factors affecting the inclusion of environmental-based learning in the teaching of 'research techniques'.	**No effect (frequency)**	**Some negative effect (frequency)**	**Strong negative effect (frequency)**	**Teacher's comments**
A lack of teaching resource materials		1	6	• Not enough resource available on environmental-based learning (TQ1). • No teaching resource materials (TQ5). • Content will not be fully emphasised due to less teaching resources (TQ7).
Not emphasised in curriculum		3	4	• Partially covered but can still be expanded in curriculum (TQ1). • There is no way you can include it if it is not in the curriculum (TQ3). • It is not included in the curriculum (TQ5).

				• It does not show the importance/significa nce of the theme at all (TQ6). • This means there is less information available to present to learners (TQ7).
Teachers' lack of knowledge/training in environmental education		2	4	• Teachers lack knowledge on research techniques in general (TQ1). • The teacher cannot do it effectively without the knowledge (TQ3). • Teachers lack knowledge and did not receive training in environmental education (TQ5). • They will not emphasise on the subject at all and draws and draws this knowledge from learners (TQ6). • It is not possible to teach the content which is not at your level of understanding (TQ7).
Time constraints		3	4	• Too little time to cover certain topics especially those not in syllabus (TQ1). • Not enough time due to workloads (TQ3). • Not enough time to give activities to the learners especially if they do field work (TQ6). • One can always make time (plan in advance) (TQ7).
Personal heavy	1	1	5	• I am studying and it

loads				leaves me with little time to do much (TQ1). • Can negatively affect because of (time limited) (TQ3). • Some teachers are given too many classes and no free periods to concentrate and to prepare for some topics like research (TQ5). • Personal heavy loads should not interfere with teaching (TQ7).
Lack of school support for environmental education	1	1	4	• School does not really support environmental related activities (TQ1). • The school can discourage some activities (TQ3). • Learners will then not experience what they are supposed to for better understanding (TQ6). • Sometimes it might be difficult especially if learners need to travel for their studies if there is no transport (TQ7).
Opposition to student involvement in environmental action		4	2	• Learners too busy to get involved in environmental activities (TQ1). • A lot of learners do not indulge themselves in environmental

				action because they do not want to practice what they have learned (TQ7).

APPENDIX 7 continued....

Teachers' suggestions on how the situation can be improved.	**Responses**
	• Much of enquiry-based learning should be integrated in the formal curriculum, teacher training should be done and learners should be motivated to do research in environmental related issues (TQ1). • In my opinion there is no best possible way, every method that teachers use to integrate enquiry-based learning and that makes learners to understand is the best (TQ2). • Include it in the syllabus once it is in the curriculum so that every teacher will find it important. Carry out workshops/training to educate teachers about it because I believe most teachers lack understanding of this concept including me (TQ3). • Allow time (periods) for practical work. Need to scale down on some of the work to get lessons for practical work lessons. Train teachers on answering of research techniques (TQ4). • (TQ5) (did not comment) • The syllabi should change and integrate

	the enquiry-based environmental learning so that this does not became an issue from the teachers' side but a must that it should be touched and covered as per syllabus (TQ6). • More practical must be done in the field (TQ7).

APPENDIX 8: ANALYTIC MEMO 2: INDICATOR FRAMEWORK IN USE TO IDENTIFY THE DEVELOPMENT OF ACTION COMPETENCE AMONGST LEARNERS

SUMMARY OF MAIN ISSUES EMERGING FROM FOCUS GROUP INTERVIEWS, OBSERVATIONS AND AUDIO TRANSCRIPTS

Aspect	Indicators/evidence	Source of data
Knowledge and understanding of the problem: Students require knowledge on which to base soundly reasoned decisions. This knowledge could include technical, social, political, historical and economic factors.	• We went in the informal settlement to ask people about electricity but we also found out other problems that they are facing.	• FGI 1#4
	• I think we simply learned something in this case, we saw the problems with our eyes so we had experience and we saw what the people are experiencing.	• FGI 2#L2
	• Our data showed that people do not have access to electricity in the informal settlement; they mostly use firewood as source of energy.	• LWG2
	• Basically what we found out is that, the waste is being either collected by the municipality which is a good thing or burned by the residents... 33.3% of the residents [interviewed] burn their waste.	• LWG3
	• I think what was good about this topic was that we experienced first-hand on what was going on but again, normally these things we read about them in the textbooks but we have never ever experienced it in our lives but so it's a good way of	• FGI 1#L3

	experiencing first-hand information on certain topics**.**	
	• We experienced what people experience where they live.	• FGI 2#L2
	• I have seen that most of the people [in the informal settlement] walk long distances in order to collect water at the taps.	• FGI 2#L6
	• The waste is not managed properly like here in residential areas because we have rubbish bins at each house... they have to collect and burn rubbish which is not a good thing.	• FGI 2#L8
	• A lack of electricity makes it difficult for them to go and visit the toilets at night.	• FGI 2#L8
	• I even got to see that development does not take place equally around places.	• FGI 2#L10
	• We come up with recommendations which we thought might be solutions to the issue of people not having electricity in the informal settlement ...we think that the municipality must make sure that they provide pre-paid electricity which can be cheaper for people living there.	• FGI 1 #5
	• I feel that they are not really considered as part of the town because the municipality don't even go there and clean up the	• FGI 2# 5

	place.	
Commitment to solve the problem: Students should show commitment and values that motivate them to participate in contributing to changes in society.	• We tried to get answers and see what we can do about the situation... We also wanted to speak on behalf of the people to the councillor.	• FGI 1#L1
	• For the town council to make some improvements.	• FGI 1#L5
	• The public's opinion is also important for the councillor, it was important for us to talk to him about some problems he might not know about.	• FGI 2#L9
	• We wanted to talk to the councillor for him to pass the message to the mayor.	• FGI 2#L6
	• I felt that if we as a class don't succeed to make a change those people living in the informal settlement were going to look at us as if we were just there for fun....We were really there for a project but if we don't make a change they are also just going to look at us as spectators.	• FGI 2#L5
	• What about if they really go	• FGI2#L4

	and develop that place and make it into a better place? You will feel much happy because you know you did your part making the place look better.	
	• People are complaining about the supply of water; apparently it's little and there is only like two taps; two main taps and then we feel for them as to why they are getting less water.	• LWG1
	• I really wanted to talk to the councillor because when we went there [in the informal settlement]; we saw the problems with our own eyes. We basically understood it and said that we can maybe pass on the message because probably those people [residents] did not get a chance to speak to the councillor in person we like felt that we can pass the message and do our part.	• FGI 2#L1
Participation: Students require skills in making decisions in a way that is consultative, democratic, collaborative, and co-operative.	• What was good about it is that we learned how to ask questions and how to interview people.	• FGI 2#L1
	• Thanks to my members of the group it was really fun together as a team, we did a lot of work together in a shorter period of time than working alone.	• FGI 1#L1
	• For our group we could speak different languages so it was easier to find out information in different languages.	• FGI 2#L8
	• What was also nice about	• FGI 2#L1

	being in a group is that when you had to form the final part of the project you could get the ideas from others. • This research has made us to get along like brothers and sisters, there was this bond that joined us as one like to share our views based on a topic. • We had to step up our communication abilities in order to make people understand. • Learners participated collaboratively in group projects on real life issues i.e. water, waste management and energy demand.	 • FGI 1#L4 • FGI1#L3 • FN 19/07 & FN 21/07 • Photographs 2, 3, 4 & 9
Emotional response: to be able to decide the appropriate action to take, and their own personal responsibility and commitment, students need to understand their own and others' attitudes and values towards issues.	• This is not normal, people can't live in such conditions • I cannot continue to interview the people because I feel bad. • We felt pity for the people and sometimes we even felt like crying. • What I did not like about the project is when you go there [in the informal settlement], you find small kids not going to kindergarten and not going to school. • From a human point of view it is really hurting and painful seeing people without electricity.	• FN 16/7 • FN 16/7 • FGI 2#L2 • FGI 2#L1 • FGI1#L2

Interest in the future: An interest in the future and capacity to predict what change might be possible in a given context.	• We need to educate the people first.	• FGI 2#L10
	• It's best to educate them first....at least they will develop ideas of making their community a better place if they are educated.	• FGI 2#L5
	• I think first of all before they educate the people they must give them water, clean water at least, adding more taps, electricity for their safety and more rubbish bins to clean away the waste, because there is no way of educating the people while they are thirsty.	• FGI 2#L6
	• We need to develop the rural areas.... for example things that attract people to come here [in town], we can just put the same things in the rural areas where the people are coming from.	• FGI 2#L2
	• If I have to make some changes in this town I will consider education...we need people to have access to education; whereby they have to know that whatever they do is the cause of the problems.	• FGI 2#L2
	• And please to those people they should try to take their children to school so that they may have a future one day and try to improve where they stay.	• FGI 1#L3
Planning and taking action: Students require the skills and	• Learners set up goals for data collection.	• LWG 1;2;3

confidence to identify and solve problems, set goals, gather information, communicate, and manage time and logistics to take action (indirect or direct).	• Learners investigated and searched for their own information. • Learners communicated their findings. • Learners learned how to ask questions and how to interview people. • Learners communicated their views and opinions to the representative from the relevant authority of the town (Photographs 11,13; sections 4.3.6 & 3.3.7) • Learners delegated learning tasks in order to manage time e.g. [We] didn't have to spend a lot of time there [in the informal settlement] because [we] were a lot and could go to different houses and just quickly collect the information.	• Photographs 1; 2;3 &4 FN 16/07 • LWG 1,2 &3 • FGI 2#L1 • Photographs 7 & 8 • FN 22/07 • LWG 1;2&3 • Photographs 11 & 13 • FGI 2#L6

APPENDIX 9: Letter to Principals

To: The Principal **8 March 2010**

Dear Sir/ Madam

Request for permission to collect data for research purposes

This letter intends to communicate to your office that I am a registered part-time student at Rhodes University **(student number 609S3543)**. I am a Master of Environmental Education student wishing to use your school as one of my research sites for the purpose of collecting data that will significantly contribute to my research report to be submitted for examination at Rhodes University.

My research seeks to investigate Grade 11 and 12 Geography teachers' implementation of enquiry-based learning through fieldwork in the teaching of Geography. I therefore request for your permission to please allow me to use your school as a research site in order to administer my questionnaire. It should also be stated that only grade 11/12 Geography teachers will be required to complete the questionnaire for this study. Should the two teachers be identified, they will be required to complete a questionnaire by providing information regarding how they implement enquiry-based learning through fieldwork in their respective classes. Should the information supplied by teachers at your school be of great value upon data analysis further information and permission to collect additional data at your school will be required during the second trimester of this academic year.

It is also worth mentioning that, confidentiality and anonymity will be highly maintained and no personal information will be collected from teachers who agree to take part in this study while the school's name will also be kept anonymous. The information supplied by teachers from your school will purely be used for academic purposes.

Should you wish to verify the authenticity of what is contained in this letter please feel free to contact me at 081 4246097.

Yours Faithfully,

Frederick Simasiku

8 March 2010

APPENDIX 10: Letter to Teachers and Consent Form

Dear Grade 11/12 Geography Teacher

Kindly be informed that I am a registered Masters of Environmental Education student at Rhodes University. In order to successfully complete the course I am required to undertake a research study of my choice approved by the University. I have decided to conduct an investigation into how enquiry-based fieldwork facilitates the development of learners' action competence in the geography curriculum grade 11 and 12.

However, the main purpose of this letter is to request for your permission and assistance to please assist me by filling in the attached questionnaire that intends to investigate Geography teachers' implementation of Enquiry-based learning through fieldwork.

Please complete the attached consent form if you are willing to assist me with this research, in signing the consent form:

- You will be required to complete the questionnaire attached to this letter which will be collected from you in the not distant future.

Yours Faithfully,

Frederick Simasiku

Consent Form

I hereby agree to participate in this study by completing the questionnaire administered by **Frederick Simasiku**. I am fully aware that the main purpose of completing the questionnaire is to assist the researcher understand how teachers like myself are implementing enquiry-based learning through fieldwork in the senior secondary school geography curriculum. I also agree that the responses I will supply shall only be used for research purposes.

Signed: _____

Date: _____

APPENDIX 11: LETTER SEEKING PERMISSION TO CONDUCT RESEARCH

To: The Principal

Tsumeb Secondary School

P.O Box 372

Tsumeb

Republic of Namibia

5 July 2010
Madam

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a registered Master of Environmental Education student at Rhodes University (student number 609S3543). I am currently collecting data in order to compile a research report to be submitted at the end of this year. The aim of the research is to investigate how enquiry based fieldwork learning in geography facilitates action competence amongst learners. I hereby request for permission from your office to please allow me to collect relevant data during my Geography lessons. It should also be stated that learning will continue as normal with emphasis on learners doing group projects. The learning activities will be based on the prescribed senior secondary school geography syllabus.

Furthermore, I would also like to inform you about the field trip that the class will also carry out during their projects in the Tsumeb informal settlement. The proposed date for the fieldwork investigations is on the 19th July 2010. Attached also find a letter requesting the parents' permission to allow their children to participate in the research. It must also be stated that interviews with some selected learners will be conducted after the fieldwork and will strictly be undertaken during the afternoons in order not to interfere with normal school time. No learner will be requested to take part in the study without permission from parents or against his/her will. Pictures will be taken during the data collection process and learner interviews will be recorded too.

I will be extremely pleased if my request will be considered.

Yours faithfully
Frederick Simasiku

APPENDIX 12: LETTER SEEKING FOR PERMISSION FROM PARENTS

5 July 2010

Dear Parents

REQUEST FOR PERMISSION

I am a registered part-time student at Rhodes University studying towards a Masters in Environmental Education. As part of my studies I am required to conduct a study in my work environment in order to submit a research report to the University.

In order to compile the research report it is required that I conduct some interviews with learners in my class and also take some photographs. Since learners are minors, I have to request for their parents' permission in order for the learners to take part in the research process. The Interview questions will be based on learners' Geography field work projects that learners will be conducting. I hereby request for your permission to allow your child to take part in the interviews. The interviews will take in the afternoons in order not to interfere with lessons. Interviews will be recorded and pictures will be captured during the sessions. It should however be stated at this moment that pictures and interview recordings will purely be used for research purposes. It should also be stated that learners can stop participating in this study should they wish so at a later stage.

Should you request further clarity please contact the school principal or alternatively I can be reached on my mobile phone: 081 4246097.

Yours faithfully

Frederick Simasiku

APPENDIX 13: LEARNERS' DATA ANALYSIS HANDOUT

DATA ANALYSIS, CONCLUSIONS AND PRESENTATION TECHNIQUES

Now that all your data has been collected, it is time to use the data to answer your research objectives. The first is to analyse the data and placing it into tables, graphs or charts. Discuss with your group members the meaning of the information and test the research hypothesis. Draw conclusions by looking at the evidence in your data. It is very important to now present your findings to the public. This can be done in an oral and visual report and as a written project report. At the very end, you should reflect and evaluate the research project with your group members. You should also discuss and make recommendations about how to take action for the environment based on your findings. Let us now learn about these steps in more detail.

Data Analysis:

Data analysis is a process of gathering, modeling and transforming data with the goal of highlighting useful information, making conclusions and supporting decision making. The best secret to analyse data successfully is to:

"ALWAYS START WITH YOUR RESEARCH QUESTION OR HYPOTHESIS"

When analyzing data from the questionnaires, interviews or measurements, always start with a review of your research objectives. Why did you do the research investigation in the first place? This will help you organize your data and focus your analysis. For example if you wanted to find out why you think people prefer electric stoves to gas stoves, you can organize the questionnaire data into two parts. You could do this by counting the number of responses people gave for gas stoves and for electric stoves.

Basic Analysis Process

Follow these guidelines to analyse information that has only limited answers or from rankings or from tallies.

- Tabulate the information. For example, add up the number of ratings, rankings, yes's and no's for each question.
- For ratings and rankings, look for "How many people/ respondents ranked 1, 2, or 3". Consider conveying the range of answers. For example, 20 people ranked "1", 30 ranked "2" and 20 people ranked "3"

Follow these guidelines to analyse date from verbal answers in interviews, focus groups or written commentary on questionnaires.

- Read through all the data.
- Organize comments into similar categories, for example, concerns, suggestions, advantages, weaknesses, similar experiences and recommendations.
- Label the categories or themes, for example, concerns or advantages

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APPENDIX 14: FOCUS GROUP INTERVIEW TRANSCRIPT WITH LEARNERS

Focus Group Interviews Transcription (Energy & Electricity demand in informal settlement of Tsumeb)

26 July 2010

Q: What was so good about searching for your own information?

FGI 1#L1: What was so good about it is the fact that, we got to learn more about what the people in the informal settlement really need like the energy and electricity and their views and opinions on how to handle the fact that they don't have electricity.

FGI 1#L2: The good thing is we got a chance to go there physically and see for ourselves what state the people are living in. Based on what we saw in the informal settlement we can now tackle the challenges which are being faced by the people in the informal settlements.

FGI 1#3 I think what was good about this topic was that we experienced first-hand on what was going on but again, normally these things we read about them in the textbooks but we have never ever experienced it in our lives but so it's a good way of experiencing first-hand information on certain topics.

Q: What problems did you identify with your topic?

FGI 1#4: Since we went for research in the informal settlement. We came to know people very well we asked them several questions whereby people produced answers and basically our topic was all about electricity. We went in the informal settlement to ask people about electricity but we also found out other problems that they are facing. Based on the data we received which we represented in tables. I see that most people living in the informal settlement have less access to electricity compared to other people living in the town.

FGI 1#3: We had to step up our communication abilities in order to make people understand.

FGI 1#5: Based on our topic, the problem we got was that people are scared to walk at night because have lights.

FGI 1#2: The problem people have in the informal settlement is a lack of electricity and it makes them to face all kind of criminal activities. They become victims of criminal activities, it is really bad because while we were interviewing a woman said that there were a lot of rape cases reported; children being raped. It is bad not having electricity especially the people walking at night meaning they have to walk in the dark alone without seeing anything.

Q: What do you think is the main cause of people not having electricity?

FGI 1#L1: It is simply because the informal settlement was not planned that's why the people really don't have energy and electricity and for some people electricity is too expensive can't afford that.

FGI 1#L3: I think that people are ignorant , because they forced the government to give them that place to live on... they wanted the place they got the place thinking that all their problems were solved just to discover that they were other problems again. They asked for a place and now there is no electricity and the list of other problems goes on.

FGI 1#L4: I mean in our days electricity is a basic need for everyone and the fact that there is no electricity, people's lives are at risk, anytime people can get injuries some people provided us with the information that whenever they come back from their houses during times when there is no electricity they can experience snake bites. Since the informal settlement was not planned the municipality just got that space for people to live there.

FGI 1#L2: The other problem is ignorance; most o people living there come from other places and come to settle in the town to support their children. The thing is, how can you live your home town where you were situated and come in another town and then demand for land while there is no land? Meaning that the new location was not planned; it's not planned at all it was not suppose to be there in the first place. The mine is in charge of the land and number two that informal settlement is close to the mine on the other side and that can cause all sorts of problems for the people. People should at farms or where they are from, they shouldn't try to come into new locations and demand for land while there isn't suppose to be any land. People want to be in towns I don't know why people want to be in town?

Q: How did you (as learners) try to solve the problem of shortage of electricity?

FGI 1#L4: We come up with recommendations now which we thought might be a solution to the issue of people not having electricity in the informal settlement. We think that the municipality must make sure that they provide pre-paid electricity which can be cheaper for people living there.

FGI 1#L3: We had an interview with the town councillor and he told us that the only thing that they can do for now is to put street lights so that's the only thing. He said that the municipality cannot bring electricity to the shacks it is impossible.

Q: What made you try to talk to the councillor or someone from the Municipality?

FGI 1#L1: We tried to get answers from them and try to see what we can do about the situation and we also wanted to speak on behalf of the people in the in the informal settlement to the councillor, the municipality and who ever. But then as far as I am concerned, we got our answers and we tried our best as we could.

FGI 1#L5: At least for them to make some improvements.

FGI 1#L2: From a human point of view it is really hurting and painful seeing people without electricity. The municipality is trying all their best to provide them with street

lights as the councillor mentioned; that settlement was planned in the first place so it's challenging.

Q: What did you like about the project in general?

FGI 1#L1: What I loved about this topic was to go to the people and put ourselves in their shoes and compare how some of us that use electricity on a daily basis might cope...How it feels not to have electricity on a daily basis. I also liked getting their views and at least learn more about what electricity and energy is all about in general than just reading about it.

FGI 1#L4: What I liked about the topic during our research was about the people living there, they are actually kind; they are all humans like us they answered with politeness, every question we asked them that what I liked about the people living there.

FGI 1#L5: I found it so fun because I've never experienced such a thing in my life.

FGI 1#L2: It opened our eyes to come down to the real world and see how people are living in the informal settlement instead of just us being in towns. We are living the good life; we are having electricity happy every day, but we have to help the ones who are in need of electricity and I am happy that we had a chance to go there and try to find solutions to their problems.

FGI 1#L5: It encouraged us to study and not live like them in future.

Q: What did you not like about the project?

FGI 1#L4: I did not like the fact that people don't have electricity.

FGI 1#L3: Its really heartbreaking especially to talk to someone who was a rape victim because of the darkness and seeing someone who was beaten up and marked at that place its really heartbreaking so that's what I didn't like about this project.

FGI 1#L2: The other thing which I didn't like was the state of condition the people are living in. It's a waste town there...waste is everywhere and people have to live with those kind of things because they don't have anything to help them...For example there are no public rubbish bins there..There is nothing there I didn't even see one there and that's the thing that I hated. And the other thing is children...the small girls become victims of crime like rape so that's the thing which I didn't like seeing as well.... it's the children.

Q: How did you find working together in groups?

FGI 1#L1: Thanks to my members of the group it was really fun because you know as they say a lot of hands is better than one, so as we worked together as a team we did a lot of work together in a shorter period of time than me working alone and it was really nice working together as a group than working alone.

FGI 1#L4: Besides being classmates this research has made us to get along like brothers and sisters, there was this bond that joined us as one... like to share our views based on a topic so that's one thing that I also liked about being in this group, they treated me very well with love the whole research was fine.

FGI 1#L2: It's a good experience; it's a good experience working with different people you know, like together coming...putting our heads together and then finding different solutions to our problems, it was very good; very interesting working with people....very fantastic

FGI 1#L1: It was actually a good experience you know.

FGI 1#L2: It's actually the first time we got to do this honestly as a class...as a subject going to the places themselves you know and then experience what people experience where they live and stuff like that so it was very fantastic.

Q: What else would you like to add?

FGI 1#L2: From my point of view, I think that government, municipality the council should take out money and help the ones in need instead of just saving money for new projects. We have to help the ones in need it doesn't matter whether the settlement was planned or not. People want to come closer and enjoy the life we are enjoying. They don't have cinemas where they are coming from; they don't have shopping malls; they don't have entertainment facilities and proper medical attention so that's why they try to come into towns and get the life we are living so we shouldn't really complain about them coming here going on strike wanting land. We should give them land; if there is land we should give them land.

FGI 1#L3: We as the Namibian public should also understand that some of these things are not a do and done deal; it is extremely hard for the municipality to get new land and to try and relocate people; to put in money for street lights; to put in money for water; to put in money for all the other basic needs because as we already said Tsumeb is not for the town council. Tsumeb is owned by the mine; we should not expect the council to always solve our problems every time we create them. Some of these people are the cause of these problems but yet they want the councillor to come and clean up what they caused themselves so we should really not try to demand too much from the council but to try and meet the council half way as well.

FGI 1#L1: It's not a thing of demanding; the people are in the situation they are and It forces them to do what they do; not everyone wants to force to get land or a piece of land where there is no electricity; no water nothing. It's just a situation the person is in. What if I live in a box house and I do not like the conditions there, the kids in the informal settlements are our future leaders. So like a small kid who is like in the new location doesn't have access to a kinder garden; doesn't have access to anything, this certain boy or girl was suppose to be our next president or our next minister.

Q: What do you think can be the best solution in the future of such problems not to happen?

FGI 1#L1: Encourage the people to help themselves like selling food and all that in order for them not to sit and relax and let the government do everything. There is no such thing as been spoon-fed in our days everything revolves around money.

FGI 1#L3: And please to those people they should try to take their children to school so that they may have a future one day and try to improve where they stay.

FGI 1#L4: And one thing I would like to add is that, If I happen to be put in authority to make some changes in this town. First of all if I have to consider an issue privately in my mind...its education. We need to provide some education, access...people must have access to education; whereby they have to know that whatever they do is the cause of the problems. So they may know that if they have education people should know that if we have a shortage of this thing then the consequences might be too bad. So by having education you know it will be good for them; for them to make some changes and have a better life like others do.

FGI 1#L3: (Just this last one, brief one)...actually! Alcohol is demanding too much from our pockets and we are giving too much to alcohol and forgetting that we have problems trying to drown ourselves so please let us not try to drown ourselves with alcohol but take the little we have by taking our kids to school.

Focus Group Interviews Transcription (Water demand and Waste Management in the Tsumeb informal settlement)

27 July 2010

Q: What was so good about searching for your own information?

FGI 2#L1: What was good about it is that we learned stuff that we did not know at the time and we learned how to ask questions and how to interview people.

FGI 2#L2: We simply learned something...in this case we saw with our eyes so we had experience and we saw what the people are experiencing.

FGI 2#L3: What was interesting is that, while you are collecting your own information there is nobody that can tell you that this is rounded up or...You cannot argue with it because it's the truth, because you were there and you experienced it and it was like the real life situation you can picture yourself doing this or how other people will do it. Basically it was the truth and that was actually fun knowing that I collected this information and its mine I did it on my own I have the statistics.

FGI 2#L4: It was a lifetime experience, not actually lifetime but once in a lifetime for us to do such an activity. what about if they really go and develop that place and make it into a better place? You will feel much happy because you know it was because of you, or okay not because of you but you did your part making the place look better.

FGI 2#L5: As for me sir it was a good experience. Sometimes when you see people suffering like that we ask ourselves why? When they are like leaders and we got answers now and it is clear now in our eyes.

FGI 2#L6: And for me it was happy to know that people...most people are always quite so they let it out what they are experiencing and what they lack.

FGI 2#L7: for me it was an eye opener sir, because I learned not to judge a book by the look of its cover. We went into there and we researched but then the things we got we made our own interpretation and we made a mistake without going to the municipality and asking them.

FGI 2#L10: I think it was actually a nice thing because I even got to see that development does not take place equally around places. So we are like living this side and we feel life is nice but when we went there we saw how people are living.

FGI 2#L2: Sir! I think we also in a way pushed the councillor to make it faster, he said they are going to change that we put ourselves in their shoes and see how it feels...so we actually pushed the councillor to do it as early as possible.

FGI 2#L5: It was an encouragement for us the grade 12 because we wouldn't want to live the life they are living.

FGI 2#L1: I also believe like...for example you find your parents telling you that they are people who are suffering and you don't believe that now we saw how people live in poverty and all that.

Q: What kind of problems are people facing in the informal settlement with regard to the topics you were reaching?

FGI 2#L1: Lack of taps.

FGI 2#L7: The water is not treated well in the informal settlement, compared to the water we have this side which is more purified than the water that side.

FGI 2#L8: The waste is not managed properly like here in towns because we have rubbish bins at each household and bigger public rubbish bins where we can all throw our rubbish but for them they have to collect and burn rubbish which is not a good thing.

FGI 2#L6: And I have seen that most of the people walk long distances in order to go to the tap and collect water.

FGI 2#L2: I have also seen that some people collect water like from the toilets and which is not like a good thing so it's actually affecting their health like in Soweto.

FGI 2#L4: What I saw and what the councillor said is, that place it was built in a rush there was no proper management and proper planning. I think the water is not safe enough because what I think is the water is coming from the nearby mine which is behind the location and they know that they use that water maybe to clean the minerals there the same they use for their personal consumption which is increasing the rate of ill-health.

FGI 2#L5: I feel that they are not really considered as part of the town because the municipality don't even go there and clean up the place.

FGI 2#L1: When they collect their water the taps are far from their houses, they collect water in dirty containers that are affecting their health.

FGI 2#L3: The waste...I've noticed that some of them have the mentality of 'we should keep our place clean' but then there are others who just leave the waste

there and basically they are living in the waste, it's not that the waste is there...they are living amongst it that's the problem everyone just drop their waste anywhere I can live here and drop my waste in my neighbour's yard and don't just care...it happens...it happens.

FGI 2#L6: I've noticed that sometimes at night the people who stay far from the taps, sometimes they need to drink water in the night and probably they only have water which they used to wash the dishes...sometimes you will be forced to drink it up.

FGI 2#L8: Also about the electricity, it like it is difficult for them to go and visit the toilet during the evening because there are criminals around there that take off cell phones, people's goods so it's also like the security that side is also bad.

Q: What is the main cause of the problems that you identified with you topics?

FGI 2#L10: With water I really don't understand, yes seriously I don't. Like the councillor said they are saying people forced so that they can go and settle there but then it's like it takes two to tango, the people forced and the councillor accepted sir don't you think water is like it's not only a basic need but it can also be something like a human basic right, it's just a part of life, you cannot want to put someone in a place where there is not enough water.

FGI 2#L3: I think all of it has to do with a lack of education, I mean if these people were educated and they forced for this land I think they would have managed it in a better way. I think it all leads to a lack of education...they are not educated.

FGI 2#L8: The other thing is ignorance...it plays a big role because it's like I don't care about the next person it's just all about you...you just throw your rubbish there for you its fine but for the other person it's not.

FGI 2#L2: on the other hand, I think these people, since they are the ones that forced the councillor and maybe the municipality or whoever, like to move that side I think they didn't think about the future like the consequences. So they only felt 'we are going to be able to stay in that place, but did not think like 'will we be able to manage the place ourselves, or will we be able to get water. As long as they got a place to stay that's what they all thought but they didn't think about the consequences.

FGI 2#L6: I know water is really needed but they are also not been a little bit patient because as we all learn in development studies, development does not just take place like quickly, it takes time, And those people just got there last year (2009) November and the municipality is still trying to something. If the municipality would have abandoned those people they wouldn't have taps by now.

FGI 2#L5: Sir! I also think it's the stubbornness of the people and this mentality that ok we will just go and the government will just provide.

FGI 2#L4: I think the municipality wanted to take the pressure off their backs so that they don't get embarrassed with the national constitution because if they could not give those people land they could have boycotted and do some funny things in front of their offices and it would have been a big embarrassment to them. So they just decided let's just give them so that we can ignore them a little bit and wait for our budget and then we can give them later, hats what the councillor was trying to say.

FGI 2#L7: Doesn't the government give a law that towns must reserve areas for the construction of squatter settlements so if they were well acquainted with their laws they would have known that we must reserve land for this settlement and we must update those land and develop them.

FGI 2#L6: The land which was reserved for the squatter camps is full, it's fully occupied.

FGI 2#L7: But, then as a leader you must put yourself in that person's shoes and forget about yourself. Don't be ego-centric and put yourself in that person's shoes and do the right thing you see.

FGI 2#L2: I am not against those people but seriously sometimes you ask yourself like why did these people move from the rural areas to urban areas? Ok simply because maybe they want jobs? You know there is no space! As the councillor said there is no space the space is done, but t they are still pressuring.

FGI 2#L6: As the councillor said, most of the people are leaving their homes in the rural areas, and I am sure and I can guarantee some of those people know for sure that where I am going I am heading for a disaster and you know in the village it's easy for you to get food and water because it rains there is always natural food! They are leaving the old people there with the reason they are going to look for jobs and I mean most of them don't get a job but they still stay and say that they will get a job after 5 years.

FGI 2#L4: I also came across old people in that new location. They were in that old age home which the other members were complaining about the situation there being bullied around and paying a lot of fees and lying on the ground, on the floor and next to them there is bar which is producing a lot of noise. I experienced it there at once and I was looking at the echo that's coming from the bar straight to the house, and I imagined it myself that there is old people in that house that are sleeping and I was there 3 o'clock in the night it was making the echoes at night.

FGI 2#L1: People are never satisfied for example they are like saying the councillor is not doing anything, even now for example like the councillor gives them water and electricity they will want to start building better houses. You see they will never be satisfied then after maybe better houses they will start asking for roads, even people in like in towns here they are still complaining about the councillor not giving something but their houses are ok, so people are never satisfied.

FGI 2#L6: And also to add, the municipality must also start seeing where people start up their business especially like bars and staff, like now in this case as he said at the old age home it is next vision (a night club) and I mean if the municipality could have moved it somewhere and you know it could have been much better, because some of those people are moving because of the noise.

Q: How are the problems that you identified affect people in the town and are you also affected by those problems or not?

FGI 2#L9: for instance, a person who lives in the informal settlement has a friend that lives in town. The person will always complain to help out his friend and will always come to his house and collect water and want to sleep at his house.

FGI 2#L6: I think people are staying in the informal sector settlement there you know crime rate is also high there and so some of those people they come to the formal settlements and steal from them which really has a big effect on them as well.

FGI 2#L1: It also has like an impact on for example if someone who lives in the informal settlement is from our class like for example sometimes he will not come to school because of certain problems so it also affects the class.

FGI 2#L2: I think it will also affect the population of the whole country at large or let me say of the town because people will like give birth to a lot of kids so that they can help them in the future so it will make the population to rise.

FGI 2#L5: Firstly the appearance of the town, that side really looks [pointing in the side of the informal settlement] dirty and then those people that come and check the cleanest towns, when they come here maybe Tsumeb will be the last cleanest town because of the dirty informal settlement. And the other thing is that people from that side are frustrated and they are just taking their stress out on innocent people.

FGI 2#L3: I think it affects the development of the town, the town moving forward because instead of the municipality focusing on stuff building hospitals or schools where we can study instead they use the money to try to renovate or to improve that side of the town and these people on side are affected because they want improvement they pay taxes and stuff like that to get the town improved now they pay taxes for other people, while they do nothing they are at home.

FGI 2#L2: I think it's also causing one problem, of maybe a person will be a prostitute in order to just make money for food at home.

FGI 2#L4: It's increasing the rate of HIV.

FGI 2#L7: The only thing is that the only effect that will happen vast difference between the haves and the have not's which will lead people in the squatter settlements to be desperate and commit social evils**.** And it will affect me in a negative way because the reason being I won't be able to move forward and I will just be living in fear.

FGI 2#L5: Sir! Also the rate of employment mostly people coming from this side are unemployed and kids they don't go to school so when they grow up they are also increasing the rate of unemployment, plus their health is also not so good and they are making the hospitals so full and we use the state hospitals all of us including us and the people in the informal settlements.

FGI 2#L9: One other thing is that it creates violence amongst people.

FGI 2#L4: As she said it is increasing prostitution and those things because most people there are unemployed like there are young women there between the age of 18 to 25 and they need work and they may became sex workers, which also might increase the rate of HIV and other infectious diseases, for me as a concerned citizen I won't be free and be able to have kids because there will be lot of diseases in the town.

Q: How can the problems that you identified be solved or reduced in the future?

FGI 2#L5: We need to educate our people, that's the first step.

FGI 2#L10: Sir I think she is right what she is saying about educating people because the first problem is that even if they build more taps there, they are saying that the municipality don't have money so I think they must find a way of generating money and build taps in the informal settlement.

FGI 2#L6: first of all I think before they educate the people they must give them water, clean water at least, adding more taps, electricity for their safety and just more rubbish bins to clean away the waste, because there is no way of educating the people while they are thirsty.

FGI 2#L7: I think we must have a change in our leaders, what I am trying to say is that those people! You need to bring people in with new ideas; you can't just be going on with the same mentality for 20 years.

FGI 2#L4: What I think is that, the management there, the municipality, the councillors and the mayors and the people there (informal settlement) must select their leaders out of the whole settlement, certain people like the man who was complaining the other day *(referring to a resident in the informal settlement)* and hold meetings and discuss, talk and exchange ideas on what should be done and what should not be done. And as she said, educate our people because those people some of them are not even educated as you can see on the pictures we took there you can see, water is laying all over but they were provided with the tap but then the water is laying all over around the tap. And if the municipality can build toilets such as modern toilets we want people to use the toilets properly.

FGI 2#L5: Sir! Let me just add something on my point, you see if you keep providing for these people they will never see that its difficult for the government to get that money and stuff to provide for them. So I think it's best to educate them first and then they will know the sweat, you know just to get that mentality that it's not easy to get that money and at least they will also like develop ideas of like making their community a better place if you educate them.

FGI 2#L3: Sir! I think all the ideas that we are giving now I think people had already thought about it and the government and the municipality have thought of them, but what we need is action I mean they are talking about we are going to do this and that, we need action and in order for these people to move we all need to be part of it, getting the statistics was probably the first step but we need to be part of it we can't say our people need to be educated while we are not educating them I think we should all get involved if we all involved the problem can be solved. Because these things I think they already thought of them. We need to take action all of us as a community.

FGI 2#L2: We need to develop the rural areas like for example things that attract people to come here, we can just put the same things from where the people are coming from.

Q: Why did you want to talk to the town council or the municipality?

FGI 2#L6: I actually think that when you talk to the councillor on the other hand if he thinks that he is not doing something he will gain that guiltiness that ooh people are now also starting to realise that I am not doing it and probably he will react faster

because it's not only those people who are concerned but also people from the formal settlements who are concerned about the constitution.

FGI 2#L1: I really wanted to talk to the councillor because when we went there, we saw the problems with our own eyes you like experience it and so what? We basically understood it and said that we can maybe pass on the message because probably those people did not get a chance to speak to the councillor in person we like felt that we can pass on the message and do our part.

FGI 2#L9: The public's opinion is also important for the councillor like it was very important for us to talk to him because they might be some problems that he never knows or he will just happen to find out from us and maybe they are also important to him, maybe even some ideas that he never heard of it was important to give our ideas.

FGI 2#L7: Me I just wanted to talk to him so that he can give the message to the mayor is checking out the whole things.

FGI 2#L6: In the same way we acted as their voice, we wanted the councillor to act as our voice to the mayor.

Q: What did you like about the project?

FGI 2#L1: What was nice about it is you learn the problems experienced by people with the things you waste like for us when your mom tells you to close the tap you feel like 'my mom just like talking too much' but now we felt that people don't have water here and we waste water, just that experience.

Q: What did you not like about the project?

FGI 2#L8: Some people thought that we were members of the municipality; we got attacked by one lady. The questioning was done to us.

FGI 2#L2: Sir! It was somehow emotional; we felt pity for the people and sometimes we even felt like crying

FGI 2#L9: I didn't like what I saw because I saw no future on that settlement.

FGI 2#L6: Sir! As for me most of them, the language and you know some of them could not understand English or Afrikaans and those are the only two languages we can speak and most of them were not giving you that information which you need and sir most of them you could see they were laying to you pretending that everything is all right while nothing is alright at all.

FGI 2#L5: Sir! What I feel is that somehow if we don't like succeed to make a change they are going to look at us as if we were just there for fun. You know we were really there for a project but if we don't make a change they are also just going to look us like as spectator blunders**.**

FGI 2#L1: What I did not like about the project is when you like go there you find small kids not going to kindergarten; not going to school just such stuff, emotional, emotional.

Q: How did you find working in groups?

FGI 2#L6: Sir for me it was very nice because you know it was you didn't have to spend a lot of time there because you were a lot and you could go to different houses and just quickly collect the information insert the title and then there you are done with everything.

FGI 2#L8: Yes sir it's more or less the same thing also like for our group we could speak different languages so it was easier to find out information in different languages.

FGI 2#L1: What was also nice about being in a group is that for example when you had to like form the final part of the project you could get the ideas from other people like you learn new stuff that you yourself did not think of like how you could do it.

FGI 2#L3: What was fun is apart from not being at school is that, since we were not at school the whole day, it was actually when we came to finalise the whole thing it's like we all had we were bursting with these ideas so it was coming to the conclusion making the final thing putting it together it was actually fun, because this one wanted something like this, and I wanted something like this, it was actually a whole lot of fun.

FGI 2#L7: For me personally I found that actually I am not a team leader I am a team player.

FGI 2#L6: Sir on the other hand is you know when it was time to now write down, like to put together all the ideas you had maybe I can admit I don't have the best handwriting but Lelethu has got it so she could put it in a proper way so at least that the product of being in a group.