SELECTED NAMIBIAN SECONDARY SCHOOL GEOGRAPHY TEACHERS' PEDAGOGICAL THINKING AND PRACTICES: THE CASE OF MAPWORK.

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ABSTRACT

Learner performance in mapwork in secondary school geography in Namibia has been consistently poor. Examiners' reports provide detailed feedback on the difficulties learners demonstrate with little, if any, attention paid to teachers' perceptions, experiences and pedagogical practices of mapwork. This qualitative study generated insights to understand selected geography teachers' perceptions and pedagogical practices of mapwork. Data were generated through a questionnaire administered to thirty geography teachers in fifteen secondary schools in the Ohangwena Circuit in the Ohangwena Region of Namibia. The teachers' responses were coded and analyzed and patterns and trends identified. Based on what emerged, a purposive sample of three teachers was chosen for in-depth interviews to probe their responses and to observe their classroom practices.

The study draws on learner centred pedagogy (LCP), the official educational policy in Namibia, and Shulman's perspectives of teachers' content and pedagogical content knowledge (PCK) (1986, 1987) to interpret what teachers say about the teaching of mapwork and how they teach it. The qualities of teachers' PCK that support student learning in mapwork are not yet fully understood because there has been little research on teachers' PCK for teaching mapwork and spatial thinking in geography classrooms (Jo & Bednarz, 2014).

The study sheds light on the teachers' qualifications and experience, their perceptions and attitudes towards the teaching of mapwork, their teaching strategies and the resources they use. The findings reveal that the teachers are conscientious but ill-equipped to teach mapwork. The study illuminated a disjuncture between the rhetoric and practice of learner centred pedagogy. There is evidence which suggests that the teachers' knowledge of the curriculum is superficial and limited to content. Their practices are focused on teaching map skills and procedural knowledge with little, if any, attention given to spatial and map conceptual understanding and application of knowledge to solve problems.

The study concludes that teachers' map and spatial conceptual understanding and pedagogical content knowledge should be strengthened if the persistent problem of poor learner attainment is to be resolved. It provides insights that may be of value to Namibian teachers, teacher educators, curriculum policy developers and Senior Education Officers when addressing this problem.

DEDICATION

This thesis is dedicated to:

My dear mother, Natalia (Mboshono) Sheetekela

My grandmother, Hendrina (Naango) Neshuku

My first-born daughter, Julie-Bridget Ndapandula Tunomwene (Nanguloshi) Haufiku

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LIST OF ACRONYMS

ACRONYM	FULL NAME
AfL	Assessment for Learming
BEd	Bachelor of Education degree
BEd-Hon	Bachelor of Education degree with Honours
BETD	Basic Education Teacher Diploma
CK	Content Knowledge/Curriculum Knowledge
CS	Combined School
DEAL	Diploma in Education African Languages
DNEA	Directorate of National Examinations and Assesment
GIS	Geographic Information System
GPS	Global Position Satellite (GPS)
HOD	Head of Department
HS	High School
IGU	International Geographical Union
IGU-CGE	International Geographical Union Commission on Geographical Education
IT	Information Technology
JSC	Junior Secondary Certificate
LCP/LCE/LCA	Learner Centred Pedagogy/Learner Centred Education/Learner Centred Approach

LTSMs	Learning and Teaching Support Materials
MEAC	Ministry of Education, Arts and Culture
MEC	Ministry of Education and Culture
MoE	Ministry of Education
NCBE	National Curriculum for Basic Education
NRC	National Research Council
NSSCH	Namibia Senior Secondary Certificate High level
NSSCO	Namibia Senior Secondary Certificate Ordinary level
PCK	Pedagogical Content Knowledge
PGCE	Post Graduate Certificate in Education
SOE	Senior Education Officer
SS	Secondary School
SSA	Sub-Saharan Africa
TCE	Teacher Centred Education
UNAM	University of Namibia
UNESCO	United Nations Education Scientific and Cultural Organisation

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CHAPTER ONE

RESEARCH OVERVIEW

1.1 Introduction

This study investigates selected Namibian secondary school geography teachers' perceptions, experiences and classroom practices of teaching mapwork. The study responds to the question of how mapwork is taught in secondary school geography in Namibia, where low learner performance in mapwork in the junior and secondary examinations is a persistent and unresolved issue.

This chapter contextualises the study, explains why I decided to undertake the research and how it may contribute to the field of school geography research in Namibia. I outline the research goal, research questions and methodology. I conclude the chapter with an outline of the structure of the thesis.

1.2 Contextual background of the study

Geography is the study of the earth's landscapes, people, places and the environment (Namibia. Ministry of Education Arts and Culture [MEAC], 2015). What makes geography unique is its ability to bridge the human and physical sciences (Namibia. MEAC, 2015). Geographers use maps to communicate the spatial information about phenomena and processes in the human and physical environment, and the patterns and changes that occur with time (International Geographical Union-Commission of Geography Education [IGU-CGE], 2016, United Nation Education Scientific Cultural Organisation, [UNESCO] 2017). A review of international literature reveals that in spite of maps being an important tool used by geographers to communicate spatial information, the teaching and learning of mapwork is an ongoing challenge (Satterly, 1973; Andersons & Leinhardt, 2002; Bednarz, n.d.; Bednarz, Acheson & Bednarz, 2006; Larangeira & van der Merwe, 2016). Maps are sophisticated and abstract graphic representations that encode spatial information, using symbols together with numbers and words. Map concepts and properties are abstract and need to be taught. These include contours/relief, position, perspective, map projections, interpolation, direction, bearing, distance, scale, inter-visibility, gradient, coordinates and distribution (The American National Research Council (NRC), 2006; Namibia. MEAC, 2015).

During my ten years of experience teaching secondary school geography, I have become aware that teaching and learning mapwork is a challenge in Namibian secondary school geography. According to the Namibian Junior Secondary and Senior Secondary Certificate examiners' reports, learners have difficulty reading, analysing and interpreting geographical data presented to them in graphic form. Learners' performance in Paper 2 (Mapwork) has been persistently poor (Namibia. Directorate of National Examinations and Assesment [DNEA] 2013, 2014, 2015 & 2016). A more recent Namibia Senior Secondary Certificate Ordinary level [NSSCO] examiners' report highlighted that "mapwork is still a major concern and teachers should strive to give more attention to this section of the paper" (Namibia. [DNEA], 2017, p. 289). The problem is however not confined to Namibia. Studies in different national contexts describe mapwork teaching and learning challenges. A study in Hong Kong for example, found that map reading and interpretation was poor (Yau at el., 1992 as cited in Amosun, 2016). Similar findings in Britain and Poland, and more recently in Nigeria were attributed to teachers' lack of proficiency teaching mapwork skills (Amosun, 2016; Ezeudu & Utazi, 2014). The literature on mapwork focuses mostly on the difficulties learners experience with map reading and interpretation, with less attention given to the teaching of mapwork. This study, in focusing as it does on the teaching of mapwork from the perspective of Namibian teachers, may help to address the gap in the literature.

1.3 Research Goal

The goal for this study is to generate insights for understanding selected Namibian geography teachers' perceptions and pedagogical practices of mapwork. It responds to the question: What are selected Namibian geography teachers' perceptions and pedagogical practices of mapwork in secondary school geography classrooms? And the following sub-questions:

- What are Namibian geography teachers' views and experiences of teaching mapwork in secondary school geography classrooms?
- What pedagogical approaches are used by Namibian teachers in secondary school geography classrooms?
- What lessons can be learned from teachers' pedagogical practices that may be used to strengthen and enhance mapwork teaching and inform teachers' professional development?

1.4 Research methodology

This study is a qualitative exploratory case study within an interpretive paradigm. The use of this approach helped me to understand teachers' perceptions and pedagogical practices of teaching mapwork in secondary school geography. Five data collecting methods were used, namely a questionnaire, semi-structured interviews, non-participatory classroom observations, followed by stimulus recall interviews and document analysis. These tools enabled me to generate insights for a deeper understanding of mapwork teaching. A detailed discussion of the research methodology and research participants is discussed in Chapter Four of this study.

1.5 Significance of the study

The study identifies a number of lessons learned that may be of value to Namibian teachers, teacher educators, curriculum policy developers and Senior Education Officers (SOEs) when addressing the problem of low learning outcomes in mapwork.

1.6 Structure of the study

The thesis is organised as follows:

Chapter Two reviews the literature on the teaching and learning of mapwork concepts and skills and the issues and challenges associated therewith. It also includes a discussion on mapwork in the Namibian secondary school geography curriculum.

Chapter Three is a review of the theoretical perspectives informing the study, namely Learner-Centered Pedagogy (LCP), the official pedagogy in Namibia and teacher knowledge, particularly that offered by Shulman (1986, 1987).

Chapter Four describes and explains the research methodology and design as well as the selection of the participants. It discusses the data collection methods and data analysis, and issues associated with case study research.

Chapter Five presents the data analysis and findings of teachers' responses to a questionnaire and semi-structured interviews, the purpose of which was to elicit their perceptions and experiences of mapwork teaching. Emergent patterns and themes are identified and discussed.

Chapter Six presents the data analysis and findings of the classroom observations I undertook to understand how a sample of three teachers teach mapwork. Emergent patterns and themes are identified and discussed.

Chapter Seven discusses what emerged in Chapters Five and Six in relation to the literature reviewed in Chapters Two and Three.

Chapter Eight synthesizes the findings of the research, presents the lessons that can be extrapolated from the study and makes some recommendations. The chapter concludes with a critical reflection on the research process and limitations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This study, as outlined in Chapter One, focused on the teaching of mapwork in Namibian secondary school geography. The goal of the research was to generate insights for understanding selected teachers' perceptions and pedagogical practices of mapwork. This chapter reviews literature on mapwork teaching which is relevant to the study. The chapter starts with a discussion on the importance of geography in education. This is followed by a discussion on the importance of teaching mapwork and spatial thinking in school geography. Issues and challenges associated with the teaching of mapwork are then discussed. A critical commentary on mapwork in the Namibian school geography curriculum follows. The chapter concludes with a synthesis of key points relevant to the study.

2.2 Importance of geography in education

The National Council for Geographic Education (1994) defines geography as

> … an integrative discipline that brings together the physical and human dimensions of the world in the study of people, places, and environment. Its subject matter is Earth's surface and the processes that shape it, the interrelationships between people and environments, and the connections between people and places (p.18).

More recently, the International Geographical Union's Commission on Geographical Education [IGU-CGE] (2016) asserts that the "high level ideas" of geography are place, space, scale and environment. Figure 2.1 illustrates how geography bridges the physical and the human (social) sciences, and focuses on the interrelationship between them. It shows how geography is concerned with the structures, processes and functions of the human and physical environment systems at different scales from the local, regional, international and global. Geography is the only discipline that deals with "spatial variability, i.e. phenomena, events and processes within and between places, and should therefore be regarded as an essential part of any education for all citizen and societies" (ICU-CGE, 2016, p. 4). Geography helps us to "appreciate and understand how places and landscapes are formed… and the Earth's diverse and interconnected mosaic of cultures and societies" (IGU-CGE, 2016, p. 5).

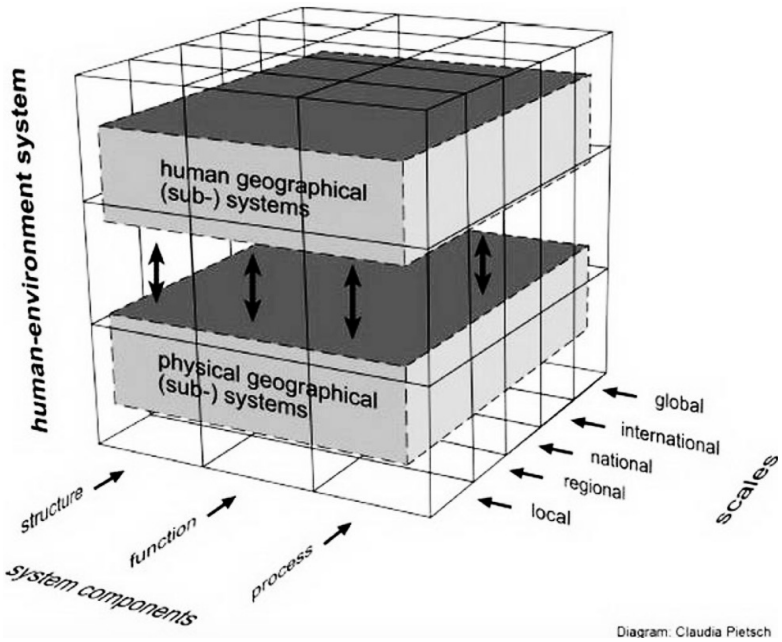

Figure 2.1: Basic concepts of the analysis of spatial relationships for geography as a subject. (Source: Gamerith, Hammer, & Czapek, 2014)

According to UNESCO (2017), geography is concerned with identifying processes and patterns within and between the human and physical environment, identifying actors and their influence on space at different levels and the implications this has for people and the environment at each scale. Furthermore, UNESCO (2017) acknowledges the important role played by geography in developing holistic, systems thinking and spatial understanding necessary for addressing the complex, multi-faceted challenges and problems people face in the world today. This important contribution of the discipline has been recognized for some time in the literature. For example, Naish (1997, as cited in Lambert & Balderstone, 2000) contends that

> School geography has the potential to develop young people's understanding of their 'place' in the world and so to help them form their identity. It can enable them to perceive the structures and processes which help and hinder their development, and can also foster their commitment to social justice and democracy, and the conserving, participatory and critical forms for citizenship … and thereby help to create a better world (p. 361).

Bednarz and Bednarz (2004) argue that geography education should help inform geographers who are interested "in how individuals … make sense of the space around them and in the impacts on individuals' spatial understanding caused by technology, symbols, and society" (p. 25).

The literature asserts that geography is a vital subject for the 21st century. For example, the IGU-CGE (2016) states that "geographical education is vital to equip the next generation of

people with the knowledge, skills and practices to value, care and make reasonable decisions for the planet" (p. 5). School geography contributes to young people's education by developing

- **Geographical knowledge and understanding** of *major natural systems of the Earth* in order to understand the interaction within and between ecosystems. *Socio-ecosystems of the Earth* in order to achieve a sense of place. *Spatial concepts - key* ideas unique to Geography that help students to make sense of the world: location, distribution, distance, movement, region, spatial association, spatial interaction and change over time.
- **Geographical skills** in using communication, thinking, practical and social skills to explore geographical topics at a range of levels from local to international.
- **Attitude and values** dedicated to seeking thinking solutions to local, regional, national and international questions and problems on the basis of the Universal Declaration on Human Rights (IGU-CGE, 2007, p. 245).

Of significance to this study is spatial conceptual understanding and geographic skills, including an ability to read and interpret maps, graphs and charts, photographs and tabular information. According to Graves (1997), such geographical ability is closely related to the development of one's ability to "read, orientate oneself, and develop mental maps of the environment in which they live, to plan routes and develop the ability to navigate and move in their own world" (p. 27).

School geography also helps young people to answer questions of what, how, why and where, which makes it possible for an "individual to understand relationships and responsibilities they have to both the natural environment and each other" (IGU-CGE, 2016, p. 5). It follows that the teaching of geography should therefore "…build on people's own experiences and should help them to formulate geographical questions, develop their intellectual skills and respond to issues affecting their lives" (IGU-CGE, 2016, p. 5). Likewise, learning geography should introduce students "not only to key 21st century skills, but also to distinctive investigative tools such as maps, fieldwork and the use of powerful digital communication technologies such as the Geographic Information System" (IGU-CGE, 2016, p. 5). Graves (1997) states that

> In teaching geography teachers, could be said to be developing spatial skills in their pupils, to be getting them used to analysing the spatial aspects of economic and social problems and to be making them aware of the nature of the

> environmental issues and developing in their minds the concept of environmental ethics (p. 28).

Geography is a key subject that develops spatial thinking and maps are important tools for communicating spatial information. School geography should focus on developing an understanding of how maps can assist young people to better understand how social-economic, environmental and political changes at both local and global scales affect our everyday lives (UNESCO, 2017, p. 109). "Maps and graphics are powerful tools in understanding the spatial dimensions of an issue as well as synthesizing and communicating complex and sometimes contradicting data" (UNESCO, 2017, p. 112). In addition, "maps and other visuals reflects the worldviews of the people who made them, a critical point of view on how an issue represented can be developed" (UNESCO, 2017, p. 112).

Ezeudu and Utazi (2014) contend that

> … education that does not include geography in its curriculum will have a lot of social cost among which include: depriving of young people of early awareness of spatial relationships; denial of students their early exposure to maps and their uses; and it engenders a geographic literacy that will last till adulthood just to mention but a few (p. 41).

In summary, geography is a worthwhile discipline because

- It combines human and physical geography by looking at the interaction and interdependence between societies and their natural environments at different spatial scales
- Geography combines the description of place, the analysis of patterns in space and the study of spatial processes shaped by actors
- Geographical thinking and skills contribute to the global citizenship.

The IGU-CGE (2016) calls all policy makers, education leaders, curriculum developers and geography educators at local, national and international educational levels to make sure that students receive geographical education that is "effective and worthwhile" (p. 4). My view is that teaching young people how to use maps to communicate spatial information is a key element of an effective and worthwhile geographical education.

2.3 Maps: Essential tools for communicating spatial information

Bednarz (n.d., p. 1) defines maps as a "graphic representation of a portion of Earth that is usually drawn to scale on a flat surface. It is the central way geographers organise and analyze information" (p. 1). Maps are powerful tools geographers use to display and communicate geographic information (Bednarz, n.d., p. 1). A similar view is expressed by Amosun (2016) who maintains that maps are representations of part of the earth's physical, human/cultural features which have been drawn to scale to fit on a flat sheet of paper. Maps and diagrams are powerful tools used to visualize, explore, store, and communicate geographic information, and the skills of making maps and using these visual representations of the world are very important in the discipline of geography (Stephen, 2010; Bednarz, n.d.).

Maps promote spatial thinking, understanding and visualisation, and are a pre-requisite for spatial thinking (Balboni, 2013). According to Bednarz (n.d.) "…learning to think geographically is learning to think spatially" (p. 2). Maps are an essential tool which geographers use to organize and analyze spatial information (Bednarz, n.d.). Spatial thinking is defined as "the knowledge, skills, and habits of mind to use spatial concepts, maps and graphs, and processes of reasoning in order to organize and solve problems" (Bednarz, Achoson, & Bednarz, 2006, p. 398). The American National Research Council defines spatial thinking as "a collection of cognitive skills comprised of knowing concepts of space, using tools of representation, and reasoning processes" (2006, p. 12). Spatial thinking involves the ability to consider objects in terms of their location in space, and question why objects are located where they are as well as visualising relationships between and among those objects (Bednarz, n.d.). Jo and Bednarz (2014b) maintain that teachers who value spatial thinking as an important goal of education, teach geography in a way that promotes students' spatial thinking skills. Recognising that maps are social constructs that may communicate a particular worldview, Bednarz (n.d.) contends that it is "…important to develop a healthy, critical awareness and scepticism about maps and other graphics and images" (p. 2).

The teaching of maps is important in secondary school geography because maps promote learners' geospatial thinking. They also help learners to navigate in space and find their way home or in any environment in which they find themselves (Liben, Kastens, & Stevenson, 2002). Few would refute Bednarz's (n.d.) assertion that maps are the indispensable part of geography, an informative core around which geographical information can be learned. Larangeira and van der Merwe (2016) argue that map literacy is an essential skill for

interpreting difficult information presented visually in maps, thus this is an essential competence that cannot be neglected in the development of a geographer. Maps help us to think beyond our real-world experiences and to think analytically about locations and their relations to each other (Uttal, 2000, p. 247). Maps are powerful tools for displaying and communicating geographical information and a key way in which geographers organize and analyze information (Bednarz, n.d.). In the classroom, maps provide a foundation on which understanding about places, including faraway places in the world, can be introduced and used to discuss topics such as climate, vegetation, landforms, and settlement patterns among others (Anderson & Leinhardt, 2002, p. 314). These authors maintain that in spite of the importance of maps, many learners struggle and lack map skills necessary to read and make sense of maps.

One way in which we experience and learn about the world is through direct experience with the world as we move and travel within the environment from one place to another. However, not every individual can experience and learn about the earth and the world directly. Thus, for most individuals much of their knowledge about the earth comes from [map] representations (Liben et al., 2002, p. 269). For example, "maps provide a concrete depiction of Earth, making it possible to see portions of the Earth that would otherwise be unavailable …" (Liben et al., 2002, p. 270). Uttal (2000) stresses that "…maps provide a perspective that can be difficult to acquire from direct experience navigating in the world" (p. 247). Uttal's view is that maps change the way one thinks about the represented information. He explains that they give us "… an awareness of the world beyond what we have experienced and allow us to see and study sets of spatial relations without directly travelling through space (Uttal, 2000, p. 249). According to Uttal (2000), knowing the world through maps provides an important 'inroad' into realising other ways of thinking about and mentally representing the world beyond one's direct experiences (p. 250). Furthermore, maps influence how we learn and acquire spatial information: they provide a static view of space and a different perspective from what we usually see from navigation" (Uttal, 2000, p. 250). This is because maps show space at a small scale which decreases the actual size of the feature. And it is this "characteristic of maps that allows us to visualise spatial relations, and that would not be available form direct experiences" (Uttal, 2000, p. 250). Maps bring into view and 'highlight' spatial and geographical information that would have been inaccessible form direct visual experience such as relations and projections among others (Uttal, 2000, p. 251). Anderson and Leinhardt (2002) argue for understanding the concept of map projections because "a solid understanding of map projection

allows a map reader to see beyond distortion in the map and to use a map as a representational system for reasoning about the earth's surface" (p. 317).

Bednarz (n.d.) observes that maps are increasingly used as a means of studying a wide range of scientific phenomena, and because of the popular use of maps in today's world, learning how to read and interpret maps is an essential skill (p. 1). Liben et al. (2002) express a similar view that "… while maps are a core of geography; their importance extends beyond the geography classroom to a diverse range of disciplines". There is significant interest among geographers, urban planners, geology, biology, mathematics, psychologists, cognitive scientists and many others in map use and spatial thinking (Uttal, 2000, Liben et al., 2002, Bednarz et al., 2006, Bednarz, n.d.). In all these fields, maps are seen as being more than just simple sources of locating information, but rather as "realizations" in the "ah-ha sense of discovery" (Liben et al., 2002, p. 270). Bednarz (n.d.) contends that "the ability to use maps, images and other spatial technologies intelligently and critically is becoming a requirement to participate effectively as a citizen in modern society" (p. 1). For this reason, map education is seen as very important in teaching and facilitating learning with understanding of the basic properties of maps.

Bednarz et al. (2006) assert that while "maps are not the whole of geography, but there can be no geography without maps" (p. 398). They argue that maps are the primary tools geographers use to communicate spatial information and geographers frequently define their subject around maps and map use (ibid.). Maps "represent a compilation of geographic information about selected physical and human features" (National Council for Geographic Education, 1994, p. 61). Maps use "points, lines and area symbols, as well as colour, to show where phenomena are located, and how they are arranged, distributed, and related to one another" (ibid., p. 61). Maps show visible features such as "rivers, seacoasts, roads, and towns and invisible features such as "subway systems, tunnels, ad geologic formations" (National Council for Geographic Education, 1994, p. 61). Furthermore, maps are also used to 'depict abstract features' such as political boundaries, population densities, and lines of latitudes and longitudes (ibid.). Liben et al. (2002) assert that

> … maps record and store information, serve as computational aids, serve as aids to mobility; summarize complex, voluminous data; help us to explore data (analyse, forecast, spot trends); help us to visualize what would otherwise be closed to us; serve as trigger devices to stimulate thoughts (p. 271).

A strong case is made for teaching learners "… how to use maps and other geographic representations, tools, and technologies to acquire, process, and report information form a

spatial perspective" (National Council for Geographic Education, 1994, p. 61). A similar view is held by Ezeudu and Utazi (2014). They contend that maps play a significant role in the teaching and learning of geography and maps are the distinctive tools used by geographers to achieve the objectives of geography (Ezeudu & Utazi, 2014). Maps are viewed as the 'everyday' tools which "…geographers rely on in order to study the world, both near and far" (Larangeira & van der Merwe 2016, p. 120).

2.4 Mapwork teaching and learning

Mapwork teaching and learning should be taught and taught well. According to Bednarz et al. (2006), "teaching *about* maps means providing students with the skills and understandings required to read, interpret and produce maps" (p. 399). It "means using maps to help students learn key [map] concepts and relationships" (Bednarz et al., 2006, p. 399). Teaching *with* maps allows students to learn and think *through* maps, (that is to think spatially) in various reasoning and problem solving activities in both the classroom and real world (Bednarz et al., 2006, p. 399). For students to use maps effectively, appropriate teaching is needed. Teaching should take into account the difficulties students experience when learning about maps and spatial thinking (ibid., p. 402). Maps and spatial thinking should be taught "using maps and other graphic representations such as globes, graphs, diagrams, and … satellite-images …" (ibid., p. 402). These representations should be used to develop students' "personal understanding about location and characteristics of places … and their ability to describe and analyze patterns of people, places and the environment on earth using both visual and mental maps" (Bednarz et al., 2006, p. 403).

Bednarz (n.d.) argues that students should be taught to "think spatially to become fluent with spatial concepts, to think in terms of patterns in space (where), and to consider the processes that produced those patterns (how and why there)" (p. 2). She further says that when students are allowed to think through maps, they learn to appreciate maps and the information they communicate.

Spatial thinking can be taught using maps. It should include teaching spatial concepts, which according to Catling (1995), cited by Wilmot (1998, p. 31) include: perspective (the view from above); symbols (how features and objects are shown on a map); location (where things are on a map); direction (which way), and scale (how far; reduction). Learners need to understand these concepts and the skills for calculating, measuring and reading spatial information encoded in a map and then be able to apply this knowledge to make sense of spatial processes,

relationships and patterns in the natural environment (for example, calculate the gradient to understand slope type); and between the physical and human environment (for example how gradient affects transport and settlement). Map conventions and properties are abstract and thus for some, difficult to understand. Concepts such as overlay, buffer, distortion, scale, distance, symbols, direction and projection, which are essential for basic map reading and interpretation, and spatial analysis, need to be explicitly taught (Oda, 2016; Zwartjes et al., n.d.). Map reading, interpretation and analysis should be taught, not simply as a skill but as a means of representing and analyzing information about particular ideas (Bock, 2002). Wilmot (1998) argues that the acquisition of spatial knowledge depends on spatial perception skills and spatial conceptual understanding. She views spatial literacy as an ability to recognise objects and features, and an ability, through cognition, to interpret and make sense of the object/feature, spatial relationships and make spatial inferences (Wilmot, 1998). The extent to which teachers use maps to develop learners' spatial thinking and understanding is discussed in Chapter Seven.

The need for developing critical map literacy is described in the literature. For example, Bednarz et al. (2006) stress that, just as texts are written by individuals with different viewpoints, which can be read and interpreted differently for different purposes, maps too are not just objects that represent reality; maps are socially constructed and are subjected to critical analysis. Bednarz et al. (2006) call for "an increase in levels of carto-literacy" that "… must include explicit instruction about how to interrogate a map — to consider the conditions under which it was produced, the viewpoint it portrays and the messages it conveys" (p. 404). Teaching should develop "students' critical awareness and scepticism about maps as well other graphics and images" (Bednarz et al., 2006, p. 404). The extent to which teachers enable spatial thinking and understanding in their mapwork lessons and critical map literacy, is discussed in Chapter Seven.

2.5 The language of maps

Maps are graphic representations that use a symbolic language to communicate spatial information (Wilmot, 1998). Map makers encode spatial knowledge, using symbols often in combination with words and figures which map readers have to decode when reading and interpreting a map. Weeden (1997) explains that maps use three types of symbols: point, line and area symbols to represent phenomena. These are explained in a map key. In order to develop map literacy – the ability to read and interpret information on a map, teachers need to understand maps as a form of communication and to give students an opportunity to become

fluent in the language of maps (Bednarz et al., 2006, p. 402). Wilmot (1998, 2002) asserts that map literacy requires conceptual knowledge of the object/phenomenon represented in a map as well as spatial perceptual skills and an understanding of spatial concepts. Teachers need to understand the spatial information and concepts maps communicate and the conventions they use for doing so. Map conventions and properties are abstract, and thus for some, difficult to understand. According to Wilmot (2002), spatial literacy can be enhanced through the explicit teaching of spatial perceptual and conceptual skills from a young age. The extent to which the teachers in this study perceive and teach mapwork as described in the literature is discussed in Chapters Five, Six and Seven.

2.6 Difficulties and challenges of teaching mapwork

A review of the literature describes the difficulties and challenges teachers experience when teaching mapwork in secondary school geography which are relevant to this study.

2.6.1 Teachers' attitudes towards teaching mapwork

It is believed that teachers' attitudes toward their work play a significant role in how they connect towards their work. It is however, important to note that this does not only affect the teachers' work but the performance of the learners.

Okwilagwe (2012), citing Anderson (1991), describes attitude as "…a moderately intense emotion that predisposes an individual to respond consistently in a favourable or unfavourable manner when confronted with a particular object or task (p. 68). Attitude is viewed as an individual's state of readiness to react in a certain way to a particular situation (Okwilagwe, 2012, p. 68). Teachers' attitudes toward the subject they teach greatly influences the way they teach it and it impacts on learner performance (ibid.). Teachers' beliefs and what they do in their classrooms have a lot to do with their attitudes. Their choice of teaching methods and teaching materials of teaching mapwork reading will depend on the teachers' attitude.

2.6.2 Teaching and learning support materials

Map reading can be defined as the "recognition and identification of map symbols and the comprehension of the geographic features that they present" (Innes, n.d, unpaged). Although maps are regarded as an important aspect of geography, one finds that there are no materials to teach this important aspect in schools. Innes cites how research done in South African schools revealed that the availability of maps and mapwork resources is an issue, as is the level of training teachers receive. Textbooks contain too few map extracts, the availability of maps used

in the examinations is an issue and there are insufficient specialised map skills textbooks being used. From my teaching experience, I am aware that the same can be said for Namibia. I concur with Innes (n.d.) who argues for teachers being provided with maps of the local area and offered training in how to use maps to teach geography. Van der Westhuizen and Fleischmann's (2018) research found a shortage of information technology (IT) resources and access to computers in many schools in South Africa. They reported a low level of integration of technology in teaching and learning in many geography classrooms, and second language learners experiencing difficulty comprehending abstract terms. In the absence of research in Namibia, it is not possible to comment on whether or not the difficulties and challenges described in the international literature may be relevant in Namibia. I concur with Brooks (2010, p. 143), who asserts that "understanding how teachers view their subject is crucial to understanding what happens in geography classrooms".

2.6.3 Teacher knowledge

The literature describes that the topics learners find difficult in mapwork are the same as those teachers find difficult. For example, the findings of a recent study indicated that students found fifty per cent of the topics difficult. These included gradients, inter-visibility, latitude and longitude (Amosun, 2016). The research sheds light on a number of challenges teachers face when teaching mapwork. These include learners not having basic mathematic skills, lacking motivation to attend classes, do homework and perform in the examination, and having a negative attitude to mapwork which they perceive as boring, hard and requiring abstract thinking (Amosun, 2016). Amosun (2016) contends that inappropriate teaching methods may be a contributing factor to poor performance in mapwork. Another Nigerian study found that geography teachers do not possess the necessary competency needed for teaching mapwork and this contributes to poor learner performance (Ezeudu & Utazi, 2014). It is widely accepted that education cannot rise above the quality of its teachers. Teachers cannot teach what they do not know (Ezeudu & Utazi 2014, p. 47).

Amosun's (2016) study showed that geography teachers are scared, and often avoid teaching mapwork because it is sophisticated and requires abstract thinking and mathematical skills. If teachers lack the skills and competencies needed to teach mapwork, it may influence their pedagogical choices, motivation and confidence — all of which will impact on the quality of learning. It is widely acknowledged that there is a relationship between students' learning and the quality of their teachers and that "a weak teacher can have a deleterious impact on learners" (Goodwin et al., 2014, p. 284).

Studies done in Britain and Poland found that the difficulties encountered by students when reading and interpreting topographical maps may be attributed to teachers' inability to properly handle components of teaching mapwork skills (Reinfried, 2001, p. 68). In a South African study, Larangeira and van der Merwe (2016) report that they also found that the student teachers who had trouble with map literacy were not taught map skills on a regular basis at school level, and some student teachers had not studied geography at secondary school — which was disadvantageous (p. 134).

Bednarz et al. (2006) note that when teaching mapwork, teachers tend to teach map skills by focusing on the content of the map. As a result, too often, learners are able to give an account of the map but lack the ability to interpret the content and the geographic impacts illustrated by maps (ibid.). A similar finding was made in McCall's (2011) study with mapwork teaching focused on "teaching factual details without requiring students to understand map and spatial concepts such as why places are located where they are, or reasons for their physical and human characteristics" (p. 133). The focus was on memorization of facts rather than on helping students to thinking critically and learning with understanding (ibid.). According to Larangeira and van der Merwe (2016) "if students are rote-taught and not encouraged to apply map skills, then their spatial cognition with regards to map literacy is impeded" (p. 134).

The extent to which these factors are impacting on teaching in Namibian school geography classrooms is discussed in Chapters Six and Seven.

2.7 Mapwork in the Namibian Secondary School Curriculum

An analysis shows that the purpose and aims of the Namibian secondary school geography curriculum (Namibia. MoE, 2010, 2015) are aligned to those advocated by the international literature (IGU-CGE, 2007, 2016). Namibian school geography aims to equip learners with knowledge and understanding of "… the relationships and interaction of people and their environment in response to physical and human processes, as well as aspects of changing world, a sense of place and relative location on local, regional and global scale with emphasis on Namibia" (Namibia. MEAC, 2015, pp. 1-2). The curriculum aims to develop learners' understanding and appreciation of how human activities lead to environmental problems and a need for environmental improvements and conservation (Namibia. MEAC, 2015). It also emphasizes the need for learners to develop geographical skills including "… suitable techniques for observation, collecting, classifying, presenting, analysing and interpreting data,

obtaining information from a variety of sources such as maps in a variety of scales …" (Namibia. MEAC, 2015, p. 2).

Table 1 shows how the Namibian secondary school curriculum clearly sets out *what* should be taught in mapwork in terms of key concepts and skills, namely what learners must understand and be able to do, and the progression from grade to grade. However, the curriculum does not specify or provide guidelines on *how* the specified mapwork content should be taught.

Table 2.1: Summary of mapwork content and skills in Namibian secondary school geography curriculum

Grade	Map concepts	What learners should be able to do:
8	Map symbols, map scales Measuring distance Directions, locations (degree & minutes) Contours (Namibia. MBEAC, 2015)	• use 16 divisions of direction on maps, • identify and interpret the symbols on variety of maps with different scales • interpret different types of scales (e.g. words, ratio, and linear scales and convert from one scale to the other, • measure and calculate straight distances on a map using different scales, • recognise relief features like hills (table or flat top and conical), mountain, diverse slopes (e.g. gradual, steep, steeped, vertical), valleys and spurs on contour maps, • recognise horizontal and oblique photographs, - identify simple, natural and man-made features on horizontal and oblique photographs
9	Interpretation, scale and distance, Directions Location (degree, minutes & seconds), Photographs Contours, Cross-section(inter-visibility) Interpolation (Namibia. MEAC, 2015)	• interpret maps reflecting human and physical aspects • calculate distance on maps with a variety of scales, interpret contour maps representing a variety landforms • determine location in degrees, minutes and seconds • identify geographical information from horizontal and oblique photographs • draw simple freehand cross-sections and determine inter-visibility • draw an isoline on a map to connect places with equal values
10	Graphs, Interpretation of human and physical features on map, Location (degrees, minutes, seconds), distance and scale, Photographs Contours, Cross-section (inter-visibility), Interpolation of isolines (Namibia. Ministry of Education, MOE, 2010a)	• interpret maps reflecting human and physical aspects • calculate distance on maps with a variety of scales • interpret contour maps representing a variety of landforms • determine location in degrees, minutes and seconds • obtain geographical information from horizontal and oblique photographs • orientate any map • draw simple freehand cross-sections and determine inter-visibility • draw an isoline on a map to connect places with equal values (interpolation)
11-12	Graphs, Interpretation of human and physical features on map,	• interpret maps reflecting human and physical aspects

	Location (degrees, minutes, seconds), Distance and scale, Photographs, Contours, Cross-section (inter-visibility), Interpolation of isolines (Namibia. MOE, 2010b)	• calculate distance on maps with a variety of scales • interpret contour maps representing a variety of landforms • determine location in degrees, minutes and seconds • obtain geographical information from horizontal and oblique photographs • orientate any map • draw simple freehand cross-sections and determine inter-visibility • draw an isoline on a map to connect places with equal values (interpolation)

The curriculum provides a detailed list of content. It shows how map skills and map reading and interpretation are the core components in Grades 8 to 12. Learners are required to "interpret maps reflecting human and physical aspects" and "interpret contour maps representing a variety of landforms." The curriculum emphasizes map skills, including an ability to measure, calculate, orientate etc., with little attention given to the application of these skills to solve problems. No mention is made of spatial concepts and no guidance is provided to teachers on how spatial thinking and spatial conceptual understanding can be promoted through mapwork.

A review of international literature reveals that in spite of spatial thinking being viewed as "…pervasive, significant, and powerful, it is under-recognised, under-appreciated, and therefore under-instructed" (Larangeira & van der Merwe, 2016, p. 120). Bednarz (n.d.) contends that if learning to think geographically involves learning to think spatially and being able to interpret difficult information found on maps, geography teachers should also be able to read and interpret maps. Spatial thinking and visual literacy should be promoted explicitly in the subject curriculum. The Namibian geography curriculum does not do this.

2.8 Namibian teachers' experiences of teaching mapwork

Very little research has been done on mapwork teaching and learning in Namibian school geography. Bock's study, conducted with student teachers at the University of Namibia, focused on the problems that student teachers experienced when reading and interpreting spatial information about landforms on 1:50 000 topographic maps (Bock, 2003). The study found that the student teachers

- struggled with basic mathematic calculations
- experienced problems with reading and interpreting maps

- either do not know how to calculate the vertical interval, or they are not familiar with the concept in spite of the frequent use of the term 'contour interval' being used in school geography
- could not identify slopes and landforms on contour maps.

These findings raise questions about teacher knowledge for teaching mapwork and their ability to demonstrate mathematical proficiency. Bock (2003) stresses that more often geography teachers fail to realize that geographical theory is closely linked with mathematical language (p. 10). This implies that teachers should not only be able to read and understand graphic representations but should equally be able to recognise relationships between "spatial visualisation and mathematical reference" (Bock, 2003, p. 10). This is discussed in Chapter Seven.

2.9 Teacher support

The need for research on improving teaching is described in the literature. Bednarz and Bednarz (2004) assert that more emphasis should be placed on research that can improve the understanding and learning of geographic literacy. They contend that research should focus on learning that promotes problem solving and teaching strategies that support spatial literacy through maps (p. 23). Citing Lane (2005), Larangeira and van der Merwe (2016) argue for research on the pedagogy of teaching map skills. According to Okwilagwe (2012), teacher training should focus on improving teacher motivation and the state should provide continuous professional development opportunities for in-service teachers.

Universities are also seen as having an important role to play in developing teachers' mapwork content base, and their teaching methodologies. This point was made by Larangeira and van der Merwe (2016) in their study with first-year geography students at the University of the Witwatersrand. They argue for the inclusion and integration of map theory and methodology modules in the social sciences and geography training programmes across all four years of the university's Bachelor of Education degree. Furthermore, they recommend a bridging or introductory course at the beginning of the first year for geography student teachers with no secondary school geography background. A similar view is expressed by Anderson and Leinhardt (2002) when they call for "conceptual driven instruction for teachers to help them understand what problems maps can solve, and the practices of working with maps" (p. 137).

The extent to which Namibian teachers may require similar support is discussed in Chapter Seven.

2.10 Conclusion

This chapter has discussed why maps are important tools for communicating spatial information about the environment. It has described the spatial concepts and skills needed for reading and interpreting maps and how these can be enhanced through teaching. Mapwork in the Namibian secondary school geography curriculum was commented on and finally the challenges and difficulties associated with teaching mapwork were discussed.

CHAPTER THREE
THEORETICAL PERSPECTIVES

3.1. Introduction

This chapter sets out the theoretical perspectives used to analyze and interpret the data gathered on teachers' perspectives and pedagogical practices of mapwork. The chapter starts with a discussion on Shulman's (1986, 1987) ideas on teacher knowledge in general and pedagogical content knowledge in particular. Teacher knowledge in the context of geography, particularly mapwork is discussed. This is followed by a discussion on Learner-Centered Pedagogy (LPC), the official pedagogy advocated by Namibian education policy and the Namibian school geography curriculum (syllabus). These theoretical perspectives are discussed in relation to the approaches and teaching methods put forward in the literature on school geography. Before the chapter concludes with a synthesis of the discussion, an analytical framework is presented.

3.2. Teacher Knowledge

In this study, I draw on Shulman's (1986, 1987) ideas about teacher knowledge. He identifies seven categories of teacher knowledge which are worthwhile and crucial in any educational context. These are as follows:

- Content Knowledge
- General Content Knowledge
- Pedagogical Content Knowledge
- Curriculum Knowledge
- Knowledge of learners' characteristics
- Knowledge of educational context e.g. school
- Knowledge of educational end purposes.

3.2.1. Pedagogical Content Knowledge (PCK)

Shulman (1986) explains that pedagogical content knowledge (PCK) is knowing how to teach and present subject content in ways that are accessible to learners. It involves going beyond knowing subject content (p. 9). Shulman explains that

> Mere content knowledge is likely to be as useless pedagogically as content-free skills. But to blend properly the two aspects of a teacher's capacities requires that we pay as much attention to the content aspects of teaching as we have recently devoted to the elements of teaching process (1986, p. 8).

Smith and Lovat (2003) assert that PCK means knowing 'what' to teach and 'how' to teach as the two cannot be separated (p. 72). A similar view is held by Vavrus, Thomas and Bartlett (2011) who explain PCK as "bringing together the critical elements of teaching content and pedagogy to describe the understanding and skills teachers need to transform the conceptual, factual and theoretical knowledge of the subject … to a group of students" (p. 74). PCK is seen as "… accumulated knowledge about the act of teaching, including the goals and procedures that form the basis for what teachers do in the classroom" (Mullock, 2006, p. 48).

Bednarz, Bockenhauer, and Walk (2005) define pedagogical content knowledge "as the best way to teach subject matter. It is a combination of pedagogical and content knowledge" (p. 107). Harte and Reitano (2015) maintain that pedagogical knowledge "is the knowledge base necessary for geography teachers to achieve effective teaching of their subject areas to meet the cognitive and emotional needs of students" (p. 226). This means that geography teachers need to have sufficient knowledge, the necessary skills and suitable teaching approaches in order to deal effectively with the different aspects of the subject they teach. Vavrus et al. (2011) caution that "… without PCK teachers' expertise in their content areas may not be fully utilised in the classrooms as they have not learned a variety of ways to teach their subject and how to address students' misconceptions of certain topics or adjust difficult areas in the curriculum" (p. 74). Mullock (2006) follows that what teachers do in their classrooms and how they do what they do, is shaped by their attitudes, values, knowledge and beliefs gathered from their experience as students and teachers. The extent to which the teachers in this study demonstrated PCK for teaching mapwork is discussed in Chapters Six and Seven.

3.2.2 Content Knowledge (CK)

Shulman (1986) describes content knowledge as knowledge and understanding of the most important areas and key concepts of the discipline in the mind of the teacher. He explains that "to think properly about the content knowledge requires going beyond knowledge of the facts or concepts of a domain" (p. 9). Such knowledge of subject content requires an understanding of how the subject matter is structured, that is an understanding of the conceptual framework

on which the discipline is built. Shulman (1986), drawing on Schwab's (1978) ideas, elaborates as follows:

> The structures of a subject include both the substantive and the syntactic structures. The substantive structures are the variety of ways in which the basic concepts and principles of the discipline are organized to incorporate its facts. The syntactic structure of a discipline is the set of ways in which truth or falsehood, validity or invalidity, are established. (p. 9).

This means that "teachers must not only be capable of defining for students the accepted truths in a domain. They must also be able to explain why a particular proposition is deemed warranted, why it is worth knowing, and how it relates to other propositions, both within the discipline and without, both in theory and in practice" (Shulman, 1986, p. 9).

3.2.3 General Pedagogical Knowledge (GPK)

According to Shulman (1987) general pedagogical knowledge is the "knowledge of generic principles of classroom organisation and management" (p.14). Moreover, Grossman and Richert (1988) assert that general pedagogical knowledge "includes knowledge of theories of learning and general principles of instruction, an understanding of the various philosophies of education, general knowledge about learners and knowledge of classroom management" (p. 54). Shulman (1987) further explains that good classroom organisation and management helps teachers to organise learning activities, allocate and promote time on task as well as formulate well-structured assignments. At the same time, good sound classroom management enables teachers to create working patterns, create a healthy learning environment and motivates learners to achieve the intended learning outcomes (ibid.). The extent to which GPK was evident in this study is discussed in Chapters Six and Seven.

3.2.4 Curriculum Knowledge (CK)

According to Shulman (1986), curriculum knowledge includes the knowledge and understanding of the curriculum, the teaching and learning materials and resources available for teaching and the ability to assess a specific subject or topic at a given level. Shulman (1986) refers to the curriculum, together with all the materials associated with it, as the "material medica" of pedagogy, "the pharmacopeia" from which teachers draw their tools of teaching to present specific content and to assess or evaluate what or how much the students have achieved (p. 10). Curriculum knowledge is seen as including knowledge of the materials and resources, including for example textbooks, films, and other curriculum materials available for teaching

a particular subject. Furthermore, it is also seen as including what Grossman and Richert (1988) refer to as "… an awareness of preconditions for studying a particular content" (p. 54).

In spite of the importance of curriculum knowledge being widely acknowledged in the literature, research undertaken in South Africa found that many geography teachers struggled (and lacked support) to navigate their way through the national curriculum (Wilmot 2005, in Wilmot & Dube, 2015). Teachers need to be appropriately supported in developing a deep (theoretical) understanding of curriculum so that they can implement it in creative and expansive ways (Wilmot, 2005). The extent to which knowledge and understanding of the curriculum was evident in this study is discussed in Chapters Six and Seven.

3.2.5 Knowledge of learners' characteristics

According to Shulman (1987), this category of teacher knowledge includes understanding the different characteristics of learners, and the ability to identify and embrace individual learners' differences. Shulman stresses that teachers need to know and understand that learners bring a wide range of knowledge from home to school, which they need to build on and nurture through the use of different pedagogical approaches that enable such learners to learn. The extent to which teachers in this study understood and embraced the learners' differences is discussed in Chapters Six and Seven.

3.3. Teacher knowledge in the context of mapwork

3.3.1. Pedagogical Content Knowledge (PCK)

The importance of PCK for effective teaching is acknowledged in the geography education literature (see for example Lane, 2009; Jo & Bednarz, 2014a; Harte & Reitano, 2015; Brooks, 2010; Larangeira & van der Merwe, 2016). However, the qualities of the teachers' PCK that support student learning in mapwork are not yet understood because there has been little research on teachers' PCK for teaching mapwork and spatial thinking in geography classrooms (Jo & Bednarz, 2014a, p. 302).

According to Jo and Bednarz (2014a), PCK in mapwork teaching is the teacher's proficiency to present geographic concepts using a variety of maps to promote students' spatial thinking skills. Teachers with good PCK are able to include the bigger ideas of maps and their properties such as space, time, overlay, scale, distance, and location in a variety of teaching practices as well as in their lesson planning and assessment strategies (Jo & Bednarz, 2014a).

The IGU-CGE (1992) states that "geography should be taught in schools by well-trained, specialized teachers … who are not only qualified in their discipline but also in geographical education" (p. 13) including geography content knowledge which Lee and Luft (2008) refer to as a combination of "content alongside with instruction of the content" or Pedagogical Content Knowledge (PCK) (p. 1344). It has been argued that "knowledge of subject matter is *sine qua non* in teaching" and learners cannot simply be taught how to think, but should be have something to think about (Reitano & Harte, 2016, p. 280). It follows that "a geography teacher is expected to have a knowledge of structure that combines both content knowledge (facts, skills, concepts, generalization) and PCK (representations and instruction)" (Reitano & Harte, 2016, p, 280) "that helps teachers transform (geography) content into learning experiences for students" (Lee & Luft, 2008, p. 1344).

3.3.2 Content Knowledge (CK)

Accomplished geography teachers "not only know their subject matter deeply; they also know how to help others develop a deeper understanding of that subject matter" (Lane, 2009, p. 41). Equally, a teacher should have a rich bank of pedagogical content knowledge that allows them to make subject matter comprehensive to students (ibid.). It is therefore this expertise that enables them to transform their content knowledge in a way that is understood by their students, as well as to choose the analogies, examples, or applications of a concept or skills that make the content accessible and interesting to a group of learners (Lane, 2009, p. 41). Shulman's work has influenced many researchers in the context of school geography. For example, Golledge (2002) asserts that geography teachers need a knowledge base for teaching mapwork which includes geographic knowledge, spatial knowledge and mapwork content knowledge.

- *Geographic knowledge* is the product of geographic thinking and reasoning about the world's natural and human phenomena (Golledge, 2002). Citing Eliot (2000), Golledge (2002) explains that "knowledge of space is phenomenal, knowledge about space is intellectual" (p. 1). He elaborates as follows:

> In geography knowledge of space represents the accumulation of facts about the spatial arrangements and interactions … while knowledge about space consists of the recognition and elaboration of the relations among geographic primitives such as arrangement or organization, distribution, pattern, shape, hierarchy, distance, direction, orientation, regionalisation, categorization… (Golledge, 2002, p. 1).

Importantly, Golledge (2002) asserts that "geography as a discipline has a language and knowledge that is not casually accessible, … [but] it is a concept rich and a structured body of

knowledge that is based on specific modes of thinking and reasoning that usually have to be taught" (p. 10). It is this knowledge that makes a geography teacher proficient and confident in presenting subject matter to his or her students. In addition, geographic knowledge also emphasizes "cognitive demand such as understanding why and how in addition to where, as equivalent to knowledge about place, culture, interactions, politics, economic, resources, and natural environment characteristics" (ibid. p. 3). When teachers have sufficient geographic knowledge, then they are equipped with the ability to deal with and develop spatial meaning, but in order to do that they need to have spatial knowledge.

- *Spatial knowledge* is necessary to consider objects in terms of their location in space, to question why objects are located where they are, and to visualise relationships between and among these objects (Golledge, 2002).

When teachers are fluent in spatial knowledge or spatial concepts, they become confident in describing and explaining patterns of objects in space (where), and in considering the process (how and why they are there) as they observe them in the world around them (Weeden, 1997; Bednarz, n.d.). Maps are viewed as essential tools for investigating spatial patterns because they organise and display geographic information (Weeden, 1997; Bednarz, n.d.). However, in order for a teacher to read and interpret spatial patterns and information found in maps they need another form of knowledge, namely mapwork content knowledge.

- *Mapwork content knowledge* is the knowledge for teaching mapwork content and basic properties of maps.

Weeden (1997) explains that both teachers and students should know the basic essential properties of maps, such as plain view (perspective and relief), arrangement (location, direction, and orientation), proportion (scale, distance, and selection), and map language (signs, symbols, words, and numbers) (p. 170). He contends that "…these properties should form the basis of mapwork skills … [and] can be taught individually and then integrated" (ibid.).

Moreover, McLaughlin and Talbert (1990 as cited in Williams, 2000, p. 140) stress that the effectiveness of teaching depends largely on how teachers think and feel about what they are doing and how they can do it, which centre on the following four dispositions: motivation, conception of task, enthusiasm over subject-matter, and sense of efficacy. Shulman (1987) explains that when teachers are uncertain about the content they teach, they tend to adopt a certain teaching strategy in order to allay their anxiety (p. 18). The extent to which teacher

motivation, confidence and attitude may affect mapwork teaching is discussed in Chapter Seven.

Another aspect of a geography teacher's PCK is an ability to recognise and build on learners' experiences and mental constructs and find ways of linking these to new ideas being taught (Lane, 2009). Balboni (2013) maintains that the best strategy a teacher can use is to "build on" what the learners already know. Similarly, it is also important for teachers to keep in mind that "children have been decoding their world since infancy", they have been making meaning and seeking to understand the world around them (Balboni, 2013). Good teaching recognises and builds on the knowledge and experiences of the learners. This is a key premise of the constructivist epistemology underpinning Namibian Learner-Centred Pedagogy (LCP).

3.4. Learner Centred Pedagogy: International Perspectives

In this study, the terms learner-centred pedagogy (LCP), learner-centred education (LCE) and learner-centred approach (LCA) are used interchangeably. LCP is rooted in the notion of progressive education and constructivist epistemology. The international literature describes how there has been a shift since the 1990s to LCP (UNESCO, 2000). A similar shift has been observed in the educational policies of sub-Saharan African (SSA) countries post-independence and particularly after the 1990 *Education for All* conference that gave birth to the Dakar framework. According to this framework, quality education includes "active learning techniques and a relevant curriculum … that builds upon the knowledge and experiences of the teachers and learners …" (UNESCO, 2000, p. 17).

Increasing access to education in African countries and improving educational quality includes addressing the issue of limited resources in schools and the quality of teaching methods in African classrooms (Vavrus & Bartlett, 2012). It prompted countries like Botswana, Malawi, Mali, Namibia, South Africa, and Tanzania to replace teacher-centred transmission approaches with LCP. In spite of national differences, these policies share a common goal. They encourage teachers at both primary and secondary levels to move away from the teacher-centred methods toward those that encourage learning through inquiry and research and emphasise learning outcomes other than memorization and recall (O'Sullivan, 2004, Nyambe, 2008, Vavrus & Bartlett, 2012). LCP is seen as an "active" approach to "discovering" knowledge that superseded the traditional "passive" approach to memorising information. This view is based on the notion that teachers are not the knowers of knowledge but should stimulate learners' curiosity to learn, and facilitate their learning (Vavrus & Batlett, 2012). LCP emphasizes active

learner participation, it puts the learner at the centre of inquiry and helps learners to develop high-order thinking skills (Vavrus et al., 2011).

LCP is underpinned by constructivist learning theories, which argue that "learning occurs when students are engaged actively in a process of constructing meaning and knowledge" (UNESCO, 2017, p. 24). A similar view is taken by Vavrus and Bartlett (2012) who contend that LCP elicits and builds on learners' interests and prior knowledge and promotes active learning, which gives learners an opportunity to apply the learned knowledge and skills to solve real-life problems. The extent to which this was observed in the teaching of mapwork in the Namibian lessons I observed, is discussed in Chapter Seven.

The implementation of LCP in SSA has not been without its challenges. Longitudinal research done on LCP in Tanzania by Vavrus and Bartlett (2012), Vavrus, Bartlett and Selema, (2013) and globally (including Africa) by Schweisfurth (2011), identified a number of challenges. Firstly, teachers are often taught about LCP, but not how to implement it. The theories and teaching methods associated with LCP are unfamiliar to teachers and educators who are expected to implement such policy reforms (Vavrus & Bartlett, 2012). This is attributed to the fact that pre-service teachers receive little training in how to implement this pedagogical approach during teacher training (ibid.). Furthermore, Schweisfurth (2011) argues that "teacher education itself rarely [uses] learner-centred, and so does not provide suitable models upon which fledgling teachers can base their practice" (p. 428). Schweisfurth (2011) contends that teacher training is "insubstantial both in content and time" and

> … even where initial or in-service teacher education is supportive of learner-centred education (LCE), if this later contrast with classroom, local monitoring, and inspection regime realities, and the demand of centralised curricula and examinations, once teachers are in classrooms, the impact of training in LCE methods diminishes over time (Schweisfurth, 2011, p. 428).

Secondly, tight, centrally controlled curricula and the backwash effect of high-stake examinations in many SSA countries militate against engaging learners in inquiry-based pedagogies (Vavrus & Bartlett, 2012, p. 641). A review of seventy global studies of LCP revealed that the willingness of teachers to use the LCP methods was influenced by examination results, and the extent to which exams test learners' ability to reproduce fixed bodies of knowledge (Schweisfurth, 2011, p. 429). In the context of school geography, Brooks (2006) contends that examination specifications in a national curriculum are interpreted too

prescriptively by teachers. This type of examination-driven curriculum relies on textbooks that have often been written by examiners with the examination in mind. She cautions that this places the examination in a position of power as not only "it defines geography at this level, but also that it defines the tools of instruction and how it should be taught" (ibid. p. 354). This is influenced by the fact that teachers need to "cover" all the topics as required by the syllabus.

The material condition of many schools which often lack basic books and supplies, is another challenge that makes the implementation of the constructivist pedagogy difficult (Vavrus & Bartlett, 2012). Vavrus et al. (2013) explain that "…material and human resources constitute a challenge, ranging from teacher training and preparation to provision of sufficient textbooks, teaching materials, class space, number of teachers, and appropriate furniture" (p. 9). The extent to which similar challenges are faced in Namibia, in the teaching of mapwork in school geography is discussed in Chapter Seven.

Research conducted on the use of LCP in SSA showed that it is difficult to shift teachers' beliefs and practices for philosophical and practical reasons (Vavrus et al., 2013, p. 9). They found that in spite of the promotion of LCP in the national curriculum, "teachers generally continue to rely on teacher-centred approaches … such as lecturing, rote learning and repetition, with very little attention being paid to critical thinking, dialogue, group work and/or reflection" (Vavrus et al., 2013, p. 9). They argue that:

> Teachers take up the new ideas differently, in relation to their contexts, positioning and knowledge… Teacher characteristics, such as prior qualifications, reflective competence, grade level, subject knowledge and confidence, as well as access to resource and support structures [including support from school heads] in their schools, are all implicated in their take-up of learner-centred practices (Vavrus et al., 2013, p. 9).

The findings of research in other SSA countries show that previous experiences as student teachers, together with the conditions of teaching in schools, deeply influence the extent to which teachers embrace and implement LCP (Vavrus et al., 2013). The extent to which this is evident in this study is discussed in Chapter Seven.

3.4.1 Learner-centred pedagogy: Namibian perspectives

After Namibia became independent in 1990, a learner-centred approach was adopted as the new education reform policy. "It was considered an effective antidote to the shifting teacher-centred practice used within the previous apartheid system" (O'Sullivan, 2003, p. 586). It was

also seen as being more "aligned with the newly adopted political and ideological values of democracy and social justice that guided the new Namibia" (Nyambe & Wilmot, 2014, p. 28). Education reform and the adoption of LCP was underpinned by the goals of access, equity, quality and democracy (Nyambe & Wilmot, 2014; Pomuti, 1999). Education based on democratic and participatory principles was seen as promoting mutual respect and co-operation (Pomuti, 1999). Driven by this agenda "…learning was intended to become active, meaningful, purposeful and goal-oriented" (Swarts, 1999, p. 37). Schooling was seen as playing an important role in supporting enabling the realisation of the vision and goals of education reform (ibid.). This is acknowledged in the policy.

> Our teaching methods must allow for the active involvement and participation of learners in the learning process. Teachers should structure their classes to facilitate this active learner role. Often, that will mean organising learners in smaller or larger groups, or pairs, or working with them individually. It will mean as well using teaching techniques that fit the purpose and content of the lesson and at the same time encourage active learner participation, for example, explaining, demonstrating, posing questions, checking for understanding, helping, providing for active practice, and problem solving. (Namibia. Ministry of Education and Culture [MEC], 1993, p. 60).

Furthermore, the policy acknowledged the need for recognising and valuing learners' life experiences and the need for teachers to be able to interpret syllabi and subject content in relation to the aims and objectives of basic education (Namibia. MEC, 1993, p. 80). It stressed the need for teachers to be able "…to use local and natural resources as an alternative or supplement to ready-made study materials and thus develop their own and the learner's creativity" (Namibia. MEC, 1993, p. 81).

LCE is seen as a social learning process that emphasizes collaboration and an exchange of ideas through carefully planned learning experiences that enable the development of conceptual understanding, skills, values and attitudes (Pomuti, 1999; Van Harmelen, 1999). An LCP approach "should be an active process whereby learners are encouraged to construct meaning for themselves and create knowledge by sharing experiences with others and through collaborative interaction" (Pomuti, 1999, p. 15). The role of the teacher is multi-fold – sometimes a transmitter of information, at other times a facilitator and at yet other times a scaffolder and co-learner (Van Harmelen, 1999, p. 31). The teacher's role is to help and facilitate learners to construct their own knowledge as opposed to being a "supplier of knowledge" (Johannesen, 1999, p. 19). The extent to which the teachers in this study understand their roles in promoting and enabling learning is discussed in Chapter Seven.

In spite of policy documents describing what LCP should look like in practice, teachers' implementation of LCP in their classrooms has not been without its challenges. For example, O'Sullivan (2004) found that teachers "tended to view knowledge as fixed, objective and detached from the learner, and were of the opinion that it was the teachers' function to transmit, usually using rote-learning techniques, this knowledge to the children" (p. 595). The successful implementation of LCP "presuppose[s] [the] availability of a specially designed environment with space, resources and small classes and that any pedagogy is feasible other than memorisation" to a context in which learners "… often have no books or resources and teachers are untrained in pedagogy other than drill and practice" (O'Sullivan, 2004, p. 595). Nyambe and Wilmot (2014) argue that the lack of instructional resources and facilities such as libraries, textbooks, and even school buildings in some cases has hindered the implementation of the LCP in Namibia. O'Sullivan's (2004) study also found that teachers were unfamiliar with the types of learning, such as problem-based learning, associated with learner-centred education (p. 595). Nyambe and Wilmot (2014) attribute this to the fact that many teachers were not properly trained and had little exposure to, experience of, and insufficient knowledge to implement LCP. A "clash of cultures" is another challenge (Nyambe & Wilmot, 2014, p. 35). O'Sullivan (2004) explains how, in many Namibian cultural contexts "…the relationship between adult and child is one of respect and authority. The child is not encouraged to question… in the company of elders" (p. 596). This is in stark contrast to LCP's goal to develop critical thinking.

3.4.2 Critiques of the learner-centred pedagogy

LCP is seen as being imposed on a developing world context of Africa. It has been criticised for having a "hidden agenda," of being a "political artefact" and an ideology that reflects the norms of a "liberal Western subculture" (Tabulawa, 2003, p. 10). Tabulawa argues that LCP is driven by a political and economic agenda of "… capitalistic ideology hidden under the pretence of democratisation" (ibid., p. 10). A similar view is expressed by Schweisfurth (2011) who also contends that LCP "…unnecessarily excluded practices found in the global South, where classroom interactions may look teacher-centred to an outsider, while actually being variations of LCE adapted to local cultural practices and resource realities" (p. 429).

Another criticism of the LCP is that it is viewed as a "one-size-fits all pedagogical" approach, and or a "universal pedagogy", and one that works equal effectiveness irrespective of the context (Tabulawa, 2003, p. 9). In spite of LCP being seen as enabling improved learning

outcomes, Tabulawa asserts that "to date there is no study that has conclusively established that learner-centredness is necessarily superior to traditional teaching in the Third World countries in terms of improving student achievement in test scores" (p. 10). A similar view is held by Schweisfurth (2011).

Nyambe and Wilmot (2014) describe the arguments against LCP implementation in Namibia which include "… allegations of watering down academic standards, and teaching little subject content owing to the constructivist methodology, chaotic and unruly classrooms due to democratic underpinning the LCP, learner indiscipline, and little learning going on due to the use of group work" (p. 31). O'Sullivan (2004) found that LCP was unfit and inappropriate to the Namibian context of large classrooms, a shortage of resources and teachers who were not properly trained to implement it.

Nyambe and Wilmot (2012) argue that mixed pedagogies may enhance learning outcomes. Vavrus and Bartlett (2012) call for a "blend of learner-and content-centred strands of pedagogy …" (p. 640). This may address what O'Sullivan (2004) refers to as the "cycle of recriminating" in which "teachers blame policy-makers and administrators for unsuitable policy and lack of support, and policy-makers blame teachers for not implementing it" (p. 340).

3.5. Pedagogy in School Geography: International Perspectives

LCP is strongly advocated in the international literature. The IGU-CGE's (1992) preferred approaches to teaching geography are those which encourage students to engage in questioning and enquiry and develop geographical skills that enable learners to seek solutions to current and future problems. The use of maps, fieldwork and Geographic Information Systems (GIS) are recognized. Furthermore, school geography should develop geographical knowledge and understanding of spatial concepts that help students to make sense of "the world: location, distribution, distance, movement, region, scale, spatial association, spatial interaction and change over time" (IGU-CGE, 2007, p. 245). A school geography curriculum should contain a "balanced range of knowledge dimensions, process dimensions, and applied dimensions as well as the dimension of values and attitudes" (ibid. p. 246) that involves learners in different geographical functional, systematic, prognostic, action-related, structure or process-related approaches" (IGU-CGE, p. 247).

UNESCO (2017) asserts that geography content should be linked to learner-centred approaches and it should build on and link learners' lived experiences to the geographical knowledge being

learned (UNESCO, 2017). Opportunities should be provided for learners to construct knowledge, and think critically and creatively through active participation (ibid.). In order to keep up with the 21st Century, geography teachers need to "adopt a pedagogy that do[es] not only teach procedural knowledge, but which also includes tasks that enable learners to identify a geographical issue, interpret and create maps, work with methodologies to gather information and be able to compare the information they have collected" (UNESCO, 2017, p. 111). Therefore, "subject-centred and learner-centred approaches must be considered together and not as opposing poles" (UNESCO, 2017, p. 114).

Lane (2009) calls for learners to be involved in "…brainstorming, diagnostic testing, probing, and questioning [by both teacher and learners], narrative writing, as well as the use of informal interviews with learners" (p. 47). Learning should be inquiry based and use a wide range of strategies which include drawing or constructing maps and group problem-solving task activities (ibid.). Mapwork lessons should include practical group work, for example drawing maps of the school grounds and taking photographs from different perspectives to encourage discussion and debate about key map concepts among learners (McCall, 2011).
When learners draw their own maps, they are learning about characteristics of maps such as scales, perspectives, symbols, and map keys in a meaningful way (Brophy & Alleman, 2007; Seefdt, 2005, as cited in McCall, 2011, p. 134). At the same time, students can compare and contrast their maps, regard their maps' perspectives, or the angle from which the map is drawn such as "pictorial (front view), panoramic (elevated view), or aerial (bird's eye view)" (Sobel, 1998, as cited in McCall, 2011, p. 134). While doing this, learners can also observe similarities and differences in the symbols they use on their maps, or where they place the cardinal direction, and what they choose to include and omit (McCall, 2011, p. 134). The extent to which the learners were engaged in such activities in the observed lessons is discussed in Chapters Six and Seven.

Recent research conducted in South Africa found that

- teachers are trapped in old fashioned content and constricted teaching styles and strategies which favour certain types of learning styles and neglect others
- teachers advocate traditional practices that follow-step-by step instructions, followed by opportunities for the learners to apply the newly taught facts or procedures
- teachers are expected to use learner-centred approaches without adequate training (Golightly, 2018, pp. 438-439).

This is in stark contrast to active learning and constructivist epistemology. The extent to which this is evident in the Namibian geography mapwork classrooms that I observed, is discussed in Chapters Six and Seven.

3.6. Pedagogy in School Geography: Namibian Perspectives

The approach to teaching and learning advocated by the Namibian secondary school geography curriculum (syllabus) mirrors the LCP philosophy described in the literature. It demands "…a high degree of learner participation, contribution and production … is based on a democratic pedagogy, a practice that promotes learning through understanding" (Namibia. Ministry of Education Arts and Culture [MEAC], 2015, p. 5). Learning should include group work, pair work, individual and whole class work and it should promote co-operative and collaborative learning (Namibia. MEAC, 2015).

3.7. Teaching Methods

According to Golightly (2018), teaching styles are "a combination of teaching strategies, methods and techniques that teachers implement in their classrooms" (p. 439). It is the way in which the content and skills of a subject are taught and how a teacher teaches and engages with learners (ibid.). Methods used include inter alia "discussion method, project method, inquiry method, lecture method, questioning, activity-based method, fieldwork and laboratory technique" (Olusegun 2006, p. 65). However, a teacher's choice and use of one or more methods is seen to be influenced by certain factors. These include the aim of the lesson, the content or topic, the knowledge, skill and attitudes being developed, and the size and the nature of the classroom (Golightly 2018). These factors are also influenced by a teacher's personality, her teaching philosophy and skills, together with her ability to select and use such methods (ibid.).

3.7.1 Lecture or Chalk-and-Talk

This is an oldest approach to teaching and learning. According to Golightly (2018), direct instruction "refers to whole-class expository teaching strategies such as lecture, modelling and demonstrations" (p. 450). It is a teacher-centred approach in which the teacher directly delivers the geography content and directs the learning activities to maximise academic achievement (Golightly, 2018, p. 450). Olusegun (2006, p. 80) stresses that:

> … the lecture method is the oldest teaching method … It is also referred to as expository method because it is a teacher dominated and learner passive method. It

> is also known as the talk-and-chalk method in a situation when the teacher decides to write the summary of the points s/he has taught on the board. In this method, the learners' involvement and participation is at low ebb because communication is often one way for most of the time during the teaching-learning process.

Golightly (2018) offers a similar definition, that "a lecture is a traditional instruction method where the teacher talks, illustrates, explains and answers questions" (p. 450). Freire (2005) views this approach as a *banking concept* as this concept "involves a narrating subject (the teacher) and patient, listening objects (the students) (p. 72). According to Freire (2005, p. 73), the lecture method or the banking concept is characterised by the following;

- The teacher teaches and the students are taught;
- the teacher knows everything and the students know nothing;
- the teacher thinks and the students are taught about;
- the teacher talks and the students listen;
- the teacher disciplines and the students are disciplined;
- the teacher chooses and enforces his choice, and the students comply;
- the teacher acts and the students have the illusion of acting through the action of the teacher;
- the teacher chooses the program content, and the students (who are not consulted) adapt to it;
- the teacher is the subject of the learning process, while the pupils are mere objects.

From Freire's perspective, it is evident that the role of the teacher is a transmitter of knowledge and learners are passive receivers of information. Although this pedagogical practice is associated with passivity on the side of the learners, it is still practiced in some geography classrooms. Golightly (2018, p. 540) defends this approach, saying that it is better for the teacher to directly explain and demonstrate geography concepts, rather than leaving learners to discover knowledge. He argues that when using direct instruction, learners can be engaged through questioning (Golightly, 2018, p. 450). Olusegun (2006, p. 80) expresses a similar view. He justifies the appropriateness of direct instruction in large classes with insufficient teaching and learning materials, and in which teachers have to use and combine different teaching approaches such as questions and answers and note taking among other.

3.7.2 Project-based method

The project method involves practical work by learners. Golightly (2018) asserts that the project method is a self-directed method that involves learners in various knowledge

construction activities and demonstrations of their understanding through presentation. In the project method, the teacher guides, clarifies geographical concepts, assists and encourages the learners to carry out the project (Olusegun, 2006, p. 78). It allows learners to ask questions, find resources and apply knowledge, and it develops critical thinking, problem solving, cooperative learning, self-directed learning and so on (Golightly, 2018, p. 457). He contends that a project method involves learners investigating, analysing, interpreting and synthesizing information in meaningful ways and may include working in the field, doing experiments, building models, making posters, and creating multimedia presentations (ibid.).

3.7.3 Enquiry-based learning

A strong advocate of enquiry learning, Roberts (2013), describes the essential elements of enquiry as follows: it is question-driven; supported by evidence; requires thinking geographically, and reflective (p. 9).

Golightly (2018) points out that enquiry-based learning involves investigating an issue or a problem. It requires learners to "inquire, examine information, formulate hypothesis, gather data, test hypothesis and draw conclusions. Golightly (2018) contends that "…effective enquiry-based learning stimulates learners' curiosity, enabling them to seek and formulate answers to questions" (p. 452). Similarly, Naish, Rawling, and Hart (2002) assert that enquiry-based teaching and learning involves a range of teaching and learning methods which encourage learner participation and problem solving. Dube (2012) argues for the effectiveness of this teaching method for developing geographical knowledge, skills, attitudes and values in students. The use of an enquiry method in a mapwork lesson should encourage learners to think for themselves as they seek solutions to problems and apply their skills in a given situation.

3.7.4 Field work

Fieldwork, according to Golightly (2018), involves any kind of teaching and learning that takes place outside the constraints of the classroom. It is supervised learning that takes place via first-hand experience in the environment (Golightly, 2018, p. 456). Fieldwork provides learners with opportunities to observe and practice what they have learned in the classroom (Olusegun, 2006). Bland, Chambers, Donert and Thomas (1996) maintain that

> 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 (p. 165).

According to Olusegun, (2006) "in the geography, fieldwork has been observed as a *sine qua non* aspect of the geography teaching because it fosters and enhances observational skills and critical thinking ability in the learners" (p. 106). Fieldwork contributes to the development of the skills including observation, description and explanation, collecting and recording data, map reading and the use of information to solve problems (Golightly, 2018, p. 456).

3.7.5 Questioning method

The questioning method is a common teaching method in many classrooms. It is used to synthesize what has been taught in a previous lesson, focus learners and check that they are on the right track (Basha & Rao, 2007). Olusegun (2006) asserts that while a lesson can be taught using the questioning method from the beginning throughout to the end, the following factors should be considered:

> The questions should deal with important areas of the subject matter, and must be of the learners' interest and not vague and ambiguous. In addition, the questions should not be too difficult or easy for the learners to answer but should be logically expressed and structured, develop the habit of critical thinking in the learners that is encouraged through the questioning. Questioning should encourage both teachers and learners in the preparation for every lesson, it should be able to enhance both the teacher's and learners' performance. (Olusegun, 2006, p. 80)

It follows that good questioning should strengthen students' knowledge, through probing questions and clarifying their ideas. The extent to which teachers use the questioning method in their teaching of mapwork is discussed in Chapters Six and Seven.

3.8. Assessment for Learning (AfL)

Dreyer (2018) defines assessment as the "process of gathering evidence on the achievement of learning intentions" (p. 462). It is an integral part of the teaching and learning, multi-dimensional and continuous/ongoing throughout the learning process. It requires teachers with the competencies to plan and implement quality assessment (ibid.).

The Namibian secondary school geography curriculum (syllabus) is aligned to the learning and assessment objectives described in the Namibian National Curriculum for Basic Education (NCBE). The knowledge with understanding and skills learners need to demonstrate are clearly stated. The document emphasizes the need for the curriculum to be learning-driven rather than assessment or examination driven and teachers are encouraged to assess and examine to support teaching and learning (Namibia. Ministry of Education [MoE], 2010, p. 32). Both the national curriculum and geography curriculum are very clear on what sorts of teaching and

assessment should be done; however the two policy documents are not clear on how teachers should carry out the teaching and assessment activities as outlined or how they should use assessment to support learning.

It has been noted that in countries where LCP is central to the national curriculum (as is the case in Namibian), the skills of analyzing, synthesis, and critical thinking are rarely tested (Vavrus et al., 2011, p. 91). They contend that in SSA the teachers' emphasis on the 'right' facts and format for answers in high-stake national examinations militates against teachers using approaches that support the development of learners' enquiry skills (Vavrus et al., 2011, p. 91). The backwash effect of examinations impacts negatively on teaching. It reinforces behaviourist assumptions about knowledge as discrete, sequential, and classifiable into correct and incorrect categories, and the transfer of direct knowledge and information from the teachers to the learners, as opposed to the constructivism epistemology of active and enquiry learning (ibid.). From a constructivist perspective, assessment should promote learning with understanding and application of knowledge to solve problems on hand rather than the acquisition of facts (ibid.). A similar view is expressed by du Plessis and Muzaffar (2010), who argue that if learners are the active participants in learning, then assessment instruments should be expanded so that multiple and meaningful information is gathered about the different aspects of their learning. Furthermore, they argue that for assessment to be effective in African educational systems it requires a "profound shift from traditional end-of-year examinations to a system of continuous assessment throughout the school year" (ibid., p. 68).

According to du Plessis and Muzaffar (2010) "… assessment should be formative rather than only summative" (p. 68). Classroom assessment should be diversified and extended beyond summative assessment; it should include a range of learning activities done throughout the learning process so that feedback can be given to support learning (ibid., p. 71). It should help teachers to reflect on their teaching and adopt pedagogies that meet the needs of all the learners. Importantly, assessment should promote critical thinking based on demanding high-order thinking skills and a "robust understanding" of the subject matter (du Plessis & Muzaffar, 2010, p. 71). They argue for classroom-based assessment that helps teachers to identify and provide additional support to weak learners as well as evaluate the effectiveness of the instruction. The extent to which teachers' assessment practices support mapwork learning is discussed in Chapters Six and Seven.

3.9. Learning and Teaching Support Materials (LTSMs)

LTSMs include all forms of materials used to facilitate the teaching and learning of geography. LTSMs help to make the teaching and learning process interesting, exciting, enjoyable and motivating (Olusegun, 2006). He cautions that because they are important, LTSMs need to be carefully selected according to criteria, including for example learners' characteristics, the lesson objectives, suitability, technicality, practicality and the teacher's ability to use them (ibid., 2006). In mapwork, LTSMs include globes, maps, models, printed media e.g. textbooks, and the chalkboard.

3.10. Analytical Framework

The goal of this study is to generate insights for understanding how mapwork is being taught in secondary school geography classrooms in Namibia. My choice of research topic was informed by the poor learning outcomes for mapwork in Namibia. The literature reviewed in Chapter Two reveals the important role maps play in communicating spatial information and developing spatial thinking. It also revealed the challenges associated with teaching mapwork because the concepts are abstract and many require a level of mathematical proficiency. In Chapter Three, I explained how I drew on Shulman's ideas of teacher knowledge, particularly PCK, to help me generate insights for understanding what map concepts and skills are being taught and how they are being taught. I was attracted to Shulman's (1987) assertion that PCK is "... the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful" (p.15). According to Lee and Luft (2008), "PCK is the unique combination of content and pedagogical content knowledge that helps teachers transform [geographic] content into learning experiences for students (p. 1344).

I use PCK as an analytical lens to view teachers' mapwork practices. In addition, it will help me to understand the link between teachers' knowledge and beliefs, and how this knowledge is used in the classroom (Lane, 2009, p. 40). It will also help me to understand how the content, curriculum and pedagogical knowledge of the participants are being integrated in their classroom practices (ibid.). According to Lane (2009), "effective application of PCK in geography classrooms is for a teacher to understand the importance of preconceptions in the construction of student knowledge where teachers understand and appreciate the way students construct naïve theories … and how they hinder or support learning is important, so that the teachers are able to address such ideas through instructions" (p. 46). In addition, the teachers' beliefs and understanding about how students construct knowledge, and their choice of

approaches or instruction that focus on building understanding of learners from scratch will help me to understand how such beliefs influence their classroom practices to promote learning (Lane, 2009, p. 46).

An, Kulm, and Wu (2004) identify two types of teaching beliefs regarding student learning: "learning as knowing" and "learning as understanding" (p. 148). According to these researchers, a teacher who holds the belief of learning as knowing often assumes that [mapwork] is learned and understood if a "concept or skill is taught, and thus, this type of learning is achieved by surface learning" (ibid.). Very often, teachers with beliefs such as this are "satisfied with learners knowing or remembering facts and skills because they are not aware of students' thinking and misconceptions" about [geography and mapwork] (An et al., p. 149). While for a teacher who holds the belief of learning as "understanding" realizes that "knowing is not sufficient and that understanding is achieved through conceptual understanding and procedural development by making sure that learners are able to complement and apply the learned [mapwork] concepts and skills" (ibid., p. 149).

For Shulman (1986), PCK involves the blending of content and pedagogy into an understanding of how particular content is organized, represented and adapted to the diverse interest and abilities of the learners. These transformations "…are the essence in the act of pedagogical reasoning of teaching as thinking, and of planning … whether explicitly or implicitly … the performance of teaching" (Shulman, 1987, p. 16). He explains that:

> The key to distinguish the knowledge base of teaching lies at the intersection of content and pedagogy, in the capacity of the teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful yet adaptive to the variations in the ability and background represented by the students (Shulman, 1987, p. 15).

Reitano and Harte (2016) explain that the point of representation lies in the ability of the teacher to use "multiple ways of analogies, illustrations, explanations, metaphor to present ideas to learners in a manner that combine the knowledge and of the content and pedagogy to learners to form pedagogical content knowledge (PCK)" (p. 281). Shulman (1986) cautions that teachers should have

> … an understanding of what makes the learning of specific topics easy or difficult: the conception and preconceptions and misconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons (p. 9).

Shulman's (1986, 1987) ideas on teacher knowledge enabled me to organize my data according to the conceptual categories of PCK. Shulman (1986, 1987) has identified two categories of PCK: the first one is "representation": this is the ability of the teacher to transform the content knowledge into forms that are pedagogically powerful for the learners to understand; the second category relates PCK to the teachers' "understanding of what makes learning of specific topics easy or difficult" (Shulman, 1986, p. 9). These categories were used to analyze the teachers' representations and transformations of content (discipline knowledge) into comprehensible learning experiences for the learners (Lee & Luft, 2008, p. 1344).

This perspective will also help me to understand how teachers assess learning. According to Lane (2009), an effective geography teacher has the patience and knowledge to look beyond learners' correct responses and questions their underlying understanding. In addition, I will be able to see the extent to which learners are engaged in the lesson, share their personal theories and beliefs and evaluate their own ideas against those of their classmates (Lane, 2009). It will also help me to see how well the teachers are able to analyze and reflect on their classroom practices, and to understand how teachers use subject content knowledge to "develop learners' deep understanding of mapwork concepts, and identify students' ideas that could potentially act as "road-blocks" in understanding core concepts of the topic" (Lane, 2009, p. 47).

Using Shulman's notion of teacher knowledge will help me to understand how teachers apply their knowledge in decision making, the types of examples they use, the design of the lesson as well as making on-the-spot judgements in the classroom (Guerriero, n.d., p. 6). According to Guerriero (n.d.), decision making is a basic teaching skill which is regularly used by teachers, when "processing cognitive complex information about the learners in order to find alternatives to increase their understanding" (ibid.). The kind of decisions teachers make in classrooms is influenced by different factors "such as students, the nature of the instructional task, the classroom, and the school environment, which combined with teachers' characteristics and cognitive processes to impact the pedagogical decisions made" (Guerriero, n.d., p. 6). Furthermore, Guerriero (n.d.) maintains that if teachers are to make informed pedagogical decisions, they first need to "analyze and evaluate specific learning episodes, … the context and situation factors and they should be able to connect such information to their specialised knowledge of teaching-learning process in order to guide their teaching actions" (p. 6).

Table 3.1 shows the analytical framework I developed to help me describe, with a view to understanding, teachers' mapwork practices.

During my research, I needed to be mindful of Shulman's caution that:

> [M]ere content knowledge is likely to be as useless pedagogically as content-free skills. But to blend properly the two aspects of a teacher's capacities requires that we pay as much attention to the content aspects of teaching as we have recently devoted to the elements of teaching process (Shulman, 1986, p.8).

The analytical framework (Table 3.1) shows how I blended content knowledge and PCK with other theoretical perspectives discussed in Chapters Two and Three. This framework informed the questions in the survey and semi-structured interviews, and it provided theoretical lenses for interpreting my classroom observations. In Chapters Six and Seven I provide evidence of how these theoretical perspectives helped me to describe and interpret teachers' geographical content knowledge (including their spatial conceptual and map content knowledge) and their PCK.

Table 3.1: Analytical Framework

Content Knowledge (CK) (Shulman, 1986, 1987)			**Pedagogical Content Knowledge (PCK) (Shulman, 1986, 1987)**						
Knowledge of Geography: geography content (Physical and human), nature of geographical knowledge, geographical processes and changes (IGU-CGE, 2016)			**Knowledge of teaching:** various teaching methods, use of motivating activities, ability to select effective activities (Lee & Luft, 2008)		**Knowledge of assessment:** formal and informal ways of assessment, skills for students, discussion and questioning, immediate feedback (Lee & Luft, 2008)	**Knowledge of resources:** materials, activities, multimedia, local facilities, technological laboratories, geographical magazines, etc (Lee & Luft, 2008)		**Knowledge of students:** different levels, needs, interests, prior knowledge, ability, learning difficulties, misconceptions (Lee & Luft, 2008)	**Knowledge of curriculum organisations:** states and local standardised tests, making connections between lessons and units, organising lessons in specific order, making decisions about what to teach ad how to teach it, flexible design (Lee & Luft, 2008)
Geographic Content Knowledge **(**Golledge, 2002; Bednarz, n. d)	**Spatial Conceptual Knowledge** **(**Golledge 2002; Jo & Bednarz, 2014a)	**Mapwork Content Knowledge** **(**Namibia. MEAC, 2015; NRC, 2006; Weeden, 1997)	**Teaching strategies LCE/Active learning** (Namibia. MEAC, 2015, Roberts 2013, Golightly, 2018)	**View of learning (Epistemology)** (McCall, 2011 Namibia, MEAC, 2015; Westbrook et al., 2013, Golightly, 2018)	**Cognitive Skills (questions)** (Lane, 2009; McCall, 2011, Roberts, 2013)	**Activities: what are the learners doing?** (Lane, 2009; McCall, 2011)	**Resources** (McCall, 2011; Jo & Bednarz, 2014a)	**Student thinking & misconceptions:** **(**Lane, 2009, Roberts, 2013)	**Goals & Objectives of teaching and learning** **(**Lee & Luft, 2008)
- human and physical/world -relationships -interaction -place -space -local/national/global -human processes-physical structures -settlement -population -landforms -climatology -climatic regions -geomorphology	Arrangement -identifying -location -magnitude -boundary -network -shape -interpolation -pattern -overlays -connections -clustering -categories -distribution density -slopes -gradient -distance -integration -rotation -coordinate -grid -adjacency -orientation	-scale -distance -location -relief -symbols -direction	-Learner-centred -Experiential -Fieldwork -practical (model building) -enquiry approach **Teacher classroom talk** -geographical talk -managerial talk -instructional talk	**Constructivism** -child-centred learning -project work -individual work -experiential -activity-based learning **Social constructivism** -teacher modelling -student centred learning -inquiry based -high order questioning -communicative learning -co-operative **Behaviourism** -transmission -teacher centred -lecturing & demonstration -whole class teaching -direct/explicit instruction -repetition	-types of questions, who asks them? -identify -recognise -explain -compare -evaluate -analysis -speculate -infer -predict -types of thinking (Bloom's taxonomy) Spatial thinking concepts **Questioning** -about view point and perspectives -probe reasons/evidence -seek clarifications -probe assumptions -probe implications/consequences -questions about questions	-individual -pair work -group work -whole class -cooperative -participating -contributing -production -brainstorming -diagnosing testing -probing -questioning -matching -observing	-maps -globes -atlases -data base -grid systems -photographs -chats -graphs -Google map -Google earth	-view point and perspectives -naïve theories -prior knowledge	-curriculum aims and goals -real life application, -integrated understanding -problem solving -cross curriculum

Shulman's (1986, 1987) ideas of teacher knowledge have been critiqued for only focusing on the cognitive domain and neglecting the affective domain. Guerriero (n.d., p. 3) argues that besides teacher knowledge there are attitude and motivational variables that need to be considered. Blömeke and Delaney (2012) contend that both the cognitive and the affective domain should come together in the classroom. The affective domain is defined as "… the way people respond emotionally and their capability to feel other living things' pain or joy" whereas the cognitive domain "…involves knowledge, comprehensions and critical thinking on a specific topic," both of which both are seen as important for effective teaching (Bunt, 2018, p. 191). This has been well articulated in the Fig. 3.1. according to Blömeke and Delaney (2012).

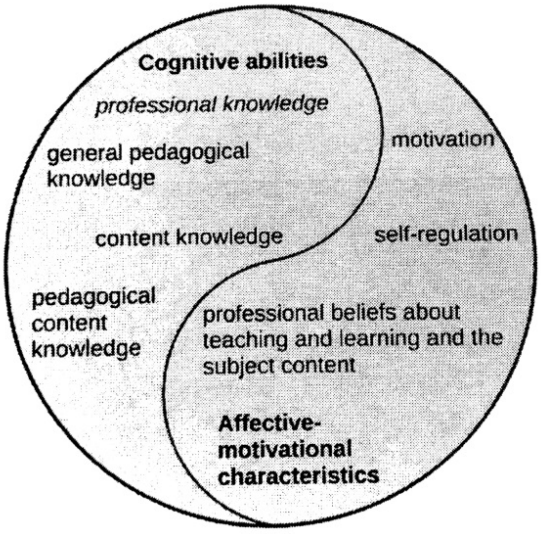

Fig. 3.1: Professional competence of teachers, adopted from Blömeke and Delaney (2012) in Guerriero (n.d. p. 3)

It is clear from Fig. 3.1. that professional competency involves more than just knowledge. The model above was adapted from Blömeke and Delaney (2012) who blended the cognitive abilities (domain) and the affective-motivational characteristics (domain) as the two main components of teachers' professional competencies (Guerriero, n.d., p. 3). This is a very important observation, because what teachers know and feel has a great influence on their classroom practice. Thus, it would be a slip-up if the two were treated separately (Guerriero, n.d.). This means having the "cognitive ability to develop effective solutions for job-related problems and having motivational, volitional and social willingness to successfully and responsibly apply them to solutions in various classroom situations" (Blömeke & Delaney, 2012, unpaged).

3.11. Conclusion

A key goal of this study is to describe in rich detail, teachers' pedagogical practices when teaching mapwork. This chapter responded to the question of how mapwork is taught in Namibian secondary school geography. The chapter explained the two theoretical lenses I used to interpret and make sense of the teaching approaches and strategies I observed in the three teachers' classrooms. More specifically, I discussed how I draw on Shulman's ideas of teacher knowledge (1986, 1987) and Learner Centred Pedagogy, underpinned by constructivist epistemology, as analytical frameworks.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This chapter gives an account of the research orientation and case study method. It describes the research participants and sampling methods used, and explains the methods of data collection and how data was analyzed. Issues associated with case study research are also discussed.

4.2 Research Orientation

This study is a qualitative exploratory case study within an interpretive paradigm. My choice of research orientation was guided by the research goals, namely to understand teachers' perceptions and pedagogical practices of teaching mapwork in secondary school geography, and the assertion that "… qualitative researchers want to know what the participants in a study are thinking and why they think what they do" (Fraenkel & Wallen, 2008, p. 432). In addition, Leedy and Ormrod (2010) explain that qualitative researchers "… use verbal descriptions to portray the situation they have studied … and they seek a better understanding of a complex situation" (p. 95). In the same vein, Cohen, Manion and Morrison (2011) contend that qualitative research provides an in-depth, intricate and detailed understanding of meanings, actions, from non-observable and observable phenomena as well as attitudes and behaviours toward the phenomena being investigated.

4.2.1 Interpretive paradigm

The main purpose of interpretive research is "… to understand the meaning which informs human behaviour" (Bertram & Christensen, 2015, p. 26). It does not aim to predict what people will do, but rather seeks to describe and interpret how people make sense of their worlds, and make meaning of their particular actions (ibid.). The main purpose of this study is to generate an in-depth understanding of secondary school geography teachers' mapwork perceptions and practices. I am aware of Bertram and Christensen's (2015) acknowledgement that "… the way people generally behave and respond in a given situation depends largely on their past experiences and circumstances: and thus, their context is very important" (p. 25). The interpretive paradigm aims at understanding human agency, behaviour, attitudes, beliefs and perceptions and how such influences the choice of methods they use (Bertram & Christensen,

2015). Equally the interpretive paradigm is characterised by a "concern for the individual", as well as generating a context base for understanding human experiences (Cohen et al., 2011, p. 17). The interpretive paradigm is appropriate for this study because it enables me to generate insights for understanding what teachers say about their mapwork teaching and how they teach mapwork.

4.2.2 Case study

This study uses a case study method because it allows for an in-depth investigation of a specific, bounded phenomenon (mapwork). Case studies are often descriptive in nature, and they describe what it is like to be in a particular situation (Bertram & Christiansen, 2015, p. 42). According to Hamilton and Corbett-Whittier (2012), a case study allows a researcher to capture rich data and offer an in-depth picture of the aspect under study (p. 10). In the same vein, Rule and John (2011) maintain that case studies offer an in-depth "thick, rich description of the case and illuminating to its broader context" (p. 7). I framed this study as a case study because its focus was limited to the teaching of mapwork and was not extended to other sections of geography. In addition, this study aims to understand selected Namibian secondary school geography teachers' perceptions and pedagogical practices of mapwork.

4.3 Research Question and Goals

Guided by the goal for this study, namely to generate insights for understanding Namibian geography teachers' perceptions and pedagogical practices of mapwork, the main research question is: What are Namibian geography teachers' perceptions and pedagogical practices of mapwork in secondary school geography classrooms? The following questions serve as sub-questions to the main research question:

- What are Namibian geography teachers' views and experiences of teaching mapwork in secondary school geography classrooms?
- What pedagogical approaches are used by Namibian teachers in secondary school geography classrooms?
- What lessons can be learned from teachers' pedagogical practices that may be used to strengthen and enhance mapwork teaching and inform teachers' professional development?

The findings of this study will have the following significance to the wider geography community in Namibia and provide insights that may be of value to Namibian teachers, teacher

educators, curriculum policy developers and Senior Education Officers (SEO) when addressing the problem of low learning outcomes in mapwork. The findings will contribute to the literature on geography education in Namibia.

4.4 Research Process

The study consisted of three phases. Before these got underway, I conducted a pilot study with two experienced geography teachers working in schools in Grahamstown where Rhodes University is situated. The first phase of the research consisted of a survey in the form of a questionnaire. The questionnaire was administered to thirty secondary school geography teachers in the Ohangwena circuit. The purpose of the questionnaire was to elicit the teachers' views and perceptions of mapwork teaching. The questionnaire also helped me to select the sample for further in-depth study through face to face interviews and classroom observations.

The second phase consisted of the semi-structured interviews with a sample of three teachers. The interviews were done to probe the teachers' responses to the questionnaire as well as their mapwork practices. The third phase consisted of classroom observations and stimulus recall interviews. The observations were done to complement the teachers' responses to the interviews and see if there is any relation between what the teachers say they do and what they actually do in their classrooms. Informal conversations like stimulus recall interviews were done for the purpose of reflecting on what had happened during the lessons.

The three phases described above took place over a seven-month period (August 2017 – March 2018).

4.5 Research Site

In the first phase, a questionnaire was administered at fifteen secondary schools out of a total of twenty-two schools in the Ohangwena circuit. This circuit is one of the ten in the Ohangwena Region of Northern Namibia which is within six km of the Namibian-Angolan border. The other circuits are: Ondobe, Endola, Ongha, Eenhana, Ohakafiya, Okongo, Enyanya, Oshikunde and Otunganga. Figure 4.1 below shows all twenty-two schools in the Ohangwena circuit. These include primary schools (PS), combined schools (CS), secondary schools (SS) and high schools (HS).

Given that the research was focused on mapwork teaching in secondary schools, the survey was only carried out in the fifteen schools in the circuit that offer geography at a secondary phase (grades 8 to10 or grades 8 to 12).

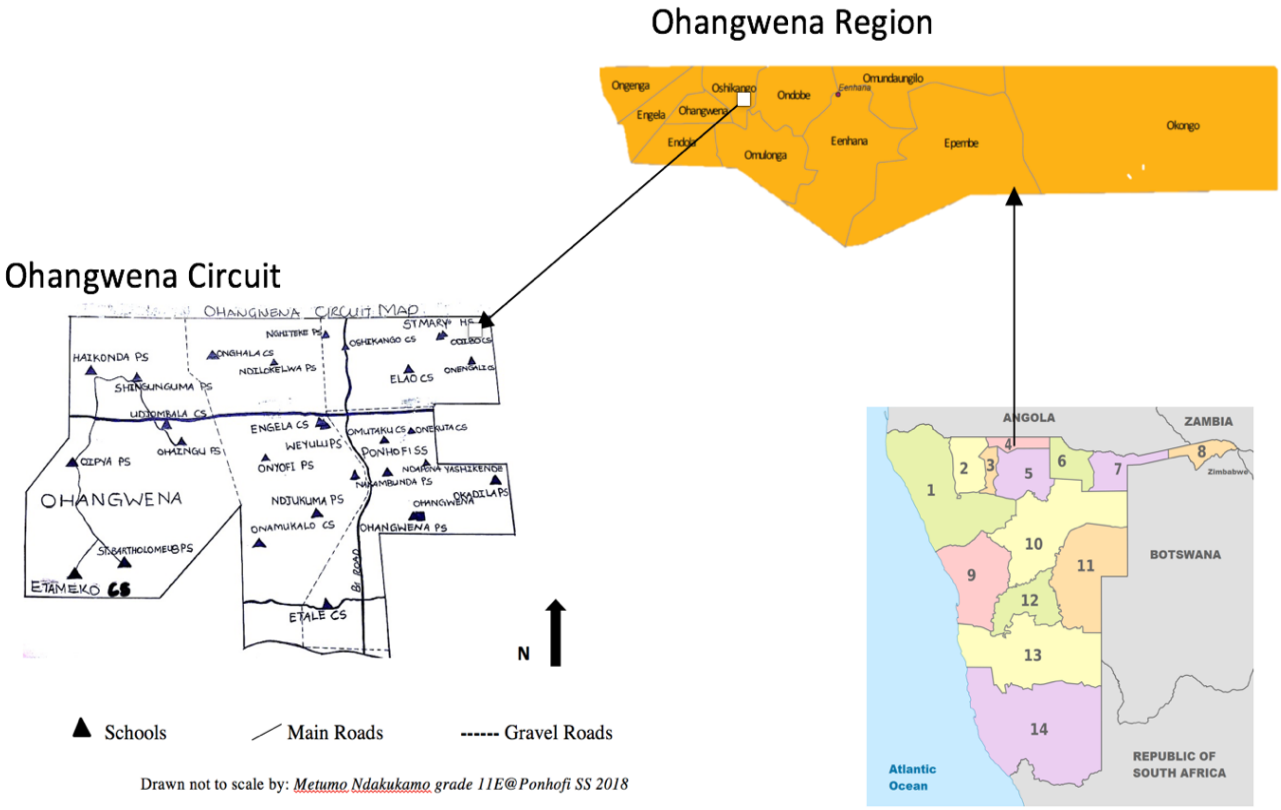

Figure 4.1: Map showing schools in Ohangwena Circuit

The second and third phases of the research (interviews and classroom observations) were carried out at three schools where the sample of teachers participating in the research, teach. Pseudonyms have been used for the schools and teachers who participated in the study. Hanganeni High School is a semi-urban school situated within the boundary of Helao Nafidi

town. Mewiliko Combined School is situated twenty km away in a south-west direction, and Twakulilwa Senior Secondary School is situated fifteen km away in a north-east direction. The schools are surrounded by communal farming and settlements.

Hanganeni HS is well-known in the circuit and the region, and most of the circuit and regional activities are held there as the school is believed to be located at the centre of both the circuit and the region. The school formally caters for grades 8 to12, but with the implementation of the new curriculum it will be catering only for grades 10 to12, with grade 8 already being removed as of 2018. Academically, Hanganeni HS has performed well over a number of years. Twakulilwa SS is run by the Anglican Church and is subsidised by the government. The academic performance of the school is mostly average and it fluctuates from year to year. The school caters for grades 8 to12. Mewiliko Combined School is located in the wetlands and is surrounded by open pans (oshanas). The school caters for grades 0 to 10. The general performance in the Junior Secondary phase is average and it fluctuates as well. During the heavy rain and flood season from February to March, Mewiliko CS sometimes closes to ensure the safety of both the learners and teachers. It only reopens when the water level subsides.

4.6 Research Participants

The research was carried out with thirty geography teachers in the fifteen secondary schools. Guided by the responses to the questionnaire, a sample of three teachers was selected for further in-depth interviews and classroom observations. A detailed profile of the three teachers is provided in Chapter Six.

4.7 Sampling Procedures

Sampling involves making a decision about which people, settings, events or behaviours to include in the study and deciding how many individuals, groups or objects (such as schools) will be observed (Bertram & Christensen, 2015). For this study, I have used a combination of purposive and convenience sampling.

4.7.1 Purposeful Sample

Purposive sampling was used to select the three participating teachers as it involves deliberately selecting particular settings, persons, or events for the important information that they can provide, and therefore one needs to select a sample from which one can learn the most (Maxwell, 2008). In this study, purposive sampling was also used to select those individuals that I thought would yield the most information about the topic under investigation (Leedy &

Ormrod, 2010). I selected three teachers who gave rich responses to the questionnaire. The three included both male and female teachers of different ages and teaching experience.

4.7.2 Convenience sample

The research site (the Ohangwena Circuit) was selected for convenience purposes because most of the schools in this circuit are within a radius of thirty km from my work place. This meant that it was easy for me to reach the teachers at their schools (Bertram & Christensen, 2015) when I was administering the questionnaires and conducting the follow-up interviews and classroom observations.

4.8 Data Collection Methods

In order to gather rich data that would enable me to generate insights for a deeper understanding of mapwork teaching, I used three data collecting methods: a questionnaire, semi-structured interviews and classroom observations together with stimulus recall interviews.

4.8.1 Pilot Study

A pilot study is a preliminary stage where the research instruments are tested with people who are similar to the actual research participants (Bertram & Christiansen, 2015, p. 49). In this study a pilot study was undertaken in order to test the effectiveness of the data collection tools. The pilot study was carried out with two experienced Grahamstown secondary school geography teachers that I know and who were not participants in the study. Their responses and feedback were used to make adjustments and refinements to the research tools and questions. The piloted questionnaire revealed that one of the questions was not clear. It was refined as per the recommendations made by the teachers. I also deleted a few questions that they thought were irrelevant.

4.8.2 Questionnaire

My choice of questionnaires was guided by Bertram and Christiansen (2015) who argue that questionnaires are a good way of gathering "data from a large number of people … and they are a good way of finding out about peoples' opinions, perceptions or beliefs" (p. 79).

The first part of the questionnaire schedule (see Appendix D) consisted of closed-ended questions which generated general biographical information about the teachers, including their educational background and qualifications, teaching experience, classes/grades taught etc. The

second part of the questionnaire schedule consisted of open-ended questions and explored general attitudes towards the teaching of mapwork, teaching strategies, wider teaching and learning issues e.g. resources, and teachers' perceptions and experiences of teaching mapwork in secondary school geography. Open-ended questions allow the respondents to give their own opinions and experiences in relation to a particular issue without any restriction (Cohen et al., 2011, p. 382).

Twenty-two of the thirty teachers to whom I administered the questionnaire returned completed questionnaires to me. From these responses, I was able to select a sample of three teachers that I could follow up with interviews and classroom observations. I chose three teachers who provided the most detailed responses. I made the assumption that they might represent best practice.

In making sure that the questionnaire reached the teachers without any unnecessary delay, I visited each school and handed the questionnaires personally to the teachers. In some cases, I waited until the teachers had completed the questionnaire, while in other cases I collected them from the school two days later. I emailed the questionnaire to a few teachers which I then collected from them in person. I made sure that I gave the teachers enough time to complete the questionnaire because I noticed that most of them were busy invigilating and marking their mid-term examinations. Their busyness may have been a reason why some did not complete the questionnaire.

Administering and analyzing questionnaires was not without its challenges. I was disappointed by the quality of the responses. Many responses were short and lacking in detail and some of the open-ended questions were not answered. The same concern was expressed by Cohen et al. (2011), that although open ended questions enable participants to freely put across their accounts, due to their demanding nature and time needed to respond, open-ended questions can be "overlooked" (p. 393) [and] "may lead the respondent to refuse to complete [them]" (p. 382). Some questionnaires were incorrectly filled in. Some teachers did not tick the box to indicate their response, and some ticked the wrong box or ticked two boxes when this was not necessary. Cohen et al. (2011) advise that after administrating the questionnaire, the researcher needs to check that all questions are answered accurately, as inaccuracy can occur which may reduce the validity of data, unless picked up on time (p. 407). In some cases, there were inconsistencies or evidence of a contradiction in some teachers' responses to the questionnaire,

particularly the questions about how confident teachers felt about teaching mapwork and what they experienced as challenges/difficulties in teaching mapwork.

4.8.3 Interviews

In Phase 2 of the study I conducted a semi-structured one-to-one interview with each of the three teachers. The interviews were necessary for this study because they have enabled me to gain more access to the three participating teachers' "ideas and thoughts, their perceptions … their fears and concerns in their own words …" (Ezzy, 2002. p. 45). Using a semi-structured interview also give me an opportunity to ask follow-up questions as well as clarify questions and issues that interested me from their responses to the questionnaire. According to Nieuwenhuis (2016, p. 93), interviews can be used as a way of validating and confirming data collected through the questionnaire. The semi-structured interviews are good because they are flexible and gave me an opportunity me to ask open-ended questions. Cohen et al. (2011) argue that open ended questions "enable the respondents to answer as much as they wish, … and they are suitable to for investigating complex issues to which simple answers cannot be provided" (p. 382). I also wanted to find out whether participants have or experience any challenges or difficulties in teaching mapwork. In addition, I also wanted to find out whether they have any suggestions on how to enhance mapwork teaching as well as teacher mapwork professional development.

The interview schedule, based on what emerged in the teachers' responses to the questionnaire, was designed to help me with probing what they had said about their mapwork practices, perceptions and experiences (see Appendix E). The interview questions were guided by my research questions. Following Patton (2002), the interview schedule allowed me to establish and build a conversation with the participants and this helped to put them at ease. The schedule guided our conversation and helped me to stay focused when I was probing the teachers' responses and pressing for further clarity. During the interviews, I avoided talking too much as I did not want to influence what they were saying. Following Cohen et al.'s (2011) advice, before starting the interview, I introduced myself to the teachers and informed them of the purpose of the interview, the nature and scope of the questions and the approximate duration of the interview. I also asked for their permission to audio-record the interviews. None of the teachers objected or seemed uneasy with the recording. This was clearly explained to the teachers both orally and in writing and they signed the consent form.

All the interviews were done in English, because it is the language of teaching and learning in Namibian schools. The interviews were audio-recorded and transcribed by me. This helped me to "know my interviews better" (Seidman, 1998, p. 98). The transcription of the first two interviewees were done soon after the interviews, and this helped me to stay close to the data and identify gaps in the data that I needed to fill. However, the third and last interview was done in a bit of a rush because the teacher kept on postponing it and always seemed to be busy, so this caused a delay in the transcribing process. The interview transcripts were given back to the participants for member checking (Bassey, 1999). This was to make sure that their accounts were correctly presented. Ms Munageni responded positively to the member checking and added and completed sections where I had left a space because I could not hear what she was saying. Ms Nailonga and Mr Haitange had little to say, although Ms Nailonga filled in some blank spaces in the transcript which was helpful.

Although I was able to carry out the interviews as planned, it was not without some challenges. Noise was an issue when interviewing Ms Nailonga at Mewiliko Combined School. Because there was a lack of space, the interview was conducted in a storeroom close to the Grade 1 and 2 classrooms. The Grade 1 and 2 teachers did not seem to be in their classrooms at the time of the interview, and the noise made by the learners affected the quality of the audio-recording, so at times we could hardly hear ourselves talk. Ms Nailonga took time to silence the learners and the noise was minimised. In the case of Ms Munageni and Mr Haitange's interviews, there were a few disturbances from learners and other teachers wanting to ask something.

Another challenge encountered was that two of the teachers (Ms Munageni and Ms Nailonga) did not see the interview schedule beforehand and we had a normal conversation and discussed issues as they arose, and they were also able to discuss and share their normal everyday teaching (classroom practices) of mapwork. However, Mr Haitange was given the interview questions to read a day before the interview commenced. This was a decision I regretted because he seemed to have planned responses to the questions, and knew what the next question was. In the case of follow-up questions or where the question was altered or rephrased, he knew it was not the same question as in the schedule. I am assuming this influenced the data I collected from him. I therefore concur that if participants see the interview schedule beforehand, the data may become "contaminated" (Henning, van Rensburg & Smith, 2007, p. 53). The interviews were done at a time most convenient for the teachers, and it was confirmed that it did not disturb their normal teaching schedules.

4.8.4 Classroom Observation

According to Cohen et al. (2011), observation "offers an investigator an opportunity to gather 'live' data from naturally occurring social situations" and allows the investigator to look directly at what is taking place *in situ* rather than relying on second-hand accounts (p. 456). Observation gives researchers an opportunity to see things for themselves and draw meaningful conclusions. Using classroom observation in this study allowed me to see, hear and experience reality in the same way as participants do (Nieuwenhuis, 2016, p. 90). It also enabled me to gather data that I could compare to what the teachers say they do and what they actually do, and this enabled me to triangulate data from the questionnaire and interviews with the teachers. Robson (2002, as cited in Cohen et al. 2011, p. 456) explains that;

> What people do may differ from what they say they do, and observation provides a reality check; observation also enables a researcher to look afresh at everyday behaviour that otherwise might be taken for granted, expected to go unnoticed.

Thus, using observation in this study provided me with an opportunity to see beyond the teachers' own words about their classroom practices of teaching mapwork, by comparing their responses to the questionnaire, to the interviews, to the real actions in the classroom. In addition, using observation gave me an opportunity to "take advantages of unforeseen data sources as they surface" (Leedy & Ormrod, 2010, p. 147), that I was able to use to develop a deeper and critical understanding of the teachers' mapwork pedagogical practices and their perceptions and experiences of teaching mapwork in secondary school geography. For example, how teachers relate to their learners and/or how on-spot decisions were made as the teaching and learning process unfolded. I observed each teacher teaching two lessons, which made a total of six lessons. With the teachers' permission, I audio- and video-recorded each lesson. None seemed threatened by my recording. The two recordings were necessary for review and further analysis. Using video-recording in this study was very helpful because I was able to review the videos many times. This helped me identify additional information each time I watched the video or listened to the audio-recording (Simpson & Tuson as cited in Cohen et al., 2011). The video recordings offered more 'unfiltered' observational records than human observation (Cohen et al., 2011). I placed the audio recorder on the teacher's table to capture the verbal interactions in the classroom. The challenge was that when the teacher moved from the table, the quality of the audio recording was affected. In addition, the audio-recording could also not capture the distant conversations with the learners at the back of the classroom. All six lesson observations were transcribed by myself.

Furthermore, guided by the analytical framework (see Chapter Three, Section 3.10, Table 3.1), a lesson observation schedule was designed and used to observe each lesson (see Appendix F). Cohen et al. (2011) argues that an observation tool or schedule helps the researcher to generate additional data from real situations and it also helps the researcher to develop a sense of ownership over the matter to be observed. The observation schedule had pre-determined categories of what I wanted to see in the lesson, and because of the lesson observation schedule, I had no plan to take further observation notes. However, interesting happenings in the classroom were recorded using a video as they unfolded in the lesson, and were noted during the transcribing process as I reviewed and watched the videos; for example, the use of body language by the teachers to emphasise the point or silence the learners. In addition, the teachers' lesson notes were collected and analyzed to contribute to the richness of the data description. I also made general observations about the ethos of the school, the teaching and learning environment including the size of the classrooms, the arrangement of furniture, class size, LTSMs, wall displays, and the general organisation and management characteristics like punctuality and levels of absenteeism and the attitudes and behaviours of the learners.

My role was that of non-participant observer. According to Bryman (2008), "non-participant" is a term used to describe a situation in which the observer does not participate in the social settings being observed (p. 257). The use of non-participant observation in this study was to make sure that as a researcher, I did not have an influence on the way the teachers were performing their tasks, but to observe teachers' mapwork practices in their own natural situations. This also meant that I did not interact with the learners or the teachers while the lessons were underway and I did not contribute to any classroom discussions. I cannot rule out the fact that my presence in the classroom may have had an effect on what was happening in the classroom. To fulfil my obligation as a non-participant observer, I sat at the back of the class. This helped me to observe all the activities taking place in the classroom and make sure that I was not a distraction. It was also important that I sat at the back of the class in order to reduce the impact or disturbance that might be caused by the use of the video-recording of the lessons.

4.8.5 Stimulated Recall Interviews

A stimulated recall interview was done after each lesson observation. They took the form of an informal conversation in which the teachers were asked to reflect on what happened in the lesson. The lesson plan was used to prompt discussion. I planned to watch the video-recording

with the teacher as part of the conversation, but this did not happen as planned. Although the stimulated recall interviews were useful to get the teachers to reflect on their lessons, not much emerged during the interviews. Nevertheless, they allowed me to probe deeper to get the teachers to talk about what was happening in the classroom (Nguyen, McFadden, Tangen, & Beutel, 2013). At the same time, teachers were able to defend and "discuss their decision-making processes as they carried out their teaching roles" (Nguyen et al., 2013, p. 3). The stimulus recall interviews were also audio-recorded and transcribed by me. This added to the richness of the data gathered.

4.9 Data Analysis

Data on teachers' perceptions and experiences of mapwork teaching, gathered through the questionnaire in Phase 1 of the research, were analyzed using conventional qualitative and quantitative (descriptive statistics) data analysis procedures (Cohen et al., 2011). Descriptive statistics involve transferring and summarising data into graphic presentation (Cohen et al., 2011). Such data were converted into tables and short descriptions and conclusions of the emerging themes were given. This follows Yin's (2009, p. 126) notion that data analysis involves categorising, tabulating, testing and recommending evidence in order to arrive at meaningful conclusions. Likewise, an analysis of data involves breaking up data into manageable themes, patterns, trends and relationships to draw empirically-based conclusions (Mouton, 2001, p. 108). And thus, similarities and differences in the teachers' responses were also used to identify further emerging patterns, themes and relationships on the challenges and difficulties of teaching mapwork, as well as on the use of learning support materials and teachers' mapwork professional development.

Merriam (1991, p. 123) asserts that "the process of data collection and analysis is recursive and dynamic". Data analysis occurs simultaneously, and should be aligned to the research questions, theoretical framing and research approach as well as data collection tools and methods (Merriam, 1991). For phases 2 and 3 of the study, the first circle of data analysis involved listening to and watching audio- and video-recordings of the interviews and classroom observations. I listened carefully as I transcribed the recordings. For Phase 2 interviews, an analytical meme was developed according to the questions in the interview schedule. I compared the participants' responses to the questions by identifying similarities, differences

and anomalies and gave a short description of what was emerging. This made it easier for me to pull out the emerging themes to provide answers to my research questions.

The initial analysis of data gathered from the classroom observations in Phase 3 of the study was based on open coding. I identified six emerging themes and categories. These were: teaching approaches, teaching strategies, knowledge, LTSMs, classroom arrangement and assessment of learning. I worked with the analytical framework (see Table 3.1. in Chapter Three, Section 3.10) to interpret what emerged in my data analysis.

4.10 Issues associated with qualitative research

4.10.1 Ethical considerations

A good researcher takes research ethics seriously and understands the importance of confidentially in research. Bertram and Christiansen (2015) stress that ethics has to do with behaviour that is considered to be right or wrong and it is very important in research that mainly involves humans and animals (p. 65). Gravetter and Forzano (2006) point out that "it was assumed that researchers, bounded by their own moral compasses, would protect their participants from harm" (p. 99). Participants were made aware of the research purposes and aims and were assured that they were not putting themselves and the institutions they represent at risk or cause them any harm. Anonymity of data and confidentiality of the research participants was maintained throughout the research process and the data collected were only used for the purpose of this study. The participants' identities and names were protected through the use of pseudonyms. Participants were ensured of voluntary participation in the study and were given the freedom to withdraw at any stage of the study should they feel uncomfortable to continue or no longer interested (Bertram & Christiansen, 2015).

I obtained informed consent from the Directorate of Education, and permission to carry out the research was granted to me by the regional director on the 3 August 2017 (see Appendices A and B). Further consents were obtained from school principals and from all the participating teachers in a form of a letter. Teacher participants also signed a consent form as an agreement to participate in the study (see Appendix C). The consent letters were written by me as a researcher and were all in accordance with Rhodes University's Research Ethics, of which the ethical clearance was granted to me after submitting the research proposal for this study to Rhodes University's Education Higher Degrees Committee (EHDC). I also obtained permission from the participants to video-record the classroom observations and audio-record

the interviews. Such a request was clearly stated in the consent letters. Parental consent to video the teacher teaching was obtained, as the learners were also likely to appear in the videos. It was made clear to the parents that the video-recording would be focused on the teacher rather than the learners. The parents were required to sign a reply slip. Parents responded positively to the request and their consents were signed and returned.

4.10.2 Validity and Trustworthiness

Validity "is how accurately account represents participants' realities of the social phenomena and is credible to them" (Schwadt, 1997, as cited in Creswell & Miller, 2000, p. 124).

- **Triangulation**

To ensure validity, triangulation was done through the use of multiple sources of data collection tools, namely questionnaires, semi-structured interviews and classroom observations together with stimulated recall interviews. Triangulation is referred to as the "process of using multiple sources and methods to support propositions or findings generated in a case study" (Rule & John, 2011, p. 109). Using triangulation in my study helped me to compare what teachers think and say, to what they do. It also helped in eliminating potential bias that might be caused by the use of a single method of data collection (ibid.).

- **Member checking**

I also used member checking by providing the participants with copies of their interviews and stimulated recall interview transcripts to check if their accounts were correctly captured (Creswell & Miller, 2000). After the participants checked their interview transcripts they all affirmed that everything was fine and only Ms Munageni made a few changes here and there by deleting or lengthening some details. Using member checking did not only ensure correct capturing of the participants' accounts, but it also aided in creating trustworthiness and confidence in me as a researcher by the participants.

- **Particularity vs Generalisation**

This study explored selected Namibian secondary school geography teachers' pedagogical thinking and practice of mapwork on a small scale. The findings for this study are limited by the fact that it was a small-scale study which only focused on one level of the school system in Namibia (secondary level grades 8 to12). The study was carried out in a few schools, in one

circuit, in one region in the country. Most of such schools are semi-urban and rural schools. My viewpoint as a researcher is that school settings and teachers' practices and experiences may differ across the country and/or regions. Thus, in presenting rich descriptions of the teachers' mapwork pedagogical thinking and practices, I am not aiming at generalising the findings of this study to the wider community of secondary school geography teachers in Namibia. This follows Bassey's (1999, p. 5) words that a study of a singularity does not seek to establish generalisations about the wider population to which the case belongs. The purpose of this study is to describe and interpret the occurrence of the cases I observed within their own world by providing a "thick description of it" (Geertz, 1973, p. 3). The purpose is to provide a rich description of what happened in this case study to try and understand what is probably happening in other cases. However, I cannot rule out the fact that in this study, some claims are made on behalf of "fuzzy propositions", that is, "a kind of statement which makes no absolute claims to knowledge but hedges its claims with uncertainties" (ibid., p. 12). In addition, "naturalistic generalisations" claims (Stake, 2000, p. 449) made in this study aided in generating a "thick description" of the case creating a "vicarious experience" for the wider population to which the case belongs, thus making other teachers feel that they are part of the case (Stake, 2000, p. 439).

4.11 Conclusion

This chapter described and justified the methodological orientation that guided this study. It discussed the research design, and gave a detailed explanation of qualitative research as well as the interpretive paradigm. Furthermore, the chapter described the research site, research participants as well as sampling procedures. The data collection tools used for this study are questionnaires, semi-structured interviews, and classroom observations together with stimulated recall interviews. Details of data analysis was also discussed in the chapter. The chapter concluded by looking at issues related to ethics and how trustworthiness and validity were taken into consideration throughout the research process.

CHAPTER FIVE

TEACHERS' PERCEPTIONS OF TEACHING MAPWORK

5.1 Introduction

The purpose of this chapter is to present the findings of the analysis of data on teachers' perceptions of mapwork, gathered through a questionnaire and interviews with a purposive sample of teachers. The chapter concludes with a synthesis of the findings.

5.2 Analysis of data gathered through a questionnaire

As explained in Chapter Four, a questionnaire was administered to thirty secondary school geography teachers in the Ohangwena circuit. The purpose of the survey was to elicit teachers' perceptions and experiences of mapwork teaching. The questionnaire also enabled me to gather biographical information about the teachers. Twenty-two teachers completed the questionnaire. Their responses are summarized in tables which correspond to the questions asked on the questionnaire. This is followed by an analysis of emergent patterns and themes.

5.2.1 Biographical profile of the teachers

Table 5.1: Summary of the teachers' age, gender, qualifications and teaching experience

Gender		**MALE**				**FEMALE**			
Age		20-29	30-39	40-49	50-59	20-29	30-39	40-49	50-59
		4	6	2	2	2	3	2	1
Professional qualification	College	3	5	1	1	0	1	0	1
	University	1	1	1	0	2	2	2	0
	No indication	1							
Type of qualification	BETD	2	5	1	0	0	1	0	0
	BED	0	1	1	0	0		1	0
	BED-H	1				2	2	0	0
	Others: ACE, DEAL, FDM				2			1	1
	No qualification	1							
Subject specialism		MALE				FEMALE			
	Social Sciences	9				1			

	Geography	3	5
	Others	1	2
	No indication	1	0
Phase specialized	Lower Primary	0	1
	Junior Secondary	11	1
	Senior Secondary	2	6
	No indication	1	0
Highest level of geography	Matric	3	2
	Diploma	1	1
	BEd	3	2
	BEd(Hons)	2	2
	MEd/PhD	0	0
	Others (HPEC, ACE)	4	0
	No indication	1	1
Teaching experience	0-5	4	3
	5-10	3	0
	10-15	3	2
	15-20	1	1
	20-25	1	1
	25-30	1	1
	No indication	1	

Table 5.1 shows that the teachers range in age with the majority being younger than fifty years old. The majority of the respondents are experienced teachers with only seven having five and less years of experience. Apart from one, all the respondents are qualified teachers. The level at which the teachers studied geography varies from matric, to majoring in it at university. The majority of the respondents have specialized in general Social Sciences (geography and history) plus other subjects. Very few have specialized in geography in their degrees. This influenced the way I choose my sample. I did not select respondents who had not specialized in geography for follow-up interviews because I wanted specialist geography teachers, with a

certain level of experience. The profiles of the three teachers selected for further investigation is discussed in Chapter Six.

5.2.2 Teachers' perceptions of mapwork

Generally, most teachers perceived mapwork as difficult and challenging for both teachers and learners. The teachers indicated that they experienced difficulty with identifying relief features, interpreting grid references/location, measuring distance, converting scales, drawing cross-sections, interpreting contours and topographical maps and calculating gradient. They also indicated that they experienced difficulties with learners' attitudes towards mapwork and learners struggling to read, analyze and interpret topographical maps. A lack of basic mathematical skills among learners was also mentioned. Maps were also seen as difficult because they are abstract and require imagination because map concepts (contours and lines of latitude) cannot be seen in reality. The teachers also mentioned a shortage of teaching aids and resources such as compasses, globes and maps with not enough time to teach and practice. One of the respondents highlighted that they were not fully prepared in their teaching training program to teach some of the mapwork topics. Three teachers acknowledged that teaching mapwork is difficult but also interesting and fun. Eight teachers said they do not experience any difficulties teaching mapwork; they however indicated that mapwork requires energy and self-knowledge from the side of the teacher, as well as patience from both teachers and learners. One teacher stated that "…it is not mapwork that is difficult, but teachers make it difficult by not teaching it the way it should be [taught]". This teacher asserted that *"... mapwork MUST be taught practically, however, sometimes teachers still use chalk and talk method ..."*

5.2.3 Strategies used to teach mapwork

Most teachers said this depended on the topic being taught. Most of the teachers said they used expository (teacher tell) methods, and practical work. They mentioned using old examination question papers to expose learners to different maps and teach map skills. Nine teachers indicated that they sometimes use rote learning and memorization of map skills. The teachers mentioned using questioning to elicit learners' prior knowledge, and the question and answer method to lead and facilitate classroom discussions. None mentioned fieldwork. The extent to which I observed these strategies being used in practice is discussed in Chapter Six.

5.2.4 Mapwork integration

Table 5.2 summarises the number of teachers who indicated where they integrated mapwork in other sections of the curriculum (syllabus). It takes place mainly in settlement, climatology

and population geography, with only eight teachers stating that they integrate mapwork into geomorphology.

Table 5.2: Number of teachers who integrate mapwork into other sections of the syllabus

Topic	Total
Settlement geography	17
Population geography	15
Climatology	16
Geomorphology	8
All	8
None	0

A limitation of the questionnaire is that it did not probe the reasons why the teachers integrate mapwork in some sections and not in others. The extent to which I observed mapwork being integrated is discussed in Chapter Six.

5.2.5 Learning and teaching support materials (LTSM)

The teachers stated that they mostly use textbooks, topographical maps, compasses and wall charts. A few (four) teachers indicated that they sometimes use globes, newspapers, atlases, wall maps and Google maps, and one teacher mentioned sometimes using a computer for PowerPoint presentations. Textbooks are supplied by the government and schools may purchase additional resources such as reference books, atlases, globes etc. Some teachers indicated that their learners share textbooks. Many (seventeen) indicated that they make their own LTSMs. These include sketch maps, posters and relief models. The use of resources is discussed in Chapter Six.

5.2.6 Teachers' confidence

All the respondents felt confident about teaching mapwork. However, their level of confidence varied from one topic to another. This is illustrated in Table 5.3.

Table 5.3: Teachers' confidence

Topic	Level of confidence and number of teachers per topic			
	Very confident	Confident	Somewhat confident	Not confident
Measuring map distance	18	3	1	0
Converting of scales	10	11	1	0
Direction	19	3	0	0
Bearing	12	7	1	1
Grid reference (location)	13	5	2	0
Contours	16	4	2	0
Identifying relief features	13	7	2	0
Cross-sections	13	5	3	0
Interpolation	14	6	3	0
Calculating area	7	10	3	0
Gradient	5	11	2	1
Interpreting topographical maps	13	9	1	0
Describing settlement on maps	11	9	1	0
Others	0	0	0	0

The table above shows that there is a varying level in the respondents' confidence in different mapwork topics. Most teachers said they were most confident teaching a topic such as direction, measuring map distance, contours, working with maps, interpolation, grid reference and bearing. This is contrary to what they said when asked about what they perceived as difficulties when teaching mapwork. Only a few teachers indicated some confidence in teaching topics such as converting scales, grid references, cross-sections and interpreting topographical maps.

5.2.7 Teacher support for mapwork teaching

In response to the question of whether the teachers had attended any in-service mapwork workshops/courses, twelve indicated that they had attended a week-long mapwork specific workshop run by the regional subject advisor. Issues discussed at the workshop included:

- The integration of mapwork (as examined in Paper 2) in the theory section of the syllabus (as examined in Paper 1).
- Map skills (map scale, calculation of distance, location using coordinates etc.).
- Relief (contours), gradient, interpolation, slopes etc.
- Map properties (key, tittle etc.).
- Map interpretation.

- Resources for teaching mapwork.

While there is evidence of professional support, it appears to be examination and content based, focusing on the 'what' of mapwork, with little, if any, attention being given to the 'how' (pedagogy) of mapwork. A limitation of the questionnaire was that it did not ask the teachers to evaluate the usefulness of the workshop. It was addressed in the interviews with the three sample teachers, only one of whom had attended a mapwork specific workshop.

What emerged is as follows:

- Teachers perceive mapwork as difficult.
- Difficulties are experienced when identifying relief on maps, measuring distance and converting to scales, calculating gradient, interpreting contours and relief and using co-ordinates.
- A lack of mathematical skills among learners and teachers is a challenge.
- The most frequently used teaching methods are teacher-tell and practical work.
- Teachers say they integrate mapwork into settlement, climatology, population, and to a lesser extent, geomorphology.
- Textbooks, topographical maps and compasses are the most frequently used LTSMs, and many teachers make their own LTSMs
- Teachers feel confident about teaching mapwork although their level of confidence varies from one topic to another.
- There is a level of support for teachers (a mapwork specific workshop).

5.3 INTERVIEW DATA PRESENTATION

Semi-structured interviews were held to probe selected teachers' responses to the questionnaire. The findings were as follows:

5.3.1 Teachers' perceptions of mapwork

All three teachers acknowledged that mapwork is important and interesting, and that they felt confident and enjoyed teaching it. Mr Haitange explained that *"... mapwork gives learners an opportunity to see most of the things they see in general life in a form of a map ... how different physical features are represented on the map."* Ms Nailonga enjoyed teaching mapwork *"... because there is a lot of practical work, for example measuring, converting contour lines into landforms and so on,"* and she enjoyed teaching calculations and interpretation of symbols. Mr

Haitange and Ms Munageni said they sometimes get discouraged when learners take too long to grasp the concept being taught. Ms Munageni and Ms Nailonga agreed that teaching mapwork is not without its difficulties and challenges. Ms Munageni explained that mapwork is *"…quite challenging especially when it comes to learners because … they have that negative attitude and they think it is tough and hard for them to understand and pass it."* Ms Nailonga admitted that while five years of teaching experience had made mapwork less of a challenge, it was *"…not easy to present it."*

5.3.2 Teaching approaches

In response to questions on how they taught mapwork, the three teachers indicated that they plan and prepare their lessons according to the content and basic competencies listed in the syllabus. Ms Munageni spent about an hour each day planning a lesson, while Ms Nailonga and Mr Haitange prepared the lessons for a week at a time. They indicated that the preparation time depended on the topic and type of teaching aid(s) that were required. Ms Nailonga described her lesson preparation as follows:

> *Preparation is very important especially when it comes to mapwork. I have to rehearse with my syllabus. Then I have to check what the basic competencies are. Then I check different books that focus on the topic that I am going to teach. Then I check if I can find teaching aids that will interest the learners…. I spend most of the time during weekends preparing my lessons, and during the course of the week I just have to go thought and see if there is something that I need to add.*

I asked the three teachers how helpful they found the syllabus. Ms Munageni and Mr Haitange said the syllabus is helpful, but some of the objectives were not clear. They also used textbooks and teachers' guides to prepare lessons. Ms Munageni explained that:

> *I used to take the syllabus objective and present it to the learners in the classroom so they know what they are expected to…. Yes, the syllabus is useful [because] that is where the examination questions are driven from.*

In response to a question on whether they get help with their lesson preparation and teaching, all three teachers said that they get help from colleagues in case there is something they do not understand. Ms Munageni and Mr Haitange indicated that they also work in teams to prepare notes for learners, practical activities and assessment. Ms Nailonga is the only geography teacher at her school. She explained how she used to use her telephone to consult more

experienced teachers when she needed help with how to present a map competently, the sorts of questions to ask and activities to give to the learners.

There is evidence which suggests that mapwork teaching is closely aligned to the syllabus and that the teachers have an informal collegial support system which assists them with their mapwork teaching.

The teachers' approach to learning was similar. Typically, it consisted of starting a lesson with questions to elicit the learners' prior knowledge, explaining the lesson content and concluding with an activity. Ms Munageni described her approach as follows:

> *First I like to get the learners' prior knowledge on that specific topic if it is new or based on a topographic map. I first ask them how they understand or give me their knowledge, because some of the things they covered already from the previous grade. Then from there I can give them more information and ask questions, after I give them a class activity based on the lesson.*

On the other hand, Ms Nailonga explained that the way she teaches mapwork depends on the topic she is teaching. She explained that:

> *I don't know where to start, since I have different topics in mapwork. If I have to teach how to interpret maps … I have to ask them some general questions for example, what is a map? After giving their answers I might give a map, where they have to identify different features they see in that map or if the map is available in their textbooks, I refer them to the textbooks to do the same. Then we look at the keys that are shown on the map and explain to them which keys are helping us to read the map. After these discussion[s] I have to explain how the map can be interpreted and how the features in the map can be asked in the exam.*

This description shows how examinations influence Ms Nailonga's teaching and how she focuses on knowing 'what' rather than explaining or applying knowledge.

In response to the question of what teaching methods were used for teaching mapwork, expository/lecture type teacher-tell, group and practical work were mentioned. Ms Munageni explained how she uses *"…a lecture method or teaching whereby I give more information to the learners, although I have to ask them their pre-knowledge first… and I also use group work whereby I give each group a task to present to others in front."* Ms Nailonga said

> *Well I use the learner centered method, whereby in most cases I start with questioning, questioning and answering method, and where I have to demonstrate and then practical [activities], when we need to practice and let the learners practice also. In most cases mapwork needs practice instead of just talking.*

I probed Ms Nailonga about the practical activities she does and she described how, when teaching contours, she sometimes takes the learners into the surrounding area to identify gentle and steep slopes and compare how they are shown using contour lines on a map. Practical activities also involved the learners drawing a contour sketch of a conical hill, a valley and a spur. Mr Haitange also indicated that he sometimes takes learners into the field to identify different landforms and slopes and measure distance. In contrast, Ms Munageni indicated that she never took learners into the field because fieldwork and enquiry methods are only applicable to research skills. Her practical activities involved getting learners to build cut-out cardboard models showing the contours of different landforms.

I also probed the teachers about what they understood by a learner-centered approach. According to Ms Munageni it is one in which *"... learners are doing most of the work and the teacher is just there to guide them."* Ms Nailonga's view *was "... learner-centered approach requires learners to get involved and play a role in their own learning, but I have to monitor the learners or supervise how they are doing it."* Similarly, Mr Haitange said that *"learner-centered approach is that way you make the learners to be able to do most activities."*

I asked the teachers to explain how they implemented a LC approach in their mapwork teaching. Ms Munageni replied that she only uses it for *"the topic they are already familiar with e.g. direction, bearing, but other topics e.g. gradients it has to be teacher centered."* She elaborated as follows:

> *With the new topic, it is a new concept to them it's a new thing to them. They are not really familiar with it, so therefore I think it needs more explanation from the teacher first, and then they can come in.*

Ms Nailonga explained a LC approach as follows:

> *... I demonstrate on the chalkboard, I have to ask learners to identify before me, it is them that have to draw, it is them that have to do the calculations, then I*

have to come in after they have done something, in many cases that is how I get them involved in a learner centered way.

There is evidence which suggests that the teachers are aware of the need for learners to be active participants with the teacher guiding and directing them. The teachers said they used group and peer work but it is difficult to gauge whether or not they understand social learning processes associated with LCE. Ms Nailonga had mixed feelings about group work. She said she uses it because it saves time and maintains a good relationship between learners, but it does not work well with the lazy learners and they may end up not learning anything. Ms Munageni and Mr Haitange said that a learner-centred approach does not work well with all topics because some topics need the teacher's input. They indicated that a teacher-centered approach is more appropriate, especially when introducing a new concept. There is evidence which suggests a somewhat superficial understanding of a LC approach as one in which learners are active [busy doing something]. The teachers' descriptions of their methods of teaching mapwork supports a view of learning through transmission rather than learning as an active process of knowledge construction and meaning making.

5.3.3 Integrating mapwork

I received mixed responses to the question of whether mapwork was taught as a separate topic or integrated when teaching other sections/themes in the syllabus, and there were contradictions between what was said in the questionnaire and interviews. For example, in the questionnaire, Mr Haitange indicated that he integrates mapwork with settlement, population and climatology. However, when I probed him during the interview he indicated that he teaches mapwork separately after teaching other topics so that learners are familiar with the features, for example, relief. Ms Munageni and Mr Haitange said that integrating mapwork confused learners because many were not familiar with the features in the map. None of the teachers mentioned using maps to illustrate or promote an understanding of the relationship between human activities and the physical environment.

5.3.4 Teaching map concepts

The teachers' descriptions of how they teach map concepts are summarized and discussed below.

	Ms Munageni	Ms Nailonga	Mr Haitange
Map symbols	• ask them to compare different colours with the ones in the book and give them examples	• give them a map to identify features • look at key on the map and explain how to use it to read a map • explain how to interpret a map and what symbols mean in reality • emphasize how they can be assessed in the examination	• give learners practice using the key and explain what the symbols in the map mean.

There is evidence which suggest that the emphasis is on 'knowing', that is recognizing and matching the symbol on the map to the key. There is no evidence which suggests that an understanding of different types of symbols or what the symbols communicate, is being taught.

	Ms Munageni	Ms Nailonga	Mr Haitange
Scale	• ask learners to give different types of scales • look at metric measurement e.g. cm to km etc. • explain in more detail how to convert scales	• test learners' pre-knowledge • build on what learners already know and ask learners to mention types of scales by writing them on the board • then demonstrate to them how to convert one scale to another	• this is like mathematics; we look at when to add more zeros using the metric ruler.

The teachers' responses reveal an emphasis on being able to recall what a scale is, the different types of scales and how to convert from one scale to another. One may infer that knowledge

'what' and 'how' is emphasized and this may be at the expense of developing knowledge with understanding.

	Ms Munageni	Ms Nailonga	Mr Haitange
Distance	• ask learners to demonstrate or explain how to measure distance • explain in more detail how to measure different distances using different scales in different units using a paper or string	• draw a simple map on the board and demonstrate to learners how to measure distance in different units, using different scales	• practice using different methods for example with small paper or string.

The teachers' responses suggest that procedural knowledge is taught through explanation, demonstration and practice.

	Ms Munageni	Ms Nailonga	Mr Haitange
Direction	• ask one of the learners to draw a compass direction while others label it • explain to learners how to find directions following certain steps	• ask learners to mention the direction they learnt in a previous grade • go on to use a map and demonstrate finding directions of two points and also on the board • learners use a compass to find direction	• first familiarize learners with the compass directions – north, west, east, south • learners can find directions using a compass.

The teachers build on what learners already know before explaining, demonstrating or giving instructions on how to find directions. Only Ms Nailonga mentions working with an actual map. Again, the emphasis is on procedural knowledge with no evidence of learning being applied to solving a problem using a map.

	Ms Munageni	Ms Nailonga	Mr Haitange
Location (latitude and longitude)	• explain to learners the difference between latitude and longitude and give examples • focus on degrees and minutes • draws lines of latitudes and longitudes and carefully follows certain steps and formula to calculate the seconds	• start with lines of latitude and longitude • link to real life situations to make it clear to the learners • teacher draw latitudes and longitude line on the board and demonstrate on the chalkboard as she explains to learners how to find location and go through each step carefully	• start by identifying the degree of the point, then minutes and seconds • follow certain steps, practice and compare answers.

For all three teachers, the emphasis is on procedural knowledge, that is how to find a place or phenomenon on a map using coordinates. There is little, if any, evidence of developing their understanding of the significance of coordinates and how they are used in everyday life to solve problems and make decisions. Instead, teaching and learning remains at the level of abstraction.

	Ms Munageni	Ms Nailonga	Mr Haitange
Contours	• discuss in class and find slopes and landforms • ask learners to create different models for landforms using boxes • use PowerPoint to show different pictures.	• ask learners to define contour and their features • use a map to explain and show different contours, slopes and landforms in reality • use body language e.g. elbow to make a point when showing spur/valley • give learners time to practice and do an activity.	• have some maps in the classroom as teaching aid(s) • use maps in the text-books; do these examples with the learners to show how contour lines look.

The teachers teach contour though discussion, building models and using maps and body language. The focus appears to be on recognizing and identifying individual relief features. None of the teachers mention reading and interpreting how relief features, when viewed together, enable a person to describe a physical landscape and secondly understand how relief affects human activities.

The teachers' accounts of how they taught cross-sections and gradients were consistent with how they taught the concepts discussed above. According to Ms Nailonga, gradients are in the syllabus for the senior grades so she has never taught it. I also asked the teachers if they taught map projections. Their responses suggest that they do not understand *("what is that?"*) the concept and do not teach it.

What emerged was as follows:

- Examinations influence how mapwork is taught
- Teachers build on what learners already know before they start teaching
- Teachers draw sketch maps on the chalkboard to demonstrate to learners how to apply a skill — for example measuring distance, interpreting contour lines and drawing cross-sections
- Teaching is mostly teacher-directed with teacher-tell, and teacher demonstrations and explanations dominating
- The focus is on teaching skills and developing procedural knowledge (how to do, follow step-by-step instructions) at the expense of conceptual understanding
- There is no evidence of skills being applied to solve problems or interpret patterns and relationships shown on a map
- There is little, if any, evidence of links being made to the real world of the learners
- There is no evidence which suggests that mapwork is integrated with other geography topics
- The teachers indicated that the most commonly used resources are textbooks and maps.

5.3.5 Knowledge and skills taught in mapwork lessons

The teachers were asked about the knowledge and skills they taught in mapwork lessons. They all said: map reading and interpretation, calculations, giving directions, identifying features on the map and analyzing geographical information. Teachers were probed to explain how they teach or promote such kinds of knowledge and skills in their mapwork lessons.

In response to a question about how they develop learners' map knowledge and skills, the three teachers' descriptions showed that they were mostly teaching map reading skills and an understanding of the map title, key and symbols, and the different types of maps. None mentioned spatial thinking and spatial concepts.

5.3.6 Assessing learning

I asked the teachers several questions about how they gather evidence of learning and give feedback to learners. Ms Munageni explained how she used assessment to inform her teaching:

> *... after each concept I give assessment or an activity but they have to do individually and submit. I mark and give them feedback. If I realize that most of them did not understand then I have to go back and repeat and give other assessment.*

Ms Nailonga described how she asked questions on what had been taught, and gave written and practical activities to do. She also set questions on a map which she marked and then worked through and discussed with the learners. She explained that if there are only a few learners who did not do well in an activity, she works through the paper with them individually or as a group. If there are many, then she re-teaches the whole class. Mr Haitange gave a similar explanation. He provides remedial lessons when a few do not understand and when more than half do not understand, he repeats the lesson using a different method.

The teachers' assessment appears to be mostly summative, that is, taking place after the teaching has been done and based on an assessment (presumably a test) or a written activity. Feedback appears to be quantitative (a mark) as opposed to qualitative (a comment). There is some evidence of summative assessment being used in a formative way.

The teachers indicated that they give homework depending on the basic competencies, or the topic they have covered or are going to cover. Homework is given once or twice a week. Sometimes the homework is given in a form of a worksheet generated by the teachers, or an activity in the textbook which requires learners to work in groups or individually. On average, teachers take a day or two to mark and give feedback to the learners. Mr Haitange emphasized the importance of giving prompt feedback. This suggests that he understands the value of feedback. Ms Munageni explained that she points out the common mistakes made and then she guides the learners on how to answer these questions. She also asks the learners to give her the answers before she gives them the correct answer. This suggest an emphasis on getting the correct answer. Teachers' assessment practices are discussed in Chapters Six and Seven.

5.3.7 Learning and Teaching Support Materials (LTSMs)

The teachers said they used different resources in their mapwork teaching, the most common of which were the syllabus, textbooks, atlases, maps or pictures. Ms Nailonga described how she consulted different books for maps and pictures and if she did not have the map she required, she normally drew one. Mr Haitange was the only teacher who said he used an atlas. Ms Munageni commented as follows:

> *Atlases? NO! … I get the information from the textbooks, as well as notes from other colleagues from other schools as well as the internet…. I download videos and images…*

Mr Haitange was the only teacher who said he uses Google Maps and Google Earth. He explained that

> *We use this mostly when we are teaching about different types of maps, sometimes you can bring them to the lab and learners can log in and they can see what you mean by contour maps and they can also be able to see how a map looks like even from the computers that we have. …*

From the three teachers' questionnaire and interview responses, it is evident that textbooks are an important resource that is used to guide teaching and provide examples of activities. Ms Munageni explained that she instructs her learners *"… to revise and do more activities in the textbook at home. … There is also a map pasted at the back of the textbooks, most of the activities and information are driven from there."* What resources the teachers use and how they use them are discussed in Chapter Six.

5.4 Challenges and difficulties of teaching mapwork

I asked the teachers to share with me some of the challenges and difficulties they experience when teaching mapwork. All three acknowledged learners' lack of basic mathematical proficiency as a challenge, and their ability to carry out simple calculations. Other challenges include a shortage of equipment and teaching materials including textbooks, charts, posters and maps. The teachers described how this results in the same maps being used over and over again for tests, practical activities and even for examinations. The system of moving teachers from one classroom meant that teachers had to carry teaching resources from class to class. A lack of a home base militated against readily available resources. Insufficient time for mapwork

teaching was another challenge. Furthermore, the use of South African topographical maps in the examinations was another challenge which Ms Munageni explained as follows:

> *… another thing is we are Namibians, but the maps we are using for our examinations especially in Grade 11 and 12 are from South Africa. So, learners are not familiar with those areas. Maybe we can get or use Namibian towns or areas that learners and teachers are familiar with.*

Ms Munageni said that she thinks the use of these maps impacts on the learner performance.

In response to a question about teacher motivation and creativity, the teachers indicated that the shortage of resources limits their creativity. Time was another constraining factor with teachers having to rush to cover the syllabus before the examinations. The teachers also said that poor learner performance was discouraging and demotivating.

5.5 Teacher support for mapwork teaching

The teachers indicated that they had attended different workshops organized by the subject advisor in the region. Ms Nailonga and Mr Haitange attended a general geography information sharing workshop at which mapwork was discussed. Only Ms Munageni had attended a mapwork specific workshop. She commented as follows:

> *I attended one last year in Windhoek, whereby we were trained by one of the professors from the University of Cambridge. … The workshop was on how we can teach mapwork as well as research skills.*

She elaborated further:

> *The aim of the workshop was to inform Namibian teachers that mapwork and research skills are not difficult and should not be taught in isolation but should be integrated with other topics… For example, when you do landforms in geomorphology then you should already include contours which are also part.*

I probed Ms Munageni about how the workshop had shaped her practice. She explained that the learners found the integration of mapwork and theory confusing, mainly because of the way the examinations are structured with theory being examined in Paper 1 and mapwork separately in Paper 2.

Ms Nailonga expressed her dissatisfaction with the way the workshops are conducted. According to her, the workshops often consist of teachers sharing their practices — much of which she already knows from talking to other teachers. She felt she should be learning something new rather than listening to the same thing which she already knows.

Ms Nailonga also expressed her frustration:

> *One thing I also hate it is the time allocation, sometimes you are booked for the whole week…, but still things are done in a rush or not done appropriately. Perhaps because no one is prepared to do the presentation or to present and focus on a specific area. But we have teachers who knows and understand geography issues better, and off course they can do a better job but, we only have those individuals.*

In spite of the frustrations and expectations not always being met, Ms Nailonga acknowledged that workshops are helpful and one can always learn something from interacting with other teachers.

In response to questions about whether they would like support for mapwork teaching, two teachers said they would like support as it would improve their practice. Ms Munageni wanted help with integrating mapwork into other topics and Ms Nailonga said she would like to observe another teacher giving a mapwork lesson. Mr Haitange indicated that he received enough support from his HOD.

What emerged from the interviews is as follows:

- The teachers acknowledge the importance of mapwork in school geography
- The dominant pedagogical approach is teacher-centred, based on a transmission view of learning through direct instruction/lecture/teacher-tell method
- Most lessons follow a similar pattern: asking questions to elicit prior knowledge, whole class teaching and ending with an activity
- Teachers appear uncertain about the integration of mapwork into other topics in the syllabus
- A number of challenges are experienced when teaching mapwork, including for example, a lack of appropriate LTSMs.
- Textbooks are the most important LTSM used

- Assessment is mostly summative
- Feedback is given in the form of marks
- Mapwork teaching focuses on map skills which are taught in a procedural manner with little evidence of application
- Learner performance discourages teachers
- There is limited professional support for mapwork teaching.

5.6 Conclusion

This chapter has presented the findings of what emerged in the analysis of the questionnaires and interviews. It has shed light on teachers' perceptions and experiences of mapwork teaching. The next chapter presents the findings of the classroom observations undertaken with the three sample teachers.

CHAPTER SIX

TEACHERS' CLASSROOM PRACTICES

6.1 Introduction

This chapter analyzes and discusses how the three teachers teach mapwork. Data were gathered through classroom observations that were video-recorded and transcribed. Each teacher taught two lessons to a specific grade. The chapter consists of four parts. In the first three, I provide a rich description of each teacher's teaching practice. This is followed by an analysis of what emerged from the two lessons I observed each teacher give. The fourth section synthesizes and categorizes what emerged according to themes. Throughout the discussion, pseudonyms are used for the teachers, learners and schools.

Table 6.1 summarises the three teachers' experience, qualifications, the grades they teach, the type of school (combined school, secondary school or high school) they work in, and the mapwork topics I observed them teach.

Table 6.1: Profile of the three teacher participants

Teacher	School Type	Qualification	Experience	Grades taught	Grade observed	Lesson topic/s
Ms Nailonga	CS	BETD+ DEAL	14 years	5, 8, 9, 10	10	map symbols, scale and distance
Ms Munageni	HS	BEd-Hon	4 years	11, 12	12	contours, grid reference (longitude and latitude)
Mr Haitange	SS	BEd	11 years	10,11, 12	11	bearing, scale

6.2 Ms Nailonga's classroom practice

With 14 years of experience, Ms Nailonga is the most experienced teacher participating in the study. Ms Nailonga has a three year Basic Education Teacher's Diploma (BETD) majoring in Social Sciences 8 –10 (geography and history) plus a Diploma in Education African Languages

(DEAL) from a former college of education. She has been teaching at Mewiliko Combined School since 2013 when she became the Head of Department of Social Sciences Grades 5 –10. Ms Nailonga teaches social studies (Grade 5) and geography (Grades 8 –10). She is the only person teaching geography at the school.

Mewiliko Combined School is a village school surrounded by communal land which is utilized for subsistence farming. The school is located in a flood prone area. During the flood season (January to March) the school sometimes has to close. The school has an enrolment of 381 learners from pre-grade to Grade 10 and an average class size of twenty-eight per grade. Learners' ages range from five years in the pre-grade class, to nineteen years in Grade 10. In the Grade 10 class I observed, eighteen of the thirty-one learners are female and 13 were male. School attendance is generally good although it tends to drop during the flood season. Most learners and teachers speak Oshiwambo as a first language and English as a second language.

Most of the learners come from economically challenged homes in the surrounding areas and nearby villages. They commute to school every day. The school has no hostel facility. The school became a non-fee-paying state school when free schooling was introduced in 2016. The school has electricity and internet connectivity. All classrooms have chalkboards in the front of the rooms. Some classrooms have cupboards but these have no doors and locks for the safe storage of teaching materials. There is no administration office at the school. One of the classrooms is used as a staffroom. Each teacher has a desk where they store their materials. The principal and the school secretary share a store room as an office, in which printing is done and where the copy machines are kept. The school has the basics, including for example chalkboards, learners' desks and chairs, a computer, a copy machine and textbooks.

The first lesson starts at 08h00 and the last ends at 14h30. The school timetable follows a five-day cycle with eight lessons of 40 minutes per day, and a 30-minute break at 10h40. The timetable makes provision for double lessons lasting 80 minutes, although there are no double lessons for geography. Learners stay in the same class all day with teachers rotating. There are study hours for Grade 5 to10 learners on Mondays, Tuesdays and Thursdays in the classrooms from 15h00 to 16h00. Wednesday is a sports day and learners are expected to engage in different sporting activities e.g. soccer, netball, athletics etc., which teachers supervise.

The classroom in which I observed Ms Nailonga teaching mapwork was small. The Grade 10 learners were seated in paired rows facing the front. I did not observe them working in pairs. Worksheets were completed individually and questions were directed to individual learners.

There were enough desks and chairs for all the learners and they all had textbooks, notebooks and pens with which to write. The learners were disciplined and I did not observe any unruly or disruptive behavior. The classroom atmosphere appeared to be positive and conducive to learning. There were no classroom displays on the walls. The chalkboard in the classroom was in good condition but small. The teacher had to rub off the notes she made off the chalkboard several times to create space to continue writing. There was no teacher's desk and chair in the classroom. The teacher used the front learner's desk for her textbooks, chalk etc.

6.2.1 Ms Nailonga: Lesson 1

Lesson Topic: Map symbols **Grade:** 10

Duration: 40 minutes **Number of learners:** 31

Date: 06. 03. 18

The lesson began promptly at 13h50. Ms Nailonga greeted the class and started teaching from a standing position in front of the class. She recapped what had been taught in Grades 8 and 9 mapwork. She asked them to define a map and wrote their answers on the chalkboard. Approximately six minutes was spent explaining the concept of a map. She asked the learners to name different types of maps which she wrote on the chalkboard: political, physical, population, climatic, street maps, road maps, synoptic weather maps, topographical maps, and vegetation maps.

Ms Nailonga did not explain the purpose or uses of the different maps the learners had named. She highlighted the two maps (topographical, synoptic weather maps) they would be focusing on in Grade 10, but did not explain why they were only focusing on them.

Ms Nailonga asked learners to recall the basic features of maps and wrote their responses (scale, key, title, direction, relief, position) on the chalkboard. She spent a few minutes describing each of the map features. No reference was made to an actual map. She did not correct inaccurate answers, for example that relief is not a feature of all maps. She mentioned that maps use symbols to communicate information but did not explain what this entails or what learners need to know and understand in order to read and interpret maps.

Ms Nailonga: *... Those are some of the basic features that you may find on all of the maps. There should be a scale. Imagine a map of your country, a map of your classroom, a map of the world to fit on a small piece of paper is because it is reduced to scale. ... all the maps they*

are reduced in order to fit on the paper. We also have the key. This is symbols because in the map we normally talk about the language of symbols where they are indicating what the symbols represent on that map. We also have a title - this is just a topic based on what the map is all about. And we have the direction, so the direction usually in most of the maps you may find an arrow, that an arrow usually has N, do you use to see it?

Learners: *Yes* [in unison]

Ms Nailonga: *N, that is an indication to you that North is on that side where the arrow points. In case the map you are given does not have an arrow, always assume that on top of your book, on top of your paper, is where north is. We have the relief, how high is the land in that map. And this can be shown either by color, either by shade, or the lines could be use. And we have the position, position where we use the longitude and latitude lines. We will come to it later.*

Ms Nailonga then spent a few minutes reading and explaining the syllabus' basic competencies, describing what learners are required to learn in the lesson. She wrote the competencies on the chalkboard and circled the word 'interpret' with blue chalk. She defined 'interpret' but did not explain why it is important to interpret maps. The next ten minutes of the lesson were spent looking at the map symbols. Ms Nailonga read through and showed learners the different keys and symbols on page 8 of the textbook. The learners listened and looked at their textbooks as she read. Ms Nailonga did not use real examples or a map to show the learners what symbols looked like on a map. She kept on asking whether the learners were following or whether they could find the symbols from the list of keys in the textbook (see Figure 6.1. below).

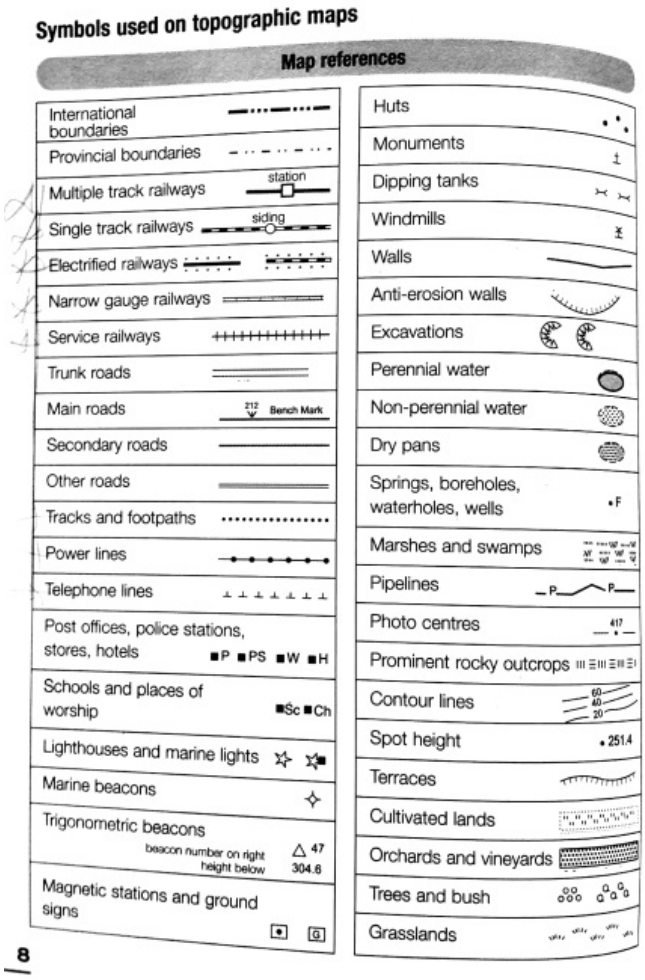

Figure 6.1: List of symbols

Ms Nailonga: *... on page 8 there are symbols that are commonly used on the topographical map. ... those symbols will help us to interpret and read the map and identify the physical and the human features. Physical features, these are the natural ones, natural things that you may find in a specific map. The human features this comes from the human being. The things that are made by people. The symbols on page 8, they can help us to read the map. Let us start with the first, almost the first eight symbols or twelve symbols, no! not the first twelve but the first two symbols they indicate the boundaries. Then the third symbol going to the twelfth symbol, they are showing different roads, all types of roads. In the previous grade, you learned about types of transport isn't?*

Learners: *Yes* [in unison]

Ms Nailonga: *So, those symbols they indicate different types of roads and we call them kinds of transport … And starting from the power line, we have power lines there, telephone lines, are you there?*

Learners: *Yes* [in unison]

Ms Nailonga: *Aah… post office, police station, stores and hotels, schools and place of worship. Those symbols they represent kinds of services available to people in the specific area shown on the map. We have a trigonometric beacon symbol. Can you see that symbol?*

Learners: *Yes* [in unison]

This continued for ten minutes until she had worked through all the symbols. Although the teacher made some reference to real life situations, it was theoretical and abstract with no real-world examples being given and without any reference to symbols on an actual map.

Ms Nailonga made some inter-curricula links by reminding the learners that they might have learned what some symbols represented in agriculture.

Ms Nailonga: *the dipping tanks, if you remember you have done this in agriculture. The farmers used this thing to protect their animals from diseases using this dipping tanks. Can you remember this?*

Learners: *Yes* [in unison]

When going through the symbols, Ms Nailonga made reference to the types of questions that would be asked in the examination or test. *"It might be asked which settlement is here? At place A, at place B?"* Throughout the lesson, the learners listened attentively to Ms Nailonga and copied what she had written on the chalkboard. Ms Nailonga only gave the learners an opportunity to ask questions after she had finished reading and explaining all the keys and symbols to the class.

Ms Nailonga: *… You do not expect someone to tell you or give you a list of symbols for you to give or explain what the symbol represents and you say excavation, wind mill, monument or what, but you will be asked according to the activities that are taking place. Is there any question?*

When she had finished talking about the symbols, Ms Nailonga told the learners to look at the map on the next page of the textbook. The map showed a Namibian place that was not familiar

to the learners. Ms Nailonga discussed the questions 3, 4 and 5 with the class (refer to Figure 6.2). Ms Nailonga wanted to find out if learners could identify and interpret the map symbols.

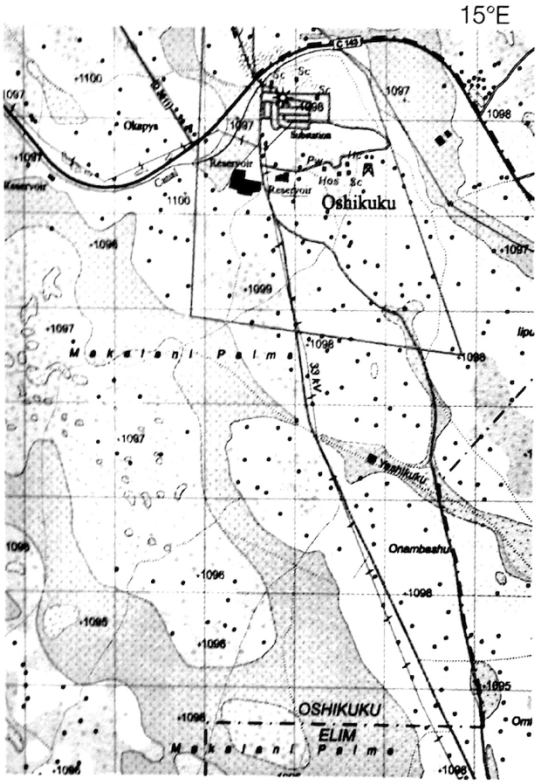

Figure 1.2 Part of 1:50 000 map 1715 CB Oshikuku

1 What is the meaning of the number 1715 in the title of the map?

2 Write down the height of the highest point on the map. What do we call the symbol that indicates this height?

3 Using the information on the map, identify and write down two ways in which water is available to this area.

4 Describe the natural vegetation in this area.

5 What type of settlements can you recognise on the map?

6 What type of building, indicated by a map symbol, can you recognise on the map?

7 Write down any two types of transport routes that appear on the map.

9

Figure 6.2: Class activity

Ms Nailonga: *Let us start with number three* [reads the question aloud]. *Take that map find out how water is available, I already told you that there is non-perennial, perennial water, dry pans, spring water, boreholes, water holes, pipe line represents the availability of water. What about the people of Oshikuku? How is water available to them? What are the sources of water in Oshikuku?*

Learners: silent

Ms Nailonga: *Check the symbols, check the words, maybe they are using symbols or they are using word, check the symbols we have learned, check the words that are related to water. There is nothing?*

Learners: *There is.*

Ms Nailonga: *Then tell me,*

Ms Nailonga: *eee…… where do they get water from? Aaye! [no], who is sleeping?*

Learners: silent

Ms Nailonga: *Ok, Liz?*

Liz: *The canal?*

Ms Nailonga: *They get water from the canal. Thank you. Where else? Emmy!*

Emmy: *Dry pans?*

Ms Nailonga: *dry pans, dry … Emmy dry? Is there water there? It is a dry pan there is no water, they don't get water there, so we have a canal, we have reservoirs, we have a water tower - those are some of the sources of water. Let us do number 4.* [Describe the natural vegetation in this area]. *The natural vegetation, is there any natural vegetation in that map?*

Learners: silent

Ms Nailonga: *I said trees and bushes, grassland aah! What else? They represent natural vegetation. So, which ones are available there? Shaddy?*

Shaddy: *Trees and bushes*

Ms Nailonga: *Trees and bushes! Ame ohanditi aaye!* [I am saying no, it is wrong*] Who know why? The question said 'describe'. Shaddy is correct. The problem is she did not describe; she did not form up any sentence to talk about those trees and bushes. … Where are there the trees and bushes? Is it all over or they are found on one side of the map? … Where are the trees and bushes?*

Learners: *North of the map.*

Ms Nailonga; *So, there are trees and bushes on the northern side of Oshikuku. You have to describe.*

Ms Nailonga's teaching emphasizes recall and comprehension. Learners read and identified map symbols. They listened and answered questions that required no interpretation or explanation even though Ms Nailonga told them that this would be required.

Ms Nailonga: *... what I am telling you is that for the sake of knowing the symbols, you have to study them by heart, but do not expect to be asked what does this symbol stand for or mean? What you will be asked is the human activities that physical features that are available on that specific map.*

To round off the lesson, the learners were given a worksheet to complete in class for consolidation purposes. The teacher instructed the learners to read the symbols and questions carefully in order to complete the task. Learners were given about six minutes to complete the class activity. The worksheets were collected and the lesson ended with Ms Nailonga telling the class to learn the map symbols by heart and know what they mean so that they would be able to interpret them in the examination.

What emerged was as follows:

- The teacher's classroom organization and management was good. The class was well behaved, polite and attentive
- The teacher appeared confident with no sign of self-doubt being observed
- There is evidence that the teacher knows the lesson content. However, the lesson lacked spatial conceptual understanding of what and how maps communicate spatial information using (map language) e.g. symbols, dots, lines etc.
- The emphasis was on teaching and learning factual information and being able to memorise, recall and comprehend without being able to explain or apply the information to interpret a map
- The lesson was teacher-led and consisted of teacher-talk interspersed with teacher-initiated questions. Ms Nailonga asked all the questions and decided what sort of activities the learners should do. The learners answered questions and when a learner struggled, Ms Nailonga answered the questions herself
- For most of the lesson, no reference was made to an actual map. Map features were taught in a theoretical and abstract way with little application to a real world.

- The only time a map was used was when the learners were completing an activity in the textbook (see Figure 6.2), the purpose of which was to assess if they understood the symbols taught in the lesson
- Throughout the lesson the teacher emphasized rote learning and memorization of facts about maps. The learners were given little opportunity to ask questions or discuss the content. The learners only spoke when answering the teacher's questions
- No links were made to the learners' lived experiences. There was no evidence of application and problem solving
- Constant reference was made to what is required in the examinations. This suggests a backwash effect of examination and testing classroom practices
- The teacher taught the whole class, without focusing or paying attention to the needs of individual learners. There was no evidence of differentiation or support for learners who were struggling
- The teacher taught from the front of the class. The learners listened carefully to the teacher, and copied down what she wrote on the chalkboard
- There were no maps on display in the classroom. LTSMs consisted of the textbook and a worksheet
- Thirty-four minutes of the forty-minute lesson was spent on instructional teaching, with the remaining six minutes and an additional five minutes of the afternoon study break used to complete the class activity.

6.2.2 Ms Nailonga: Lesson 2

Lesson Topic: Scale and Distance	**Grade:** 10
Duration: 40 minutes	**Number of learners: 31**
Date: 08. 03. 18	

The lesson began promptly at 13h50. Ms Nailonga greeted the class and began with a recap on what had been taught previously. She asked learners to explain how it is possible for a map to fit onto a page or a book. When the learners did not respond, Ms Nailonga rephrased the question.

Ms Nailonga: *Alright last time we looked at the features of the map or map symbols. We also talked about a map being reduced to fit in a flat surface or to fit in a piece of paper. So what*

make it possible for a map to fit in a small piece of paper? Like a flipchart, a poster or a book? Can you tell me?

Learners: silent

Ms Nailonga: *Yee! Ooh! The map is reduced to what?*

Learners: *To a scale.*

Ms Nailonga told the class they were going to look at scale and distance. She asked them to define scale. She then wrote the definition of scale on the chalkboard.

Ms Nailonga: *All the maps that we find wherever we find them they are reduced to a certain scale. For today we are looking at scale. Scale and distance. Can you explain to us what a scale is? What is a scale? Hafeni?*

Hafeni: *The relationship between the two places in the map and the same place on the ground.*

Ms Nailonga: *Hafeni said, scale is the relationship between two places, between our school and Oshipale Primary school. Two places on the map, on the piece of paper, on that map you are given and the distance in reality between the school and another school. So, the relationship between the actual distance on the ground and the reduced distance on the map.*

Ms Nailonga asked the learners to list the three types of scale and wrote their answers on the chalkboard. She then told three learners to come and write down the examples of scales on the chalkboard. The learners spent about three minutes doing this.

Shaddy*: Word scale.*

Ms Nailonga*: Word scale, yes! Nelao?*

Nelao*: Ratio scale.*

Ms Nailonga*: Ratio scale, yes! Liz?*

Liz*: Linear scale.*

Ms Nailonga*: Linear scale. These are the types of scales. Thank you.*

Ms Nailonga spent a few minutes pointing at the 1:50 000 ratio scale and explaining that it always has 1 as denominator, colons and is always in centimetres. Ms Nailonga offered no

explanation of a representative fraction. She proceeded to spend about seven minutes demonstrating how to convert a ratio scale into a word scale. She reminded the learners to refer back to the metric system when they converted using the scales. After working out how many centimetres there are in a kilometre, she proceeded to convert the ratio scale into a word scale.

Ms Nailonga: … *The ratio scale it can be changed, it can be changed to became a word scale, it can be changed. There we are given 1 cm represent 50 000 centimetres we can change it. … Let us change it to become a word scale. … we were given a word scale here 1 cm represent instead of writing a colon now in a word you write what?*

Learners: *represent*

Ms Nailonga: *represent, represents we have*

Learners: *The word represents (correcting the spelling)*

Ms Nailonga: *Yee! Ooh, (re-pre-se-nts) thank you. We can use the word represent or instead of the word represent we can use the word* ***to*** *1 cm to, we have 50 000 cm. here you have to go back to mathematics so, most of the time we use when we are putting the distance in reality we either use m or km so you have to go back to the metric system where we have to check how many centimetre in a kilometre. How many centimeters in a kilometre?*

Learners: whispering

Ms Nailonga: *who is singing? Raise your hand and say something please. How many cms in 1 km? I see some are already drawing the metric system - decametre, kilometre, metre, so, how many centimetres in 1 km? How many are they? I see someone is taking his book for mathematics. Yes! Kauna how many centimetre?*

Kauna*: 100 000*

Ms Nailonga*: in 1 km, there are 100 000 cm. so, now on the given ratio scale we have 50 000 there you have to divide, divide this 50 000 by 100 000 can you do that? Mathematicians please help us out.*

Learners: working out the answer on their calculators.

Ms Nailonga*: yes, what answer did you get?*

Learners: (shouting the answers)

Ms Nailonga: *Please put up your hand and give us the answer, Shaddy?*

Shaddy: *5km*

Ms Nailonga: *50 000 divided by 100 000?*

Learner 1: *0,5*

Ms Nailonga: *0,5 learners? Yee! Yes, Eino?*

Eino*: 0,5 km*

Ms Nailonga*: 0,5 km. so, now we have what? Another type of scale?*

Learners: *A word scale.*

Ms Nailonga: *A word scale, but we got it from a ratio scale by converting it.*

Ms Nailonga moved on to a linear scale and spent about five minutes explaining how to convert a word scale to a linear scale. She drew a diagram of a linear scale on the chalkboard and wrote a short description of it, telling the learners to look at the chalkboard while she wrote. She pointed out that the linear scale is divided into two sections, but she did not clarify why there were two sections. It was only after she had finished explaining to the learners that she asked if they had any questions and whether they had been following. The learners did not ask any questions. The next twelve minutes of the lesson were spent explaining how to use a scale to calculate distance on a map. Ms Nailonga drew two points on a sketch map she had drawn on the chalkboard and then explained step by step how to measure distance between two points on a map using a specific formula e.g. km = $\frac{map\ distance}{100\ 000} \times scale$. The learners listened and watched what she was doing and some copied what she wrote on the chalkboard. When she had finished explaining, she wrote an activity on the chalkboard and asked learners to work on it. She emphasized the use of the metric system and told the learners they should always divide with 100 000 to get kms without explaining why.

Ms Nailonga did another example on the chalkboard using a linear scale, after which she asked if learners had questions. No questions were asked so she gave learners an activity that required measuring distance on a map. She handed out a worksheet and went through it emphasizing what was important for examination purposes. The learners spent six minutes doing the worksheet before Ms Nailonga concluded the lesson with a brief recap of the main points.

What emerged was as follows:

The teacher was confident and well prepared. There is evidence that she knew the content of the lesson. The teacher tried to make links to the learners' lived experiences e.g. when calculating distance

- The teaching approach was teacher-centered. The teacher stood in front of the class and explained the content to the learners. The teacher did most of the talking and made notes of the important aspects of the lesson on the chalkboard
- Learners listened attentively and took notes from the chalkboard. The teacher interacted with the learners through questions and answers
- Learners were taught as whole class. There was little discussion
- Learners were seated in paired rows facing the teacher, who remained in front for the entire lesson
- There was no learner-learner interaction through pair work or group work
- Thirty-four minutes were used for teaching and the other six minutes were used to complete the class activity
- The concept map scale was taught in a series of steps, focusing on how to measure and convert map distances using different scales. The emphasis was on the steps learners need to follow in order to complete the activity. Little, if any, attention was given to developing a conceptual understanding of scale
- No real maps were used. The teacher drew sketch maps on the chalkboard of their school and the neighboring school to explain how to measure distance between the two schools
- The only time a real map was used was when the learners had to do an activity towards the end of the lesson
- The teacher made several references to the examination and assessment.

6.3 Ms Munageni's classroom practice

Ms Munageni is the youngest and least experienced of the three teachers who participated in the study. She has been teaching at Hanganeni High School since graduating from university in 2013. She has a four-year Bachelor of Education degree with Honours (BEd-Hons) majoring in geography and biology, from the University of Namibia (UNAM). Ms Munageni teaches geography and development studies in Grades 11 and 12.

Hanganeni Secondary School is one of the largest schools in the region. It has 1182 learners and thirty-eight teachers, six of whom are geography teachers. The school is located in a small growing town in the Ohangwena Region of northern Namibia, about six km from the Namibian-Angolan border. The school is a national symbol; it was located near the army base during the apartheid era and the school and the community played an important role in the liberation for independence. The school was attacked several times during the struggle for freedom, and this resulted in the destruction of the school's facilities, the killing of two learners, and teachers and community members.

The school caters for learners from Grade 9 to12, with an average class size of forty. There is an age and gender variation among the learners in the school — fifteen years in Grade 9, to twenty-two years in Grade 12. In the Grade 12 class I observed that there were forty-five learners of which twenty-five were females and twenty males. The school offers boarding facilities for both boys and girls. However, the hostel facilities only accommodate half of the learners in the hostel. The other learners have to find accommodation in the surrounding areas in town where they have to pay rent, or in nearby villages as far as ten kilometres or more away. The learners' attendance is generally good, with low absenteeism among the non-boarding learners.

The learners come from local feeder schools in the circuit and the region. Most learners and teachers speak Oshiwambo as a first language and English as a second language. Most of the learners live in the surrounding areas and nearby villages and a few come from the neighbouring country Angola. Many learners are from economically challenged backgrounds with some paying hostel fees out of the government social grants or else they are exempt from paying the hostel fees. The school has been a non fee-paying school since free education was introduced in 2016.

The school has electricity. The classrooms have chalkboards and some have cupboards, although without doors and locks for teachers to store their teaching materials. The school has an administration office and a staffroom in which each teacher has a desk where they store their materials. There are a number of offices including one for the principal, the HODs and secretary. The school has the basic resources for teaching, including chalkboards, learners' desks and chairs, computers, a copy machine, textbooks, book storeroom and a printing room. There is also a small library and science lab at the school. The school has a computer lab with

internet connectivity in which there are about twenty computers for the teachers and learners to access information about maps.

The first lesson begins at 07h30 and the last one ends at 14h00. The school follows a seven-day cycle with eight lessons of forty-five minutes per day, and a thirty-minute break at 10h30. The school timetable makes provision for double lessons lasting ninety minutes. Both the mapwork lessons I observed were double lessons. The learners remain in the same class all day and teachers rotate. There are study hours for all the learners on Wednesdays and Thursdays in the classrooms from 15h00 to 16h00. There is an evening study period from 18h00 to 20h00 for learners who board.

The Grade 12 classroom was on the small side and somewhat crowded, but this did not seem to affect the teaching. The learners were seated in paired rows facing the front. The teaching approach was more collaborative with learners completing a worksheet in pairs in the second lesson I observed and working in groups in the first lesson. There were enough desks and chairs for all the learners and they had textbooks, notebooks and pens. The learners were disciplined and I did not observe any unruly or disruptive behavior.

The classroom walls had displays that were mostly biology related. Only one flipchart with a diagram of the internal structure of the earth related to geography. The weekly cleaning list and class timetable were also displayed. The chalkboard was in good condition, but small. The teacher had to rub off the notes she made to create space for writing. There was a teacher's desk but no chair for her to sit on. She kept her teaching materials e.g. textbooks, chalk, worksheets and maps on the desk.

6.3.1 Ms Munageni: Lesson 1

Lesson topic: Interpretation of contour lines	**Grade: 12**
Duration: 90 minutes	**Number of learners:** 45
Date: 20. 02. 18	

The lesson began at 09h15 — fifteen minutes late, because the learners had to move from their classroom to the library. The teacher had to search for an extension cable and adapter so that she could set up her PowerPoint slide show. Learners were seated in groups of five. The teacher greeted the learners and recapped what they had done previously in mapwork. She asked learners to mention the two types of features found on topographical maps.

Ms Munageni: *So, if I may take you back to what we covered last time on mapwork, we learned that in a topographical map there are two types of features, isn't [it]?*

Learners: *Yes,*

Ms Munageni: *Who can name those features for us? Yes, Panduleni?*

Panduleni: *We have natural features and man-made features*

Ms Munageni: *Yes, we have natural features and man-made features, so man-made features are feature that are constructed by human being and we also have physical features or natural features, features from nature. So, some of the natural features on the topographical map can be presented using contour lines. In some cases, you can be asked to discuss the relief features of the specific place and then you must make use of the contour lines to help you identify those features and that is what we are going to talk about today,*

Ms Munageni then asked the learners to define contours.

Ms Munageni: *... but before we look at those land forms we have to remind ourselves what are contour lines? What are contour lines? Who can help us to define that? Tuli?*

Tuli: *Lines on the map joining points on the map with equal height.*

Ms Munageni: *Contour lines are lines on the map joining places with equal height. Meaning that we have line that are joining different places with equal height. Contour line have some features — who can give me features of the contour lines? Characteristics of contour lines. Who can help with that? Or rules for contour lines, contour lines have rules? What are those rules?*

Learners*: Contour lines never touch.*

Ms Munageni: *So, they never touch, is it touch?*

Learners: *Cross*

Ms Munageni: Contour lines never cross each other. So, they never cross each other, however they can touch each other at some points.

Ms Munageni asked learners to identify the different landforms illustrated by contour lines.

Ms Minageni: *List all the land forms that we can remember that are formed by contour lines. We have a lot of them probably ten. Can you list that you know? Panduleni?*

Panduleni: *I know a spur*

Ms Munageni: *We have a spur. Hafo?*

Hafo: *A valley*

Ms Munageni*: We have a valley. Hella?*

Hella*: Gradual slope*

Ms Mungeni: *Gradual slope?*

Learners: *Aaye! (no)*

Ms Munageni: *Quiet, that one is a type of slope, we are talking of land forms.*

Hella*: Oho! Conical hill*

Ms Munageni: *Conical hill, yes, Sammy?*

Sammy: *A flat-topped hill*

Ms Munageni**:** Flat-topped hill. Paula?

Paula: Saddle

Ms Munageni: *We have a saddle.*

Learners: *Waterfall*

Ms Munageni: *Waterfall, a cliff*

Learners: Escarpment

Ms Munageni: *Escarpment, plateau and so forth.*

Ms Munageni showed learners photographs of models of selected landforms on the projector. She asked the learners to identify the landforms and the kinds of materials that had been used to make such models in the photo. She then read a list of materials and equipment they needed for a model building activity. Ms Munageni read out instructions for the activity and told the group leaders to collect contour templates for their groups. She encouraged the class to be creative and emphasized that they needed to "*come up with a beautiful model of that specific contour landform.*"

Figure 6.3: Learners building a model

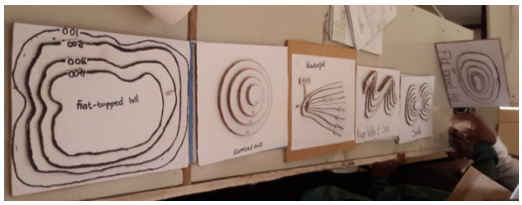

Figure 6.4: Models built in the lesson

Ms Munageni read out some questions the learners needed to answer after they had completed their models.

Ms Munageni: *There we have questions do to at the end of your activity, and I hope you brought your group books, because you will need to submit your group book when you are done with answering those questions. ... so, give the name of the landform you modelled, the second one, state the contour interval so, you have numbers there, use those numbers and give me the contour interval, and then lastly just describe or give the features of your land form. Are we clear? ...*

Ms Munageni read out the marking criteria she would be using to mark the learners' work. She encouraged the learners to work as a team in order to complete the hands-on activity.

Ms Munageni: *... lastly, what I am going to use to mark your work, I am going to look at neatness, is your work neat? Creativity, you must be creative, and then originality, meaning that it must resemble the real thing, must not look like something that is not real. And remember, team work! Are there any questions? If there are no questions, we can start.*

The next forty minutes were spent constructing models (Figs 6.3 and 6.4). Ms Munageni walked around the class checking how learners were getting on and attending to individual group's questions and concerns. She kept asking the learners if they were done and encouraged

them to finish working before the lesson ended. The lesson concluded with Ms Munageni asking the learners to tidy up before leaving the library.

What emerged was as follows:

- The teacher appeared confident and seemed to know the lesson content and what she was talking about
- There was learning-by-doing. The learners were involved in hands-on practical activities to build cardboard models of contour landforms, but using pre-drawn forms and labels given to them, to work with
- To a certain extent there was evidence of LCP through group work. The learners worked in groups or teams of five to complete the activity
- On the surface this looked like a very good lesson, however, the lesson focused only on the basic characteristics of contours, labels, and examples of land forms. These are elements already learnt in Grade 8. There was no effort to move beyond this to the use and interpretation of contours, nor posing any problems to solve
- Although contour lines have a number of characteristics, only one received attention in the lesson
- The learners were kept busy building 'neat' models. There was no evidence of spatial conceptual understanding being developed
- The concept (contours) was taught in isolation. The learners were not required to apply their knowledge (of contours) to read and interpret landscapes depicted in maps
- Throughout the entire lesson the teacher emphasized the steps or procedures learners had to follow in order to complete the activity
- The questions asked in the written activity were closed-ended and recall questions that did not require explanation or application of knowledge. Learners were not questioned or challenged when building their models
- Apart from the PowerPoint slides, no other LTSMs used by the teacher. Only one group used a textbook to check for answers to the questions. There were no maps or other geography resources on the classroom walls
- No topographical maps were used to show the learners what contours look like on a map or how landforms (relief) are shown by means of contours
- The teacher did all the talking in the first seventeen minutes of the lesson. Learners listened attentively and only spoke when answering a question asked by the teacher

- Forty minutes were spent on learners building a model and fifteen minutes were lost because of the move to the library and looking for equipment.

6.3.2 Ms Munageni: Lesson 2

Lesson Topic: Location **Grade:** 12

Duration: 90 minutes **Number of learners:** 45

Date: 14.03.18

Ms Munageni arrived late for the lesson which was meant to start at 09h00. The learners were seated in paired rows when the teacher arrived. She greeted the class and asked the learners if they had their stationary needed for the lesson. Time was lost because a few learners went outside to look for their rulers, pencils, calculators etc. She told the learners to settle down and proceeded to write the learning objective of the lesson on the chalkboard which she then read to the class.

Ms Munageni: *One minute, wait, wait, go back and seat. Hurry up time is going.*

Learners: [coming and going in and out of the classroom for about six minutes]

Ms Munageni: *Can we all have our seats. So, if you don't have pencil, ruler and other you can share with your neighbour. Alright can I have your attention; we are going to look at map reading and we are going to focus on location. We will look at how to locate features in the map, how to give the exact location of a certain feature on a topographic map. Our objectives there, what are we expected to know at the end of this lesson? To be able to locate features on the map using coordinates and be able to give and read degrees, minutes and second in order for you to give the precise location of a certain feature on the map. So, that is what we are going to look at today.*

Ms Munageni drew lines representing latitude and longitude on the chalkboard and asked the learners to differentiate between the two. She asked the class to affirm their friends' answers and noted keywords on the chalkboard.

Ms Munageni: *... before we go into more details of how we can locate using degree, minutes and seconds, because that is our main objectives, firstly we need to familiarize ourselves with these two lines latitude and longitude lines. ... Who can tell me the difference between the two*

lines? How do you know that this is one is latitude line and this one is longitude line? How do you know which one is which?

Learner 1: [Speaking very quietly]

Ms Munageni: *Looks like you are just telling yourself, we can't hear, please speak up so that everyone can hear.*

Learner 1: *Latitude they are horizontal lines, while longitude they are vertical.*

Ms Munageni: *Latitude is horizontal and longitude is vertical, is he correct?*

Learners: *Yes* [in unison]

Ms Munageni: *So, latitudes are the horizontal lines that we find in our topographical map while the longitudes are the vertical lines. Meaning that vertical standing, while the other ones are…*

Learners: *Sleeping*

Ms. Munageni: [laughs] *sleeping?*

Learners: *Yes* [in unison]

Ms Munageni: *Ok, so, probably that will be the easy way that you can use in order for you to determine which one is which. Are we clear?*

Learners: *Yes Ms* [in unison].

Ms Munageni asked the learners to give examples of latitude and longitude lines.

Ms Munageni: Who can give an example of a latitude line? Hafo?

Hafo: *Equator*

Ms Munageni: *So, an example of a latitude line is an Equator. While longitude?*

Learners: *Greenwich Meridian.*

Ms Munageni: *Greenwich Meridian, … So, these are vertical lines on the globe. If you look on the globes the horizontal one are called latitude meaning that they are the ones that are across the globe, while the latitude ones are vertical on the globe. …*

Ms Munageni used her hands to demonstrate to the learners what horizontal and vertical look like. She noted the characteristics of both lines on the chalkboard. She asked the learners on which side of the Greenwich Meridian Namibia is found:

Ms Munageni: *... these ones depending now on which hemisphere you find yourself, the latitude ones show how far, how far are you from what?*

Learners: *Equator* [in unison]

Ms Munageni: *How far are you from the Equator, how far, it shows how far North or South of Equator. So, now it depending on the hemisphere, for example we are on a southern hemisphere and therefore, we are going to focus on how far are we south of the equator. So, the latitude one they show how far the place is East or West from where?*

Learners: *Greenwich Meridian*

Ms Munageni: *A place is from Greenwich meridian, so Namibia is on which side of the Greenwich meridian?*

Learners: *East, south, west*

Ms Munageni: *South?*

***Learners*:** West, East?

M Munageni: *You guys don't know? We are on the east of the Greenwich meridian. And we are south of the equator.*

Learners were uncertain about their answers. Ms Munageni corrected the learners without any reference to a map or globe. She asked the learners to explain why the latitude lines are also called 'southing' and longitude lines 'easting':

Ms Munageni: *so, another name we call them southing and the longitude line are called the easting. Why do we call them southing?*

Learners: [murmuring] *Because they are increasing towards the south.*

Ms Munageni: *Why we call them southing is because they are increasing towards the south. So, you find them in a topographical map and they are increasing towards that side.*

Learner 2: *Ms… Ms… why are they not northing? They are northing.*

Ms Munageni: *They are northing?*

Learners: *Yes, they are also northing, what about those ones that are going up?*

Ms Munageni: *But I said we are on which side of the equator?*

Learners: *ooh, we are looking at Namibia?*

Ms Munageni: *We are on the south, and that means the lines are increasing toward the south from the north of the equator downward to the south.*

Learner 4: *But Ms. what shows that they are increasing toward the south?*

Ms Munageni: *What shows? He is asking what shows that they are increasing toward the south? What shows that they are increasing toward the south?*

Learner 5: *The degree.*

Ms Munageni: *The degrees will show. Because if you have 0 at the equator, is it? 0° equator, the degree is 5, 15 and so on?*

Learners: *Yes* [in unison].

Every time a learner asked a question Ms Munageni redirected it to the class for discussion. She asked the learners to explain how to locate a feature on the map. The learners did not respond. Ms Munageni repeated the question several times and wrote it on the chalkboard.

Ms Munageni: *... Anyone with an idea how can you determine the degrees, minutes and seconds? Of a certain feature? Anyone with an idea? Ndilimeke! Yes?,*

Ndilimeke: [Silent]

Ms Munageni: *Anyone with an idea on how to determine degrees, minutes and seconds for a certain feature? ... You may have a spot height, 220 and then they ask you to locate or give latitude and longitude lines for the spot height given.*

Learner 7*: The degrees and minutes are already here.*

Ms Munageni: *In most cases in our topographical maps the degrees and minutes are already given*

Learners: *Yes* [in unison].

Ms Munageni: *However, you still need to start there. You just don't write the seconds alone; you have to start from the degree. Hafo?*

Hafo: *You have to take a ruler and draw a vertical line straight and then you determine where the that line lies on a certain degrees and minute and after that you measure the distance from a certain degree to another, and then after taking the reading you take the whole reading with two degrees which is an interval distance and then you take that distance where that point lies on that latitude line and then you multiply it with the 60 and you divide by the total distance of the whole minute.*

Ms Munageni: *Alright, thank you, did you get it?*

Learners: *Noo!* [emphatic]

Learner 4: *I am confused.*

Ms Munageni: *You are confused? You will find out now.*

Ms Munageni told the learners that they should always give the latitude line first and then longitude but did not explain why. She drew a rough grid representing lines of latitude and longitude with degrees and minutes. She then demonstrated how to locate a feature on a map using coordinates. She wrote the seven steps that needed to be followed and the formula that must be used on the chalkboard. She asked the learners to estimate the measurements while she was demonstrating the procedures on the chalkboard. This took about fifteen minutes. In total, about sixty minutes of the lesson was spent explaining and demonstrating how to locate features on a map.

It was only at this stage of the lesson that Ms Munageni distributed the topographical map of Harrismith, South Africa. The learners worked in pairs to complete a worksheet for the remaining fourteen minutes of the lesson. The questions on the worksheet asked the learners to give the location of a feature on a map using degrees, minutes and seconds. Ms Munageni walked around the classroom checking how the learners were doing and attending to individual pairs' questions and concerns. Ms Munageni told the learners to submit their worksheets and maps once they were done.

What emerged was as follows:

- The teacher seemed prepared for the lesson on location. There was evidence of teacher-learner interaction through questions and answers. Classroom discussion was encouraged through guided questions and sometimes probed responses by the teachers and learners
- Latitude and longitude was discussed in relation to Namibia
- The learning and teaching environment was relaxed and non-threatening. The learners asked questions when they did not understand. The learners corrected the teacher in a respectful manner
- Some learners openly and freely expressed their views and misunderstandings. Learners suggested answers
- At the end of the lesson, learners worked in pairs to complete an activity to locate features on a map handout using latitude and longitude
- This also looked like a good lesson, however, again the content and skills being covered here are all done from Grade 9. There was no progression beyond the review of these basic skills and knowledge in this Grade 12 lesson, either in the questions being asked nor were there any problems to be addressed. Learners were taught to follow certain steps and formulae to locate a feature in a map, as the teacher had notes that she referred to in her explanations. The lesson focus was on knowing and doing without any application to real-life situations or problem solving
- The map concept was taught in isolation from other geography topics
- The teacher stood in front of the class explaining the content to the learners for most of the lesson. She did most of the talking and used the chalkboard to demonstrate finding positions using coordinates. The learners listened attentively to the teacher and one or two asked questions where they did not understand or were confused
- The teacher's explanations were interspersed with questions, most of which checked if the learners were following
- Whole class teaching was done and not much attention given to learners who expressed confusion
- Using latitude and longitude to give a location was taught using a grid sketched on the chalkboard. No maps or globes were used to demonstrate and explain coordinates to the learners. The only time a real map was used was towards the end of the lesson where learners were given a worksheet for consolidation purposes

- The teaching and learning process was controlled by the teacher and it was closely aligned to the leaning objectives and content listed in the syllabus.

6.4 Mr Haitange's classroom practice

Mr Haitange is between 30 and 40 years old and has been teaching for eleven years. He has been at Twakulilwa Secondary School since 2010. Mr Haitange has a four-year Bachelor of Education degree (BEd) majoring in geography and history. He teaches geography and history in Grades 10 to12.

Twakulilwa Secondary School is located near the Namibian-Angolan border in the Ohangwena Region. It is one of the oldest schools in the country, and the first English-medium school in northern Namibia. The school is a national symbol for the role it has played in the liberation struggle of the country. During colonial times the missionaries were deported, students were abducted twice and the school buildings were destroyed. The school was temporally closed down and moved further inland to a different location and was only reopened after independence. The school is diverse; it caters for learners with different abilities from diverse cultural backgrounds as well as from neighbouring countries like Angola. There is also cultural diversity among the teachers in the school. Most teachers at the school are Oshiwambo speaking, with a few non-Oshiwambo speaking from the Zambezi Region and Zimbabwe.

Twakulilwa Secondary School is a rural school surrounded by communal land with subsistence farming. The school is private church-run school which is subsidized by the Namibian government. The parents are responsible for paying school and hostel fees for their children. Very few learners depend on social grants to pay fees.

The school has seventeen teachers, four of whom are geography teachers. It has an enrolment of 424 learners from Grades 8 to12, and a class average of thirty learners per grade. There is age and gender variation among the learners in the school — from fifteen years in Grade 9, to twenty-five years in Grade 12. Some of these learners have failed Grade 10 or 12 from other schools and want to improve their grades. In the Grade 11 class I observed, there were thirty learners, of which nineteen were female and eleven were male. Twakulilwa is a boarding school and offers hostel facilities to both boys and girls. Like Hanganeni high school, the hostel accommodation is a challenge. Only half of the school is accommodated in the hostel and the other half have to find accommodation in the surrounding areas or nearby houses. The learners' attendance is generally good, with low absenteeism among the non-boarding learners.

There is an administration office at the school, a staffroom and various offices, including one for the principal and the secretary as well as other offices. The school has the basic resources for teaching e.g. chalkboards, learners' desks, chairs, computers, a copy machine, textbooks, a book storeroom and printing room. There is also a small library and a computer lab at the school. Like Hanganeni high school, the school has electricity and internet connectivity. It has a computer lab with about ten computers connected to the internet which the teachers and learners can use to access information.

The first lesson starts at 07h30 with the last one ending at 13h00. The school follows a seven-day cycle with eight lessons of forty minutes per day, and a thirty-minute break at 10h30. The school timetable makes provision for double lessons lasting eighty minutes. However, the two lessons I observed were all single lessons lasting for only forty minutes. Unlike the other two schools in this study, at Twakulilwa the teachers remain in the same classroom and learners rotate for their lessons. There are study hours for all the learners on Wednesdays and Thursdays in the classrooms from 15h00 to 16h00. There is also provision for evening study for boarders on Mondays to Thursdays from 18h00 to 20h00.

The classroom was slightly bigger than those at the other two schools and it was subject specific. The classroom had a storeroom where Mr Haitange kept his materials e.g. maps, textbooks, etc. The learners were seated in straight rows facing the front. There was a desk and chair for each learner and they all had a textbook, exercise book and pens. The atmosphere in the classroom was orderly and conducive to learning and the learners were well disciplined. I did not observe any unruly or disruptive behavior.

The only wall display consisted of a world map. The weekly cleaning list and class timetable were also pinned up. The chalkboard in the classroom was small but in good condition.

6.4.1 Mr Haitange: Lesson 1

Lesson topic: Bearing
Grade: 11
Duration: 40 minutes
Number of learners: 30
Date: 12. 03. 18

This lesson was taught in the afternoon during the afternoon study period. It started at 15h00 with Mr Haitange greeting the learners and recapping what they should know about bearing from Grade 11. He told the class they would be looking at bearing and gave them a handout

with notes and a few steps on how to find bearings. He reminded the class that they had done bearings in mathematics. Mr Haitange read the handout and drew a rough sketch map on the chalkboard. He plotted two points A and B on the chalkboard and started explaining step-by-step how to find a bearing on a map:

Mr Haitange: *I don't know whether you have already done it in mathematics or you are going to do it otherwise all I know is that bearing we do it in these two subjects geography and mathematics. Now to look at this paper here that I have given you, it is written how to measure bearing. The question in the test will ask us to find bearing from point A to point B. if you look at that paper that I have given you there is a diagram which has got many points. ... Now it says there the* ***first step,*** *it is to find the points concern, let us say we are having our two points there. ... point A here and we have point B there. ... The next step you have to put a line or connect the two points with a straight line. As we said the first step is to find the two points concern. We have our two points A and B.* ***The next step*** *is to connect the two points with a fine line. ... we have joined from point A to point B. Then we go to the next step draw a across line up on the north from feature, we are going to be have N, the bearing of B from A this what we are trying to do here. So, our next step three draw a cross line up on the north from feature, our bearing from feature here is which one?*

Learners: *A* [in unison]

Mr Haitange: *... if we are looking at the board here, mostly our north every time it is on the top even if we are looking in our books our north is usually on top there. So, we are going to establish our north here and we are going to put a line on our point. ... The list says here our last* ***step here step four*** *measure the bearing with your protractor. ... but what is important is these four steps.*

Mr Haitange did an example on the chalkboard of how to measure bearing on a map following the four steps. He repeatedly emphasized the four steps set out in his handout. He showed the learners the protractor they would use to measure bearing and explained how to read bearing on a protractor while demonstrating on the chalkboard.

Mr Haitange: *(repeated the four steps) ... Now what is important is that when we calculate our bearing we are supposed to measure our bearing clockwise. Which means we are going to measure our bearing in this direction clock wise* [showing with his hand]. *So, we are going to*

measure the bearing of B from A. I got a big protractor and I hope you got smaller ones to work with?

Learners: *yes, sir* [in unison]

The learners listened and watched Mr Haitange demonstrate on the chalkboard. He asked one of the learners to come up to the chalkboard and show the class where to read the bearing on the protractor.

Mr Haitange: *... So, we are going to take our protractor we are going to first of all to place it on our line here we have got our point A from B here. I want you to tell me where are we going to get the readings? If we place our protractor here? And this is how you hold your protractor. So, who is going to tell us how many readings we have here? When we hold the protractor like this. It is reading how many degrees?*

Learner 1: *143 degrees*

Mr Haitange: *He says 143 degrees, where did you find the 143?*

Learners: [giggling]

Mr Haitange: *ok, no, thank you now, I said we read on our line here, and that is how he got the 143 degrees.*

Mr Haitange did another example on the chalkboard with the class listening and watching. He asked a learner to explain on the chalkboard how to measure bearing following the four steps. He then asked another learner to come and do another example on the chalkboard. There was a bit of commotion as the learner struggled to draw a straight line between the two points without a ruler. Mr Haitange calmed the class down and the lesson continued. He affirmed the learner's answer and emphasized the four steps that needed to be followed.

A learner asked a question on how to find a bearing of an opposite direction. Mr Haitange explained that they would be talking about bearings of more than 180 degrees in the next lesson:

Learner 3: *Sir. How do we measure from C to A, how do I get that C to A?*

Mr Haitange: *When you measure from C to A is the same thing, what you are told to do. We are going to be talking about, the bearings that are more than 180 later. After this, we are* [then] *going to talk about bearings* [that are] *more than 180. …*

Mr Haitange told the class to do three examples in the handout, following the four steps. He wrote the instructions on the chalkboard. The learners worked on the activity for about ten minutes during which time Mr Haitange repeatedly reminded the learners of the four steps.

Mr Haitange spent about eight minutes going through the three questions. He asked the learners to call out their answers which he wrote on the chalkboard. He picked the answer given by most learners but did not indicate if it was correct.

Mr Haitange: *Ok, let us start with this one, the bearing of E from A, Titus tell me what you got on this one E from A.*

Titus: *107*

Mr Haitange: *Joseph what did you get?*

Joseph: *115*

Mr Haitange: 115? I want someone else, yes Peter?

Peter: 117

Learners: *Ooh!*

Mr Haitange: *117, let see Pinehas?*

Pinehas: *117*

Mr Haitange: *117, yes, Paulus?*

Paulus: *116*

Mr Haitange: *107, 115, 117, 117, 116, these are the answers that we have. As you can see they are a bit different but a bit close, the highest 117 and the lowest 107. This difference is too big. We can have a difference of a degree or two. Paulina give me your paper. This one that I was given by Paulina, the north is not straight, our north must be straight. … Let me see one here, Tomas what did you get? This one for Tomas I think is better with 115. Let see Leena show me yours. Let me see this one is 116. The north is fine ok, so we take 116 degrees.*

The same process was repeated for the other two questions. Mr Haitange recapped the four steps of measuring bearing on the map. He asked learners if they understood what they had been doing and if they had questions.

Mr Haitange: *Does anyone have a question? Does anyone have a question? Hafeni, when we measure, we measure* [from where the direction must be given from] *not from D.*

Hafeni: *Sir! From the beginning, I don't understand.* [Hafeni got the answers to all three questions wrong]

Mr Haitange: *You don't understand? Ok, can we look at our paper for our steps? Find the two points.*

Hafeni: *Ok sir, I found them.*

Mr Haitange: *you found them, ok, then connect the two points with a straight line.*

Hafeni: *Sir, please come here!*

[Learners giggle]

Mr Haitange: [moving towards Hafeni. [Their discussion could not be picked up by the audio or video as I was seated from the other end of the classroom]. *Ok some of you here we will use this this example from A to C let's do this one, where do we place our protractor?*

Learners: [all noisy]

Mr Haitange: *Can you be quiet there? For example, in our line that we used to establishing north, that is where we place our protractor. I said that today we are only going to do bearings that are less than 180 degrees, maybe when we continue tomorrow we are going to do the bearing* [that are] *more than 180.*

Mr Haitange concluded the lesson by telling the learners what they would be doing in the next lesson before dismissing the class.

What emerged was as follows:

- The teacher seemed to know the content of the lesson on bearing and what he was talking about. The learners shared answers and incorrect answers were clarified. The teacher

emphasized very well the need for greater accuracy in measuring and drawing, so as to reduce errors

- The teacher addressed some of the learners' concerns and provided individual support for a learner who had openly indicated that he was struggling
- The learners were given a number of chances to practice the measuring and orientation skills on the board and explain to others how to work out a bearing
- To some extent there was classroom discussion, however, it was mostly teacher led. The lesson was teacher-centred using a teacher-tell method interspersed with teacher-initiated questions. The teacher's questions were low order (recall and comprehension)
- The content (bearings) was taught in isolation from other mapwork topics. Knowledge about bearings was not applied to a real map. The emphasis was on procedural knowledge. There was no explanation and application of knowledge
- For most of the lesson the teacher did all the talking. Learners listened and only talked when answering questions. Whole class teaching took place
- The learners were given a worksheet activity to complete. This required them to follow a set of steps to calculate bearing. This evidence suggests learning through practice and drill
- The teacher used his notes and a handout describing the procedure to be followed for calculating bearings.

6.4.2 Mr Haitange: Lesson 2

Lesson topic: Measuring distance on a map **Grade:** 11

Duration: 40 minutes **Number of learners:** 30

Date: 13. 03. 18

The lesson was taught in the afternoon, during the afternoon study period. The lesson started at 15h00. Mr Haitange greeted the learners and told them that they would be focusing on how to measure distance and convert to scale. He distributed a map of Thabazimbi, South Africa, and a handout with a metric conversion table. He displayed a copy of the map on the chalkboard and showed the learners the scale of the map — 1:50 000. He told the learners to use the keys to read the symbols on the map.

Mr Haitange read the metric conversion table on his handout to the class. He wrote different scales on the chalkboard (1:50 000, 1:10 000, 1:100 000, 1:250 000).

Mr Haitange: *... On our table, we have got different scales — the scale on our map which is 1:50 000 that is the scale that is on our map. But sometime you can have other maps they can have a scale of 1:10 000, other maps can have 1:100 000 and the last one we have here is 1:250 000 those are the scales that we normally have on the maps. We are going to start with 1:10 000 then 1:50 000, then 1:100 000 and then 1:250 000. Now when the map is written like that we need to know what does this mean here? If we look at our table, it says this table is a quick reference to convert distances on a map into distances on the ground. ...*

Mr Haitange explained to the learners that 1:50 000 means that one centimetre represents 500 metres on the ground. He gave an example of a soccer field to explain how big 100 metres is. He drew a rough sketch of a soccer field and labelled it 100 metres on each side. He asked learners how many metres a complete soccer field has.

Mr Haitange: *... If you look at our map here it is showing us that there is a small town here in South Africa and it is showing us about various features the distance that they have, we can be able to calculate that distance using our scale, our scale here is 1:50 000 now what does this mean? If we refer to the table 1:50 000 means 1cm, that is 1cm on the rule it represents how many km or how many metres? Let's look at the scale in our table 1:50 000 means 1cm represents 5000m, because we have divided here into metres. ...If we take for example our sport filed there, a standard one, it is like this (drawing on the board) a standard one, here is 100m those who do athletics know this, this one 100m, this one 100m this one also 100m. So, if you run the whole round around the field you have run how many metres?*

Learners: *400 metres.*

Mr Haitange: *400 metres, so, you ran 400 metres. If you run two rounds it's how many metres?*

Learners: [murmuring]

Mr Haitange: *It's going to be 400 x 2, so, that will be a total of?*

Learners: *800 metres*

Mr Haitange: *it will be 800 metres, so we have a scale here of our map, which is 1:50 000 now which means 1cm on the ground it represents 500 metres ...*

Mr Haitange gave different types of distances found on a map e.g. straight distance, winding (curved) distance. He explained to the learners what they need to use in order to measure such distances. He referred them back to the metric system.

Mr Haitange: … *now we can be able to convert the distance of either it's a road, it is a railway line, or anything that is there on our map using our scale. Now we are going to discuss one method that we can use to calculate our distance on the map. We can be able to calculate the distance when our feature either it is a road that we are talking about, or it can be a river or it can be a railway line, when it is straight we can just measure that with a ruler. But if it is winding by winding I mean when it is meandering like this (drawing on the board) you cannot use a ruler because it is winding let's say it is a railway line or a river when it is winding like this we can use specific method to measure the length or the distance of our river using what is on the map and then we convert that distance using our scale.*

Mr Haitange pointed to the map displayed on the chalkboard and asked the learners to find the Crocodile River. He asked the learners to measure the distance along the river between two bridges. He gave the learners pieces of paper and explained to them step-by-step how to use them to measure distance on a map. He drew a sketch of a river on the chalkboard and demonstrated to the learners how to measure distance. He asked the learners to do the same on their maps by dividing their rivers into small straight parts. Mr Haitange walked around the class checking how learners were dividing their rivers. He demonstrated the second step by copying down the distance from the map with a piece of paper. He asked the learners to do the same on their maps. Mr Haitange asked learners to convert their measurements into centimetres using a ruler and noted their answers on the chalkboard.

Mr Haitange: *ok, after measuring our distance the distance that we have got now on our paper, we are going to put our paper on the ruler. … Where you have got your marking, you are going to put your paper on the ruler. And go on to the last mark where you have the last mark at Whale. On your last point, we are going to go to the ruler and find where it is written Whale, how many cm did you get?*

Learner 3: *6.2*

Mr Haitange: *6.2cm, let's have a look at the answers we are getting. We have 6.2cm that is what he got, yes, Hileni?*

Hileni: *5.3*

Mr Haitange: *5.3cm here,*

Ndinelao: *5.2cm*

Mr Haitange: *5.2cm, almost the same as this one, let's have the last one*

Learner 4: *5.4*

Mr Haitange: *the last one we have is 5.4. you see our answers, this one is a bit off this one 6.2 may be there is a problem with the measuring, where did you start?*

Learner 2: *from here to here,*

Mr Haitange explained to the learners where they should start measuring on their rulers. Some learners did not seem to understand where to start measuring on a ruler:

Mr Haitange: *... ok, if you look at our ruler, you see our ruler here, there is a small space here that is not calibrated, when you are measuring you start here from the zero, don't start here on the edge here. ...*

Mr Haitange asked the learners if they had questions. No questions were asked. Mr Haitange collected the maps and then recapped the main points of the lesson. He told the class they would be looking at another method of measuring and calculating distance on a map in the next lesson and then dismissed them.

What emerged was as follows:

- In this lesson on scale the teacher came in with a definite plan for his lesson, but it turned out that he had not predicted the real challenges of explaining how to do the conversions, and skimmed over the details too quickly. As a result, there was a continued air of puzzlement and confusion
- Scales are taught from Grade 8, so one would have hoped that by Grade 11 that not only the basic operations of scale conversions would be reviewed, but application examples of their use and problem solving would be more advanced in the Grade 11 lessons. This was not the case in this lesson
- Learners worked individually in class. The teacher checked to see if the learners were managing and guided them on how to measure the distance
- In the lesson, the learners were taught as a whole class with no differentiation or attendance to learners' different needs

- Although the teacher and learners had maps, the teacher's demonstrations were done on the chalkboard with very little reference to the actual maps on hand
- The focus was on steps to be followed
- Questions on the worksheet were mostly on working out distance following certain steps or procedures without any real-life application.

6.5 Synthesis of what emerged

Table 6.2 summarises what emerged from the six lesson observations that were done with the three teachers. The findings have been categorized according to six themes, namely

- Teaching approach
- Teaching strategy
- Knowledge
- LTSMs
- Classroom arrangement
- Assessment for learning

Table 6.2: Summary of findings

Category	Ms Nailonga	Ms Munageni	Mr Haitange
Teaching Approach	For both lessons the teaching approach was teacher-centered. The teacher dominated all the lessons. The teacher did most of the talking and made notes of the important aspects of the lesson on the chalkboard. The learners listened attentively and copied notes form the chalkboard. The teacher asked all the questions and the learners answered. There was no evidence of learner-learner interaction through group work, pair work or classroom discussion.	For both lessons teacher-talk intercepted with questions and answers. For both lessons, whole class teaching was followed by group activity in lesson one and pair work in lesson two. All lessons were teacher dominated. The learners were seated in paired rows and groups while the teacher occupied a dominant position in front of the class.	All lessons were teacher-centred. The teacher controlled the pace and sequencing of the lessons. Learners were taught as a whole class with no special attention being given to learners with different learning needs, except for the end of the second lesson when the teacher attended to one learner who was struggling. Learners worked individually on the class activities in both the lessons. Feedback on the class activity was done with the whole class.
Teaching Strategy	For both lessons, whole class teaching was followed by an individual activity. There was no evidence of differentiation for learners with different learning needs. Learners were expected to complete the class activities without receiving help from	No evidence of differentiation in both the lessons with all the learners being treated in the same way. The teacher led the classroom discussion through guided questions and the learners sometimes responded. For both lessons the teaching	Both lessons consisted of teacher talk intercepted with a few questions and demonstrations of the learned skills on the chalkboard. Only in the second lesson the learners used a map to complete a worksheet to measure

	their friends. For both lessons, there was no evidence of pair work, group work, field work or classroom discussion, etc. The teacher answered her own questions when learners struggled to answer.	and learning process was guided by the teacher who emphasized the learning objectives and concepts as listed in the syllabus. In the first lesson the learners worked in groups to build models of different landforms. In lesson two the learners worked in pairs to find and locate features on the map using degrees, minutes and seconds. There was no evidence of using other strategies e.g. fieldwork, enquiry, debate etc.	distance on a map. In the second lesson instructions were noted on the chalkboard and learners answered questions without any reference to a map. There was no evidence of learner-learner interactions through group or pair work.
Knowledge	For both lessons the map concepts were taught in isolation from other geographical concepts and as a stand-alone topic in the geography junior syllabus. Questions asked in the lessons were closed-ended, which required recalling and identification of facts. There is no evidence of real-life application or problem solving. There is evidence of rote learning and memorization. There is visible backwash	For both lessons knowledge was factual and was based on recalling of facts and memorizations of facts. Questions asked were low order thinking or required simple responses. Both lessons focused on an abstract way of dealing with map concepts. The mapwork content was taught procedurally following a series of steps without any real-life application or any reference to a map. The lessons	The knowledge promoted was factual, based on recall and identification. In both lessons, taught an abstract way of dealing with map concepts, without any application to the real world. The content was procedurally taught following a series of steps without any reference to a map. The topics ‘bearing’ and ‘distance’ were taught in isolation from other geographical concepts and as a stand-

	effect of examination and its influence on the teaching.	focused on knowing and doing without application and problem solving. In lesson 1, learners built models of landforms without developing conceptual understanding of the features or linking them to other topics in the syllabus (e.g. geomorphology). In both lessons the map concepts were taught in isolation from other geographical concepts and as a stand-alone topic in the senior geography syllabus. All the diagrams, calculations and map features being located were not real examples as they were based on assumptions using sketch maps.	alone topic in the senior geography syllabus. There is evidence of rote learning and memorization and the effect of examinations in the teaching. There is no evidence that learners were being prepared for after school or real-world use of maps.
LTSMs	No LTSMs displayed on the classroom walls. No reference was made to a map during the actual teaching. A map and worksheet were only used at the end of both of the lessons. The textbooks were only used in the first lesson by both the teacher and learners. No mapwork-specific	For both lessons no geography textbooks or mapwork-specific books, reference books or any other LTSMs used. A projector was used in the first lesson and a map and worksheet in the second lesson. There were no maps or geographical displays on the classroom	In both lessons no geography or mapwork specific textbooks were used. A map was only used in the second lesson when the learners were working out distance. There was a display of a world map on the classroom wall, with

	textbooks or reference books were used. The teacher drew sketch maps on the chalkboard to explain how to carry out measuring and calculation of distance. Learners had to imagine everything e.g. how reduction looks like on the map.	walls. There was no use of a map or globe to show the learners how landforms/relief are shown on a map or a globe and to show learners the lines of latitude and longitude. Most displays on the classroom walls were for biology, with only one for geography, on the internal structure of the earth (geomorphology).	no other geographical displays on the classroom walls.
Classroom arrangement	Learners were seated in paired rows facing the teacher. The teacher occupied a dominant position in front of the class. The classroom appeared small with little space.	Lesson 1 was taught in the library and learners were seated in groups of five. The second lesson was taught in the actual classroom and the learners were seated in paired rows facing in front. For both lessons the teaching and learning environment was well organized and discipline was well managed. The library had not enough chairs and some learners stood for the entire lesson. The classroom appeared small with not	In both lessons learners were seated in straight rows facing the teacher. The teacher stood in one place while explaining the content to the learners. the teacher only moved around the class when the learners were doing the class activity.

		enough space for the teacher to move around.	
Assessment of learning	Questions asked were low order thinking e.g. ‘what’ and ‘how’ instead of ’why’, and some were managerial questions which affirmed whether the learners were following the lessons. The written assessment at the end of the lessons (worksheets) consisted of closed-ended questions which required recalling of the facts of the concepts being learned.	For both lessons, most questions were asked by the teacher and the learners answered. It was only during the second lesson that the learners asked questions when they did not understand. For both lessons the questions on the worksheet consisted of closed-ended questions and required no application or problem solving of the mapwork concepts being taught.	The teacher asked all the questions during the lessons and learners answered. The questions asked required low order thinking skills and recalling of facts. Most questions asked in the lessons were managerial or affirming if learners were following the lesson. Only a few questions were based on the learning content. The learners worked individually to complete a worksheet on bearing or measuring distance following certain steps or procedures.

What emerged was as follows:

- The most frequently used teaching strategies are teacher-tell/lecture/expository methods interspersed with the question-and-answer method. Whole class teaching dominated with a few instances of pair- and group-work.

- The teachers' pedagogical approach in mapwork is focused on teaching map skills and the procedural knowledge needed to perform a skill. These skills are taught separately and without attention being given to developing an understanding of maps or spatial concepts underpinning them. Teaching practices support rote learning and low order thinking.

- The teachers' pedagogical approach to mapwork teaching is not aligned to the active learning, constructivist approaches of LCP advocated by Namibian educational policy and the geography syllabus.

- The focus of teaching is on map skills. These are taught separately and in a technicist manner with little, if any link being made to the map concept or spatial concepts underpinning the skill, and with no application to a real map or the real world of the learners.

- Procedural knowledge is developed at the expense of conceptual understanding. Teaching is focused on how to measure, calculate or read a map with little evidence of applying the skills to interpret information on a map (for example, the physical features and landscapes depicted by contours and other symbols) or in the real world. There was no evidence in the lesson observed that suggests that the teachers make links to theory (e.g. geomorphology).

- The teaching of mapwork is syllabus and textbook bounded. In the actual teaching, teachers strictly follow what is stipulated in the syllabus and textbook with no reference to any sources for expanding the content being taught.

- Teachers are conscientious but inadequately equipped to teach mapwork. Textbooks are the only LTSM for mapwork. There was no evidence of maps being used in their teaching.

6.6 Conclusion

This chapter opened a window on how mapwork is taught by three Namibian geography teachers. It described in rich detail what is happening in their lessons. What emerged in each teacher's lessons was analyzed and categorized according to themes. The chapter concludes with a synthesis of what emerged in the six lessons when viewed in unison.

CHAPTER SEVEN

DISCUSSION OF FINDINGS

7.1 Introduction

This chapter discusses the findings of the analysis of the data on teachers' perceptions and experiences gathered through questionnaires and interviews (see Chapter Five) and the observations of their practices (see Chapter Six) in relation to the literature reviewed in Chapters Two and Three. The chapter consists of three parts. First, the teachers' perceptions and experiences are compared to the challenges and issues of teaching map skills and concepts in school geography as described in the literature. The second part discusses the teachers' pedagogical practices using the theoretical perspectives on teacher knowledge, particularly PCK (pedagogical content knowledge) and LCP (learner-centered pedagogy). The last part synthesizes and concludes the discussion.

7.2 What are Namibian geography teachers' views and experiences of teaching mapwork in secondary school geography classrooms?

This question was answered by analyzing the teachers' responses to the questionnaires and interviews. Two key findings emerged. Data from the interviews with the three teachers selected as the sample in the study revealed the following: **mapwork is important** and an interesting topic in geography; it should be taught to develop a wide range of skills such as map reading, analysis and interpretation; the knowledge and skills to read and interpret maps are important both in the classroom and in the field; and to prepare learners for life after school. The views held by the three teachers about the importance of mapwork are similar to those described in the literature. For example, Stephen (2010) and Bednarz (n.d.) explain that maps and diagrams are powerful tools used to visualise, explore, store, and communicate geographical information, and the skills of making maps and using these visual representations of the world are very important in the discipline of geography. Similarly, Anderson and Leinhardt (2002, p. 314) stress that in the classroom maps are the foundation of understanding about places around the world and through which teachers introduce faraway places to learners. One of the participants (Mr Haitange) emphasized that when learners are learning about maps and mapwork, *"... they get to understand more about their environment ... [and] not just about countries ... they can use such knowledge even after they have completed their school ..."* Liben et al. (2002) argue that "maps are a core of geography; their importance extends beyond

geography classrooms to diverse range of disciplines" (p. 270) including for example, geology, biology, mathematics, and by urban planners, psychologists, cognitive scientists and others (Uttal, 2000, Liben et al., 2002, Bednarz et al., 2006). In all these fields, maps are seen as being more than just simple sources of locating information, but rather seen as "realizations" (Liben et al., 2002, p. 270). It is important to note that the three teachers understand as do authors in the literature, that teaching mapwork and the use of maps is not only confined to geography classrooms, but that it is also important to prepare learners for life after school. In such a way, they will be able to prepare the learners to take up other fields in the future and be able to solve problems affecting their society both as young professionals and members of society.

While teachers acknowledge that **maps are important and interesting**, they did not explain why they are important. One may infer that **they may not fully appreciate the value of maps as tools** used by geographers as described in the literature. UNESCO (2017) for example, states that studying geography through maps helps us to better understand the relevance of social-economic environmental and political changes at both local and global scales in our everyday lives (p. 109). The UNESCO (2017) document further states that "maps and graphics are powerful tools in understanding the spatial dimension of an issue as well as synthesizing and communicating complex and sometimes contradicting data" (p. 112).

The literature describes how the discipline, geography, focuses on spatial thinking and maps are the tools for communicating spatial information (the interrelationships between the physical and human aspects of geography) (Stephen, 2010; Bednarz, n.d.). Spatial thinking is defined as "the knowledge, skills, and habits of mind to use spatial concepts, maps and graphs, and processes of reasoning in order to organize and solve problems" (Bednarz, et al., 2006, p. 398). Spatial thinking can be enhanced through teaching and school geography plays an important role in this process (American National Research Council, 2006; Wilmot, 1998). Maps are seen as essential tools for enabling spatial conceptual learning (Bednarz, n.d). According to Jo and Bednarz (2014b) teachers who value spatial thinking as an important goal of education, teach geography in a way that promotes students' spatial thinking skills. While the three teachers acknowledged the importance of maps and mapwork in geography, there was no evidence that suggests that they fully understood why maps are important tools used to communicate spatial information and develop learners' spatial thinking abilities. The teachers made no reference to maps being used to identify and explain interrelationships and how this information can be applied to solve problems. Furthermore, they made no reference to how they used maps to

support the teaching of topics such as climate, vegetation, landforms, and settlement patterns (Andersons & Leinhardt, 2002).

The teachers acknowledged that the teaching of mapwork had not been without **challenges**. They mentioned how learners perceive mapwork as difficult and have a negative attitude to it. Similar concerns are described in the literature. Andersons and Leinhardt (2002) note that although maps hold such importance, many learners struggle and lack mapwork skills. Amosun (2016) raises a similar concern of learners showing a negative attitude to mapwork and finding it boring and difficult to understand because it requires abstract thinking. He contends that learners also lack motivation to attend classes, do homework and perform in the examinations. Learner motivation to attend class or do homework were raised as concerns in this study.

More than half of the twenty-two respondents to the questionnaire perceived **mapwork as difficult** and challenging to **both teachers and learners**. The teachers mentioned the following elements of mapwork as difficult: calculating distances using scales, scale conversions, calculating bearings and any other map skills requiring mathematical proficiency/competency. One respondent explained that *"... mathematics is a fundamental aspect of teaching geography, so if a teacher lacks this knowledge, like how most teachers are, it contributes to the difficulties."* Bock (2003) notes that more often most geography teachers fail to realize that geographical theory is closely linked with mathematical language and that without a mathematical ability, teachers will not be able to teach such vital knowledge to the learners. Bock asserts that teachers should also be able to recognise relationships between spatial representations and understand the mathematical orientation of maps in order to read and interpret maps. If teachers lack these skills and competencies, it will influence their pedagogical choices, motivation and confidence, which in turn, may impact on the quality of teaching and learning. Shulman (1987) notes that "when teachers are uncertain about the content they teach, they tend to adopt a certain teaching strategy in order to allay their anxiety" (p. 18).

In their responses to the questionnaire, the teachers also mentioned that what makes mapwork even more difficult is that it requires visualisation and imagination because contour lines and lines of longitude and latitude are abstractions that cannot be observed in reality. Spatial concepts communicated by maps are abstract. These include: perspective (a view from above); symbols (how phenomena are shown on a map); location (where phenomena are); direction (which way); scale (reduction; how far) and purpose (what is meant to be seen) (Catling, 1995

as cited by Wilmot, 1998). Working with maps requires visualisation or spatial perceptual skills (an ability to 'see' and recognise what an object or feature is, where it is and its relationship to other objects/features) and spatial conceptual skills (an awareness and understanding of what one sees and an ability to interpret relationships, make inferences and apply one's understanding to solve problems) (Wilmot, 1998).

Amosun (2016) argues that one of the reasons why geography teachers are scared and often avoid teaching mapwork, is because mapwork is sophisticated and requires **abstract thinking** and **mathematical skills**. Most of the teachers in this study perceive mapwork as difficult and challenging because it requires some mathematical proficiency.

There was no evidence that the teachers were aware that the teaching of mapwork includes teaching **abstract spatial concepts**. For example, one needs to recognise and make sense of contour lines and patterns on a map and be able to visualise, analyze and interpret the relief feature or landscape depicted on the map. It requires an ability to visualise and transform two-dimensional representations on the map into three-dimensional forms (Wilmot, 2002). It is only when this has been completed that one can start to identify relationships between the physical and social environment and then apply one's knowledge to solve problems. From the teachers' responses to the questionnaire and interview and the classroom observations, there is evidence that suggests that the teaching of map skills is foregrounded, and that the teachers understand mapwork as the teaching of skills. There is little, if any, evidence of spatial concepts being taught. This is a concern, given that the literature argues that spatial conceptual understanding can be taught and enhanced through teaching (Wilmot, 2002, Bednarz et al., 2006).

Some teachers also found reading and interpreting physical features on a topographical map difficult. It raises the question of whether the teachers fully understand the physical features and landscapes being represented on a map using contours and other symbols. It also raises the question of whether teachers are able to **link theoretical knowledge (geomorphology) to the relief depicted on the map** and the extent to which this may point to weak content knowledge. A study focused on illuminating the problems experienced by student teachers at the University of Namibia when reading and interpreting maps, found that none of the student teachers could successfully identify slopes and landforms on contour maps (Bock 2003). A similar finding, reported by a study carried out in Britain and Poland, attributes the difficulties students experience to the teachers' inability to properly handle this component of teaching mapwork (Reinfried, 2001). According to Bock (2002), map reading, interpretation and analysis should

be taught, not simply as a skill but as a means of representing and analysing of information about particular ideas. There was no evidence that suggests that this was happening in this research study.

Other challenges that the three teachers raised include a **shortage of teaching and learning materials** in schools, including for example, maps, globes, atlases, and reference books. Ms Nailonga clearly indicated that it is hard for one to teach mapwork without a map. Ms Munageni also stressed that due to the shortage of maps, the same map has to be used repeatedly for examinations, tests and even for class activities. She also expressed concern about the use of South African topographical maps which require teachers and learners to read and interpret unfamiliar places. Similar concerns are raised by Innes (n.d.) who contends that although mapwork is regarded as an important aspect of geography, the provision of map extracts in geography textbooks is inadequate as is the availability of maps from examination papers and specialised mapwork textbooks in South African schools. Furthermore, Innes argues that besides the shortage of map teaching resources in schools, teachers do not receive adequate training on how to use resources. Innes is emphatic that "… teachers need to be provided with maps of their local areas and offered training in using maps to teach geography" (Innes, n.d., unpaged). A recent study found a shortage of information technology (IT) resources and access to computers in many South African schools, and a low level of integration of technology in the teaching and learning of geography in many classrooms (van der Westhuizen & Fleischmann, 2018). None of the teachers in my study commented on the use of IT in their teaching of mapwork.

7.3 What pedagogical approaches are used by Namibian teachers in secondary school geography classrooms?

This question was answered by analyzing data from classroom observations (refer to Chapter Six) as well as what the teachers said in the interviews. This section discusses the findings using Shulman's (1986, 1987) ideas about teacher pedagogical content knowledge (PCK) and learner centered pedagogy (LCP) as theoretical lenses.

7.3.1 Teachers' mapwork classroom practices and pedagogical approaches

In spite of the teachers claiming that their pedagogical approach and teaching strategy for mapwork depends on the topic (element of mapwork) being taught, the findings of the classroom observations was that they consistently adopt a teacher-centered approach underpinned by a transmission view of learning. The most frequently used teaching strategy was a teacher-tell/lecture or expository method interspersed with a question and answer method. Whole-class teaching dominated, with very few instances of pair- and group-work being observed.

- **Lecture/Teacher-tell Method**

According to Golightly (2018) the lecture method "…is a traditional instruction method where the teacher talks, illustrates, explains and answers questions" (p. 450). A similar view is held by Olusegun (2006) who explains that the lecture method is also known as the talk-and-chalk method when the teacher transmits knowledge to the class and writes a point form summary of what has been taught on the chalkboard. This was the dominant method of teaching used by the three teachers who made notes of the main points on the chalkboard as they explained the topic to the learners. The teachers did almost all the talking and learners only spoke when answering a question or responding to a teacher's request. This is similar to what Olusegun (2006) explains — that in the lecture method, "the learners' involvement and participation is at low ebb because communication is often one way for most of the time during the teaching-learning process" (p. 80). The role of the teacher is to transmit information to learners who are viewed as passive recipients of knowledge. In one interview, a teacher acknowledged the efficiency of the lecture method because it enabled her to give more information to the learners. In all three cases, the layout and organization of the classrooms supported a hierarchal teaching/learning environment and a transmission epistemology. Learners were seated in straight paired rows facing the teacher who directed and controlled the whole class teaching from the front of the classroom. It helps to create and reinforce unequal power relations associated with a traditional teacher-centred approach.

- **Question and answer method**

The question and answer strategy was used frequently with the direct instruction/teacher-tell method. Basha and Rao (2007) are of the view that the question and answer method helps a teacher to consolidate what has been learned. Olusegun (2006) contends that while the questioning method can be used for an entire lesson of whole class teaching,

> … questions should deal with the important area of the subject matter, and must be of the learners' interest and not vague and ambiguous. In addition, the questions should not be too difficult or easy for the learners to answer but should be logically expressed and structured (p. 80).

According to Basha and Rao (2007), the question and answer method clarifies any doubts the learners may have and helps to ensure that they are on the right track. A good question should probe and strengthen learners' knowledge and help them to clarify their ideas.

In this study, the three teachers asked questions when introducing a topic at the start of the lesson. These questions and those asked throughout the lesson were low order type questions based on recalling information that required single answer responses from the learners. No probing questions or questions requiring an explanation were asked, so there was no evidence of whether or not the learners understood the topic being taught. The questions did not elicit the type of response that would help the teacher to identify any misconceptions the learners might have. There was no evidence of questions being used to help the learners to think critically or creatively about the topic being taught. The learners were also asked if they were paying attention, if they had all the materials needed for the lesson, and if they were following. The teachers asked randomly if the learners were following and if learners gave an affirmative answer (yes), it served as encouragement for the teacher to continue explaining without checking whether the learners were actually following or understanding what was being taught.

There is little evidence in the findings of the study which suggests that the teachers understand the importance of questioning in diagnosing misconceptions, and supporting, enhancing and extending learning. Teachers' questioning skills were poor as was their awareness of 'what' questions to ask and 'how' to ask them so that high order thinking skills are developed.

The teachers in this study use a teacher-tell transmission method to teach mapwork. This differs from the strategies described in the literature which focus on developing geographical knowledge and understanding of spatial concepts unique to geography and which help learners to make sense of the world: "location, distribution, distance, movement, region, scale, spatial association, spatial interaction and change over time" (IGU, 2007, p. 245). According to Lane (2009), teachers should engage learners in "brainstorming, diagnostic testing, probing, problem solving and questioning, narrative writing, as well as the use of informal interview with learners" (p. 47). More specifically, McCall (2011) asserts that in mapwork lessons, learners should work together in small groups to draw maps of their school grounds and take pictures

from different perspectives of angles. This collaborative practical work will help them to learn the characteristics of maps such as scale, perspective, and map keys in meaningful ways. A theme running through the literature is active, engaged learning that promotes understanding.

There is little evidence of learners being actively engaged in mapwork lessons. The teacher-tell/lecture/direct instruction method focused on telling the learners how to do something, for example how to measure distance and convert to scale. Procedural knowledge of how to do a map skill was emphasized at the expense of conceptual knowledge and application. The traditional ways of teaching mapwork constrain rather than expand learners' understanding of maps.

Shulman (1987) argues that "comprehensive ideas must be transformed in some manner if they are to be taught" (p. 16). Furthermore, "PCK is the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful" (p. 15). It is evident from the classroom observations that the teachers were unable to transform their content knowledge into a pedagogy so that the learning content became comprehensible to the learners. Shulman's (1986) cautions that

> … Mere content knowledge is likely to be as useless pedagogically as content-free skills. But to blend properly the two aspects of a teacher's capacities requires that we pay as much attention to the content aspects of teaching as we have recently devoted to the elements of teaching process (p. 8).

7.3.2 Learner Centred Pedagogy

LCP and constructivist epistemology underpin Namibian education policy and the school geography curriculum.

> Our teaching methods must allow for the active involvement and participation of learners in the learning process. Teachers should structure their classes to facilitate this active learners' role. Often that will mean organising learners in smaller or larger groups, or pairs, or working with them individually. It will mean as well using teaching techniques that fit the purpose and content of the lesson and at the same time encourage active learner participation, for example, explaining, demonstrating, posing questions, checking for understanding, helping, providing for active practice, and problem solving (Namibia. Ministry of Education and Culture [MEC], 1993, p. 60).

The findings of this study provide evidence that while the teachers are aware of and understand LCP, they are not implementing an active learning, constructivist learning approach when teaching mapwork. The only glimpse of LCP being implemented was in one lesson given by

Ms Munageni. This lesson involved learners working in groups of five to build models of landforms. For most of the lesson, the learners were kept busy building neat models as per the teacher's instructions. They were not probed or asked to explain or give reasons for what they were doing.

One may infer that the teachers understand the rhetoric of LCP. They claim that they use group and pair work activities, fieldwork, inquiry learning, peer teaching, debate and class discussions as advocated by Namibian education policy. However, there is no evidence of their practice being aligned to policy or LCP that "promotes active learning that places the learners at the centre of inquiry thus enabling learners to develop high-order thinking skills" (Vavrus et al., 2011, p. 67).

In spite of the importance of group work in LCP, Ms Nailonga had reservations about it. She said that group work did not work well with all the learners, particularly with the lazy ones, as in most cases they end up not learning anything from the group work. A similar concern is raised in the literature, namely that LCP is alleged "to water down academic standards … of little learning going on due to the use of group work" (Nyambe & Wilmot, 2014, p. 31). The three teachers in this study stated that LCP does not work well with all the topics and that a teacher centred approach was more appropriate, especially when introducing the new topic. O'Sullivan, in his Namibian study (2004), argued that LCP is not appropriate to all situations. He contends that LCP is unfit and inappropriate to the Namibian context of large classrooms, a shortage of resources and where teachers are not properly trained to implement it. Tabulawa (2003) cautions that LCP is often viewed as a "one-size-fits all pedagogical" approach, and or a "universal pedagogy", and one that works equal effectiveness irrespective of the context (p. 9). There is a view that mixed pedagogies have the potential to enhance learning and outcomes (Nyambe & Wilmot, 2012; Nyambe, 2008). In addition, O'Sullivan (2004) advocates a notion of a pedagogy that is "learning-centred" (one that works to help learners learn) rather than LCP (p. 600). Similar conclusions were reached by Vavrus and Bartlett (2012) who call for a "blend of learner- and content-centred strands of pedagogy" (p. 640).

The findings of this study show that mapwork lessons followed a sequence or series of steps when a map skill was being taught: teacher presentation and instructions interspersed with questions requiring short answers, and an activity towards the end of the lesson. The focus of the lessons was on teaching — through direct instruction — learners how to do something with no attention paid to applying the skill when using a map. In spite of LCP being the official

education reform policy for more than two decades, teachers are still using pedagogical approaches and strategies that support rote learning and low order thinking when teaching mapwork. This finding is similar to that reported by Golightly (2018) who contends that teachers rely on traditional practices that follow step-by-step instructions, followed by opportunities for the learners to apply the newly taught facts or procedures" (p. 438). This is in contrast to the constructivist epistemology which advocates active learning and independent thinking, and that learners should be given ample opportunities "to critically examine the processes of knowledge construction" (Golightly, 2018, p. 438).

7.3.3 Teacher knowledge

According to Shulman (1986), PCK involves the blending of content and pedagogy into an understanding of how particular content is organised, represented and adopted to the diverse interests and abilities of the learners. Jo and Bednarz (2014a) explain how PCK in mapwork refers to a teacher's proficiency to present geographic concepts through a variety of maps to promote students' spatial thinking skills. According to them, teachers with good PCK are able to include the bigger ideas of maps and their properties such as space, time, overlay, scale, distance, distance, and location into a variety of teaching practices as well as in their lesson planning and assessment strategies (Jo & Bednarz, 2014a). Similarly, Reitano and Harte (2016) say that teachers with such PCK are able to use "multiple ways of analogies, illustrations, explanations, metaphor to present ideas to learners in a manner that combine the knowledge and of the content and pedagogy to learners …" (p. 281).

There is evidence that suggests that the teachers' PCK for teaching mapwork is weak. The lesson observations done in this study showed that the teachers' practices were different to those described in the literature.

According to Lane (2009), it is important for the teachers to understand the importance of preconceptions in the construction of student knowledge; in addition, understanding and appreciating the way students construct their naïve theories and how they hinder or support learning is important in order for the teacher to be able to address such ideas through instruction. However, if the teachers are unaware of what theories and perceptions learners bring to the classroom, they will not be able to address such beliefs. For example, Shulman (1987) stresses that teachers need to know and understand that learners bring a wide range of knowledge from home to school, which teachers need to build on and nurture through the use of different pedagogical approaches that enable such learners to learn. In the interviews, the

teachers said that the most challenging part of teaching mapwork is getting the learners to understand the concept being taught. The lesson observations showed that the teachers did not use the various ways of teaching mapwork described in the literature and they are unaware of the knowledge and experience the learners bring to class. This means that the teachers do not make links, challenge or build on the learners' lived experiences.

The IGU-CGE (2016) states that the teaching of geography should "build on [learner's] own experiences, learning geography should help them to formulate questions, develop their intellectual skills and response to issues affecting their lives" (p. 5). In addition, Lane (2009) furthers this argument that geography teacher's PCK should focus on learning that recognises and builds on learners' experiences and mental constructs and it should find ways to relate these constructs and experiences to new aspects being taught (p. 41). The three teachers in this case study were observed asking questions as they introduced the lesson or topic to establish what the learners knew or what learners could remember from the previous lesson. Even though teachers could establish what the learners knew at the beginning of the lesson, they did not expand the learners' knowledge or understanding or link it to the current concept being introduced. The teachers rather asked questions at the beginning of the lesson as a stepping stone to introduce the new concept or topic they were going to teach in that specific lesson.

It was also clear that teachers are unaware of some of the subject content and curriculum content required for the classes they were teaching. For example, I saw that in the interviews teachers indicated that they do not teach some mapwork concepts because they claimed it was not part of their phase syllabus. This may have been because their curriculum knowledge was poor or because they lacked confidence to teach some concepts. The geography curriculum aims to equip learners with knowledge of "the relationships and interactions of people and their environment in response to physical and human processes, as well as aspects of the changing world. A sense of place and relative location on a local, regional and global scale with special emphasis on Namibia examples" (Namibia. MEAC, p. 1). It also aims to develop important geographical skills including: "suitable techniques for observation, collecting, classifying, presenting, analysing and interpreting data, obtain information from a variety of sources such as, maps of various scales, internet …" (Namibia. MEAC, 2015, p. 2). To achieve these aims, policy asserts that teachers should be able to interpret the syllabi and subject content in relation to the aims and objectives of basic education and to relate these to the learners (Namibia. MEC, 1993, p. 80). The findings of this study suggest that the teachers' knowledge of curriculum is somewhat superficial and limited to content. There is little, if any, evidence that they

understand how to translate the curriculum goals into their classroom practice. This may account for why map skills are taught in isolation with little, if any, linking to content knowledge (for example, geomorphology).

Wilmot (1998, 2002) argues that the acquisition of spatial knowledge depends on spatial perception skills and spatial conceptual understanding. She views spatial literacy as an ability to recognise objects and features and an ability, through cognition, to interpret and make sense of the object/feature, spatial relationships, and make spatial inferences. In this study, teachers were not observed using maps to develop learners' understanding of how the human and natural environment inter-relate as encouraged by the geography curriculum and the literature. The teachers taught map skills (how to do calculations, measure and find places on map) and there was no evidence of them using maps to develop spatial thinking or understanding. This raises questions about the teachers' curriculum and content knowledge. It suggests that there may be a need for teacher workshops on how to integrate content knowledge into mapwork lessons.

In the interviews, teachers said that they integrate mapwork with other aspects of geography such as settlement geography, climatology and population geography, with the least integration occurring in geomorphology. However, from the observed lessons of the three teachers, **mapwork was taught in isolation with no evidence of any integration** with other geography topics. My analysis of the final national examination questions revealed that over the past five years, questions on climatology have been included in the map section of the examination with other sections (geomorphology, population and settlement) receiving less attention. While the teachers said that they integrated mapwork into these sections of the syllabus, this was not evident in the mapwork lessons I observed. According to Andersons and Leinhardt (2002) "… teachers might as well use maps to discuss topics such as climate, vegetation, landforms, and settlement patterns among others" (p. 314). Although the literature also advocates the use of maps and mapwork to discuss and teach other geography topics, in the six lessons that I observed mapwork was taught in isolation and as a stand-alone topic in both the junior and senior secondary syllabus. This may explain why, during the interviews, teachers were unsure about integrating mapwork with other geography topics.

There was also strong evidence which suggested that the **teaching of mapwork is closely aligned to the content prescribed by the syllabus.** In the interviews, teachers indicated that they mostly use the syllabus and the textbook to plan for their mapwork lessons. During the actual teaching, teachers strictly follow what is stipulated in the syllabus and textbook

(although textbooks were not referred to in the lessons and no reference was made to any other sources for expanding the content or extending learning). This is similar to what is described in the literature, namely

> … the national curriculum, and examination specifications … are more prescriptive as to what to be taught … thus, most teachers teaching in such examination-driven curriculum relay on a school geography textbooks that has been written specifically with that examination in mind. … and very often by the examiners responsible for that examination itself (Brooks, 2006, p. 354).

From the lesson observation, it was noted that the lesson planning focuses on the content to be taught (as listed in the syllabus). The content is presented by the teacher to the learners, assessed and then ticked off in the syllabus. In all three cases the teachers transmitted the content as it appears in the textbook but without referring to the textbook during the lesson. This was normally accompanied by long explanations on how to work with or do a map skill like measuring distance or measuring bearings etc. The explanations focused on the 'how' without explaining the relevance or application of the skill to solve problems in the real world. The teaching of map skills was done in a discrete, technical manner with no attention given to developing conceptual understanding or the application of knowledge.

The actions and focus of the teachers on the procedures and skills as defined in the curriculum, and textbooks, is in part the fault of the curriculum itself. The evidence for this was shown in the analysis of the curriculum in the literature chapter (see Chapter Two, Section 2.7) and is mirrored in all the data from the questionnaires, interviews and classroom observations.

As stated earlier, there are some real weaknesses in the curriculum. The curriculum mapwork component is fixed throughout the secondary phase (with the same content taught at all grade levels from 8 to12) with no progression or extension of the curriculum content as the grade levels go higher. The focus of all but one item, viz. "interpret maps reflecting human and physical aspects", while necessary, it favours low level factual, procedural knowledge, and drawing and measuring skills. The secondary school geography curriculum (mapwork content) needs to move upwards as the grade levels proceed, beyond largely only emphasizing and teaching the necessary map skills and procedural knowledge. The mapwork curriculum should also include the requirement to teach application of map skills to solve problems and spatial concepts at the higher grades. It also needs to be elaborate on what is expected under the item "interpret and use maps reflecting human and physical aspects". The geography curriculum more broadly speaks of and addresses a number of environmental and other problems, and the

mapwork curriculum needs to elaborate and give guidance on how to engage with these in the development and use of maps.

7.3.4 Learning and Teaching Support Materials

According to Olusegun (2006), LTSMs are "the information conveyers that facilitate teaching-learning process" (p. 89). He is of the view that the use of LTSMs make the teaching and learning process fun, interesting, exciting, lively and motivating. Even though LTSMs hold such importance, in this study **little use was made of LTSMs.** There were no displays on the classroom walls and no LTSMs were used during the lessons. This was in spite of the teachers claiming that they made their own LTSMs such as maps, models etc. in the interviews. The exception was Ms Munageni's lesson in which the learners had to build models of different landforms. No maps were used while the teachers taught the lessons. In some instances, they were used to complete a worksheet at the end of the lesson.

Shulman (1986, 1987) describes two elements of PCK that impact on teaching: the first is "representation", that is the ability of the teacher to transform the content knowledge into forms that are pedagogically powerful for the learners to understand. The second is described as "teachers' understanding of what makes learning of specific topics easy or difficult" (Shulman, 1986, p. 9). This implies that teachers need to know their subject content and appropriate methods of teaching it, and that this would include selecting and using LTSMs that enable learning and make it stimulating and enjoyable. This did not happen in this study. The teachers relied on their hand drawn sketch maps for teaching concepts such as contours, scale and distance, direction and bearing. It meant that in the absence of actual maps, map skills were taught in an abstract, procedural and arguably boring manner with learners having to imagine what reduction looked like etc. The absence of maps meant that there were no opportunities for learners to apply their knowledge to solve a problem (for example, measuring and calculating how far it was from one point to another in the real world using a map). The teachers did not seem to be aware of the relevance and importance of working with actual maps and they did not use mapwork specific textbooks to enhance and extend learning. The teachers relied on the methods they themselves had experienced when being taught mapwork.

7.3.5 Knowledge and skills promoted in mapwork lessons

The literature states that map reading, interpretation and analysis should be taught, not simply as a skill but also as a means of representation and analysis of information about particular ideas (Bock, 2003). Although the teachers in their interviews claimed to promote map reading,

interpretation and analysis of geographical information, this was not evident in their teaching. From the lesson observation, it was clear that teachers focused on teaching mapwork skills without any application or problem solving. In all the three cases, mapwork was taught in an abstract manner with no application to an actual map or the real world or lived experiences of the learners. With the exception of one of Ms Nailonga's lesson in which there was some application of the skill being taught to the learners lived experience, the rest of the lessons observed focused on developing procedural knowledge as opposed to conceptual understanding or problem solving. Bednarz et al. (2006) noted that when teaching mapwork, teachers tend to teach map skills by focusing on the content of the map. As a result, all too often, learners are able to give an account of the map but lack the ability to interpret the content and the geographic impact illustrated by maps (Bednarz et al., 2006).

Rote learning through memorisation and the recalling of facts was evident in the way the teachers recited the content to the learners over and over again. Learners rehearsed the skill being taught by repeating what they were being taught. When learners were able to repeat what they had been taught, the teacher assumed that learning had taken place and started explaining the next step. If learners struggled to repeat what the teacher had told them, the teacher repeated what had been taught again. Drill and memorization were foregrounded. Larangeira and van der Merwe (2016) caution that "if students are rote-taught and not encouraged to apply map skills, then their spatial cognition with regards to map literacy is impeded" (p. 316). In all the three cases, learners were not only deprived of applying their mapwork skills, but they were also not encouraged to think critically and logically about what they were learning.

The examinations have a backwash effect which affects mapwork teaching. The teachers made frequent reference to the examinations emphasizing what the learners should know and how mapwork would be assessed in the examinations. The literature describes the influence of tightly controlled centralized curricula and the backwash effect of high-stakes examinations on teaching in sub-Saharan African countries, and how this undermines active and participatory inquiry-based pedagogies (Vavrus & Bartlett, 2012, p. 641). Brook (2006) contends that this places examinations in a position of power that defines what is taught and how it should be taught. The effect of examinations not only limits the teachers creatively to teach mapwork in a more fun and exciting manner, but it also influences their view of learning, choice of pedagogy and assessment.

As a result, there was surface learning and direct transmission of knowledge from the teachers

to the learners without developing a deeper understanding of the mapwork concepts being taught. This not only revealed the sort of mapwork teaching taking place in the classrooms, but also the teachers' conceptions of mapwork. From both the interviews and classroom observations, there is evidence which suggests that the teachers think that mapwork should be taught for the learners to know. This was evident because in all the case studies the teachers commonly promoted the learning of mapwork skills over application and problem solving. In all the cases, the learners were taught, but never given opportunities to discover and construct their own knowledge and understanding of mapwork. Accord to the literature, a teacher who holds the belief of learning as knowing often assumes that mapwork is learned and understood if a "concept or skill is taught, and thus, this type of learning is achieved by surface learning" (An at el., 2004, p. 48). He further says that such teachers are often "satisfied with learners knowing or remembering facts and skills because they are not aware of students' thinking and misconceptions" (An at el., 2004, p. 48). From the classroom observations, the fact that learners have to remember and rehearse the learned skills to the teachers' satisfaction proves that they believe that mapwork has to be taught in order to be learned.

In addition, the kind of teaching that took place in all the lessons is in contrast with what the geography curriculum strives for, according to the Namibian, MEAC (2015), where teaching of mapwork and geography should promote the following important geographical skills: "suitable techniques for observation, collecting, classification, presenting, analysing and interpreting data and obtain information from a variety of sources such as maps of variety of scales …" (p. 2) among others. However, none of these was observed in the lessons that I observed, and no variety of resources and maps were used in the classroom.

7.3.6 Assessment

Dreyer (2018, p. 462) defines assessment as a "process of gathering evidence of the achievement of learning intentions." According to Vavrus and Bartlett (2012), in many Sub-Sahara African countries teachers continue to "assess students' knowledge of discrete, factual information, or declarative knowledge rather than more complex cognitive skills" (p. 641). They maintain that this is influenced by the fact that teachers need to "cover" all the topics as required by the syllabus, and if such delays are caused by "engaging students in active learning and critical thinking to adopt a deeper analysis of few topics," this may result in students performing poorly in high stakes examinations (Vavrus & Bartlett, 2012 p. 641). In this study,

time constraints and the pressure to complete the syllabus before examinations start were mentioned as constraining factors that affected how mapwork is taught.

From a LCP perspective, assessment should not be a traditional paper-and pencil test; such a test should promote critical thinking based on demanding high order thinking skills and "robust understanding" of the subject matter (du Plessis & Muzaffar, 2010, p. 71). This means that assessment should not only promote remembering of information, it should promote an understanding and demonstration of such concepts and theories to analyze and solve problems (Vavrus et al., 2011). Assessment should inform teaching and allow teachers to reflect on their teaching to enable them to adopt pedagogies that meet the needs of the learners.

Lane (2009) contends that an accomplished geography teacher with PCK is able to identify "unexpected ideas" that occur during the lesson and knows how to "adopt new instructional approaches on-the-spot to address these beliefs" (p. 47). In all the three cases, no on-the-spot decisions were made regarding the teaching and learning process, and everything proceeded according to the teachers' plan. Lane (2009) is of the view that that teachers' PCK should help them to "develop learners' deep understanding of mapwork concepts, and identify student ideas that could potentially act as "road-block" in understanding core concepts of the topic" (p. 47). In this study, the teachers used assessment activities which they had planned before the teaching took place. Little, if any, evidence of learning was gathered while a lesson was taught. Classroom assessment consisted of the teachers asking the learners factual questions which required simple, often one-word responses. There was no evidence of questions being used to elicit learners' misconceptions or explain in their own words the skill, procedure or content being taught. The teachers asked all the questions and learners were not encouraged to ask their own questions for clarification or other purposes. The teachers did not use assessment to help them to take advantage of the new learning opportunities as they arose in the classroom in order to address the learners' misconceptions about mapwork. I did not observe teachers using classroom-based assessment to identify weak learners in order to give them needed support. With the exception of Mr Haitange's lesson in which he identified and gave support to one learner that was struggling, in the other lessons assessment was rather used to find out how much learners had learned and how much they could remember from the lesson. One may infer that the teachers may not appreciate the important role of formative assessment in diagnosing and responding to learners who are experiencing difficulties, and enabling and supporting learning. The findings provide evidence of weak formative assessment practices. This is a concern, given that mapwork includes the teaching and learning of abstract concepts — some

of which require a level of mathematical proficiency which is perceived as difficult by both learners and teachers.

7.4 Synthesis and conclusion

The findings of the study when viewed in relation to the literature, revealed the following:

- The teachers are aware of the importance of maps and mapwork in geography but do not explain why maps are essential tools used by geographers to communicate spatial information about the physical and human environment.
- The teachers do not appreciate how maps develop spatial thinking. They do not appear to understand the spatial concepts underpinning map skills — the consequence of which is that skills are taught discretely with no application to maps and solving real world problems.
- The teachers perceive mapwork as difficult because it requires mathematical proficiency and an ability to recognize and interpret abstract spatial concepts and symbolic language used by maps to communicate spatial information.
- The dominant teaching approach is whole class teaching and teacher-centred, using a teacher-tell or lecture/direct instruction method. This militates against learners' active participation in knowledge construction and is contrary to the learner-centred approach adopted in Namibian education.
- The approach to teaching mapwork focuses on map skills at the expense of conceptual understanding and application of knowledge. Memorization and rote learning predominate. This is contrary to the development of understanding and critical thinking described in the literature.
- The teachers' practices suggest that weak PCK and a superficial understanding of the curriculum as a list of content to be taught. The teachers do not translate curriculum goals (active learning) and orientation (learner-centred pedagogy) into practice.
- Resources for teaching mapwork are limited to the textbook. This militates against stimulating deep learning described in the literature.
- Examinations have a backwash effect which affects the way mapwork is taught. This is similar to what is described in the literature.

This chapter contains a discussion on what emerged from the analysis of teachers' perceptions and experiences and their mapwork teaching practices (Chapters Five and Six), in relation to the literature reviewed in Chapters Two and Three. It has shown where the teachers' practices differ from those described in the literature. The lessons that can be learned from this are discussed in the next chapter.

CHAPTER EIGHT

CONCLUSION

8.1 Introduction

In this concluding chapter, I synthesize and reflect on the research goal, research methodology and findings. The lessons to be learned from the study are discussed. I conclude with a reflection on the research journey.

8.2 Synthesis

This study addressed the problem of poor mapwork learning outcomes in Namibian school geography. It responds to the need for research on how mapwork is taught in Namibian secondary school geography classrooms. Guided by the research goal, namely to describe in rich detail with a view to generating insights for understanding teachers' perceptions and experiences of teaching mapwork and their classroom practice, an interpretive orientation was adopted. The research questions were as follows:

- What are Namibian geography teachers' views and experiences of teaching mapwork in secondary school geography classrooms?
- What pedagogical approaches are used by Namibian teachers in secondary school geography classrooms?
- What lessons can be learned from the teachers' pedagogical practices that may be used to strengthen and enhance mapwork teaching and inform teachers' professional development?

In Chapter Two I reviewed the literature on the teaching and learning of spatial and map concepts and skills, and the issues and challenges associated therewith. I also analyzed and discussed the mapwork content and skills prescribed by the Namibian secondary school geography curriculum. In Chapter Three I presented the theoretical perspectives that informed the study, namely Learner Centred Pedagogy (LCP), the official pedagogy advocated by Namibian education policy, and teacher knowledge, particularly Shulman's (1986, 1987) ideas about pedagogical content knowledge (PCK). These theoretical perspectives provided the lenses used for analysing and making sense of what emerged in the data gathered through a questionnaire, semi-structured interviews and classroom observations. Chapter Four outlined

and explained the interpretive research orientation, the research design and data gathering methods, the selection of the teacher participants, and the data analysis. It also discussed research ethics and issues associated with case study research.

Chapter Five addressed the question of: What are teachers' perceptions and experiences of teaching mapwork? I presented the data analysis and findings of the teachers' responses to a questionnaire, and the semi-structured interviews conducted with a purposive sample of three teachers. Key findings were as follows:

- The teachers acknowledged the importance of maps and mapwork teaching in geography. However, there is little evidence that suggests that they fully understand the importance of maps as tools that help us to visualise and communicate spatial information (through a process of encoding and decoding information using symbols together with words and numbers) about the human and natural environment. None of the teachers acknowledged how maps develop spatial thinking (an ability to read and interpret spatial information and interrelationships) and how this can be applied to address problems in the real world.

- The teachers enjoy teaching mapwork but are of the view that it is difficult because it requires mathematical proficiency and an ability to recognize and interpret abstract map concepts and symbols. Bock (2003) argues for the importance of teachers demonstrating a mathematical ability for the effective teaching of mapwork.

- The teachers acknowledge the challenges and difficulties in teaching and learning mapwork but did not explain how such issues affected their practices.

Chapter Six responded to the question: How is mapwork being taught in Namibian school geography? I presented the data analysis and findings of the classroom observations I undertook with three teachers. Key findings were as follows:

- The most frequently used teaching strategies are teacher-tell/lecture/expository methods interspersed with the question and answer method. Whole class teaching dominated with a few instances of pair- and group-work.
- The teachers' pedagogical approach in mapwork is focused on teaching map skills and the procedural knowledge needed to perform a skill. These skills are taught separately and without attention being given to developing an understanding of the map or spatial

concepts underpinning them. Teaching practices support rote learning and low order thinking.

- The teachers' pedagogical approach to mapwork teaching is not aligned to the active learning, constructivist approaches of LCP advocated by Namibian educational policy and the geography syllabus.

- The focus of teaching is on map skills. These are taught separately and in a technicist manner with little, if any, link being made to the map concept or spatial concept underpinning the skill and with no application to a real map or the real world of the learners.

- Procedural knowledge is developed at the expense of conceptual understanding. Teaching is focused on how to measure, calculate or read a map with little evidence of applying the skill to interpret information on a map (for example, the physical features and landscapes depicted by contours and other symbols) or in the real world. There was no evidence in the lessons observed that suggests that the teachers make links to theory (e.g. geomorphology).

- The secondary school geography curriculum emphasizes or highlights map skills, including an ability to measure, calculate, orientate etc. with little attention given to the application of these skills to solve problems. Although the geography curriculum more broadly speaks of a number of environmental and other problems, there is no requirement in the mapwork curriculum to engage with these in the development and use of maps. No mention is made of spatial concepts and no guidance is provided to teachers on how spatial thinking and spatial conceptual understanding can be promoted through mapwork. The curriculum mapwork component is fixed throughout the secondary phase (the same content is taught at all grade levels from 8 to12), with no progression or extension of the curriculum content as the grade level goes up. The focus of all but one item, viz. "interpret maps reflecting human and physical aspects", while necessary, are low level factual, procedural knowledge, which draws on and measures skills building. The curriculum gives no guidance on the pedagogy that might be used.

- The teaching of mapwork is syllabus and textbook bounded. In the actual teaching, teachers strictly follow what is stipulated in the syllabus and textbook with no reference to any sources for expanding the content being taught.

- Teachers are conscientious but inadequately equipped to teach mapwork. Textbooks are the only LTSM for mapwork. There was no evidence of maps being used in their teaching

In Chapter Seven I discussed what emerged from the analysis of teachers' perceptions and experiences and their mapwork teaching practices (Chapters Five and Six) in relation to the literature reviewed in Chapters Two and Three. The key findings were as follows:

- The teaching of mapwork privileges map skills rather than spatial conceptual understanding. Skills are taught in a technical manner and develop procedural knowledge rather than interpretation and application of knowledge to solve problems in the world. Bednarz et al. (2006) notes that teachers tend to teach map skills by focusing on the content of the map. As a result, too often, learners are able to give an account of the map but lack the ability to interpret the content and the geographical impacts illustrated by the map.

8.3 Lessons learned

There are a number of lessons that can be learned from this study that may help to address the persistent problem of low learning outcomes in Namibian school geography. These include the following:

Lesson #1:

Teachers' perceptions of mapwork being difficult should be addressed by building **teacher confidence. Teacher professional development** should focus on developing the teachers' confidence in the mathematical proficiency necessary for mapwork.

Teacher confidence and motivation, associated with the affective domain, are as important as the cognitive domain for effective teaching (Blömeke & Delaney, 2012). They assert that teachers need both the "cognitive ability to develop affective solutions for job-related problems as well have the motivation and social willingness to successfully and responsibly apply them to solutions in various classroom situations" (Blömeke & Delaney, 2012, unpaged). I concur that teachers need support for the subject content they teach as well as the motivation and encouragement to deal with the various challenges experienced when teaching and learning mapwork.

Lesson #2:

Teachers' **mapwork content knowledge needs strengthening**. They need to develop a deeper understanding of map and spatial concepts. This may help to address the (over) emphasis on teaching map skills and rote learning evident in this study. Larangaeira and van der Merwe (2016) assert that "if students are rote-taught and not encouraged to apply map skills, then their spatial cognition with regards to map literacy is impeded" (p. 134).

Lesson #3:

Teachers' **curriculum knowledge needs strengthening** so that their knowledge is not superficial and limited to the content. Teachers seem not to understand the curriculum goals and so cannot translate them into practice.

Lesson #4:

The secondary school **geography curriculum (mapwork content)** needs to move upwards as the grade levels proceed, beyond largely only emphasizing and teaching the necessary map skills and procedural knowledge. The mapwork curriculum should also include the requirements to teach application of map skills to solve problems and spatial concepts at the higher grades. It needs to elaborate on what is expected under the item "interpret and use of maps reflecting human and physical activity". The geography curriculum more broadly speaks of and addresses a number of environmental and other problems, therefore the mapwork curriculum needs to elaborate and give guidance on how to engage with these in the development and use of maps.

Lesson #5:

Teachers' **PCK needs to be strengthened** so that an active learning, engaged, constructivist approach can be implemented. This may help to promote learners' conceptual understanding and militate against rote learning. Teachers' repertoires of teaching strategies for mapwork should be expanded through professional development workshops that model alternate strategies. Teachers' questioning skills need to be enhanced. They need to be supported in learning how to ask questions that require high order thinking skills, that challenge learners and promote critical thinking.

Shulman (1986, p. 8) asserts that

> Mere content knowledge is likely to be as useless pedagogically as content-free skills. But to blend properly the two aspects of a teacher's capacities requires that we pay as much attention to the content aspects of teaching as we have recently devoted to the elements of teaching.

Teachers need to bridge the gap to have a well-established PCK that will help them to choose appropriate "analogies, examples, demonstrations and representations to address [what] can challenge student questions and conceptions" (Lane, 2009, p. 48). In addition, when teachers have a well-developed PCK they will be able to use the knowledge of the curriculum, resources and learners, to allow their learners take ownership of the learning using appropriate curricula resources and "stimulus materials" that can help them to build on learners' understanding of mapwork (Lane, 2009).

Lesson #6:

Teachers need **appropriate resources** for map teaching. This includes 1:50 000 maps of Namibia and mapwork specific textbooks. There were no maps displayed on the classroom walls. The teachers in this study relied on hand-drawn sketch maps for teaching concepts such as contours, distance and scales, symbols and bearing. In the absence of the actual maps, learners had to imagine what reduction looked like etc. The teachers did not seem to be aware of the importance of working with actual maps or mapwork specific textbooks when teaching and engaging learners in classroom activities. Teachers need appropriate Namibian LTSMs that help learners to see the links between abstract concepts and the real world. In addition, teachers should consider integrating IT resources and appropriate digital communication technologies such as GIS, Google map and Google Earth etc. in their mapwork lessons. These technologies are vital in the area of geography and mapwork of the 21st Century and learners may have to use them in future.

Lesson #7:

The teaching of mapwork should elicit and **build on learners' experiences** and make links to the real world. This will help to concretize abstract concepts (for example, slope and gradient) and make the mathematical dimension of mapwork more applied and less daunting (for example by getting learners to pace out distances when teaching scale).

Lesson #8:

Examinations have a backwash effect on teaching. The way mapwork is examined should be reviewed in terms of the knowledge it is assessing. The balance between testing map skills

and reading, and the application of skills to interpret spatial information and make informed judgements should be reviewed.

The teachers continuously made reference to the examination and what learners ought to know when map concepts are assessed in the examination. Brook (2006) articulates that in the context of school geography, that "… the national curriculum, and examination specifications … are more prescriptive as to what to be taught … thus, most teachers teaching in such examination-driven curriculum rely on a school geography textbook that has been written specifically with that examination in mind. … and very often by the examiners responsible for that examination itself" (p. 354). As a result, this places examinations in a position of power as not only does "it defines geography at this level, but also that, it defines the tools of instruction and how it should be taught" (Brooks, 2006, p. 354).

Lesson #9:

If we want to improve learning, **teachers' classroom-based assessment practices need to be strengthened** so that they are able to identify weak learners and provide support during a lesson. Du Plessis and Muzaffar (2010) argue for classroom-based assessment that helps teachers to identify and provide additional support to weak learners as well as evaluate the effectiveness of the instruction.

Lesson #10:

If we want to improve learner performance in mapwork in Namibia, we need to strengthen the way in which mapwork is conceptualized and taught. Teachers need to be supported in deepening their content, curriculum and Pedagogical Content Knowledge. **Teacher professional development for both in-service and pre-service teachers needs to be reviewed** in terms of how well it is developing teacher knowledge through theoretically informed practices. Constructivist theory and learner-centered active learning pedagogy need to be modelled in teacher professional development. Teachers need exposure to innovative and effective ways of teaching mapwork. Teacher professional development workshops need to model best practices for teaching mapwork.

8.4 Conclusion

This research, a small-scale study of teachers' perceptions and practices of teaching mapwork, focused on one level of the school system in Namibia (secondary level Grades 8 to12). The study was carried out in one circuit of one region of northern Namibia. Most of such schools are semi-urban and rural schools.

I acknowledge that school settings and teachers' practices and experiences differ across different regions of Namibia. Thus, in presenting the rich descriptions of the teachers' mapwork pedagogical thinking and practices, my study does not seek to generalise the findings to the wider community (of secondary school geography teachers in Namibia) to which it belongs (Bassey, 1995, p. 5). That said, some claims are made for "naturalistic generalisations" (Stake, 2000, p. 449) beyond the immediate study on the basis that any Namibian teacher or teacher educator would be able to identify with the research story because of a "vicarious experience" created through thick description (Stake, 2000, p. 439).

The lessons learned from this study may help to stimulate discussion and debate amongst Namibian geography teachers, teacher educators, curriculum developers and Senior Education Officers (SOE) that helps to address the persistent problem of low learning outcomes in mapwork.

As a teacher, I myself, have been intellectually enriched through my engagement with the literature on map skills, spatial conceptual teaching and learning, and teacher knowledge. Furthermore, during the period I was resident at the university, I had the opportunity to observe experienced geography teachers teaching mapwork. This helped to deepen my understanding of what to look for in the lesson observations I conducted in my study and to better understand how to integrate mapwork into other topics in the syllabus. I had an opportunity to hone my observation skills when asked to undertake observations of students enrolled for the Post Graduate Certificate in Education (PGCE) during their school-based experiences in local schools. These experiences, together with my research experience, contributed to my personal and professional development. I have become less judgmental and more considered about the claims I make about professional and general issues. I am more passionate about teaching mapwork and geography now than I was when I started my research journey. I look forward to sharing my research findings and professional experiences with my colleagues at school, in the circuit and wider region.

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APPENDICES

Appendix A

FORMAL LETTER OF PERMISSION TO THE DIRECTOR OF EDUCATION

Dear Sir

RE: PERMISSION TO CONDUCT A RESEARCH STUDY IN THE OHANGWENA CIRCUIT

I am Johanna Ndamononghenda Naxweka a teacher at Ponhofi Secondary School and a Geography Education master's degree student at Rhodes University (RU) Grahamstown, South Africa. I would like to be granted permission to conduct a research study with the geography teachers in the **Ohangwena circuit.**

I am carrying out a research on how mapwork is being taught in Namibian Secondary School geography classrooms, and it is guided by the following research topic: *Selected Namibian secondary school geography teachers' pedagogical thinking and practices: The case of mapwork.* The purpose of this study is to investigate and generate insights for understanding Namibian geography teachers' perceptions and pedagogical practices of mapwork in secondary school geography.

The research process will commerce in **August 2017 up to April 2018** and will involve questionnaires with all the secondary school geography teachers in the circuit. Further interviews and classroom observations will be conducted with three geography teachers to be selected based on what is going to emerge from the questionnaires. The interviews and classroom observations are expected to be carried out over a period of seven months. I will make it a priority that this does not disturb or interfere with the normal teaching of the participating teachers. Thus, interviews will be contacted at a time most convenient with each teacher, while classroom observations will be carried out during the normal teaching hours or lessons.

My research proposal has already been approved by the Rhodes University's Education Higher Degrees' Committee (EHDC) and I have attached a copy, which also includes a copy of the consent form to be used in the research process. I have also attached the ethical clearance letter from Rhodes University. As part of this I undertake to ensure that the names of the schools

and all participants will be replaced with pseudonyms and that all the materials I will collect as part of the research will be accessible only to myself and my supervisor.

I hope your office will respond positively to my request. Please do not hesitate to contact me if you may need further clarification, on **0812712222** or email **joywoods03@gmail.com**.

Thank you for your consideration in this matter.

Yours sincerely

Johanna N. Naxweka (Rhodes University)

Cc: The Deputy Director of Education
Education Ohangwena Region

Cc: The Inspector of Ohangwena Circuit

Appendix B

PERMISSION LETTER FROM THE DIRECTOR OF EDUCATION

OHANGWENA REGIONAL COUNCIL
DIRECTORATE OF EDUCATION, ARTS AND CULTURE
DIRECTOR'S OFFICE

1st Floor Greenwell Complex, Private Bag 88005 Eenhana Tel: 065 – 290 201 Fax: 065 -290 224

Enquiries: Magano Gaoses
Email: mcnotto@yahoo.com
Reference: 12/3/10/1

3 August 2017

To: Ms. Johanna N. Naxweka
Cell: 0812712222

Dear Ms. Naxweka

SUBJECT: PERMISSION TO CONDUCT EDUCATIONAL RESEARCH IN OHANGWENA CIRCUIT

1. Receipt of your letter on the above subject matter is hereby acknowledged.
2. The request has been evaluated and found to have merit.
3. Kindly be informed that permission to conduct research has been granted under the following conditions and requests.
   - The data to be collected must only be used for completion of your studies.
   - It remains your responsibility to liaise with the school principals, so as to make prior arrangements with them before the date of the research.
   - No other data should be collected other than the data stated in the request.
   - The process of teaching and learning should not be hindered in any way at any school.
   - You should share the final report of your study with the directorate.
4. It is trusted that you find this arrangement in order.

Yours Sincerely,

04/08/2017

Isak Hamatwi
Director: MoEAC

Ohangwena Regional Council
Directorate Of Education Arts and Culture
Office of the Director
04 AUG 2017
Tel: 065-290 200 • Fax: 065-290 224
P/Bag 88005 • Eenhana
REPUBLIC OF NAMIBIA

Appendix C

CONSENT FORM

Research Title:	Selected Namibian secondary school geography teachers' pedagogical thinking and practices: The case of mapwork
Researcher (s):	Johanna Ndamononghenda Naxweka

Participation Information
• I understand the purpose of the research study and my involvement in it • I understand the risks and benefits of participating in this research study • I understand that I may withdraw from the research study at any stage without any penalty • I understand that participation in this research study is done on a voluntary basis • I understand that while information gained during the study may be published, I will remain anonymous and no reference will be made to me by name • I understand that I need to fill a questionnaire, interviewed and observed in my lessons • **I understand that (other data collection requirements particular to this research, e.g. test results, personal notes, audio, video recording etc. may be used** • I understand and agree that the interviews will be recorded electronically (audio recorded) • I understand that video and audio recording will be used in the classroom • I understand that I will be given the opportunity to read and comment on the transcribed interview notes • I confirm that I am not participating in this study for financial gain

Information Explanation
The above information was explained to me by: Ms. Johanna N. Naxweka
The above information was explained to me in English and I understand this language:

Voluntary Consent	
I,……hereby voluntarily consent to participate in the above-mentioned research.	
Signature:	Date: / /

Researcher Declaration	
I, Johanna N. Naxweka, declare that I have explained all the participant information to the participant and have truthfully answered all questions ask me by the participant.	
Signature:	Date: / /

Appendix D

TEACHER QUESTIONNAIRE

Statement/ Questions		Responses	
PROFILE			
1	**Gender** (please tick the box)	Female	
		Male	
2	**Age** (Please tick the appropriate box/ boxes)	20-29	
		30-39	
		40-49	
		50-59	
		60+	
PROFESSIONAL QUALIFICATION			
3a	Do you have a teaching qualification?	Yes	
		No	
3b	If **yes**, where did you get your **initial** (first) teacher education qualification? (Please tick the appropriate box/ boxes).	College	
		University	
		Other, specify	
3c	If **College**, what qualification do you have?	Education Certificate Primary (ECP)	
		Basic Education Teacher Diploma (BETD)	
		Other, specify:	
3d	If **University**, what qualification did you get? (Please tick the appropriate box/ boxes).	Bachelor of education degree	
		Bachelor of education degree (Hon)	
		Diploma in Primary Education	
		Other, specify:	
ACADEMIC QUALIFICATIONS			
4	**Highest** academic qualifications (Please tick the appropriate box/ boxes).	Matric	
		Bachelor's degree	
		Honour's degree	
		Master's/Doctoral degree	
		Other, specify:	
PHASE SPECIALISATION			
5	Indicate your **phase** specialisation during your initial (first) teacher training.	Lower Primary (1-4)	
		Upper primary (5-7)	
		Junior Secondary (8-10)	
		Senior Phase (11-12)	
		Other, Specify:	
6	Indicate your **subject specialisation** during your **initial (first)** teacher training.	Major/ 1st option:	

	(Please write clearly in the box/ boxes).	Minor/ 2nd option:	
		Others, specify:	
7	What is the highest level at which you studied geography subject? (Please tick in the appropriate box/ boxes).	Matric	
		Bachelor's degree	
		Honour's degree	
		Master's	
		Other, specify:	
PROFESSIONAL DEVELOPMENT			
8a	Have you attended any **mapwork workshop/** courses since you started teaching?	Yes	
		No	
8b	If **yes,** please describe what was done at the workshop/s		
TEACHING EXPERIENCE			
9	How many years of teaching experience do you have? (indicate in the boxes)		
LEARNING AND TEACHING SUPPORT MATERIALS (LTSMs)			
10	How often do you use the following **LTSMs** in your daily teaching of mapwork? (please tick in the box/boxes)	**Responses**	
		Always	**Sometimes**	**Never**
	Textbooks			
	Atlases			
	Globes			
	Wall maps			
	Topographic maps			
	Compasses			
	Posters and wall charts			
	News papers			
	Puzzles and games			
	Google earth			
	Google maps			
	Computers and projections			
	Others, specify:			
11	Who makes decisions regarding the **LTSMS** that you use in your class to teach mapwork? (please write clearly in the box)	**Responses**	
12	Who supplies most of the **LTSMs** that you use in your class? (please tick in the box/boxes)	Region	
		Circuit	
		School	
		NGO	
		Teacher's personal purchase	
13a	Do you make any **LTSMs** yourself?	Yes	
		No	
13b	If **yes**, please describe what those are?		

13c	Do learners have textbooks?		Yes
			No
MAPWORK TEACHING			
14	How do you teach mapwork? (please tick in the appropriate box/boxes)	Teach mapwork as a discrete topic	
		Teach mapwork integrated with other topics	
		Focus on map reading and interpretation	
		Others, specify:	
15	Which of the following geography topic(s) do you **integrate** in your mapwork lessons? (please tick the appropriate box/ boxes)	Settlement	
		Population	
		Climatology	
		Climatic regions	
		Geomorphology	
		All	
		None	
		Others, specify:	
16	Please describe **how you teach** mapwork and the **different strategies** you use.		

17	How would you describe your mapwork classroom **interaction**? (Please tick the appropriate box/ boxes)	**Responses**		
		All the time	**Sometimes**	**Never**
	Teacher dominated			
	Pupils observe and listen			
	Mechanical drill			
	Teacher – learner interaction			
	Learner – learner interaction			
	Active hand on learning by doing			
	Daily life application			
	Others, specify:			

18	How **confident** are you about teaching mapwork content? (please tick in the box/ boxes)	**Responses**			
		Very confidence	**Confident**	**Somehow confident**	**Not confident**
19	How **confident** are you about teaching the following? (Please tick the appropriate box/boxes)	Others, specify:			
		Responses			
		Very confident	**Confident**	**Somewhat confident**	**Not confident**
	Measuring Distance on maps				
	Converting of scales				

	Direction				
	Bearing				
	Grid references (latitude and longitude)				
	Contours				
	Identifying relief features on contour maps				
	Cross sections				
	Interpolation				
	Calculating area				
	Gradient				
	Interpreting topographical maps				
	Describing settlement on topographical maps				
	Please describe what, **if any difficulties** you experience when teaching mapwork.				
20	Studies around the world have found that teaching mapwork is particularly difficult. Can you share any other comments or thoughts about teaching this topic?				

Thank you so much for your time. Your input will be very helpful to me.

Appendix E

TEACHER INTERVIEW SCHEDULE

TEACHERS' VIEWS AND PERCEPTIONS OF MAPWORK?

- How important is mapwork in school geography? Why?
- What are your experiences of teaching mapwork? (how long have you been teaching geography and mapwork?)
- What are some of the challenges and difficulties you have encountered when teaching mapwork?
- How do you feel about teaching mapwork? How confident are you when you teach mapwork?
- What are the key (most important) concepts in mapwork?
- Is there anything that you find difficult to teach in mapwork? Explain.
- Are there some aspects of mapwork aspects that you are not comfortable to teach? Which ones? Why?
- Which ones are you mostly comfortable with? Why?

CLASSROOM PRACTICES

- How do you prepare your mapwork lessons?
- What resources do you use in your mapwork lesson preparations? (e.g. textbooks, atlases- which atlas, globes, wall maps, the outdoor environment etc.)
- What documents do you use to guide your mapwork teaching? Do you find it helpful? Do they contain enough information? How do you use them?
- Where do you get the information that use to teach mapwork from?
- Do you use a textbook? Which one? Is it helpful? Do you use any other textbooks or resources? Do you have enough textbooks for all the learners?

MAPWORK TEACHING

- Please describe how you teach mapwork.
- Do you teach mapwork as a separate section/topic? If so, when do you do this and with which classes? What do you teach when you do this?
- What do you understand by the term Map concepts?
- Please describe how you teach each of the following map concept
    1. Map symbols
    2. Map scales
    3. Distance
    4. Direction
    5. Location (degree & minute)
    6. Contours
    7. Cross section (inter-visibility)
    8. Interpolation
    9. Orientate maps
    10. Gradient
- Which one of these map concepts do you find easy to teach, and why?
- Which one of these concepts do you find challenging or difficult to teach and why?
- Do you integrate mapwork into other sections of the syllabus? If so which sections? Please describe how you do this (can you give me an example of a how you do this for a topic).
- What do you think the most important spatial concepts are in mapwork? Can you describe how you teach these?
- What sort of skills and knowledge do you promote in your mapwork lessons? Please tell me how you do?
- Please describe how you teach each of the following map skills
    1. Measuring distance

2. Calculating using different scales
3. Converting of sales
4. Working out gradients
5. Analyzing maps
6. Map reading
7. Map interpretation
8. Projection

- Which of these skills do you find easy to teach and why?
- Which of these skills do you find challenging or difficult to teach and why?
- What types of maps do you use to teach mapwork?
- For what purpose, do you use them? When do you use them? And how often do you use them?

TEACHING STRATEGIES

- Please describe the different ways in which you teach mapwork.
- What teaching strategies do you use when teaching mapwork? Probe their responses - do they use Fieldwork, inquiry based, experiential, practical modelling/map construction,) which one of these do you use? And how?
- What is your understanding of the concept LCP?
- Would you describe your teaching of mapwork as LC? Why? Why not?
- How appropriate is LCP to teach mapwork?
- These are some of the strategies underpinned by the learner LCP. What sort of activities do you engage your learners in your mapwork lesson? Why? what do you do?
- How do you assess whether if your learners have captured the learning content? What do you do if learners did not understand?
- Do you give your learners homework? If so, how often?
- What sort of homework do you give your learners?
- How long does it take you to mark and give feedback? What sort of feedback do you give?
- What do you think need to be changed in the teaching of mapwork?
- How do you think teaching and learning of mapwork can be enhanced in secondary school geography?

TEACHER PROFESSIONAL DEVELOPMENT

- Please tell me about the teacher professional development workshop that you attended
- What was the workshop about?
- Did you have any expectations of the workshop? What sort? Where they met?
- What sort of activities where you involved in? tell me more about them
- Was the workshop interesting and informative enough? If so, what did you learn? If not, why not?
- Would you like a professional support in teaching mapwork? If so, what sort of support would you like?
- What are your suggestions on geography teacher mapwork professional development?

GENERAL QUESTIONS

- Are there any problems/issues/ difficulties that you are experiencing in teaching mapwork that you want to share with me?
- Are you encouraged to teach mapwork as a geography teacher? If not, why not?
- Are you encouraged and motivated to be creative in your teaching as a teacher? If not, why not? If so, how?

Appendix F

LESSON OBERVATION SCHEDULE

Name of person being observed …… Date ……
Grade: ……. Number of learners ……. Length of lesson…….
Lesson topic: …… School: ……

	LESSON DESCRIPTION AND COMMENTS
Describe what happened in the lesson: How did the lesson begin? How did the teacher greet the learners? What, if any links were made to the previous lesson? How was the topic introduced?	
The structure and organisation of the lesson **Introduction:** what stimulus was used? How was the topic introduced? How did the lesson unfold? How did the lesson conclude? i.e. what was done by whom at the start, during and at the end of the lesson? What pedagogic practice was employed? What was the teacher's role? What was the learners' role?	
Was **questioning** used as one of the strategies? What types of questions were asked? E.g. what, why, how, why etc. Who asked and who answered? What types of resources were used? How were they used? By whom and for what purpose? Was there any use of **atlases or maps**? How were they used and by who? How where **textbooks/other LMS** used?	
What was the goal of the lesson? What were the key ideas/concept being developed? **What map** skills were taught? How were they taught? how were they **assessed**? What attitudes and values were being learned? Was this communicated to the learners and how?	

Mapwork integration: How is mapwork taught in the lesson? Was it taught as a separate topic? Is there integration with map skills alongside other themes and topic? How was that done?		
What was the role of the teacher in the lesson? What was the teacher doing? Comment on the pace and pitch of the lesson. The teacher's voice-audibility, tone and eye contact? What was the role of the learners? What were the learners doing during the lesson?		
Describe the type of activity the learners engaged in during the lesson and the type of activities (if any) they were given to do for homework.		
Does the teacher identify learners' incorrect understanding of mapwork? What does she do when she/he does?	Always	
	Sometimes	
	Never	

School teaching and **Learning context** Describe the ethos of the school. Did the lesson start on time? How long did the lesson last? How much of the lesson was used for teaching and learning? Were there late coming? Were there interruptions?	
The classroom teaching and learning environment Comment on the physical space, the arrangement of desk, the use of the display boards, cupboards and storage, ventilation, condition of the furniture, the teaching aids e.g. OHP, data Projector, computer, TV, the learning support materials e.g. textbooks, atlases, reference books, journals, newspapers, magazines etc.	