

The integration of mapwork and environmental issues using local context in FET Geography: An investigation of current pedagogic practices to inform professional development

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By

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ABSTRACT

This is an interpretative case study of four Grahamstown Education District Further Education and Training (FET) schools. The study sets out to investigate how Geography teachers integrate mapwork and environmental issues using local context, with the intention of providing insights for future professional development. Data for this study were generated using qualitative methods such as document analysis, semi-structured interviews and lesson observations. Interviews were conducted with geography teachers, the subject advisor and a workshop facilitator.

The evidence generated in the study revealed that contrary to the integrative design of the curriculum, there is a superficial integration of mapwork and environmental issues as well as a cursory reference to and use of local context. This was noted in both professional development support workshops and classroom practice.

The study finds that efforts to improve performance in geography need to pay closer attention to curriculum policy that calls for an integration and localization of knowledge and skills for coherence and relevance. It also notes that there is a need for a focus on real-world problem solving in social, economic, cultural and physical environments through the use of inquiry-based local fieldwork. Local investigations provide an integrative space for content and skills as well as being an important point of reference from which learners can compare and contrast issues in other places such as provincial, national, continental, and global locations.

A professional development programme that emphasizes integration and contextualization alongside the current focus on basic skills training is proposed to improve what teachers are delivering in the classroom and to support enquiry-based fieldwork and research to strengthen a place-based relevance in local, national and international contexts. Finally an exemplar for professional development is briefly developed for the topic of soil erosion.

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Abbreviations used in the Thesis

When used for the first time, names have been given in full, subsequently, acronyms or abbreviations have been used alone. A full list of these is hereby given below.

ANC	African National Congress
CBD	Central Business District
DEAT	Department of Environment Affairs and Tourism
DoE	Department of Education
EDO	Education Development Officer
EE	Environmental Education
EECI	Environmental Education Curriculum Initiative
EEPI	Environmental Education Policy Initiative
ESD	Education for Sustainable Development
FET	Further Education and Training
GET	General Education and Training
GIS	Geographic Information Systems
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
LPG	Learning Programme Guidelines
NCS	National Curriculum Statement
NEEP	National Environmental Education Programme
NEEP-GET	National Environmental Education Project for the General Education and Training
NGO	Non-Governmental Organization
NQF	National Qualifications Framework
OBE	Outcomes-Based Education
PAC	Pan-African Congress
PBE	Place-Based Education
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCED	World Commission on Environment and Development
WSSD	World Summit on Sustainable Development

Declaration of Originality

I the undersigned hereby declare that the thesis entitled: The integration of mapwork and environmental issues using local context in FET Geography: An investigation of current pedagogic practices to inform professional development, submitted for the degree of Master of Education in Environmental Education is my original work and has not been submitted in its entirety or in part to any other University or institution for a higher degree.

KEKELETSO REJOYCE BATYI



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CHAPTER ONE

OVERVIEW OF THE STUDY

1.1 Introduction

This study developed from a concern that a curriculum that calls for the integration of theory and practice so that geography teachers can work with concepts and skills in local context to enhance relevance, is not producing improved exam performance. The problem of under performance in geography in the township and rural schools with which I work as a Senior Education Specialist (SES) is most notable in mapwork. Having an interest in environmental education and wishing to improve teacher professional development in geography, this study set out to review the integration of mapwork and environmental issues using local context. My research interest developed in response to continuing poor exam scores in mapwork despite sustained training and support in the district. This study to probe some of the realities of current practice was undertaken in my capacity as a member of the Department of Education responsible for teachers' support and with a view of informing a professional development programme so as to improve the current state of affairs.

This chapter introduces the study by outlining the context of the research, including the research sites and their contexts. It sets out the research question and goal, and outlines the theoretical framework within which the research was conducted and discussions of findings in Chapter 5 are based. It clarifies some of the key concepts used in the thesis and also provides a bird's eye view of how the thesis is structured. Finally, it notes impending issues pertaining to the NCS curriculum that have a direct bearing on the study as a whole and the need for professional development in the subsequent teacher professional development and support programmes.

1.2 Context of study

The study is a small-scale interpretive case study (explained in Chapter 3) of four Grahamstown education district high schools. These are schools that offer Grades 10–12 and are known as Further Education and Training (FET) schools. Of these sample FET schools, two are located in the Rhini township area, or as it is sometimes called, Grahamstown East. This is home to the majority of the black community in Grahamstown. It is an area characterized by poor living conditions, high unemployment and a high crime rate. Its schools share a poor culture of teaching and learning, and suffer from disruptions during teaching time, a lack of parental support, dysfunctional school governing bodies and poor management. Many teachers are under-qualified, and failure rates are high. The third school, although located in a semi-rural area, is similar to the township schools, while the fourth is a former ‘model C’ school located in the white residential area or, as it is sometimes called, Grahamstown West. This school prides itself on its human and physical resources, its strong culture of teaching and learning, and its high pass rates, especially at matric level.

A surface reading of the differences here would suggest that it is easy to understand how the differing conditions explain differences in performance but my interest was to probe the key area of mapwork and the integration of environmental issues and the use of local context. The study thus investigates how FET geography teachers integrate mapwork and environmental issues using local context.

The impetus for research in this area was provided by five reasons as outlined below.

First, the Geography Chief Marker’s reports of 2008 and 2009 (see Appendix M), about the high failure rate in Geography mapwork, this report indicated that Eastern Cape Grade 12 learners continue to perform poorly in mapwork, particularly in calculations and map interpretation. For example, in 2008 some learners earned zero out of 20 marks, while certain districts averaged six percent. In orthophoto and topographical map interpretation the average percentage in a sample of 11 districts was 25% (South Africa. Department of Education [DoE], 2008, 2009). For this reason, the research focused on whether Geography teachers were teaching according to the official curriculum policy guidelines such as the National Curriculum Statement (NCS) Grade 10-12 (General). Geography (South Africa. DoE, 2003) and its accompanying National

Curriculum Statement Learning Programme Guidelines (LPU) for Further Education and Training (FET) (South Africa. DoE, 2008), and if they were, what are the factors that make learners underperform in mapwork.

Secondly, in my capacity as Senior Education Specialist, I have observed a potential problem in the senior phase (Grades 7 – 9), related to the combination of Geography and History to form Social Science. The problem arises when the Social Science subject is allocated to either a history specialist or a geography specialist. When it is given to a history specialist, the chances are that geography, especially mapwork, will be neglected, with the result that learners can reach Grade 10 without a proper understanding of the many aspects of geography.

Thirdly, also from my observations as an official, in examinations geography learners are supplied with maps of places elsewhere, perhaps because a single examination paper is set for all learners in the province. After the examinations, teachers find themselves having to use these maps to teach mapwork if their schools cannot buy local maps. It is not unusual to find a school without a single map of the local area. This tends to make mapwork more abstract, less relevant and less interesting, as learners are obliged to learn about places that they are not familiar with.

Fourthly, my observations over the years also suggest that very few teachers use the local context to make the teaching of mapwork practical and concrete; or draw on environmental issues to make mapwork more practical, relevant and interesting. This is in spite of clear curriculum guidelines requiring them to do that (NCS Grade 10-12 (General) Geography (South Africa, DoE, 2003) and LPG for FET (South Africa. DoE, 2008). For this reason, the research attempts to explore how teachers integrate environmental issues into mapwork.

Finally, from my observations over 23 years as geography teacher, district geography facilitator and cluster leader, I noticed that many teachers struggled to integrate the theory in examination paper one and the mapwork practice in examination paper two. This results in many of them teaching mapwork separate from theory. As a result, learners seldom see any relationship between the two papers and perform poorly in geography examinations particularly in mapwork (paper 2) which requires them to apply theoretical knowledge and understanding such as interpreting, analyzing, calculating and other skills.

As a Senior Education Specialist at the Grahamstown Department of Education district office, I thought it appropriate to undertake the research that would inform professional development of geography teachers because it is the responsibility of the Department of Education to improve the professional development of teachers or to contract service providers to deliver it.

The reason why I combined mapwork with environmental issues and the use of local context is because environmental education is integral to all subjects, including geography, and the geography policy requires that geography teachers integrate theory with practice when they teach. In this case environmental issues form part of the theory and mapwork, including fieldwork forms the practical part. I decided to focus on environmental concerns because they present relevant topics for fieldwork and research, and encourage learners to do mapping that is practical and that relates directly to the real world. Regarding the use of local context, the geography policy also requires teachers to use local context for grounding the knowledge of learners, before they could use other contexts specific for different grades. The research therefore outlined a research question and goals to generate evidence to probe current patterns of practice with a view to informing better professional development and teacher support in the district.

1.3 Research question and goal

Bassey (1999, p. 67) describes a research question as the engine which drives the train of enquiry. He advises that it be formulated in such a way as to set the immediate agenda for research, enable data to be collected and permit analysis to get started, while also establishing the boundaries within which the research will proceed. The train of inquiry in this study was driven by the following question:

How do the current teaching practices of FET Geography teachers integrate mapwork and environmental issues using local context?

The ultimate goal of this study was to get a better grasp of current patterns of practice so as to inform professional development and teacher support.

1.4 Theoretical framework

The coupling of mapwork with environmental issues and the use of local context in the teaching of FET geography directed me to **place-based education (situated environmental learning)** as a theoretical framework because it emphasizes the importance of contextualization through real-world learning experiences of local environmental issues, thereby promoting participation and action competence leading to an increase in academic achievement Sobel (2004).

1.5 Clarification of terminology

In this study:

Integration: would mean: “1. To make whole or complete by adding or bringing together parts. 2. To put or bring (parts) together into a whole; unify. 3. To give or indicate the whole, sum, or total of.” Kellerman (1987, p. 268). Integration in the context of this study will refer to the definitions above with reference to the teaching of theory through practice.

Local context: refers to the area around the school; the neighborhood and the area in which the learners’ community lives.

Local environmental issues: refer to environmental problems having their physical, political, economic or social origin in the learners’ school, community or neighborhood area.

Contextualization: refers to the use of context and contextually available resources in carrying out teaching and learning (Cornbleth, 2000). In this study it refers to the use of the local context (see above) in carrying out teaching and learning.

1.6 A note to the reader

This study took place at a time (2010) when the Ministry of Basic Education was streamlining the curriculum. This was due to the fact that teachers had been complaining about too heavy an administrative load, and the Minister herself said in March 2010: “We have taken steps to provide short-term relief to administrative overload” (South Africa. DoE, 2010, p. 2). Since at the time of conducting this research no official document had appeared showing the changes in the Geography curriculum, the terminology used in this study reflects the situation before the changes occurred.

1.7 Overview of the chapters

Chapters in this thesis are arranged in accordance with the aim of finding and presenting answers to the research question, and of contributing to professional development of the geography teachers for the purpose of improving quality of geography teaching and learning and performance in mapwork.

Chapter 2 has reviewed literature on the imperatives for integration, the FET NCS geography curriculum policy, teaching and learning of environmental issues, mapwork performance, fieldwork as one of the integrative approaches and how it can be used to improve mapwork performance, use of local context, place-based education as a theoretical framework for discussion in Chapter 5 and professional development to support teachers.

Chapter 3 describes and discusses the research methodology and the qualitative data collection methods and techniques used to generate data such as: document analysis, semi-structured interviews and lesson observations. It describes the sampling techniques and study sites. It also describes the data analysis process, and explains how ethical and validity issues were dealt with.

Chapter 4 offers a presentation of the data on policy and practice in relation to geography teaching. It begins with an analysis of the Geography curriculum policy, focusing on its requirements regarding the integration of environmental issues, map skills, the use of local context, and strategies for teaching and learning. It moves on to examine the professional development support provided by the district's subject advisory, and how this assists Geography teachers to put the above aspects of policy into practice. The chapter then presents the place-based practices observed in the four cases sampled.

Chapter 5 offers a discussion of the evidence presented in Chapter 4 using place-based theory, and analytical statements that review evidence on current patterns of practice regarding integration of mapwork and environmental issues, use of local context, including professional development and support.

Chapter 6 presents a concluding summary of the study, and provides some recommendations based on the findings as discussed in Chapter 5. Since the ultimate goal of this study was to

inform the professional development programme in Geography, recommendations in this regard are made. Drawing on the evidence presented in Chapter 4, with regard to both epistemological and pedagogic problems, the chapter then proposes professional development programme guidelines and an exemplar framework that focuses on integration and contextualization using active and participatory teaching and learning. The chapter also includes a critical reflection on the study and aspects for further research.

1.8 Conclusion

This chapter has provided a brief orientation to the whole study. The next chapter reviews literature relevant to the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Since the study investigates how FET geography teachers integrate mapwork and environmental issues using local context, this chapter starts by examining how environmental education (EE) came to South Africa by tracing the global and national influences in order to establish the imperative to integrate environmental issues in geography. It then examines how the South African NCS geography curriculum relates to and responded to the international and national imperatives regarding the issue of integration and how this is actualized through classroom practices. It reviews the environmental content and context of the geography curriculum that relates to environmental issues and what literature states regarding the importance of teaching and learning environmental issues and risks. It also reviews the mapwork content to examine the skills required at this level and reviews mapwork performance both internationally and nationally. It examines how fieldwork could be used as an integrative approach to teaching and learning of environmental issues in local context and to improve poor performance in mapwork examinations. The chapter also examines research on how local context could be used when integrating mapwork and environmental issues by referring to and making use of local fieldwork and locally available resources. The use of local context is associated here with the theory of place-based education which forms the basis of discussions in Chapter 5. The chapter ends by examining literature on professional development and its importance in supporting teachers.

2.2 How environmental education came to South African education

2.2.1 Global influences

According to Irwin and Lotz-Sisitka (in Loubser, 2005), the global development of environmental education (EE) can be traced back to the 1972 United Nations Conference on Human Environment held in Stockholm, where the world's rich and poor countries met for the

first time to discuss matters of environmental concern. The conference led to the establishment of the United Nations Environment Programme (UNEP), whose first task was to establish the term *Environmental Education*. UNEP and the United Nations Educational, Scientific and Cultural Organization (UNESCO) organized the first international workshop on environmental education in Belgrade, Yugoslavia in 1975, followed by the first international conference on environmental education held at Tbilisi in 1977. The Tbilisi Conference developed the framework and guidelines for EE practice at global, regional, and national level. Delegates at this conference recommended formal and informal EE across the curriculum. The Tbilisi Declaration outlined **goals, objectives, and principles**. The goals of environmental education were as follows:

- a) To foster clear awareness of, and concern about economic, social, political and ecological interdependence in urban and rural areas.
- b) To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.
- c) To create new patterns of behaviour of individuals, groups and society as a whole towards the environment (Fien, 1993, p. 50).

From these goals the following five categories of objectives were developed:

1. *Awareness*: to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.
2. *Knowledge*: to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems.
3. *Attitudes*: to help social groups and individuals to acquire a set of values and feelings of concern for the environment, and motivation for actively participating in environmental improvement and protection.
4. *Skills*: to help social groups and individuals acquire the skills for identifying and solving environmental problems.
5. *Participation*: to provide social groups and individuals with an opportunity to be actively involved at all levels in working towards the resolution of environmental problems (Fien, 1993, p. 51).

According to Fien (1993), several environmental educators called for explicit statements of principles of environmental education in order to develop criteria for assessing whether a particular program or activity actually addresses the critical objectives of education for the environment, hence the formation of the following Tbilisi guiding principles, which stipulated that environmental education should:

- Consider the environment in its totality – natural and built, technological and social (economic, political, cultural-historical, moral, and aesthetic).
- Be a continuous lifelong process, beginning at the preschool level and continuing through all formal and non-formal stages.
- Be interdisciplinary in its approach, drawing on specific content of each discipline in making possible a holistic and balanced perspective.
- Examine major environmental issues from local, national, regional, and international points of view so that students receive insights into environmental conditions in other geographical areas.
- Focus on current potential environmental situations while taking into account the historical perspective.
- Promote the value of and necessity for local, national, and international cooperation in the prevention and solution of environmental problems.
- Explicitly consider environmental aspects in plans for development and growth.
- Enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences.
- Relate environmental sensitivity, knowledge, and problem-solving skills and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in their early years.
- Help learners discover the symptoms and real causes of environmental problems.
- Emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills.
- Utilize diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment, with due stress on practical activities and firsthand experience (Fien, 1993, pp. 53-54).

According to Fien (1993, p. 54) “there have been a number of attempts since 1978 to be more specific about the nature and purpose of environmental education”. It is worth mentioning that not all countries responded positively to the Tbilisi Declaration. Irwin and Lotz-Sisitka (2005) mentioned South Africa as one such country where the Tbilisi declaration was regarded with great suspicion by the then apartheid government, which claimed that the Tbilisi principles had a communist origin.

Irwin and Lotz-Sisitka (2005) noted that there were a number of international commissions and reports during the 1980s, quoting for example, the 1983 Brandt commission report, which focused on the need for a fairer distribution of the world’s wealth and resources, the 1987 Brundtland report which was a report of the world’s commission on environment and development (WCED), the 1990 Nyerere report of the South Commission which supported the findings and recommendations of the Brandt and Brundtland reports. Following these reports, which introduced the notion of sustainable development,¹ was the 1992 Earth Summit that met in Rio de Janeiro and focused on the role of environmental education as an educational response to the environmental crisis.

In 1997, five years after the Rio Earth Summit, the world’s environmentalists and policy makers met in Rome to review the progress since 1992, and to re-emphasize the role of environmental education in support of sustainable development and to raise some educational concerns such as, adequate financing of primary and secondary education, full and equal access of girls and women to education, the participation of vulnerable and marginalized groups, and the need to reorient education in countries with strong education systems.

In 2002, the World Summit on Sustainable Development (WSSD) was held in Johannesburg to highlight the socio-ecological, political, and economical transformation at a global level and to stress the role of education in response to issues of poverty, global inequalities, and the need for sustainable development in all societies. It also emphasized the need for action, commitment, and partnerships with the aim of change in environmental education processes. Irwin and Lotz-Sisitka (2005) noted that following the Johannesburg World Summit, many government

¹ Development that meets the needs of present generations without compromising the ability of future generations to meet their needs.

departments geared their environmental education activities towards the World Summit for Sustainable Development action plan and focused on the summit's key priorities. The most important document that was developed by this summit was Chapter 28 of Agenda 21, which called for each community to formulate its own Local Agenda 21.

Local Agenda 21 is the programme developed at the Rio Earth Summit in 1992 and at the summit on sustainable development in Johannesburg in 2002. It focuses on the partnership between local communities and local authorities in achieving greater sustainability. It uses the phrase “**think global and act local.**” as a way of achieving sustainability. The hope is that it is easier to tackle environmental problems at local level, which in turn will have a global impact.

Local Agenda 21 has the following 8 objectives:

- 1) Providing enough shelter for all
- 2) Improving the management of human settlement
- 3) Providing enough construction industry activities
- 4) Promoting good land-use planning and management
- 5) Providing good infrastructure (water, sanitation, drainage and waste management)
- 6) Providing sufficient transport and electricity services
- 7) Proper planning in areas open to disasters
- 8) Promoting resource development and capacity building

2.2.2 Environmental education in South Africa

On writing about environmental education in South Africa, Irwin and Lotz-Sisitka (2005) related that contemporary forms of environmental education first reached South Africa in the mid-1970's, and that they were stimulated by the Belgrade Charter of 1975 and the Tbilisi principles of 1977. Before this, the focus was on education about soil erosion and conservation, which was basically on conservation, on the wise use of natural resources, and on basic interpretation of ecological processes. They mentioned that this conservation education was subsumed within EE.

Irwin and Lotz-Sisitka (2005) further explained that, in South Africa EE was seen holistically as including the social, political, economic, cultural, and urban environments and ecological aspects. They, however, alleged that the development of EE in South Africa has not been a

smooth process as it confronted debates, opposition, and contestation from the then education establishments. For example, when the 1987 White Paper on EE was published, it met with resistance from groups that felt that they did not participate in its development process. The Non-Governmental Organizations (NGOs) from South Africa and from the neighboring countries and the former provincial conservation agencies mostly participated in EE issues.

However, the political change in 1990 opened up some opportunities for the development of EE, as some political parties like the African National Congress (ANC) and the Pan African Congress (PAC) began to position themselves environmentally. Within this scenario, many NGOs began to explore and reassess their relationship with EE. In 1992, the Environmental Education Policy Initiative (EEPI), which was a participatory policy making alliance, was established. This alliance changed its focus to become the Environmental Education Curriculum Initiative (EECI), which was a joint state/civil society partnership project with a focus on the development of formal education curriculum policy. Irwin and Lotz-Sisitka (2005) further alleged that it was through the participatory policy-making process established in the EEPI that environmental educators working in the EECI established themselves as stakeholders in the curriculum development process of the Outcomes-Based Education (OBE) which was named Curriculum 2005. According to Lotz-Sisitka and Raven (2001), the National Environmental Education Programme (NEEP) of the Department of Education was established in 1999 to contribute to the implementation of EE at the level of curriculum policy development, materials development, professional development, and school-based activities. In 2002, the National Environmental Education Project for the General Education and Training Band (NEEP-GET) was formed to support the implementation of EE at General Education and Training (GET) level.

Griffin (2003) reveals that the White Paper on Environmental Management Policy identified the Department of Environmental Affairs and Tourism (DEAT) as the lead agent responsible for the implementation of government policy on environmental management. The foreword on the White Paper on Environmental Management Policy states that the decision to adopt and promote sustainable development emerged from the Rio Earth Summit in 1992, that in 1996 the constitution of South Africa through the Bill of Rights stipulated the rights regarding the environment as follows;

Everyone has the right:

- (a) To an environment that is not harmful to their health or well-being; and
- (b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
 - i. prevent pollution and ecological degradation;
 - ii. Promote conservation; and
 - iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (South Africa, 1996 as cited in Griffin 2003).

Griffin (2003) went further to say that, in July 1997 the Department of Environmental Affairs and Tourism's White Paper on Environmental Management presented seven strategic goals. Among these was goal 5 that called for empowerment and environmental education with the supporting objective of education and training. This would promote the education and empowerment of South Africa's people, increase their awareness of, and concern for, environmental issues, and assist in developing the knowledge, skills, values, and commitment necessary to achieve sustainable development. The supporting objectives were as follows :

- To integrate environmental education in all programmes, levels, curricula and disciplines of formal and non-formal education and in the National Qualification Framework.
- To integrate environmental education into all training and unemployment relief programmes.
- To enhance environmental literacy using all forms of media.
- To ensure that environmental education programmes and projects foster a clear understanding of the inter-relationship between economic, social, cultural, environmental and political issues in local, national and global spheres. (DEAT, 1997 as cited in Griffin, 2003, p. 54)

In the next section I examine how the South African NCS geography curriculum relates to and responded to the international and national imperative regarding the issue of integration.

2.3 An integrated approach to teaching mapwork and environmental issues

We have seen that the environmental education imperative to integrate and strengthen environment and sustainability concerns in geography originated from the international influences and then filtered down to the national level. For example, the Tbilisi guiding principles, stipulated that environmental education should:

- Be interdisciplinary in its approach, drawing on specific content of each discipline in making possible a holistic and balanced perspective.
- Examine major environmental issues from local, national, regional, and international points of view so that students receive insights into environmental conditions in other geographical areas. (Fien, 1993, pp. 53-54).

Drawing from the above principles, one of the supporting objectives of goal 5 of the South African White Paper on Environmental Management was to:

To integrate environmental education in all programmes, levels, curricula and disciplines of formal and non-formal education and in the National Qualification Framework. (DEAT, 1997 as cited in Griffin, 2003, p. 54)

We have also seen that this culminated in the Constitution of the Republic of South Africa, Bill of Rights (South Africa, 1996a), in which the right of every South African to a healthy, protected and sustainable environment is enshrined. This right was translated into the NCS principle that recognized the relationship between human rights, inclusivity, a healthy environment and social justice, where a strong focus at FET level is on environmental justice.

In this regard the NCS geography curriculum policy (South Africa. DoE, 2003), stipulates that teachers should integrate theory with practice and use local context which could be relevant to learners and that integration should take place within and across subjects and fields of learning. The reason being that, integration of knowledge and skills is important for achieving applied competence as defined in the National Qualifications Framework (NQF). Since environmental issues are integral to geography, the study investigates how integration is undertaken within the subject.

Looking at the advantages of integration in geography in Uganda, Kyagulanyi (1988, p. 109) had noted that “the integrated curriculum has the advantage of being taught through a variety of (short) activities which motivate pupils to participate fully in lesson development without being taxed”. On giving the hints on integrating skills and conceptual development he suggested that all source materials should be adapted to local needs. He further acknowledged that the integrated geography curriculum shows coherence and develops a wide range of skills. This was also noted by Kellerman (1987) when attempting to explain how integration is achieved by saying that it is achieved through multidimensional research or by the study of a variety of aspects of a whole.

The NCS Learning Programme Guidelines (LPG), for FET stipulates that:

The development and use of skills and techniques form an integral part of the process of constructing knowledge in Geography. Therefore, it should be developed, applied and integrated in the teaching of all the content selections. (South Africa. DoE, 2008, p.25)

According to the NCS Learning Programme Guidelines (LPG) for FET, Figure 2.1 below is an example of how the human and physical worlds of the geographer are integrated through the use of and application of geographical skills and techniques in an approach that deepens the understanding of a “complex existence...” (p. 8)

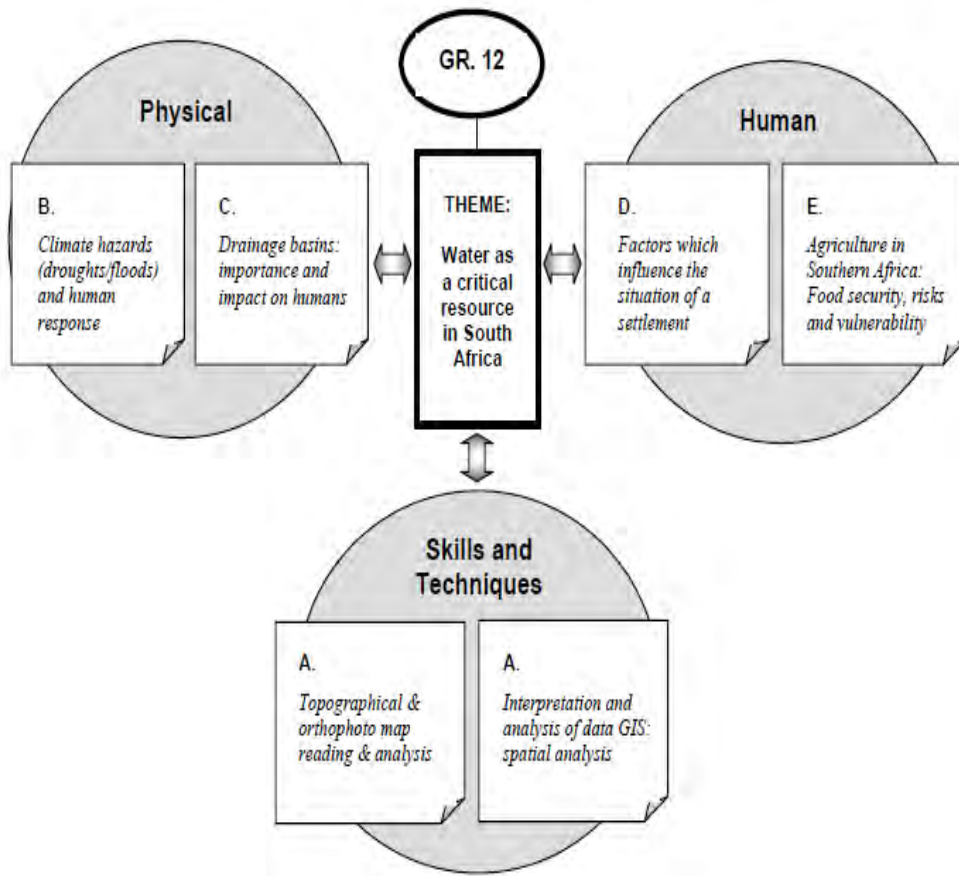


Figure 2.1: An example of the integration of knowledge and understanding in Geography (adapted from NCS - LPG Grade 10-12. (2008))

The example in this figure is on national context, but as teachers are required to start with local context, it is possible to adapt it to local context. For example, learners could use the local topographical and orthophoto map to identify a river nearby the school if there is one. They could do inquiry-based fieldwork where they test the water quality of that river, identify factors which influence water quality in that river, land-use around it, ecological impact and come up with possible suggestions on how water quality in that river could be improved if the water is polluted. This could also involve measuring the width and depth of the river and identifying the type of the river, whether it is a seasonal or perennial, using map symbols found on the topographical map.

The narrative in the literature argues that this activity could develop learners' conceptual knowledge and equip them with skills such as observation, testing, measuring and calculating, asking questions, acquiring, organizing and analyzing information, making judgments based on the information gathered and answering questions, critical thinking and problem solving. This

could also improve learners' grasp of the Geographic Information System (GIS) shaping conceptual formation and knowledge such as, spatial and attribute data acquisition, management, analysis, manipulation, integration and buffering, to name a few. Skills in using resources such as a Global Positioning System (GPS) to find the locational position and spatial coordinate of the position where water samples for testing were taken could also be developed. These are the skills which learners are required to acquire in mapwork curriculum at FET level. Inquiry-based fieldwork like this, where learners use local maps to investigate a local environmental issue (water quality), is a good example of an integrated approach.

The FET geography LPG further explains that:

Integration within Geography is achieved through the inter-relationship between the Learning Outcomes, Assessment Standards and the content. It is therefore important to note that no single Learning Outcome can be addressed on its own. In Geography, three distinct competencies, namely practical (geographical skills and techniques), foundational (knowledge and understanding) and reflexive (application to address challenges and issues) are integrated for achieving applied competence. (p. 10)

The geography curriculum policy (South Africa. DoE, 2003, p.3), in this case, emphasizes that: "In adopting integration and applied competence, the National Curriculum Statement Grades 10 – 12 (General) seeks to promote an integrated learning of theory, practice and reflection". The environmental content of geography, from which environmental issues are found, forms the theoretical part of geography (foundational competence or knowledge and understanding) while mapwork forms the practical part (practical competence or general geographic techniques and skills).

It therefore means that teachers are not expected to teach mapwork separate from theory, or theory alone separate from practice. Contrary to this, Davidson and Catling (2000) revealed that there has always been a tendency for geography teachers to treat skills as separate from knowledge and understanding, that they are not viewed as integral to the process of learning. They cited the example of how they have found mapwork separated as a unit of study from work on places and themes in primary and secondary schools. They therefore warn that teaching skills separately emphasizes a technical rather than an intellectual process and that it does not give recognition to learners' roles in developing understanding. They further revealed that there is a tendency to place emphasis on skills needed to present data, but insufficient emphasis on the

intellectual skills needed to interpret, analyze, evaluate and explore meanings in data and information. However Boardman 1983 as cited in Ying (1997) acknowledged that some basic map-reading skills may need to be treated separately, but that once students have acquired such skills, mapwork should be integrated with the content. In this case Ying (1997) also cited Stimpson (1989) as warning that separate mapwork is inappropriate to the cognitive needs of the learners.

Although the South African NCS geography curriculum responded positively to the international and national imperatives regarding the issue of integration, there are challenges especially at FET level. For example, Mokhele and Jita (2008) noted that EE, according to the present curriculum framework, is offered as a focus at the GET levels only, and that there is at present no curriculum policy provision for how to teach it at FET levels of schooling. Again, Nsubuga (2009), quoting Lotz-Sisitka, Rosenberg, Nsubuga and Schudel, made a number of observations which illuminated current pedagogic practices regarding the status of environmental teaching and learning at FET level. These were as follows:

- Although there is a focus on environmental learning in the national NSC [sic] documents, there is inadequate support for curriculum support staff and teachers to ensure that it is interpreted into appropriate guidelines, learning programmes, classroom activities, and assessment practices.
- Environmental learning is still regarded by many teachers as being outside the formal school curriculum.
- Many teachers have an inadequate knowledge of environmental concepts and issues. They tend to ‘skip’ the environmental content of the curriculum or to teach it in a superficial and disjointed manner. There is often repetition and lack of progression in what is taught. (Nsubuga, 2009, p. 38)

This links well with Mbambisa’s (2005) research on the strategies used by subject advisors and facilitators to support environmental learning (though it was at GET level) which revealed that subject advisors are faced with many challenges with regard to the provision of support for teachers. As a result they provide superficial support in the form of ad hoc workshops and school visits and that they themselves need “professional development support relating to curriculum,

pedagogical and assessment” (Mbambisa, 2005, p. 114). I think this is not surprising considering the fact that most subject advisors come straight from the classrooms, where they were assistant teachers, to being subject advisors.

Besides this, Robottom (1987, p. 85) had argued that:

Environmental education at school level poses significant curriculum and teaching problems for practitioners: it aspires to be interdisciplinary, but the conventional school curriculum is strongly disciplinary; it entails outdoor education, but school rules and regulations impose constraints on out-of-classroom activities; it is a form of inquiry teaching, but structures and relationships in schools tend to reproduce more didactic forms of instruction; it is interested in inquiries that are critical, involving critiques of environmental situations, but schooling tends to be more interested in vocational or liberal education.

Considering the fact that the importance of including environmental education is voiced from international down to national level and is constituted in the Bill of Rights, it is imperative that there should be good environmental learning in our schools, most especially at FET schools, where learners are more mature and could make a considerable contribution to finding solutions to environmental problems.

Since the concern in this study is how the FET geography teachers integrate environmental issues and mapwork using local context, we now examine the geography curriculum that presents content and context which are necessary in order to deal with environmental issues.

2.4 The environmental issues content and context of the NCS Geography curriculum at FET level

According to the Department of Education’s (2003, p. 20) NCS Geography Grades 10 – 12 Curriculum Guideline, the content in appendix N outlines the foundational competence whereby a learner is expected to be able to demonstrate knowledge and understanding of processes and spatial patterns dealing with interactions between humans and the environment in space and time. The curriculum further states that Geography, as an applied science, seeks to apply skills and techniques, knowledge and understanding to issues and challenges in the immediate environments and on a local, national, continental, and global scale. It recognizes that the issues and challenges, no matter the scale, are often complex and not easy to solve, that the subject does not only recognize the spatial and temporal dimensions of these issues and challenges, but also

values and attitudes that influence them. This encourages learners to develop critical perspectives to explain why these problems exist. In attempting to offer solutions to these kinds of issues, the subject applies principles such as those embodied in the concepts of sustainable development, sustainability, democracy, and social and environmental justice to offer appropriate solutions or strategies and to develop meaningful perspectives. In this way, it prepares them to be “active participants, informed citizens, and responsible decision-makers. Learners will also be encouraged to recognize and appreciate values, attitudes, and indigenous knowledge held by individuals and groups, to examine the consequences of their actions, and to make informed, logical decisions” (South Africa. DoE, 2003, p. 11).

Regarding the use of context, although each Grade has its own context, as shown in appendix N, the policy requires that “teachers should be aware of and use local context ... which could be more suited to the experiences of the learner” (South Africa, DoE, 2003, p. 25). The table on appendix N reflects the environmental content of the FET Geography subject that relates to environmental issues. As can be seen from this table, the NCS curriculum provides a number of environmental issues across the Grades, which can be found in any local area, whether rural or urban. These are for example, issues pertaining to the physical environment such as: the ozone issue, global warming, acid rain, the greenhouse effect, soil erosion, flooding, drought, water and land pollution, exploitation of natural resources: social issues such as poverty, racism, conflicts, employment, HIV/AIDS, refugees and gender issues: economic issues such as energy production and use, impacts of climate change, development and sustainability strategies. Political issues such as governance of urban and rural areas, local authorities and provision of services, local agenda 21 and others not mentioned here.

2.4.1 The importance of learning environmental issues and risks by school learners

Scoffham (2000) observed that all over the world the environment is in crises, that the environmental issues are complex and varied. Whether we are informed or not, we are all aware that something is wrong, that the message about environmental crises is conveyed to us through all forms of media. This is related to the supporting objective of goal 5 of the DEAT White paper, which was described in section 2.2.2 that said “to enhance environmental literacy using all forms of media (DEAT, 1997 as cited in Griffin, 2003, p. 54).

Scoffham also observed that the problem is how to respond to these crises, but then advised that since today's learners are tomorrow's decision-making citizens, and that as the 21st century progresses, environmental issues are likely to have an increasing impact on both local communities and society, it is important that learners are well informed about the causes and consequences of the problems they are likely to encounter.

Against this backdrop, Orr (2004) contends that the worth of education should be measured against the standards of decency and human survival, and that the danger of education is that it produces highly educated 'vandals' of the earth. He called them smart, degree holding people who are ecologically illiterate and ignorant of the things they must know in order to live well and sustainably on the earth, and therefore as a result, climate stability, the beauty of the natural world, the resilience and productivity of natural systems and the biological diversity are in jeopardy. In rethinking education, he put forward the following principles regarding good education, which is measured against human survival:

- That all education is environmental education.
- Mastery of one's person as against mastery of content.
- That knowledge should carry with it the responsibility to see that it is used well in the world.
- That we cannot say that we know something until we understand the effects of that knowledge on real people and their communities.
- The importance of "minute particulars" and the power of example over words and
- That, students should be taught in various and subtle ways beyond the overt content of courses. (Orr, 2004, p. 12-13)

Orr (2004, p. 14) further proposed that no student should graduate from any educational institution without a basic understanding of the following; the law of thermodynamics, the basic principles of ecology, carrying capacity, energetics, least-cost, end-use analysis, limits of technology, appropriate scale, sustainable agriculture and forestry, steady-state economics and environmental ethics. As can be seen he is making education both accountable and responsible for making our learners environmentally literate. Furthermore I think this is in line with the

goals, objectives and principles of the Tbilisi Declaration mentioned in Section 2.2.1 and the NCS curriculum that envisages the South African learner who is compassionate, with a respect for the environment and the ability to participate in society as a critical and active citizen (South Africa. DoE, 2002a, p. 3).

De Beer, Dreyer and Loubser (2005) hold the same view, that it is important that learners be made aware of environmental issues. They mentioned the following issues (most of which are in the NCS curriculum) as being very crucial; biodiversity, waste, littering and recycling, the greenhouse effect and global warming, the ozone layer and CFCs, nuclear technology, pesticides, overpopulation, urbanization, the depletion of natural resources, health hazards, desertification, deforestation, pollution, and poverty. Since awareness education is not enough, it is proper to refer back to Jensen and Schnack (1997) who advised that teaching of environmental issues should not overwhelm pupils with knowledge and investigations about how bad things are, as that creates anxiety and apprehension, but that learners should actively be engaged in different environmental activities, debates and discussions about issues and risk solutions.

The teaching and learning of environmental issues is very important if we consider Scoffham's (2000) warning that the world is in environmental crisis dominated by different issues and risks and also consider some of the Tbilisi guiding principles (see Section 2.2.1) which stipulated that environmental education should:

- Examine major environmental issues from local, national, regional and international points of view so that students receive insights into environmental conditions in other geographical areas.
- Promote the value of and necessity for local, national and international cooperation in the prevention and solution of environmental problems.
- Help learners discover the symptoms and real causes of environmental problem.

As can be seen, these principles start with local context. I think this is very relevant and important because learners are first members of the local areas where they stay or study before being members of the national, continental and global environment.

Referring to risks, Beck (1992, p. 22) encapsulated the concept by saying:

By risks, I mean above all radioactivity, which completely evades human perceptive abilities, but also toxins and pollutants in the air, the water, and foodstuff, together with the accompanying short-and long-term effects on plants, animals, and people.

Beck (*ibid*) further explained that these risks are no longer tied to their places of origin, which is industries and big businesses, but are all over and endanger all forms of life. Some people are more affected by them than others and most importantly, learners and teachers are part of a risk society and therefore there is need for risk epistemology and pedagogy which focuses on risk reduction, adaptation and resilience. On this score Scoffham (2000), reiterated that any worthwhile curriculum has to address environmental issues. The question is how should learners learn them?

Dreyer and Loubser (2005, p.138) advised (by quoting from the EE link), that to ensure a successful and holistic approach to learning in environmental education, attention should be given to the following principles:

- Environmental learning is based on knowledge and should develop the skills that are needed to study and solve environmental problems and to address environmental challenges.
- Environmental learning should include the affective domain, especially the attitudes, values, and commitments needed to ensure a sustainable society.

O'Donoghue (2001, p. 3) holds the same view that environmental learning should involve the holistic view of the environment. He described the holistic view as including the following:

- Bio-physical - Plants, animals, soil, water, air and other matter all interacting within life supporting systems and processes.
- Social - People living together as part of this environment.
- Economic - The sustaining system within which we have jobs and earn money to pay for resources and services we need and want.

- Political – The environment that enables us to contribute to and influence decisions that shape access to resources, the economy, and how people live together.

He used the figure below to illustrate the holistic view of the environment.

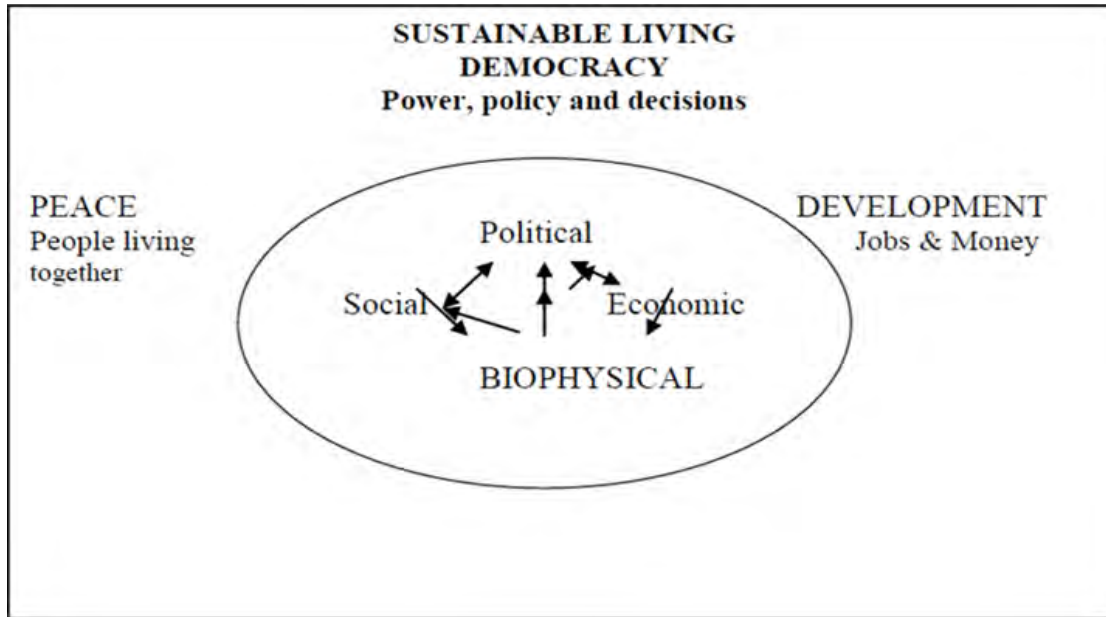


Figure 2.2: A holistic view of the environment. [Source: O’Donoghue, (1993) as cited in Makhoba (2009)]

Sauvé (2002) added to these conceptions of the environment, by viewing the environment as: a system, nature, resource, problem, place to live, biosphere, and as a community project.

The holistic view of the environment as articulated by O ‘Donoghue above, links well with the first Tbilisi guiding principle which stipulated that environmental education should consider the environment in its totality – natural and built, technological and social (economic, political, cultural-historical, moral, aesthetic). Also with the Tbilisi goals that envisage an environmental education, that fosters clear awareness of, and concern about economic, social, political and ecological interdependence in urban and rural areas. This also supports the South African Department of Environmental Affairs and Tourism’s White Paper on Environmental Management goal 5 supporting objective that strives “to ensure that environmental education programmes and projects foster a clear understanding of the inter-relationship between economic, social, cultural, environmental and political issues in local, national and global spheres” (DEAT, 1997, as cited in Griffin, 2003, p. 54). It further links well with the Geography

Grade 10-12 LPG (2008) which states that the Geography subject statement is in line with current international standards and development. Regarding the profile of the Geography learner exiting Grade 12, it stipulates that learners who have taken Geography as a subject for their National Senior Certificate should:

- Have a holistic view of the environment and its physical, biological, social, economic and political components in time and space;
- Understand and interpret patterns and processes underlying landscapes at various scales.
(p. 13)

Regarding proper environmental learning strategies, Dreyer and Loubser (2005) proposed the following learning strategies:

- Active learning, where learners should actively participate in learning situations in environmental education.
- Authentic learning, where learning should be about real environmental threats and problems. For example, in the local area, using local or community sources of information.
- Problem solving, whereby learners can investigate local environmental issues. Here they cited Evans (2002) who noted that; “Learners who have succeeded in effecting change through their solutions to problems have a sense of accomplishment, become involved and display responsible environmental behavior” (p. 3).
- Critical thinking, where learners can critically engage with information on different perspectives associated with environmental problems and risks.

Mapwork through fieldwork is the best way to make use of the above learning strategies and to involve learners in local environmental issues and risks. This has been acknowledged by La Grange (in Fairhurst, 1994), who argued that instead of studying make-believe situations and solving make-believe problems in the classroom, learners should be engaged in real-life situations through fieldwork. Related to this, O’Donoghue (2001), writing about active learning, recognized that, environmental learning is often spontaneous and is best when mediated with active learners in a **local environment**. With a relevant risk, issue, or concern as a focus, where learners can find out **‘about’** the environment, undertake investigations **‘in’** their local

surroundings, and do things ‘for’ a healthier and happier world (p. 7). He used the figure below to illustrate this point.

Relevant focus for subject/learning area and local context

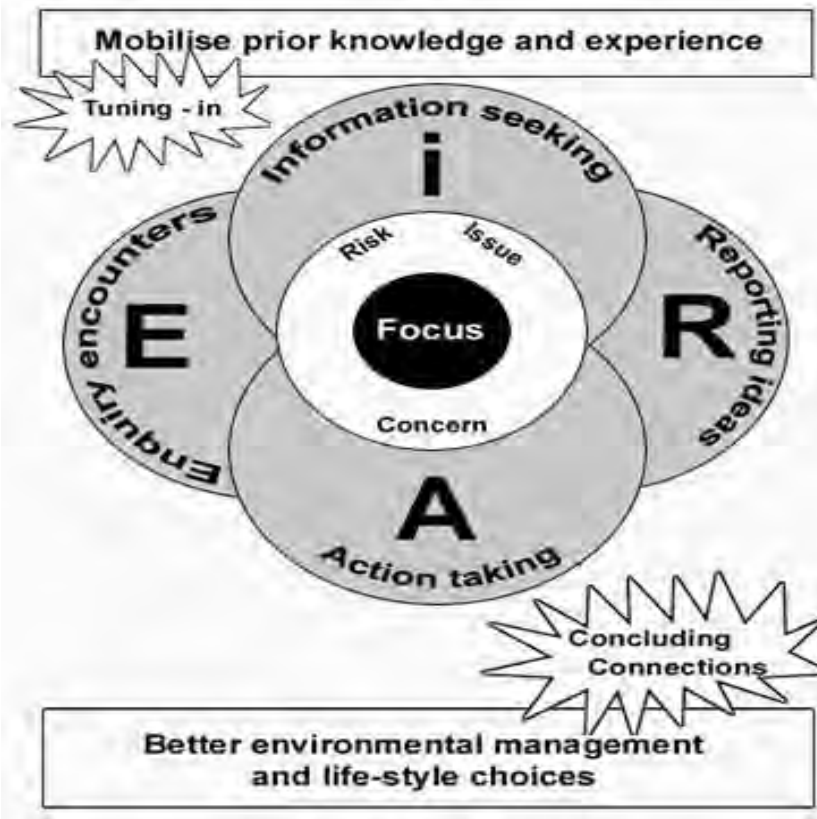


Figure 2.3: Active learning (Adapted from: O’Donoghue, 2001, p. 12)

Environmental learning of issues and risks in the local area, using local maps and other local resources makes mapwork interesting, relevant, place-based and activity-based. It is also the most meaningful way to make learners participate in their own localities for their own benefits. Wilmot (1998) in this case maintained that education is a process, which is concerned with developing an individual’s sense of identity in a part of the biophysical, economic socio/historical and political environment. She further noted that operating within a framework of **place/ space/ time** requires spatial knowledge and skills through which an individual can develop a sense of belonging, an ability to navigate and negotiate the environment, an understanding of the environment and issues/problems therein, that the possession of these skills and knowledge will enable an individual to function effectively as part of and within the environment. Thus, Stimpson (1989) observed that, mapwork is a means to developing concepts

and gaining understanding of environments and environmental issues. Since the study investigates how FET geography teachers integrate mapwork and environmental issues using local context, I will now review the mapwork content of the FET geography curriculum to examine how it allows for integration.

2.5 The mapwork content of the NCS Geography curriculum at FET level

Mapwork forms the practical part of the Geography syllabus in all grades. It is written as paper two in the Further Education and Training (FET) phase (Grade 10-12). According to the National Curriculum Statement (NCS), it is entitled **Geographical skills and techniques (practical competence)**. The general skills that learners are expected to possess in this phase are the following; asking questions, acquiring, organizing and analyzing information, making judgments based on the information gathered (enquiry skills) and answering questions. The policy requires that these skills and techniques be integrated with the foundational competence (knowledge and understanding) and with the reflexive competence (application) (South Africa. DoE, 2003). As can be seen from the mapwork curriculum (see appendix O) various other skills are catered for such as the use of atlases, map reading, analysis, interpretation, orientation and calculations. The curriculum does allow for integration specifically through “map reading, analysis and interpretation on 1:50 000 topographical and orthophoto maps” (South Africa. DoE, 2003, p. 28 and 30) and through investigative fieldwork. This has been observed by Innes (2005, p. 7) who acknowledged that:

...there is ample evidence that map use has been given a central place within Geography, and that maps are to be used to investigate real issues in local contexts that have impact on learners' lives...

Since the impetus to conduct this study was provided by the Geography Chief Marker's reports of 2008 and 2009 about the high failure rate in Geography mapwork, we now examine performance in mapwork both nationally and internationally.

2.6 Performance in mapwork

Performance in mapwork has been both an international and national concern for some time. For example, internationally, research conducted in Nigeria by Okpala (In Gerber and Lidstone 1988) about the teaching styles in reading and interpreting topographical maps revealed that in

Nigeria, the authors of textbooks on mapwork, Geography learners, teachers and examiners of school certificate Geography admitted that mapwork constitutes the greatest area of difficulty for learners. Okpala (1988) further showed that even in West Africa, authors of textbooks on mapwork recognized that mapwork presents challenges for learners. He cited the West African School Certificate Geography chief examiners' report of 1975-1984, which showed that learners' performance in mapwork was generally poor. Examiners ascribed this underperformance in mapwork to a lack of sufficient practice in map reading.

Okpala, however, contended that Nigerian learners were not alone in this problem. He cited Boardman (1983) who commented on reports by U.K. examiners in mapwork for the Certificate of Secondary Education and General Certificate of Education, who complained that many candidates did not have basic map skills. For example, they could not interpret simple contour patterns and that there were even those who stated that rivers flow into the area from the sea.

In Hong Kong, research conducted by Ying (1997) revealed that students in secondary schools have problems identifying map features and that map calculations pose a problem to some of them. De Klerk (2009), referring to the Namibian geography learners, also stated that many learners experience difficulty interpreting topographical maps, that in many cases they do not know how to measure distances, how to find a bearing and how to give grid references. He further stated that learners complete diagrams and graphs incorrectly and do not know how to use map scales and a map key.

In South Africa, similar reports emerged from the 2008 and 2009 Geography Chief Marker (See Section 1.2 in Chapter 1). Here the Chief Marker recommended that regular revision exercises should be given to the learners to familiarize them with the concepts and calculations and that they should be made to understand the skills in actual situations. Use of local context where learners go outside the classroom to the school grounds or surrounding environments and measure actual ground distances and interpret real-life issues using local maps can make mapwork less difficult, provide skills in actual situations and can improve mapwork marks.

Hurry (1994, p. 91) commended that, "mapwork is important for developing spatial and interpretative skills and yet evidence of the study conducted in the Transkei showed that students

perceive it to be little more than the collection of terms and problematic calculations”. On investigating the factors influencing learner achievement in Geography mapwork at Grade 12 level in the Mafikeng district, North West province, Mwenesongole (2009) found that most learners do not perform well in mapwork because they lack motivation, basic map reading, and mathematical skills. His study revealed the need for re-skilling and retraining all educators involved in teaching mapwork in areas of basic map reading and interpretation skills, basic mathematical skills and the importance of motivation. He argued that highly motivated learners develop a positive attitude towards learning, that their interest and desire to learn are aroused thereby leading to high achievement in mapwork. He therefore advised that taking learners out on a field trip where they could see the actual mapwork landforms represented on a specific topographical map could motivate learners and improve their performance.

Regarding the issue of what causes learners to underperform in mapwork, Ying (1997), recognized that the problems or difficulties in mapwork encountered by learners could be ascribed to the development of their understanding of spatial concepts. He cited Boardman (1983) who noted that children’s conceptual and perceptual abilities greatly affect their mapwork, but once these two improve, even their mapwork understanding improves. Wilmot (2005) concurs with this idea by noting that the ability to communicate spatial knowledge is dependent on the extent to which an individual has both spatial perceptual skills and spatial conceptual understanding. She cautioned that if an individual’s spatial perceptual skills are not properly developed, he or she would not be able to develop spatial understanding. Also, if spatial conceptual understanding is lacking, that individual will not be able to use or apply spatial perceptual skills sufficiently and efficiently. She therefore concluded that in order to communicate spatial information effectively in graphic form an individual should be able to recognize and utilize spatial perceptual skills and have the ability to apply these skills. Ying (1997) on the other hand argued that the teaching of mapwork in schools usually ignores reality and needs which are the basis for cartographic communication, that the poor performance is the result of the over use of theory by teachers. Reality in this case can be found by involving learners in investigative activities in the local area using local maps. This could improve their spatial, conceptual and perceptual abilities. Ndlwana (1991) also found, among other things, that secondary school learners do not enjoy mapwork lessons because of the theoretical and abstract manner in which they are taught and that they are unfamiliar with local maps. Here she notes that

the key point appears to be how our teaching is not localized and does not include a relation of local environment to the map abstractions.

Over and above the development of spatial and conceptual skills, Boardman (1983) and Hurry (1989) observed that maps are essentially representations and abstractions of reality which bear little resemblance to the actual area of the land they represent. They show only selected pieces of information. This means that whenever learners are involved with mapwork, they should be given a lot of practice. The 2009 Geography Chief Marker also recommended that learners should be given frequent mapwork practice, especially in calculations; that they should understand the reality of geography and the space occupied around them and how humans and environment interact on a daily basis. They argued that Geography is a living subject and educators should not destroy it by keeping it in the classroom (South Africa. DoE, 2009).

If we consider Dreyer and Loubser's (2005) learning strategies proposal of active, authentic, problem solving and critical thinking, then the best way to integrate environmental issues and mapwork is through fieldwork using local context which will be relevant to learners. This brings us to the integrated approach using fieldwork as one of the best approaches.

2.7 Fieldwork in Geography mapwork

Fieldwork offers opportunity for introducing pupils to people-environment issues and the opportunity for the analysis of these issues in the field using appropriate techniques of inquiry McPartland and Harvey (1987, p. 162) as cited by Adonis (1993, p. 9). This view was acknowledged by O'Donoghue (1993, p. 14) who observed that, "fieldwork is a teaching approach that is integrative in its own and adopts more of a participatory approach". He further noted that fieldwork offers experiential learning and cited Chapman (1992) as saying that experiential learning helps to develop knowledge, skills and attitudes. On expanding upon experiential learning O'Donoghue observed that this kind of learning within fieldwork has the potential for learners to gain the maximum benefit from it by:

- Providing opportunities for learners to interact with one another, with the teacher and the content of the activity.

- Ensuring that all learners are actively involved one way or the other and not excluded by becoming non-participatory observers.
- Encouraging feedback on what happened during the experience.
- Encouraging participants to think about the implications of the experience for themselves.
- Encouraging learners to think about any changes they might like to make themselves and would like to foster to others. (p. 16).

This is similar to Laws's (in Fien and Gerber, 1989, p.104) observation that:

Experiential learning engages learners in critical thinking, problem solving and decision making in contexts that are personally relevant to them. This approach to learning also involves making opportunities for debriefing and consolidation of ideas and skills through feedback, reflection, and the application of the ideas and skills to new situations.

In this case, Scoffham (1981) recognized that outings to the local surroundings can serve to develop a wide range of curriculum skills and help to promote the child's social and intellectual development, while Bland, Chambers, Donert and Thomas (In Bailey and Fox 1996, p. 165) argued that "Geography without fieldwork is like science without experiments", that the field is the geographer's laboratory where learners experience firsthand landscapes, places, people and issues and where they can learn and practice geographical skills in a real environment. They further observed that fieldwork provides learners with skills such as: observation, recording, research, map reading and interpretation, presentation, communication and report writing, management of time and energy, problem-solving skills such as examining issues critically and working towards solutions thereof. It further provides them with skills such as: measuring of distances, angles, rates and quantities, decision making and team work.

As indicated on the mapwork curriculum (see appendix O) geography learners at FET level are required to do fieldwork using local maps/photos and record the information of the local area. The policy says, "A more advanced level of practical work and field-work is demanded..." (South Africa. DoE, 2003, p.12) at FET level. It also prescribes an issue-based approach in conducting fieldwork and advocates that an issue-based approach enables the geographer to focus on specific issues in natural, built or social environment in a location (place or regional) context, and that:

A well-developed geographical understanding of these issues can only result from a process of enquiry in which questions are asked, evidence is examined and conclusions are reached. The enquiry method provides learners with ways of thinking critically and creatively about the problems or issues they study (e.g. the impact of HIV/AIDS on population dynamics, environmental quality, socio-economic disparities, hazards and disasters, poverty and resource management in a country).

Looking at international perspectives in geography fieldwork, the study conducted in Taiwan by Han and Foskett (2007) indicated that, the position of fieldwork in the geography curriculum in Taiwan is relatively undeveloped compared to other countries because it has not been a required part of the curriculum. They compared it with England and Wales where it forms an essential part of the National Curriculum and said that fieldwork in these countries has been the traditional requirement in Geography and it is now assessed by external examination. They further mentioned that in these countries, different professional organizations support schools and teachers in undertaking fieldwork by providing resources, information and training. The independent bodies provide services such as accommodation, specific equipment and teaching support. In his survey, Boardman (1974) revealed that Finnish teachers listed the following cognitive, psychomotor and affective objectives of fieldwork:

Table 2.1: Objectives of fieldwork: adapted from Boardman (1974)

Cognitive objectives	Psychomotor objectives	Affective objectives
<ul style="list-style-type: none"> ▪ To orientate a map in the field ▪ To comprehend the scale of a map ▪ To relate landforms of contour patterns ▪ To recognize in the field features studied on maps, photographs and on diagrams in the classroom ▪ To comprehend in the field concepts learned in the classroom ▪ To give a reasoned interpretation of phenomena observed in the field 	<ul style="list-style-type: none"> ▪ To follow a route using a map ▪ To make notes on phenomena observed ▪ To add information to a base map ▪ To draw and annotate a field sketch ▪ To make measurements in the field ▪ To conduct interviews in the field 	<ul style="list-style-type: none"> ▪ To show an aesthetic awareness of and respect for the countryside and of the environment ▪ To enjoy the study of Geography and acquire a deep interest in the subject ▪ To participate in and enjoy a healthy outdoor activity

It is interesting to note that, although the survey was carried out a long time ago, the objectives are still the same today. There is, however, little understanding of how mapwork through **fieldwork** could be used to improve learners' performance in mapwork.

2. 8 How fieldwork could improve performance in mapwork

When looking at the objectives of fieldwork as listed in Table 2.1, especially the cognitive and psychomotor objectives it is possible for fieldwork to improve the performance of learners because it is during fieldwork that they put the theory learned in the classroom into practice using the real-world. This relates to Ying's (1997) concern as discussed in Section 2.6 that the poor performance is the result of the over use of theory by teachers and Mwenesongole's (2009) advice that taking learners out on a field trip where they can see the actual mapwork landforms

represented on a specific topographical map could motivate learners and improve their performance and also with the Chief Marker's recommendation that in order for mapwork results to improve learners should be made to understand the skills in actual situations. Seeing and doing things on the real ground or actual situations also helps them with topographical map and aerial photograph interpretations.

In Section 2.7 above, fieldwork has been described as being **integrative** [my emphasis], and offering experiential learning. This is important if we consider that it is during the fieldwork or research (depending on the topic and how well the fieldwork is planned) that learners can find the opportunity to **apply** [my emphasis] their knowledge and skills to manage local problems as stipulated in the NCS curriculum policy (South Africa. DoE, 2003) and at the same time improve their mapping skills and interpretations needed in mapwork examinations. These are skills such as the calculation of actual ground distances, relating the map scales to the actual ground, using the GIS data capturing devices such as the GPS to record positions in order to understand grid references, studying vector data such as points (Poles, houses), polylines such as rivers, roads and polygons such as areas experiencing soil erosion, dumping and landfill sites, excavations and many more on the actual ground, in places that are familiar to them such as their local areas. This brings us to the issue of teaching in local context.

2.9 Teaching in local context

Teaching in local context grounds the knowledge of learners as it allows the teacher to start from the known to the unknown. It assists in building learners' prior knowledge, thus enabling them to relate to other contexts such as the national, continental and global to what they already know. It is place-based therefore it introduces them to their own places and can involve them in their own local affairs. The significance of local context in this literature can be traced back to the history of environmental education above (see Section 2.2.1). For example, the Tbilisi guiding principle that stated:

- Examine major environmental issues from **local** [my emphasis], national, regional and international points of view so that students receive insights into environmental conditions in other geographical areas.

- Promote the value of and necessity for **local** [my emphasis], national and international cooperation in the prevention and solution of environmental problems.

This is important as it prepares learners to locate themselves in a context which takes them beyond the local and creates a wider relevance based on the skills acquired from working locally.

In South Africa, DEAT's White Paper, goal 5 supporting objective stated:

- To ensure that environmental education programmes and projects foster a clear understanding of the inter-relationship between economic, social, cultural, environmental and political issues in **local** [my emphasis], national and global spheres. (DEAT, 1997 as cited in Griffin, 2003, p. 54)

Just like the issue of integration, the NCS geography policy for Grade 10-12 (South Africa. DoE. 2003, p. 25) stipulates that "Teachers should be aware of and use **local** [my emphasis] context ... which could be more suited to the experiences of the learner." For example, in Grade 11 (see Appendix N) under environmental content, the application of development and sustainability strategies should be dealt with in local context. During fieldwork, Grade 10-12 learners should use local maps and photos and record geographical information in the local area. As can be seen teaching or using local context is the requirement of the geography curriculum policy. Use of local context where learners are engaged in local fieldwork, using local maps can improve their mapwork marks because they would be applying skills in reality and interpreting real-life issues, thereby avoiding the theory abstraction. They would be engaged in places they are familiar with, thereby making the exercise relevant and motivating.

It is, however, important to note that fieldwork is not the only way of using local context. Local context can also involve using examples of the local area when teaching, for example, using **local resources** such as local topographical maps and aerial photographs, Google maps, videos and DVDs of the local area, local street maps, local magazines and newspapers, models of the local area, the local community, local flora and fauna, local landscapes, local tertiary institutions, local climate, local government and/or holistic local environment in terms of the social, political, economic, cultural and physical environment.

The use of local context in the teaching of geographic skills and techniques should also involve the use of local pictures as they assist in breaking mapwork abstraction. For example, when learners use the topographical maps of the local area together with the pictures of the same area, they can easily understand different concepts whereas, without the relevant pictures, it would be difficult or almost impossible to conceptualize certain aspects of geography. For example, using a contour map which shows landscapes such as valleys, spurs, ports, plateaux, convex and concave slopes would quickly make sense when pictures of such landforms are also used.

Topics such as intervisibility and gradient are easy to understand with the use of pictures. For example, after they have used the contour lines to determine intervisibility between different places, when they turn to pictures of the same areas they can easily check whether their answers are right or wrong. By the same token, after calculating the gradient between different slopes and finding the answer, it is easy to see which slope is the steepest.

As learners use pictures to see real life natural and man-made features, they could also come across and learn different environmental issues in their locality, such as pollution, floods, poverty, for example, location of squatter settlements and many other environmental hazards and risks. Learners can debate or discuss these issues, conduct some research or fieldwork and come up with possible solutions to such problems as per the requirements of the syllabus. This was also observed by Gilmartin (1982), who mentioned three roles that could be played by pictures in mapwork. These are:

- To attract the attention of the map reader.
- To provide additional insights to something which cannot be adequately expressed by words and
- To be remembered for a longer time.

Hurry (1989, p. 43) holds the same view about pictures and advised that “Pictures from the calendars are useful ... show them pictures of views of distant hills, plains and towns, as well as close-ups of trees, rivers, etc,” while La Grange (1994, p. 21) added that with the use of slides, photos and maps, the unknown becomes known, the far near, the abstract concrete and the outside world comes to the classroom.

Coming back to the use of local context, Swayze (2009) writing about “embracing the local”, noted (referring more to urban areas) that studying local ecosystems, natural areas and the habitats indigenous to the specific places where children live, guides them to discover that nature exists within an urban context and to consider their role as residents of an urban habitat and what it means to live respectfully from the land, that opportunities are created for children to participate in stewardship activities that are relevant to their local context, such as clean-ups, which help to make them responsible environmental citizens. Swayze (2009) further added that involving elders, whom he called the original teachers or repositories of traditional knowledge and managers of indigenous knowledge systems, in local ecosystem learning and teaching helps learners to explore indigenous knowledge, for example, learning about the medical wheel which depicts the ecological web, helps learners to visualize the interdependencies and connectedness among all life forms. This further helps the learners to show respect for the land and nature’s gifts, while on the other hand facilitates opportunities for building good relations between themselves and the elders. This view was also beautifully articulated by Hogan (2008) that local contextualization improves relevance of education and thus its quality by:

- Breaking through traditional frames/barriers between teachers and students, students and elders and community and teachers.
- Allowing formal education to take place outside of the school.
- Necessitating a change in pedagogy to more learner-centred discovery methods.
- Allowing indigenous knowledge to come into the classroom.
- Stimulating creativity and increased confidence.
- Bringing local socio-political environmental issues into the classroom.

In general she found that integrating local environmental cultural knowledge successfully contributed to curriculum relevance both epistemologically and pedagogically. Her study investigated a pedagogical approach to enhancing epistemological access (to formal curriculum) through participation and contextualization of knowledge and learning. Her argument was that such pedagogical processes have intrinsic value because they affirm learners’ and community experience, culture and knowledge and enable meaningful connections to be made between the academic and social life of the learners. Elaborating on this by referring to lesson planning, Hogan (2008) elicited that local context in lesson planning could lead to a more in depth

engagement by learners with issues in context, thereby bridging the gap between the abstractions of the curriculum policy and the concreteness of the context with the goal to enhance learning.

On the other hand, Farrington's (2006, p. 29) research findings reveal that "the drawing of maps is useful to identify local areas of environmental concerns"; that expertise and 'know how' of local environments and places can empower the youth as citizens in addressing environmental concerns. She further cited Driskell 2002, Hall, 1999, Bishop, 2004 and Burke, 2004 as saying that a common concern in environmental education is to re-situate it in local contexts whilst remaining globally informed, that increased social democratization and broader citizen participation in a Southern African context has political as well as educative considerations, and that contextualized environmental learning process cannot but benefit from a healthy identification with local context and place. These benefits are likely to increase with the integration of participatory learning activities in community or educational contexts where there are common interests among groups of individuals. Collectively, these aspects have the potential to enhance a sense of agency towards, and responsible ownership of, not only the local contexts in which people live, but also the global contexts and situations which are often relayed through various forms of mediated communication.

The use of local context is very important as it makes learners see things with new and different eyes. It develops their attachment, sense of place and the love for their own localities and therefore activates their desire to learn and to continue living there even after they finish school. When used in enquiry-based fieldwork, it encourages learners to be active participants, critical thinkers and problem solvers in their own places. It encourages integration of mapwork and content.

The use of local context when integrating mapwork and environmental issues in geography teaching is used here together with the theory of Place-based Education (PBE). This theory forms the framework for the discussion of findings in Chapter 5 of this study. It is first discussed in the section below.

2.10 Place-based education

Place-based education as a theoretical framework is very relevant for this study which seeks to investigate how geography teachers integrate mapwork and environmental issues using **local context**.

Sobel (2004, p. 7) defined place-based education as:

The process of using the local community and environment as a starting point to teach concepts in language, arts, mathematics, social studies, science and other subjects across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education increases academic achievement, helps students develop stronger ties to the community, enhances students' appreciation for the natural world, and creates a heightened commitment to serving as active, contributing citizens. Community vitality and environmental quality are improved through the active engagement of local citizens, community organizations, and environmental resources in the life of the school. PBE utilizes the local surroundings, human and non-human, as the context for integrating curriculum into a multidisciplinary approach. Complementary to the practice of interdisciplinary studies in PBE, students are engaged in real-world project based learning in the local community.

Place-based education seeks to help communities through employing students and school staff in solving community problems; it understands learners' local community as one of the primary resources for learning. It promotes learning that is rooted in what is local. For example: the environment, culture, economy and many other things which are in the learner's own **place** or immediate schoolyard, neighborhood, town or community. It gives learners an opportunity to first have a grounding in the history, culture and ecology of their surrounding environment before moving on to others. According to Altman and Low (1992) as cited in Alun (2009), place-based education shares many similarities with some environmental education and education for sustainable development (ESD) orientations and programmes in its emphasis on developing 'place attachment'. It emphasizes the key environmental and social issues relevant to the home locality; and it focuses on pedagogies characterized as experiential, action-oriented, participatory, community-based and focused on real-world problem solving.

Woodhouse and Knapp (2000) stated that place-based education includes conventional outdoor education and it is meant to help learners connect with their particular corners of the world. They cited Orr (1994) as saying that place-based education can be described as instruction directed

toward developing a citizenry prepared to live well in a place without destroying it, and that it connects place with self and community, it provides learners with the knowledge and experiences needed to actively participate in the democratic process.

Most of the explanations and descriptions of place-based education or learning seem to share the same sentiments with the theory of communities of practice. Wenger (1998, no page number) defined communities of practice as “groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly”. He added that communities of practice affect educational practices along three lines, internally, externally and over a lifetime, whereby internally, it involves organizing educational experiences that ground school learning in practice through participation in communities around subject matter. Externally, it involves connecting the experience of learners to actual practice through peripheral forms of participation in broader communities beyond the walls of the school. Lastly, over a lifetime, it involves serving the lifelong learning needs of students by organizing communities of practice focused on topics of continuing interest to students beyond the initial schooling period. This is very important when we consider the fact that the curriculum envisages a learner who is “... compassionate, with a respect for the environment and the ability to participate in society as a critical and active citizen” (South Africa. DoE, 2002, p. 3).

According to Alun (2009, p. xiii), PBE is seen as an innovative educational movement in our contemporary world which attempts to step away from the universalizing project of modernity. It is an educational counterpart of a broader movement toward reclaiming the significance of the local in the global age. It seeks to acknowledge, celebrate and promote “local knowledge” alongside or above the universal knowledge.

From the literature reviewed above, we have seen that the world is undergoing environmental catastrophes due to environmental issues and risks and that education should respond urgently to these crises. We have also seen that geographic skills and technique or mapwork equips learners with skills that will enable them to investigate issues and possibly come up with some solutions.

The most important question in this regard is how competent are teachers as the agents of change and transformation in engaging learners in active, enquiry-based and participatory learning? This would encompass fieldwork and research, which are place-based, in applying integration when

teaching in order to show coherence in the subject and to equip learners with skills, in practicing quality education that encourages deep learning. How much do they know about the local areas where they teach and the environmental issues that exist in those areas? This brings us to the subject of professional development of teachers.

2.11 Professional development

According to the National Policy Framework for Teacher Education and Development in South Africa (South Africa, DoE. 2006), teachers are believed to be essential drivers of a good quality education system. This policy notes that international evidence shows that the professional education and development of teachers work best when teachers themselves are integrally involved in it and reflecting on their own practice. However this policy reported that most of the teachers currently in the education system in South Africa received their professional education and entered teaching when education was an integral part of the apartheid system where it was organized along racial and ethnic lines. These teachers were not trained to meet the demands of the present global environment. They have a poor conceptual and content knowledge which contributes to low levels of learner achievement. This is evident from Mambinja's (2008, p. 89) action research where she was researching her pedagogic practice when she said:

I faced a number of challenges regarding knowledge and concepts. Evidence from chapter 5 illustrates that I did not have the knowledge to give details about concepts that were not clear in order to assist learners in identifying and describing environmental issues.

The same sentiments were raised during the teacher development summit that was held in 2009 between the teacher unions, the South African Council for Educators (SACE), the Education, Training and Development Practices Sector Education and Training Authority (ETDP SETA), the Education Labour Relations Council (ELRC), the national Department of Education (DoE) and the Higher Education South Africa –Education Deans' Forum (HESA-EDF). It was highlighted in this summit that:

while it must be recognized that a wide variety of factors interact to impact on the quality of the education system in South Africa, teachers' poor subject matter knowledge and pedagogical content knowledge are important contributors. (South Africa: DBE & DHET, 2011, p. 4)

The summit led to the development of the Integrated Strategic Planning Framework for Teacher Education and Development in South Africa, 2011–2025, whose main aim was “to improve the quality of teacher education and development in order to improve the quality of teachers and teaching” (p.1). The Department of Education has already put aside funding for this teacher development project. For example, it was declared in the summit that: “The successful implementation of this Plan is dependent on the effective use of funding already available in the system, as well as on obtaining additional funding . . .” (p. 21), and that the bulk of funds available for teacher development programmes will be allocated to programmes that deepen the subject specialization knowledge of teachers. Also that the following teacher support structures will be established: Provincial Teacher Development Institutes, District Teacher Development Centres and Professional Learning Communities. This is very interesting and important for the purpose of this research as its main goal is to inform such professional development programmes.

Coming back to the problem of lack of conceptual knowledge, Morrow (2007) recognized that lack of articulated conceptual knowledge and understanding of the content deprives learners of access to knowledge. He also observed that the quality of teachers’ knowledge and education influences their learners’ epistemological access because they teach only that which they know and only that which is in the curriculum, they cannot go beyond the parameters of the curriculum or bring the content to the context of the learner and his/her local surroundings. This is similar to Hart, Jickling and Kool’s (1999) concern that teachers are not able to reflect on the quality of their teaching and see how it contributes to the quality of education and /or how it can be improved. This was also revealed by Pile and Smythe’s research as cited in Taylor and Vinjevoold (1999), on teachers’ conceptual knowledge, where they found out that teachers’ knowledge of geography is weak, that “they do not have a holistic understanding of what they are teaching and are therefore unable to perceive links between different parts of the curriculum” (p. 139). Taylor and Vinjevoold (1999, p. 161) therefore proposed a professional development of teachers based on In-service training (INSET) programmes for teachers to improve their conceptual knowledge which gives them “confidence and resources to engage children at more challenging levels and undertake more adventurous learning tasks”.

The National Policy Framework acknowledged that “both conceptual and content knowledge and pedagogical knowledge are necessary for effective teaching, together with the teacher’s

willingness and ability to reflect on practice and learn from the learners' own experience of being taught" (South Africa. DoE., 2006, p. 16).

Regarding professional development in environmental education, the emphasis is now on participatory learning in context that aims for a better understanding of issues in their contexts. Complexity of environmental issues is dealt with through interrogation of the many interrelated social, economic, political and biophysical dimensions of the underlying causes of environmental issues and risks (Scott & Gough, 2003; Lotz, 1999, as cited in Wigley, 2006). Against this backdrop, Fien (1993) cautioned that the challenge is to discover the professional development experience and process that can conscientise environmental educators to the transformative nature of their field and empower them to be active, practically reflective practitioners in their chosen profession. He advised that effective professional development programmes should be practice-based, and cited Robottom's (1987, p. 114) five principles that these practice-based programs should follow. These are:

- Professional development studies in EE should be enquiry-based in order to encourage participants to adopt a research stance towards their own EE practices.
- It should be participatory and practice-based where teachers are directly involved in addressing the relationships between their personal beliefs, social and educational ideologies and false consciousness, and between their educational intentions and institutional influences.
- It should be critical in that it should involve ideological critique of the environmental and educational values and assumptions that inform and justify environmental policies and practices.
- It should be community-based and involve participants in the active investigation and amelioration of the real-world problems of relevance to the communities in which they teach. As well as encouraging learners to be actively involved in real-world problems.
- It should be collaborative in order to make it easier to recognize influences and instances of false consciousness and institutional pressures that may be controlling and constraining transformative practices and acting against improvements in EE. (p. 58-59)

This is very helpful considering the allegations made by Robottom (1987) in section 2.3 when illuminating problems that EE poses at school level.

Wilmot (1999) concurred with Robottom's five principles and emphasized that if we accept that education needs to play a role in developing knowledge, skills and values necessary for creating just, democratic and sustainable societies then we need to find ways of translating the rhetoric into practice by providing experiential and participatory learning opportunities to teachers where they can actually do the theory instead of simply telling them about the teaching strategies.

Here Mucciolo (in Gerber, 1988) recognized that the most progressive teachers do not see Geography as a Physical Science, rather, they believe that Geography can promote social change and encourage learners to become conscious citizens who are aware of social and environmental injustices and who are willing to work towards minimizing them in their societies. This is what the United Nations Environment Programme (UNEP) (2006) termed transformative learning, where teachers are urged to reconsider what they teach and why they teach it, and to educate learners for a changing world which is at risk and where learners are involved more actively in challenges of the present time.

2.12 Conclusion

This chapter has attempted to present literature (policy and research) on an integrative approach to the teaching of mapwork and environmental issues and the use of local context. The literature reviewed has shown how integration can bring coherence in the subject, how mapwork through issues and inquiry-based local fieldwork can improve performance and how the use of local context can ground learners' knowledge and bring relevance to what they are learning, generally how to integrate theory and practice for relevance and the importance of professional development to support teachers to achieve this. This review of the literature gave me a standpoint from which to begin to read current patterns of practice so as to inform teacher professional development. The next chapter describes the research methodology and methods used to conduct this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology and theoretical orientation of my study. It discusses the selection of the study sites and the methods I used to generate data. It also describes how I analyzed the data, and includes some consideration of ethical and validity issues.

3.2 Research Methodology

In an attempt to understand **how** mapwork and environmental issues using local context are worked with and integrated, I embarked on an **interpretive case study**. Neuman (2000, p. 71) described the interpretive approach as a process of inquiry that involves, “the systematic analysis of meaningful actions through direct detailed observation of people in natural settings in order to arrive at understanding and interpretations of how people create and maintain their social world”. In my case an interpretive study helped me to examine how FET geography teachers understand and make meaning of mapwork, environmental issues and local context, particularly with regard to the NCS curriculum imperative to integrate. To do this I had to listen to what they said in the interviews regarding integration and use of local context, and how they practiced what they said during classroom observations. This was very important as I was able to see where teachers needed help in order to inform the professional development.

Regarding the **case study**, Adelman, Kemmis and Jenkins (1980), as cited in Cohen, Manion & Morrison 2000, p. 181) defined a case study as “the study of an instance in action”. According to Bassey (1999, p. 58), a case study is an empirical study, which is conducted “within a localized boundary of space and time into interesting aspects of an educational activity or programme or institution or system.” Hitchcock and Hughes (1995), as cited in Cohen, Manion & Morrison, 2007 p. 253) noted that:

A case study can provide a unique example of real people in real situations, thereby enabling readers to understand ideas more clearly. Case study is concerned with a rich and vivid description of events relevant to the case, it provides a chronological narrative of these events, and blends a description with analysis.

Stake (In Denzin & Lincoln, 2000) distinguishes three kinds of case study:

- a) Intrinsic case study, where a researcher wants a better understanding of a particular case because of his/her intrinsic interest in it.
- b) Instrumental case study, where a researcher examines a particular case in order to provide insights into an issue or to redraw a generalization.
- c) Collective case study, where a researcher jointly studies a number of cases in order to investigate a phenomenon.

This study is a **collective case study** localized to four Grahamstown District FET schools where a phenomenon to be investigated is teachers' pedagogic practices regarding the integration of mapwork and environmental issues using local context.

3.3 Selection of study sites

The Grahamstown Education District is one of the 23 education districts in the Eastern Cape Province. Schools within this district include those in Grahamstown, Port Alfred, Bathurst, Kenton-on-Sea, Alexandria, Alicedale, Riebeeck East and surrounding farm areas. In total, the district has 81 schools, of which 60 are primary schools (GET) and 21 high schools (FET). I selected two FET schools from the Rhini Township in Grahamstown, one former model 'C' school in Grahamstown, and one school in the Riebeeck East area. Figure 3.1 below shows the position of Grahamstown district



Figure 3.1: Grahamstown District (Source: Google maps)

3.4 Selection of schools

The case study schools were chosen through purposeful sampling (Cohen, Manion & Morrison, 2000). The criteria I used were ease of access and a desire to cover the entire spectrum of geography teaching and learner performance over the period of 2 years, using a rough-and-ready division of the cases into high, medium and low performance. In these terms, schools A and D are low performance, school 'B' is medium, and school 'C' is a high performance case.

3.5 Data generation techniques

Data for this study was generated using the qualitative methods of document analysis, interviews and lesson observations. Each of these is discussed below.

3.5.1 Document analysis

The following documents were consulted, studied and analyzed:

- The new National Curriculum Statement (NCS) geography policy grade 10-12 (General). This was carefully studied and analyzed in order to obtain a clear understanding of its

requirements regarding the teaching of mapwork in Geography and environmental education, especially with regard to integration and the use of local context. The policy analysis provided a benchmark for assessing the teaching and learning practices in the schools, and for beginning to determine what might be needed in a professional development course. I also consulted the 2009 Geography examination guidelines for Grade 12.

- Learning programme guideline: according to the Department of Education (2008, p.7), a Learning Programme guideline “specifies the scope of learning and assessment for the three grades in the Further Education and Training band. It is the plan that ensures that learners achieve the Learning Outcomes as prescribed by the Assessment Standards for a particular grade”. This was examined in order to get a clear picture of how teachers should integrate theory and practice.
- The 2008 and 2009 geography Chief marker’s’ reports. These were also studied in order to identify patterns of performance in Geography paper two (mapwork) in the Province.
- The prescribed geography textbooks for Grades 10–12 being used in the four case study schools. A detailed content analysis was not undertaken: the books were reviewed in order to find out how and what environmental learning had been integrated into their content, and to determine whether they adequately addressed the curriculum requirements in this regard.
- Available lesson plans developed by the participating teachers and by the subject advisors for schools. These were consulted in order to assess whether teachers were planning according to the policy requirements; how mapwork and environmental learning had been integrated into the lesson plans; what hands-on activities had been planned and given to learners; and how learners were being involved in local environmental issues.
- Teachers’ portfolios and learners’ exercise books and portfolios were consulted in order to determine the extent to which learner activities related to mapwork in the local context and the integration of environmental issues, and to ascertain how well learners performed when engaging in them.
- The Provincial Curriculum Guidelines (PCG 04/2005). This was consulted in order to examine the role functions and responsibilities of the subject advisors and how they are expected to support teachers to put policy into practice.

Patton (2001) observes that documents stimulate a path of inquiry and open up new possibilities for investigation. This was certainly true of this study, because the above documents helped to define my research focus and deepened my understanding of education policy. They also helped me to decide what I should be asking in the interviews and what I should be observing in the classroom, as I explain in the following sections.

3.5.2 Semi-structured interviews

Semi-structured interviews with mostly open-ended questions were used to generate data on current practices in schools for two main reasons:

- They provide for a mix of questions and allow the flexibility to probe issues that might otherwise be ignored.
- They allow interviewees to express themselves fully.

According to Merriam (2001), the semi-structured interview consists of a mix of structured and less-structured questions, while Robson (1993) maintains that the term applies when the interviewer has worked out a set of questions in advance, but feels free to modify their order according to what seems most relevant in the context of the conversation, and can change the wording, give examples, leave out questions that seem inappropriate, and include additional ones.

Cohen, Manion and Morrison (2000, p. 275) point out that open-ended questions have the following advantages:

They are flexible, they allow the interviewer to probe so that she may go into more depth if she chooses, or clear up any misunderstandings; they enable the interviewer to test the limits of the respondent's knowledge; they encourage co-operation and help establish rapport; and they allow the interviewer to make a true assessment of what the respondent really believes.

With the research question and my chosen methodology in mind, the interview questions were drafted. I pilot- tested the questions at a local high school not included in the study, which helped to identify repetitive and unclear questions, and provided an opportunity to delete, rephrase and

add more suitable questions. For example, I realized that I had asked a question about the problems that teachers experience in teaching mapwork twice but in different ways.

Once the interview schedule had been finalized, interviews were conducted at the four research sites between March and April 2010 (see Appendix A – interview questions). The table below shows when and where these were conducted.

Table 3.1: Interview schedule

Respondent	Date	Place	Time
Mr N. (pilot test) – Pilot school	12/03/2010	Staffroom	13h15
School A teacher 1	18/03/2010	Classroom	09h30
School D teacher 1	23/03/2010	At home	16h00
School B teacher 2	24/03/2010	Classroom	11h00
Geography subject advisor	19/04/2010	Office (Department of education)	09h10
School B teacher 1	19/04/2010	Classroom	11h55
School C teacher 1	21/04/2010	Computer lab.	10h00
workshop attendant teacher one	21/04/2010	At the workshop venue	13h00
Workshop facilitator – DoE	21/04/2010	At the workshop venue	13h45

When I interviewed the district Geography Subject Advisor, he told me that one of the strategies he used to support his teachers in mapwork was to conduct workshops for them and that he had organized one to be held that week. This provided an opportunity to validate my data by triangulating it through interviews with two additional participants who would otherwise not have been included in the study. They were a teacher and the workshop facilitator. For the sake of anonymity, I have used integers (see Table 3.3) to identify them. After each interview I carefully transcribed it (see Appendix B – interview transcripts).

3.5.3 Lesson observation

This afforded me the opportunity to gather “live” data and see what was taking place *in situ* (Cohen, Manion & Morrison. 2007, p. 305). It also enabled me to compare what the participants said in the interviews (Patton, 1990), and gauge to what extent policy was put into practice in their classrooms.

O’Leary (2004, p.172) describes two types of role for the researcher:

- Non-participant: In this role, researchers do not become, or aim to become, an integral part of the system or community they are observing. This may involve watching interactions through a one-way mirror, sitting in the corner of a room observing a meeting, or hanging out in a local park. Observers are physically present but attempt to be unobtrusive. Non-participant observation tends to occur over a fixed time period and is often aligned with a structured format.
- Participant: In this role, researchers are, or become a part of the team, community, or cultural group they are observing. They may be part of a work force, they may live in a particular community, they may join the church etc. The goal is to attempt to preserve a natural setting and to gain cultural empathy by experiencing phenomena and events from the perspective of those observed. Participant observation can involve large time and emotional commitments, and is often aligned with a less structured, often ethnographic process.

The non-participant observer role was selected, for three reasons: First, because it allowed me to observe how teachers integrate mapwork and environmental issues and how they use local context. Secondly, I did not want to cause any disturbance, or make teachers uncomfortable, or appear to be intrusive. Thirdly, being a non-participant observer gave me an opportunity to find out what problems teachers were experiencing in practice.

O’Leary (2004) also distinguishes three types of observation:

- **Structured:** Structured observational studies can collect both qualitative and quantitative data; are highly systematic; and often rely on predetermined criteria related to the people, events, practices, issues, behaviours, actions, situations, and phenomena being observed. Checklists or observation schedules are prepared in advanced and researchers attempt to be objective, neutral, and removed with a goal of minimizing personal interaction.
- **Semi-structured:** In semi-structured observations, observers generally use some manner of observation schedule or checklist to organize observations, but also to attempt to observe and record the unplanned and/or the unexpected.
- **Unstructured:** Unstructured observation involves observers attempting to observe and record data without predetermined criteria. Observers either attempt to record all of their observations and later search for emergent patterns, or they make judgment calls on the relevance of initial observations and attempt to focus subsequent observations and reflections on those areas deemed most significant.

This study is based on structured observation, because I went to observe the lessons having already prepared an observation schedule (see Appendix C) with questions relating to my research question. These questions were derived from the documents I had consulted and from the semi-structured interviews I had held with the participants. Table 3.2 below provides a timetable of the lessons observed.

Table 3.2 Lesson observation timetable

School	Date	Grade	Lesson duration	Period number	Number of pupils
A	19/04/2010	10	1hr 30 min (double period)	4 and 5	17
B (teacher 1)	23/04/2010	11	35 min	3	15
B (teacher 2)	23/04/2010	10	35 min	4	17
C	07/05/2010	12	45 min	6	14
D	10/05/2010	11	45 min	4	3

Besides the observation schedule, I also used video recorder, but only as an aide-memoire, to remind me of or pick up on things or events I might have missed during the lesson.

3.6 Data analysis

Data analysis for this study went through two stages. In the first stage, the documents were indexed. The most important documents in this case were the Geography policy document and its accompanying learning programme guidelines because they informed, directed and shaped my study. I then indexed the interview transcripts and observation schedules. All indexes were compiled for the sake of ease of reference (see Table 3.3 below).

Table 3.3 List of indexes with key

Documents	Index
Document analysis -Geography policy, page	DA-GPP
Document analysis – Learning programme Guide line	DA-LPG
Document analysis- Examinations Guide lines, page	DA-EGP
Chief marker’s report	CMR
Lesson plan	LP- S (A,B,C,D)
Learner’s work- school (A,B,C,D)	LW- S (A,B,C,D)
Teacher’s work- school (A,B,C,D)	TW- S (A,B,C,D)
Grade 12 final examination question paper 2	GEQP2 -12
Interviews	Index
Interview school A teacher 1	ISAT1
Interview school B teacher 1	ISBT1
Interview, School B teacher 2	ISBT2
Interview, School C teacher 1	ISCT1
Interview, School D teacher 1	ISDT1
Interview Pilot test teacher 1	IPTT1
Interview workshop facilitator	IWF
Interview workshop attendant teacher 1	IWAT1
Interview Geography subject advisor	IGSA
Observations	Index
Observation, School A Grade 10, teacher 1	OSAG10T1
Observation, School B Grade 11, teacher 1	OSBG11T1
Observation, School B Grade 10, teacher 2	OSBG10T2
Observation, School C Grade 12, teacher 1	OSCG12T1
Observation, School D Grade 11 teacher 1	OSDG11T1

In the second stage of analysis, with the research question in mind, I carefully read and re-read the policy, the interview transcripts, the observation schedules and the field notes, and categorized the information into the following themes (see Table 3.4):

Table 3.4 Summary of categories emerging from data collected

Data source	The me
Geography Policy documents	Integration of environmental issues
	Use of local context
	Teaching and learning strategies
Interviews	Integration of local environmental issues
	Local fieldwork activities
	Use of local context
	Teachers' problems in mapwork
	Learners' problems in mapwork
Lesson observation	Pedagogic practices and challenges
	Learner performance and challenges
	Local fieldwork activities
	Teaching and learning in local context
	Integration of local environmental issues

These categories were used to code the interview transcripts and observation schedules using different colours. Rossman and Rallies (1998) as cited in Creswell (2003) define coding as the process of organizing the material into 'chunks' before bringing meaning to those 'chunks'. The geography curriculum and teachers' and learners' work was similarly indexed. Colour coding different themes helped me to manage, organize and reduce the data to relevant and manageable chunks. I then used the categories and indexes to structure the analytical memo (see Appendix D) which I used as a framework for Chapter 4. From the analytical memo and the data presented in Chapter 4, I was able to construct broad analytical statements to address my research question and to guide my discussion in Chapter 5, the data analysis chapter. According to Bassey (1999), analytical statements have to be firmly based on the raw data. Using a place-based theoretical perspective and drawing on the weight of evidence in the raw data represented in Chapter 4, I make 4 analytical statements in relation to the research question. These statements are then

substantiated and discussed against the literature reviewed in Chapter 2. In this analysis an abductive mode of inference is used. According to Danermark, Ekstrom, Jakobsen & Karlsson (2002, p. 80) abduction occurs when data is interpreted and recontextualised “within a conceptual framework or a set of ideas”.

3.7 Ethical considerations

Ethical issues are important to consider in order to show respect and appreciation for the knowledge, contribution and participation of the people with whom I worked. The first ethical issues I considered were **access and acceptance**. I obtained “official permission” (Cohen, Manion & Morrison 2007, p. 53) from the Department of Education’s District Director at Grahamstown district office to conduct research at the district schools. I did this in writing (see Appendix E). He gladly gave me permission and faxed the letter to the office of my supervisor at Rhodes University. I then wrote letters to the principals of the sampled schools to request permission to conduct research at their schools (see Appendix F). They gladly accepted and expressed the hope that the research would be of benefit to their teachers. Then followed letters to teachers at the selected schools (see Appendix G), requesting them and their learners to participate in my research. In all these letters, a detailed explanation of the purpose of the research was given. I made it clear that the teachers had the right to withdraw from participating in this research at any time they wished. I assured them of their **anonymity** and of **confidentiality** in respect of the data collected from them, and explained that my research was not aimed at exposing or humiliating them.

Being the senior education specialist at the Grahamstown education district office, I was aware that my position could influence if not threaten the participants (especially teachers) as a result I assured them that the research was for degree purposes and to inform professional development. Because I promised anonymity, no school or learner’s name is mentioned in this study, and letters and numbers are used instead. Before observation, I requested teachers to make learners aware that they would be observed, since what I intended is what Patton (1990) calls *overt observation*. I asked for their permission before taking photos of them and recording their voices.

3.8 Validity

Validity is an attempt to ‘check out’ whether the interpretation of and meaning assigned to an event is sound, or whether a particular measure is an accurate reflection of what one intends to find out (Vithal & Jansen, 2002, p. 32). Bassey (1999, p.75) defines it more succinctly as the extent to which a research fact or finding is what it is claimed to be. Winter (2000 as cited in Cohen, Manion & Morrison, 2007), advise that, in qualitative data, validity might be addressed through honesty, depth, the richness and scope of the data, the participants approached, the extent of triangulation, and the disinterestedness of the researcher.

To ensure validity in this research, I used more than one method of data collection (triangulation). I also used thick description (Cohen, Manion & Morrison, 2007) for describing and explaining events (see Chapter 4), seeking what Maxwell (1992) calls descriptive validity. Since my research is located within the interpretative paradigm, I endeavored to understand most issues from the participants’ perspective – “emic” understanding – rather than my own – “etic” understanding (Hancock & Algozzine, 2006). Cohen, Manion and Morrison (2000) warn that threats to validity and reliability can never be entirely erased, but, however, advised that one should strive to minimize invalidity and maximize validity. In this research, I further enhanced the validity of the study by attending the teacher workshop (see Section 3.5.2), where I met and interviewed more teachers than the few who were sampled. After transcribing the interviews, I returned to the participants and asked them to read the transcripts and check (member check) whether what I had written was a true reflection of what they said or not. I also allowed them to add points that they felt were necessary or had been left out. I further asked colleagues from the M Ed course (peer examination) and at work to critique my findings, presentation, discussion, conclusions and recommendations.

3.9 Conclusion

In this chapter I outlined the research methodology I used for investigating how geography teachers integrate mapwork and environmental issues using local context. I explained how I selected the site for this study and the schools to participate in it. I described the qualitative data collection methods and techniques used and discussed the data analysis process, ethical considerations and validity measures. The next chapter presents data on the four case studies of classroom practice.

CHAPTER FOUR

DATA PRESENTATION

4.1 Introduction

In this chapter, I begin with an analysis of the Geography curriculum policy that examines perspectives on integration, mapwork, environmental issues, the use of local context, and recommended strategies on teaching and learning. The review of the curriculum allows me to generate data on how the district subject advisor supports teachers to put policy into practice. With this background data I review current exam performance, examining data in the Chief Marker's reports of 2008 and 2009 Grade 12 Matric Geography Paper 2 examinations.

The body of the chapter presents the data on the four case studies of classroom practice. Here the research represents the pedagogic practices and challenges, learner performance and challenges, local fieldwork activities, teaching and learning in local context and the integration of local environmental issues. Since schools are unique, I first contextualize each case and then present the data on teaching and learning practices (reported and observed) before looking across the cases to represent current trends and issues.

4.2 Document analysis: the geography curriculum policy

The starting point for this study was an analysis of the Geography subject policy document (South Africa, DoE, 2003), referred to here as DA-GPP and its accompanying learning Programme guidelines (South Africa, DoE, 2008) referred to here as DA-LPG. These policy documents gave me some insights regarding the requirements of the Geography curriculum, particularly how integration should be done, skills required in mapwork, environmental issues and context in the FET band.

With the research question and goal in mind, I focused on what the policy states regarding the integration of environmental issues, the use of local context, and teaching and learning strategies.

4.2.1 Integration of theory and practice

According to the Learning Programme Guidelines (South Africa, DoE, 2008), the integration of knowledge and skills across subjects and terrains of practice is crucial for achieving applied competence as defined in the National Qualifications Framework. Applied competence aims at integrating three discrete competences; namely, practical, foundational and reflective competences as stipulated below:

PRACTICAL COMPETENCE

Geographical skills and techniques form the practical competence of the subject of Geography. According to the policy, this should form an integral part of foundational competence and reflexive competence. In this practical competence, the policy stipulates that teachers should help learners to use maps and to acquire skills such as “reading, analysis and interpretation on 1:50 000 topographical maps and orthophoto maps integrating concepts done in content section” (DA-GPP. 28 and 30). It further stipulates that teachers should engage learners in fieldwork in which they use “local maps/photos; recording geographical information in the local area” (DA-GPP. 26, 28 and 30). When emphasizing the importance of fieldwork, the policy referring to learners, demands that at FET level “a more advanced level of practical work and field-work will be demanded of them” (DA-GPP.12).

The mapwork content presented (see Appendix O), describes clearly what should be taught in each grade in the FET level. It describes the types of maps and map scales to be used in South African schools, the types of map projections prescribed for each grade, the use of atlases, topics for calculations, GIS content for each grade and progression from one grade to the next. According to the Geography curriculum policy, five essential skills should be acquired, these are: asking questions, acquiring, organizing, analyzing information and answering questions (DA-GPP. 10). These skills can hardly be acquired in the classroom only. This is why the curriculum makes provision for fieldwork. Of interest to this study is how teachers integrate this competence (practical) with the foundational and applied competence using local context.

FOUNDATIONAL COMPETENCE

Knowledge and understanding forms the foundational competence. Here the policy stipulates that for Grade 10-12, “learners will be expected to demonstrate a basic operational knowledge of physical and human processes and the patterns which result from them, as well as the interactions between humans and the environment on a local scale...” (DA- GPP. 15). From here they can take their own respective contexts i.e. global scale for Grade 10, continental scale for Grade 11 and national scale for Grade 12.

REFLEXIVE COMPETENCE

Application of skills forms the reflexive competence. Here the policy stipulates that: in Grade 10-12, learners will be expected to apply knowledge and skills to manage local problems and then national, continental and global according to different grades (DA-GGP. 16). Of interest in this study is how learners apply knowledge and skills to manage local problems.

4.2.1.1 Integration of local environmental issues

The literature reviewed in Chapter 2 has been assembled to provide a picture of the curriculum imperative to integrate environmental issues. According to the Geography policy document, “Geography in the FET band aims to develop tools and skills to research, interpret, analyze and make judgments based on the information gathered ... to think systematically and critically about social and environmental issues and challenges” (DA- GPP.9).

In the policy document, environmental issues are clearly stipulated in the foundational competence and then in the reflexive competence. For example, in foundational competence, teachers will know that learners have achieved this when: in Grade 10 they can **describe** the links between environmental problems and social injustices in a local and global context. In Grade 11, when they can **examine** issues and environment interactions in a local and continental context and in Grade 12, when they can **explore** possible responses to issues and challenges arising from human and environment interactions in a local and national context (DA-GPP. 20-21).

According to the reflexive competence required in Grade 10–12, teachers will know that learners have achieved this competence when: they can **apply skills and knowledge** to a range of phenomena, issues and challenges, first, on a local scale for all grades, thereafter changing scale for each grade (DA- GPP. 22-23). According to the Geography curriculum policy, (see Appendix N), the **content** on the table is specifically related to environmental issues and learning for each grade. These issues create relevant content and enquiry platforms for learners to investigate. For example, according to the Geography curriculum policy, Grade 10 learners are expected to be able to identify issues and formulate questions for an investigation. The learning process is then developed from the acquisition of experience and information through fieldwork and a variety of other sources. The learner then uses graphs, visuals and diagrams to interpret the information and represent findings in a written report (DA- GPP. 18).

In Grade 11 they are expected to be able to plan and structure a project or enquiry process, acquire a variety of information from relevant primary and secondary sources which include fieldwork, classify the acquired information according to different categories, analyze information obtained from a variety of sources – including fieldwork data, 1:50 000 topographical maps, orthophoto maps and statistics and report findings in written, oral and/or illustrative form (DA- GPP. 19).

In Grade 12 they are expected to be able to plan a geographical research project of limited extent in a familiar context, integrate information from a variety of sources, compare and contrast information from a variety of sources, analyze the acquired information in order to answer the initial question and substantiate findings in written, oral or illustrative form (DA- GPP. 19). The structure of the curriculum has a clear progression that covers the concepts and skills, relating these to landscape and outlining the classroom practices to foster the required teaching and learning.

The curriculum reflects integration and progression in relation to environmental issues as well as calling for the inclusion of fieldwork so that the learning also engages local context

4.2.2 The use of local context

With regard to the use of local context, the Geography curriculum policy stipulates that “teachers should be aware of and use local context ... which could be more suited to the experiences of the learner” (DA-GPP. 25). Local context is found in all the 3 competencies and in the content of each grade. It is, however, worth mentioning that although teachers are required to start with local context the curriculum does not stipulate which other resources besides the 1:50 000 topographical maps and the orthophoto maps should be used to enhance the use of local context. This is left to the discretion of the teacher.

Again the curriculum makes provision for the use of local context for both theoretical and for practical content thereby allowing teachers to ground the knowledge of learners and provide a place-based education.

4.2.3 Teaching and learning strategies

According to the geography policy, four different approaches should be applied in thematic studies, these are:

- (a) Systematic approach, which enables the geographer to understand phenomena (physical and human) and their resultant patterns and impacts in a systematic way (e.g. tropical cyclones, natural hazards, urbanization in a place or region).
- (b) Systems approach which enables the geographer to understand the wholeness of the environment and the interdependence of its individual components.
- (c) Issue-based approach that enables the geographer to focus on specific issues in natural, built or social environment in a location (place or regional) context. A well-developed geographical understanding of these issues can only result from a process of enquiry in which questions are asked, evidence is examined and conclusions are reached. The enquiry method provides learners with ways of thinking critically and creatively about the problems or issues they study (e.g. the impact of HIV/AIDS on population dynamics, environmental quality, socio-economic disparities, hazards and disasters, poverty and resource management in a country) (DA-GGP. 12).

- (d) Fieldwork, using local maps and photos; recording geographical information in the local area (DA-GGP.34-35).

The above strategies or approaches are specified as some of the ways in which to facilitate the integration of theory and practice. They provide a vivid picture of a sophisticated curriculum within which integration is a cross-cutting specification with regard to the development of competences and work with environmental issues and local context. Regarding fieldwork, the policy prescribes an investigative and issue-based approach in conducting fieldwork and research and advocates that an issue-based approach enables the geographer to focus on specific issues in natural, built or social environment in a location (place or regional) context (DA-GPP. 12). Against this backdrop the study first consulted with the subject advisor before engaging teachers and joining them in their classrooms for a brief look into patterns of classroom practice. Here the intention was to get a picture of patterns of integration and contextualization in practice so as to inform professional development.

4.3 Subject advisory and support

The Department of Education has instituted posts for subject advisors and support for every district in all the nine provinces. The Eastern Cape Province has 23 Education districts including Grahamstown. According to the Provincial Curriculum Guidelines (PCG 04/2005) which stipulates role functions and responsibilities of curriculum personnel, the Geography subject advisor has the following roles to play:

- To orientate and train teachers
- To support teachers on learning Area/Learning Programme/Subject content
- To develop and distribute relevant curriculum materials
- To provide teachers with effective on-site support
- To assist teachers in curriculum planning and delivery
- To promote professional development of teachers
- To establish and maintain curriculum structures
- To develop effective communication strategies

- To establish and maintain relevant statistical databases
- To monitor and evaluate curriculum programmes
- To develop and implement Work Plans and Work Plan agreements in accordance with PCG 04/2005 (South Africa. DoE, 2005, p. 5)

I interviewed the Geography subject advisor for the district to find out how he supports the geography teachers in working with the curriculum. Here I used the specifications of the curriculum as a framework to probe integration across environmental issues and use of local context before probing the question of mapwork performance that had initiated my enquiry.

4.3.1 Integration of mapwork and environmental issues

On responding to the question on what local environmental issues he had seen teachers integrating when interacting with and moderating their portfolios, he used an example of water pollution and said; “like for example the question of pollution, water pollution, Grahamstown actually had some challenges on that one in the past” (IGSA).

When probed on what he does to ensure that teachers cover Learning Outcome 1 he replied by saying: “What is happening is that I actually from time to time face them that they should actually integrate mapwork and theory in their approach” (IGSA). When asked how exactly teachers integrate mapwork and theory, he replied by saying:

Like for example, the example that I have made, that when they are going to teach a particular topic there on settlement, then they use the topographical map to indicate that one, that’s the first part of it. And the second one, the software that I have actually given them is also having some kind of exercises that from time to time that the learner should actually use, and is actually user friendly also to the educator. (IGSA)

On the question of whether teachers give learners some research projects on environmental issues, he said:

With the research this year, I’ve seen but this year I have not encouraged them to do any [local] research, I encouraged them to do practical work [exercises], within the teaching time or extra time. So with the research then ... in fact I have discouraged them to do it, because it actually takes time, it is out of focus this year. The interaction between the teacher and the learner is given priority more than going out and spend a lot of time. (IGSA)

These data were a first indication that the translation of a sophisticated curriculum document has not been easy for teacher support staff to work with as a whole. It was notable to me that the advisory services were working with what came to them and what they already had to provide support in somewhat of a responsive way.

4.3.2 Teaching and learning in local context

Regarding the support he rendered to geography teachers to teach in local context, he indicated that he had given them materials such as local maps and some software which he uploaded on their schools' computers. He further mentioned that out of the 21 FET schools which fall under Grahamstown district, 19 were doing Geography and that all of them had local maps. He further emphasized that he had requested teachers to adapt certain aspects of Geography to local context by saying:

One thing is that the examples that they should use, in many aspects of Geography, because map is the base of teaching, you can teach settlement geography you can teach geomorphology, you can teach climatology, but you can adapt those one, this is what I am actually telling them, and I have done those particular aspects within the local area using examples from area itself, whether you talk about land use and so on. (IGSA)

Responding to whether he thought teaching and learning in local context was important, he added that learners should start by learning the basics and then adapt them to local context because local context alone is meaningless if one does not know the basics. He used water pollution as an example, noting that learners should first understand the “concepts, then move to the process” (IGSA). Here the learning of concepts is not explicitly linked to context but a desired addition. A similar perspective was noted from the workshop facilitator regarding the use of local context in mapwork, who commented that teachers could apply for their local maps so that they could get the 1:50 000 and 1:10 000 of the local area where their schools are located. (IWF). These interactions were important to open up a discussion about how the curriculum is interpreted and what is being fore-grounded and how that results in helping teachers to integrate theory with practice and use of local context. However, it became clear that these were regarded merely as an optional extra and concepts and abstracted map skills become the emphasis.

When interviewing the workshop facilitator (who had been invited by the subject advisor to conduct a workshop on mapwork for Grahamstown district teachers), on the issue of integration, he indicated that he was currently not focusing on the integration of local environmental issues but then gave examples of how these issues could be integrated and said:

That would be combining with other areas in the curriculum. If they take samples, they would then investigate along that river flow indicated on the map, the land use around the river, so you would look at cultivation, you would look at sewerage disposal, you would look at landfill areas to what extent those materials and where they are located with regard to a river, for instance if we look at pollution and how that is related and whether it would influence the quality of the river, water quality. One would obviously have to look at how water quality was taken over the years, so will have to compare... (IWF)

Asked whether he includes local fieldwork in his training he said:

I only do orientation outside because I don't have time after 2 days to cover a vast range of skills, so the practical exercise will be going outside and showing them how to use a local map, but that is just outside the training venue, I really do not have the time to take them out for field exercise that would be a day itself or half a day itself, so time does not allow for that. (IWF)

It was notable here that the pressures of providing support to cover the syllabus and map skills in the township schools had led to a concentration on concepts over context and exercises over engagement in locally situated experiences.

The interview with the curriculum advisor and discussions in the delivery of a training programme opened up some of the challenges that come with a complex curriculum and the challenging thread of integration that it includes. My next vantage point was data on exam performance.

4.4 Chief Marker's report on mapwork performance

The Chief Marker's reports of 2008 indicated that Grade 12 learners performed poorly in mapwork, particularly in calculations where for example in 2008 some learners got zero out of 20 marks and where some districts got a six percent average. In orthophoto and topographical map interpretation the average percentage out of the sample of 11 districts was 25% (South

Africa. DoE, 2008a). The 2009 report shows that on questions requiring calculations, the average performance of learners was 6,73 out of 20 marks. On questions requiring application of map theory and photo interpretation which were set out of 40 marks, the average mark was 14, 61 (South Africa. DoE, 2009b). In this case the Chief Marker recommended that learners should be helped to understand the skills in reality and that, teachers should emphasis the theoretical importance of calculation. Understanding of skills in reality in this case means teachers giving learners more practical work, the best of which is to do calculations using local map in the environment. The difficult question of integrating theory with practice by teachers and relating skills to reality experienced by the learners needed to be more fully explored with case evidence from the schools.

Case studies

The context of each of the four cases is firstly outlined before data on patterns of practice are represented. For the sake of anonymity, the names of the four schools that participated in the study will not be revealed; instead alphabetical symbols are used to identify school A, B C and D.

4.5 Case One: School A

4.5.1 Context of School A

School A is situated in a township area. It was built as part of the 1992 back to school campaign, so it is relatively modern and covers Grades 8 to 12 with the total enrolment of 214 learners. It is staffed by a principal, two heads of departments and 14 post level one teachers with three non-teaching staff. The subjects that are offered at FET level are Geography, History, Accounting, Business Studies, Economics, Physical Science and Life science. There is only one Geography teacher in this school, responsible for all FET Geography. He also teaches English in Grade 10. He has a teaching diploma in education from Cape College and has 27 years Geography teaching experience. For the purpose of anonymity, this teacher is identified as SAT1.

4.5.2 Pedagogic practices and challenges

In the interview school A teacher (ISAT1) reported that he has difficulty in teaching cross section and GIS in mapwork, saying: “The only thing that really makes me a little bit

uncomfortable is the cross section ..." (ISAT1). He however indicated that he is "trying by all means to organize teachers from outside and then listen even if the Rhodes students are here for practice teaching". (ISAT1) He indicated that he liked people and places (Settlement Geography). Responding to the question on how he taught mapwork, he said:

Well I just, I give each learner a copy of a mapwork. And then introduce the basics from the previous classes up to where I am going to teach them on a certain topic. I think what is important is they should just before you teach them mapwork they need to know the background if they do understand the conventional signs cause I think that is what mapwork is all about, you know the conventional signs. Then if they master that then, it's going to be easy. (ISAT1)

Regarding the number of mapwork activities he gave his learners per week he indicated that he gave them two calculations per day because he did not want to confuse them and that he did not give them homework because they might copy from one another, but instead gave them class work or short tests.

A Grade 12 lesson on land-use zones was observed in a classroom setting. This was consistent with the Grade 12 curriculum but I noted that the learners appeared very young. I thus asked one learner sitting next to me, what grade they were doing and he told me that they were doing Grade 10. I continued with the observation scheduled noting that the Grade 12 content was being taught to the lower grade. At the conclusion of the observation session, I asked for a copy of the lesson plan to verify the topic and why it was being taught at Grade 10 level. The teacher later sent me a lesson plan for a different lesson. It was notable that this lesson plan had been written by a student who was tutoring at the school (see Appendix H). Later, when I probed why he taught a Grade 12 topic to Grade 10s, he replied that he was giving them the basics.

This experience illuminated that there are many problems in working with the curriculum and that the teachers need support and management structures that hold them accountable.

4.5.3 Learner performance and challenges noted

Regarding learner performance, during the interviews the teacher commenting about the performance of his learners said:

...Eh, it's average, they are not excelling....I last got a B symbol when we still had the Zim structure I remember, I don't remember quite well what year was that, but there was another boy who is now doing...what do you call this... a person who is designing and stuff like that. He got a very good symbol. (ISAT1)

Responding to the question on what it was that his learners found difficult, he responded by saying; "Calculations, magnetic declination and magnetic bearing and identification of the direction of the river, things like that" (ISAT1). When probed further he said; "... I think they may not be as difficult as we think as teachers, I think we need to drill them, I mean mapwork must be done daily even if it takes about 15 minutes of your period." (ISAT1). When asked whether his learners came to class with instruments necessary for map work, he replied:

No, they are not equipped although you tell them what is expected of them they should equip themselves with this and that and that and that, but I mean you find it very difficult if you...I believe in independence when they work... fortunately they are lesser number 14. (ISAT1)

When I reviewed the learners' written work for evidence of integration and contextualization, I noticed that the teacher mainly worked with provincially set question papers. For example he gave me, as an example, Cambridge 3227DD map which was set for the Grade 11 November examination of year 2009, but then he had cancelled out 11 to make it 12. I also noticed that learners had difficulty in map calculations, particularly in gradient, magnetic bearing and area. I also noticed that the learner performance was low in Geographic Information Systems (GIS) questions. This could be related to the teacher's statement that he (the teacher) had difficulty with GIS. I also noticed that he had used the examination memorandum paper as the question paper but had covered up the answers. Many of the answers were, however, still visible suggesting that the exercise was a rehearsal of an examination with the children self-checking but being given many of the answers that they may have difficulty with. The provision of some answers could be the reason why the learner scored 48 out of 100 (see Appendix I) whereas the actual exam performance was very much lower at the end of the year. Below is the school's overall matric performance track record for the past 2 years and Grade 12, 2010 term 1 mapwork performance.

Table 4.1 School 'A' Pass rates for the past 2-year period

Year	Overall Pass rate	Geography subject pass rate
2008	18.6	55.5%
2009	10.8	10%

Table 4.2 School 'A' term one mapwork marks

Learner	Term 1 mapwork marks out of 100	Weight 20
1	74	14
2	48	09
3	63	12
4	48	09
5	40	08
6	76	15
7	70	14
8	83	16
9	24	04
10	65	13
11	64	12
12	69	13
13	65	13
14	55	11
Total	844	163
Average mark	60.2	11

It is notable that the marks on the two tables (Table 4.1 and 4.2) are a startling contrast. This may be due to the fact that results on Table 4.1 are a combination of theory and mapwork which are marked externally while those on Table 4.2 are for the first term and for mapwork only and are marked internally by the subject teacher using his own standard. It might also be because he gave his learners easy mapwork tasks during the year or because he gave them work that was meant for lower grades such as the one in Appendix I. It is also notable that the challenge of teaching cross section and GIS expressed by the teacher and his preference to teach the chapter on people and places, together with the lesson on land-use zones link well with the learner mapwork challenges mentioned and overall examination performance on Table 4.1.

4.5.4 Local fieldwork activities

Responding to the question on whether he engaged his learners in local fieldwork, he responded by saying; "...Yes I do but not this year, but what I normally do is to just teach them first all the sections which is what is in the pipeline, in September we have to take an outing". . (ISAT1). When probed further on where he intended to take them he replied by saying:

No we'll go to the coast via the coast to Alexandria and see the chicory factory and then from there, and then we go to Uitenhage, from Uitenhage to Port Elizabeth, so because I'll tell you PE- Uitenhage is one of the industrial complexes. One of the core industrial complexes. (ISAT1)

The response above suggested that there is lack of understanding of what local fieldwork entails. It was taken as an 'outing'. During the follow up interview to probe the question of fieldwork he indicated that he had never engaged his learners in local fieldwork because of time limitations and the fact that the school was located inside the township area where he could always point a finger on anything he taught about, thereby saying:

No mam, it's just that I must be honest I never had a fieldwork I'm sure that it's a classroom we just pointing. Fortunately here my school is community locked so it's easy for me to point things but as I say Geography is an outside subject it interests more. I do think about that I know what you're talking about. Sometimes I do think of that but the time factor is against me because after a period, say I have a period before other teacher's period then I'll have to rush. Otherwise if time would permit, then I would appreciate it because it interests more Geography as I said is an outdoor subject. (ISAT1)

It is interesting to note here that the teacher was aware that "Geography is an outdoor subject" (ISAT1), and that it becomes more interesting when taught outside, but that there was not enough time to take it there. This illuminated the fact that the subject was not planned for prior to or at the beginning of the year and when timetables were compiled. It also illuminated the fact that the curriculum was not adhered to.

4.5.5 Teaching and learning in local context

On the question of whether he used local Grahamstown context in his teaching of Geography, he agreed and even said that he had 5 topographical maps of Grahamstown. He added that he dealt with aspects such as local winds in climatology, river courses and landforms in geomorphology

and functional differentiation in settlement geography and buffer zones to show how the Grahamstown residential area was demarcated. Once again it was clear that the use of local examples was sensible in his experience but to a large extent remained inaccessible to the learners without field experience.

As indicated in Section 4.5.2 above, the lesson was on urban land-use zones where the teacher used a one page handout photocopied from the Grade 12 textbook. In this lesson, the teacher used local context when he asked one learner to go and show by pointing his finger, where High street was found on a map of Grahamstown which was on the wall at the back of the classroom and by giving examples of functions found in the Grahamstown Central Business District (CBD). He asked learners to write names of furniture shops and financial institutions found in High street and Beaufort Street on the chalkboard. He then discussed the professional services and low order services found in these two streets (OSAG10T1). As can be seen, there was a cursory reference to local context.

4.5.6 Integration of local environmental issues

I then asked how local environmental issues were integrated in the teaching of mapwork. He showed great interest in integrating local environmental issues, and he replied by saying; “local environment ... I think you need to localize it, you need to make of things that they know of, you make example for instance like erosion ...” (ISAT1). He also mentioned that he could teach things like map symbols, landforms and rivers. When asked what environmental issues he dealt with regarding the river. He said: “You just teach its course and its meandering, because you’ve got 3 types of rivers that is; meandering, braided streams and the straight stream” (ISAT1). This response suggested a lack of enough knowledge of what environmental issues are, as the teacher mentioned meandering and types of rivers.

In response to the question on whether fieldwork or a research project on environmental issues had been included or integrated in his program, he indicated that he did integrate, before stating “No not as yet. What I did to Grade 10s (was) on pollution, because I said they must find out from the library, encyclopedia or from whoever, get research on pollution” (ISAT1). When asked whether this included something from the topographical map, for example, he replied by saying:

No, no, it was... although it's an environmental issue around Grahamstown, but to find out how many types of pollutions, maybe do they know about, each learner should ... exactly what type of pollution does seem to dominate in her or his area and then try to find out solutions for that. (ISAT1)

From the lesson that I observed and probing questions, I noted that despite the intention to integrate local environmental issues, only a cursory reference was made to these, notably in the sections on land pollution and traffic congestion (OSAG10T1).

It is notable from the interviews and lesson observation in this case that integration of environmental issues and the use of local context only received cursory attention and that there is a dire need for professional development on these issues and on the proper implementation and interpretation of the curriculum as this would improve both content knowledge and pedagogic practices which would in turn improve the examination results. Replied

4.6 Case Two: School B

4.6.1 Context of School B

School B is also situated in a Grahamstown township area. It was established in 1995 and its current staff establishment consists of a Principal, one Deputy Principal, two Heads of Departments and 22 post level one educators. At the time of this research the total number of learners enrolled at this school from Grade 8 to 12 was 427. The language of teaching and learning at this school is English and all learners take IsiXhosa as their home language. Besides the compulsory subjects such as isiXhosa, English, Life Orientation, Mathematics and Maths Literacy, the school also offers the following subjects: Geography, History, Business Studies, Accounting, Economics, Consumer Studies, Tourism, Physical Science and Life Science.

School B has two FET Geography teachers, one in Grade 10 and the other one in Grade 11 and 12. For the purpose of anonymity, these teachers are identified as SBT1 for the Grade 11 and 12 teacher and SBT2 for the Grade 10 teacher.

4.6.2 Pedagogic practices and challenges

During the interviews SBT1 indicated that she did very little mapwork during her college studies. When probed as to how little, she responded by saying that she thought her teacher did not like mapwork because she was taught very little, and that she did not understand it, thereby saying; “MMM ... I would say *enokuba* [maybe] (*my brackets*) my lecturer didn't like that part of mapwork. To be honest with you I didn't understand mapwork during ifield” (ISBT1). She also reported that she does not take her pupils out to do fieldwork because she does not like that part of teaching, thereby saying; “eee ...Maybe even me as a teacher, I don't like that part... teaching fluvial processes...I am not comfortable in teaching, the part of landforms” (ISBT1). When probed further as to which part of the Geography syllabus she likes, she mentioned weather and climate.

When I observed her lesson, she was teaching Grade 11 mapwork in her classroom. Her topic was about measuring distances on maps. She introduced the topic by asking learners to define the word, scale. One learner answered and said that the scale is the relationship between the distances on maps and the distances on the ground. From there the teacher asked learners to name the types of scales that they know of. As learners were naming the types of scales, she wrote them on the chalkboard. She further asked learners to show her what those scales looked like, thereby giving them some chalk to write on the board. As they wrote the types of scales on the board, she explained them. Pupils mentioned the following scales; ratio scale, line scale and word scale. They sat in groups of eight and seven, and used the topographical maps and the orthophoto map of Middleburg. She asked them what the scales of those maps were and then wrote three scales: 1 : 50 000, 1 : 10 000 and 1 : 250 000. She asked them to come to the board and arrange the scales, beginning from the smallest to the largest. She then explained the concept of scales, that the smaller the denominator the larger the scale and the bigger the denominator the smaller the scale. She further asked her pupils to measure the distance between two points on the topographical map and turn that into metres and then into kilometres. She gave them two minutes to do so. She did not ask them to use the orthophoto map so that they could compare or use both scales. She asked them to give the answer verbally. She then dwelled on how to make use of the scale of 1 : 50 000 to calculate distances. She spent about three quarters of the period teaching

about scales. Most of the writing was done by her on the chalkboard (OSBT1). At the end of the lesson, when I asked for a copy of her lesson plan, she said that she did not make one.

During the interview, the Grade 10 teacher indicated that she did a lot of mapwork during her training, and that in Geography the chapters that she liked most are geomorphology and mapwork because they are more practical. She said she was confident to teach them to learners but not confident enough to teach them to junior teachers. When asked what problems she experienced in the teaching of Geography, she replied by saying:

It's when the kids they don't understand something, you understand and you want them to understand more. Sometimes you want to go it depends on you so much that you go and see but sometimes you don't do that. But luckily for the part of climatology we have a weather station whereby they can see the temperature and weather and all that stuff. (ISBT2)

When I observed her lesson, she was teaching conventional signs to the Grade 10 class of 17 out of 40 learners. Since it was raining and it was also a Friday, most learners had dodged the lesson and gone home. Most pupils seemed very familiar with the topic. She had drawn a table on the board which was divided into two columns. The first column was for pupils to fill in the colours used on the topographical map. The second column was for them to fill in the features represented by those colours. She then asked her pupils to describe the direction of the rivers on the map and the direction of their school from town. Learners were inside the classroom for the rest of the period. Everything was done using the map of Vryheid and the chalkboard. It did not look like they had been outside as the teacher indicated during the interview that she did not have time to take learners out because the periods were short.

At the conclusion of the observation session, I asked for a copy of the lesson plan. She said she did not make a lesson plan for that lesson, but gave me marked learners' mapwork scripts and memos. When reviewing the activities that were given to learners, I noticed that the questions were taken from the question paper which was set provincially for Grade 12 (see Appendix J), and that the marking was done in the form of ticks with no comments. When going through the question paper, I noticed that it covered most of the mapwork topics. I also noticed that the learners had difficulty in calculation questions. This made me think that it was because the question paper was for Grade 12 and therefore the standard was too high for them as they were in Grade 10.

4.6.3 Learner performance and challenges noted

Responding to the question on learner performance in mapwork, during the interview, the Grade 11 and 12 teacher responded by saying:

They are still struggling, neh, especially the calculation part, they mix up formulas mhlaumbi [maybe] (*my brackets*) kwi question paper, they can write iformulas, maybe they can perform better, when they wrote itest they mix up iformulas. (ISBT1)

She had earlier alluded to the fact that her pupils have a language problem by saying: “They don’t understand icontent, through ilanguage, if you are teaching you must mix with iXhosa so that they can understand” (ISBT1).

The Grade 10 teacher on this question had also indicated that the problem with her pupils was that they were lazy but then added that the other problem was “the calculations, the understanding of the profile” (ISBT2).

During the lesson observation, I noticed that the Grade 11 learners did not understand the concept of small and large scale because the teacher wrote three different scales on the chalkboard and asked them to re-arrange them from smallest to the largest. These were 1: 10 000, 1: 50 000 and 1: 250 000. Here, the learner who went to the chalkboard to answer the question began with 1:10 00 and ended with 1:250 000 as the biggest scale and no one said it was wrong. I also noticed that they had a problem in using the calculator and that they did not have mapwork equipment such as calculators and rulers. For example in a group of eight pupils, there were only two calculators and one ruler.

On reading their (Grade 11) written work, I noticed that they had problems with map interpretation, bearings and map codes. Below is the school’s overall matric performance track record for the past 2 years and the 2010 Grade 12 term 1 mapwork performance.

Table 4.3 School 'B' Pass rates for the past 2-year period

Year	Overall Pass rate	Geography subject pass rate
2008	77.8%	100%
2009	46.4%	80%

Table 4.4 School 'B' term 1 mapwork marks

Learner	Term 1 mapwork marks out of 100	Weight 20
1	24	05
2	38	08
3	31	06
4	27	05
5	31	06
6	23	05
7	18	04
8	28	06
9	34	07
10	26	05
11	50	10
12	41	08
13	22	04
14	22	04
Total	415	83
Average mark	30	06

As indicated in Chapter 3 (Section 3.4), this school falls under the middle performing schools with regard to the overall pass rate over the past two years. The Geography subject pass rate (Table 4.3) is quite high compared to term one mapwork performance (Table 4.4). This might be because teachers set a high standard during the year to make learners work hard in order to improve the results at the end of the year.

4.6.4 Local fieldwork activities

Although local fieldwork activities are perceived as being important and necessary by geography teachers in this school, but they are not done because the Grade 11 and 12 teacher indicated that she did not like them by saying: “eee ...Maybe even me as a teacher, I don’t like that part” (ISBT1). On the other hand the Grade 10 teacher also indicated that she was not engaging her pupils in these activities because there was no time to do so, saying: “I think it’s very difficult to go ...we are supposed to take pupils out but teachers are busy giving exams...” (ISBT2). When probed further as to whether they did anything around the school, she replied by saying: “No... There isn’t time” (ISBT2).

As mentioned in Section 4.6.2 during lesson observation both classes were taught inside the classrooms for those particular periods. Learners’ work and teachers’ work showed no evidence of local fieldwork activities.

4.6.5 Teaching and learning in local context

When I asked (ISBT1) whether she used local Grahamstown context in the teaching of Geography she said she did not use any local context in her teaching, thereby saying: “ no I don’t teach in any local context” (ISBT1). Both geography teachers indicated that they did not have local maps which would facilitate the use of local context. One of them (ISBT2) gave an example by indicating that she adapted the content to Grahamstown context when she taught about landforms. During the lesson observation in Grade 11 where the topic was measuring distances on the map of Middleburg, I noticed that there was no evidence of using local context such as for example adapting the topic to Grahamstown distances as the subject advisor had explained during the interviews that he told the teachers to adapt topics to local context.

As mentioned in Section 4.6.2, the Grade 10 teacher in her lesson on conventional signs used local context briefly when she wrote the names of the conventional signs such as the church, the police station, the recreational area, and the golf course and asked her pupils whether those features were found in Grahamstown (OSBG10T2). From the learners’ work I noticed that, as mentioned above (see Section 4.6.2) she was using Grade 12 final examination question papers

set provincially by the Department of Education, which did not necessarily address local context of any particular learner because they were set for learners coming from different places.

4.6.6 Integration of local environmental issues

When responding to the question on how they integrate local environmental learning in their mapwork lessons, both teachers (ISBT1 and ISBT2) indicated that they had given their learners a research project on land pollution, but that it was not something that they did often. The Grade 12 teacher (ISBT1) indicated that it was about two years ago when she gave her pupils a research project on land pollution. She was not sure whether it was a research project or an assignment.

I observed lessons by both teachers on the same day. SBT1 was teaching mapwork in Grade 11. Her topic as indicated above was calculating distance on the map. I noticed that there was no evidence of integration of environmental issues in her lesson. SBT2 was also teaching mapwork to Grade 10. Although she attempted to adapt the Vryheid map to Grahamstown context when teaching about the conventional signs found in Grahamstown, nothing was said about environmental concerns. When I reviewed learners' work there was no clear evidence of integration of local environmental issues, except for two questions (question 1.8 and 3.2 in the question paper (see Appendix J) which were taken from the Grade 12 final examination question paper.

It was notable in this case that the pressure of improving results had led to teachers using technical skills and setting very high standards for learners such as using matric final examination question papers to lower classes. Also that the curriculum and its demands for integration of environmental issues was superficially dealt with, the fact that the teacher mentions only land pollution which was assigned to learners about two years ago. The use of local context is also receiving cursory attention as teachers do not have resources to facilitate the use of local context and there was no evidence of adapting those that they have to local context.

4.7 Case Three: School C

4.7.1 Context of School C

School C is also situated in Grahamstown but in town not in the township area. It is a multiracial school or a so-called former model 'C' school. It is a girls-only school covering Grade 8 – 12. It is a boarding school catering for learners from the Grahamstown environs and elsewhere, including other countries. At the time of this research it had a total enrolment of 415 learners of which 135 were boarders and 280 were day scholars. Its staff establishment consisted of 27 teaching staff of which 17 were paid by the Department of Education and 10 by the school governing body. There were 37 non-teaching staff that included the hostel workers, the cleaning and the grounds staff. It also had 4 outside coaches for various sporting activities. Besides the 4 compulsory subjects at FET level, the school offers a wide variety of subjects, such as Computer Applications Technology (CAT), Art, Music, Drama, Accounting, Business Studies, Economics, Physical Science, Life Science, Geography and History. The language of teaching and learning is English and learners study it as their home language.

The school prides itself on excellent discipline, good results, dedicated teaching and non-teaching staff, adequate physical and material resources, many awards achievements and good parental support.

There were two Geography teachers at this school, one teacher taught Grade 10. She held a temporary SGB post and as a result she taught only once a week. It was therefore very difficult to get hold of her or to include her in this research. The other teacher taught Geography and Life Science in Grade 11 and 12. He had a Bachelor of Science Degree in both these subjects with 14 years teaching experience. Because he was the only one available, he participated in this research. For the sake of anonymity he will be known as SCT1.

4.7.2 Pedagogic practices and challenges

Responding to the question on whether he did mapwork during his training the Grade 11 and 12 Geography teacher (ISCT1) responded by saying: "Eh ... yes but as far as I remember the mapwork at University was very much kind of just testing if you knew your matric stuff, that's

what I remember” (ISCT1). When responding to the question on what aspects he felt confident to teach in Geography, he replied: “I feel confident to teach most aspects, there’s nothing that I really really struggle with, I must say I enjoy climatology, it is my favourite” (ISCT1). When questioned further about mapwork, he replied:

I love teaching mapwork. The problem with it, I get very frustrated teaching map work, because the girls don’t always get it, definitely I’m stronger in physical geography and mapwork than the human geography side. (ISCT1)

During the lesson observation, the teacher taught Grade 12 mapwork. There were 14 learners in his classroom. No one was absent. His topic was map calculation. Under this topic were sub-topics such as grid reference, distance, direction, true bearing and magnetic bearing. He gave each of his pupils a map of Grahamstown. He displayed the questions to be answered using the overhead projector. The questions were as follows:

1. Port Alfred is two maps to the east of this one. What is its grid reference?
2. What is the distance that a train must travel from Grahamstown train station to the Oak Valley train station?
3. What is the:
 - a) Direction
 - b) Bearing
 - c) Magnetic bearing

From Renfew House to the top of Makaanaskop?

Some learners worked in pairs and in small groups even though they were each given a map, others worked as individuals. While they were solving these problems, the teacher went from desk to desk helping and observing how they answered the questions (OSCG12T1).

When I requested a copy of the lesson plan he sent it the following day and also sent lesson plans for the other grade (Grade 11) and some of his work. It was evident from his work that he used inquiry-based teaching. (See Appendix K)

4.7.3 Learner performance and challenges noted

Responding to the question of what frustrates him, he replied:

...getting calculations wrong over and over again and they are just not picking up distances for example, then you know that this is a problem, one of the things I do in my classes when I start teaching geography mapwork, is I ask all the girls without thinking with their eye closed give them one second to point towards North, sometimes I get girls pointing there upwards. (ISCT1)

On the question of how Grade 12 learners perform in mapwork, he replied:

I must say I had, em...last year's class was a very strong class, and I felt that they were doing actually very well with mapwork, but it's just, that's what happens sometimes you do get a strong class and sometimes you get a weaker class, but it often surprises me in that I think they are going to do worse and they do and sometimes they come up trumps with mapwork. (ISCT1)

During the lesson observation, as I was going around looking at how they performed in calculations, I noticed that some learners experienced problems in magnetic declination as the teacher also added that topic later on. They confused subtraction- east and addition- west. When giving grid reference, some learners started with longitude instead of latitude. Some learners had a problem with map code. One learner could not identify the railway station. I however noticed that each pupil was busy either measuring or calculating. They seemed to be enjoying what they were doing. Those who had problems raised their hands for the teacher to help them. They were also moving from desk to desk helping one another. The class was quite busy and learner-centered. It was however encouraging to note that all pupils had the necessary instruments needed for mapwork practice. When I reviewed his work and his learners' written work, I noticed that he gave learners frequent mapwork exercises, especially calculations, using different topographical maps and that, he integrated mapwork with theory, in most cases. Below is the school matric performance for the past 2 years and Grade 12, 2010 term 1 mapwork performance.

Table 4.5 School ‘C’ Pass rates for the past 2-year period

Year	Overall Pass rate	Geography subject pass rate
2008	100%	100%
2009	100%	100%

Table 4.6 School ‘C’ term 1 mapwork marks

Learner	Term 1 mapwork marks Out of 100	Weight 20
1	50	10
2	34	07
3	30	06
4	36	07
5	72	14
6	40	08
7	36	07
8	46	09
9	38	08
10	72	14
11	60	12
12	64	13
13	54	11
Total	632	146
Average mark	49	11

The examination results shown above in Table 4.5 give evidence of a high performing school. Even the term one Grade 12 mapwork results show a consistent correlation with the final exam marks. It is important to note here that this is a former model C school with adequate physical and material resources and highly qualified teachers.

4.7.4 Local fieldwork activities

When interviewed about fieldwork, the teacher confirmed that he engaged his learners in local fieldwork, saying: “...at the moment they are doing an environmental project...in Grahamstown, yes I have given other ones an assignment on the waste disposal in Grahamstown...” (ISCT1)

Although at the time of the lesson observation, the lesson was held in the classroom, there was, however, clear evidence of engagement in local fieldwork activities from the teacher's portfolio activities and lesson plans which he showed to me. What was encouraging was that when reviewing learners' work I noticed that most of the major fieldwork activities were done at their home areas not necessarily Grahamstown. As mentioned in Section 4.7.1, the school is a boarding school which draws learners from all over South Africa and outside the Republic, therefore during the school holidays and leave outs they did individual fieldwork at their own localities.

It was noted in this case that it is easy to conduct fieldwork as it is planned for and incorporated in the school's annual programmes. The school also has resources that facilitate fieldwork such as school buses to take learners where ever they need to go and local maps to use during the fieldwork. They even have funds to buy such maps.

4.7.5 Teaching and learning in local context

When responding to the question on whether he had a map of Grahamstown he said "Last year I bought 30 new maps of Grahamstown" (ISCT1). Regarding how he used local context in his teaching of mapwork, he passionately explained that he takes his learners to different places around town to orientate the map, to see features such as their school, their homes (those who came from Grahamstown), and the freeway using the old map of Grahamstown. He then added by saying:

... then afterwards I take up my brand new maps of Grahamstown and they have to do the same thing and they really enjoy seeing the difference and seeing the way that it is growing in particular to the east, the Joza township has grown considerably, the freeway has changed usually and of course the contour intervals are now in metre and not feet etc. So is very very nice for them to see not only the spread of their town but also to look at the local features. Then the following day, for double lesson, I drive them up to the SPCA and from SPCA we leave the bus there and we walk to this very strange building that has a view point on the hill behind prospect field at Rhodes University. There's a hill up there and we walk to that point and is an amazing view point that you can see 360° views of Grahamstown, from industrial area, all the way to Fort England you can look over Settlers Monument, you can look over VG, over all the schools, it really is an amazing view ... (ISCT1)

He further explained that he took learners around in order to make sure that they understood contours and their arrangement. When observing his Grade 12 mapwork lesson there was clear evidence of the use of local context. As mentioned in Section 4.7.2 he used maps of Grahamstown with questions referring to the Grahamstown area.

4.7.6 Integration of local environmental issues

Regarding the integration of local environmental issues the teacher asserted in the interview that he did integrate Grahamstown environmental issues by saying; “I have asked the girls to come up with any urban issues that they wish to comment on in their project It could be pollution, it could be the strike action, it could be water problem in Grahamstown” (ISCT1). He added that he had given the Grade 11 learners an assignment on waste disposal in Grahamstown. In this lesson there was no evidence of integration of local environmental issues but he was using a local map. Learners were basically doing the calculations (OSCG12T1). It was however encouraging to notice when reviewing his portfolio work that he did integrate both local Makana environmental issues and each learner’s local environmental issues as he taught learners from different places in and out of Grahamstown.

This case reflects teaching and learning which follows the curriculum directives of integration of theory with practice which was evident in the teacher’s portfolio and learners’ work and localization of content knowledge to ground the knowledge of learners and make it place-based. It projected a good example of using active and inquiry-based learning and engaging learners in real world issues. It is however important to note that of interest during the lesson observation was to understand how teachers integrate mapwork and environmental issues using local context, something which was not evident during the lesson as the teacher was teaching mapwork separately, emphasizing technical skills and not relating these skills to environmental issues.

4.8 Case Four: School D

4.8.1 Context of School D

School D is situated in a semi-rural area outside Grahamstown. It used to be a model C school but due to democratization of education it ended up being attended by Xhosa speaking and

coloureds only. It is now the same as the township or rural-township school, with a lack of resources and facilities, a high shortage of both qualified and unqualified or even under qualified teachers and therefore there was a poor culture of teaching and learning with high under performance. It is a combined school from Grade 1 to 12. At the time of this research the school had a total enrolment of 60 learners of which 31 were at GET level and 29 at FET level, 19 at Grade 10, 3 at Grade 11 and 7 at Grade 12. There were 10 teachers, 6 at GET and 4 at FET level. The language of teaching and learning at this school is English and all learners take isiXhosa as their home language. Other subjects offered, especially at FET level are: Mathematics, Life Science, Physical Science, Life Orientation and Geography. There was only one teacher qualified to teach Geography. She had a Senior Teachers Diploma (STD) in Education with 13 years teaching experience. For the sake of anonymity she will be known as SDT1.

4.8.2 Pedagogic practices and challenges

Responding to the question on how much mapwork she did during her teacher college studies, the teacher indicated that she did not do much mapwork by saying, “Not that much” (ISDT1). When encouraged to elaborate more on that, she mentioned that most of the time they had to do things for themselves, thereby saying; “Most of the time *uzenzela ubuzifundela ngokwakho* [we used to teach ourselves] (my brackets) as a result like some of the things *kungona siye fieldini uyazazi ngoku uyazifundela* [now that I’m in the field I teach myself] (my brackets)” (ISDT1).

When responding to the question on what aspects she felt confident to teach in Geography, she replied: “... It’s the content *neh* especially the settlements Geography and also part of geomorphology” (ISDT1). When probed whether she was confident to the extent of teaching other colleagues, she replied: “No not that confident, I have a problem teaching Geography with mapwork” (ISDT1).

On the question of what it was that she found to be a challenge in her teaching, she replied:

The part that is a challenge is GIS, for instance if I can get the easy way to make them understand. And also it’s not easy to teach map projections, map projections which is also a challenge because now in grade 10 and 11, especially in grade 11 I gave them the notes that we did last year in grade 12. (ISDT1)

On enquiring whether she had the map of the local area she indicated that she did not have it, that she had requested it from the subject advisor but she could not get it as the subject advisor seldom visited her school.

During the lesson observation, the teacher taught about the importance of the oceans. She had earlier indicated that she was going to teach about bearings, but when I arrived at school, she decided to teach about the importance of the oceans. She taught the Grade 11s in the classroom which appeared to be used for all the other subjects because it was full of science and other subjects' teaching aids. There were three learners, one boy and two girls. This happened to be the total number of learners in that Grade doing Geography and they were doing the same other subjects.

The teacher introduced her lesson by telling learners that she was going to teach about the importance of the oceans, particularly about how the oceans influence the atmosphere. She asked them to define the term atmosphere. She indicated that the influence of the ocean causes the difference in temperatures between the coastal regions and inland places. She further asked them whether the temperatures of the school area were the same as in Port Alfred with the approach of winter. One pupil indicated that as the winter was approaching the school's local area was colder than Port Alfred. When asked why, the other pupil indicated that it was because it is inland while Port Alfred is at the coast. The teacher then explained that places far from the sea have higher seasonal ranges in temperatures than places near the sea.

The teacher further explained that Ocean currents are the second influence and that they moderate the climate of South Africa. She then explained that the third influence of the ocean is that it is the main source of water vapour. She asked pupils what water vapour was. When they could not answer, she reminded them of the previous lesson where they talked about the hydrological cycle and evaporation. As pupils could not remember, she then explained in detail how the cycle occurs. She ended her explanation by saying that the ocean also supplies oxygen through the plants that grow near its surface (OSDT1). During the lesson the teacher did the talking, while the learners listened. No one wrote anything down. The teacher did not use the chalkboard. She had a piece of paper in front of her which, as she was talking she was making some rough drawings on but not showing the pupils what she was drawing.

At the end of the lesson, I asked to review her learners' work and also her portfolio work. I also requested a copy of her lesson plan. She gave me only the learners' work (see Appendix L), and said she did not write a lesson plan. When I reviewed the learners' work, I noticed that they had done very little mapwork activities and that there were few ticks with no comments or evidence of remedial work done.

4.8.3 Learner performance and challenges noted

Responding to the question of learner performance in paper 2, she responded by saying: "not good especially in the calculations, because there's confusion in direction and bearing and magnetic declinations" (ISDT1). When probed to describe learners' challenges, she indicated that her learners experienced challenges in calculations by saying:

It's not easy for them to do calculations. When you are teaching them they seem to understand but when you test them they don't understand. It would be better if there was a maths teacher, I would try to work hand in hand with him/her but the problem is that there is no maths teacher for the learners. And some of the resources are not there. And then also now another thing is a learner not performing well. The results are not great, maybe if the subject advisor comes continuously. (ISDT1)

Responding to the question on what caused learners to have challenges in the topics that she mentioned, she said: "It's because of the shortage of teachers especially maths" (ISDT1). As mentioned in Section 4.8.2 during the lesson, pupils were seated passively looking at the teacher while the teacher was doing most of the talking. No one was writing or asking any questions. The only time that they became active was when the teacher asked them a question and when she asked them to turn to the atlas and find the currents under discussion. It was here where they struggled to find the page which dealt with currents. Two pupils were going from page to page, while another one was waiting for the teacher to mention the page number, indicating that they lacked the skill to use the atlas. Below is the school matric performance for the past 2 years and 2010 Grade 12, term 1 mapwork performance.

Table 4.7 School ‘D’ Pass rates for the past 2-year period

Year	Overall Pass rate	Geography subject pass rate
2008	0	43%
2009	7.7	38.4%

Table 4.8 School ‘D’ term 1 mapwork marks

Learner	Term 1 mapwork marks Out of 100	Weight 20
1	46	09
2	36	07
3	51	10
4	41	08
5	43	09
6	63	13
7	21	04
Total	308	60
Average mark	44	09

The learner performance in the form of the matric final examination results in Table 4.7 above gives evidence as to what the teacher said that “I have a problem teaching Geography with mapwork” (ISDT1), and that she did not do much in terms of mapwork during her college studies. It is, however, notable that there is a startling contrast between the two tables. This is more or less similar to school A and in a similar manner, the difference might be due to the fact that results on Table 4.7 are a combination of theory and mapwork which are marked externally while those on Table 4.8 are for the first term mapwork only and are marked internally by the subject teacher using her own standard.

4.8.4 Local fieldwork activities

When responding to the question on whether she engaged her learners in local fieldwork activities, she indicated that she did not engage her learners in local fieldwork. Asked whether

she was planning to do so, she replied and said that she was planning to do it. Probed further about what fieldwork activity she was planning to engage learners in she said: “maybe give them that chance to make interviews in the location. I take them out doing landforms, types of landforms...” (ISDT1). From the learners’ work which I reviewed, there was no evidence of engagement in local fieldwork activities.

It was noted from the response here that although the teacher was planning to engage her learners in local fieldwork, it was not a priority or important as she reported that she would “give them that chance” to conduct interviews in the location. This illuminates the fact that the curriculum is not dealt with adequately and that there is a need for professional development that conscientises teachers on the importance of fieldwork in integrating theory with practice.

4.8.5 Teaching and learning in local context

Responding to the question on how she made use of local context in her teaching of mapwork in Geography, she recalled that she used local context in Grade 10 in year 2009 when she taught map symbols using features such as trigonometrical beacons and others that were found along the road between Grahamstown and her school area. Later in the interview, she indicated that she used local context “here and there” (ISDT1), and that she needed some assistance on how to use local context.

During the lesson observation, she briefly used local context when, as indicated above. She asked the pupils whether the temperatures at her school area were the same as in Port Alfred with the approach of winter. She then explained that places far from the sea have higher seasonal ranges in temperatures than places near the sea. It was both interesting and encouraging to note that the teacher was aware that she needed some assistance on how to use local context in her teaching.

4.8.6 Integration of local environmental issues

Responding to the question on what local environmental issues she deals with in her geography teaching, she mentioned drought, floods and global warming. When asked further about what the most prominent local environmental issue was in her area, she said “I think em, em, the drought”

(ISDT1). Evidence from the above detailed lesson and from the learners' work shows that local environmental issues were not integrated (OSDT1).

4.8.7 Overview across cases

This section provides a summary of the data on integration of mapwork, environmental issues, and use of local context in the practices documented in the four case studies. Included, is the evidence on the orientation of the support services and the evidence of school and exam performance in mapwork from which this study emerged.

Response from the subject advisor showed contradicting statements. In the first place he claimed that he encouraged teachers to integrate theory with practice, but later on said that he had discouraged them to do research and fieldwork as they take a lot of time but to do some "practical work (exercises)" (IGSA), in the classroom. This illuminated the extent at which technical skills were emphasized in preparation for examinations as against deep learning. This linked well with the provincial workshop facilitator who also said that he was not focusing on integration of environmental issues and that he did not have time to workshop teachers on fieldwork, but then contrary to the subject advisor, acknowledged that "the practical exercise will be going outside and showing them how to use a local map" (IWF), something which he did not have time to do. When observing how he work-shopped teachers, he also taught mapwork as a separate topic and without integration within the wider content or theory.

On looking across schools A, B and D teachers did not engage their learners in local fieldwork. Use of local context during teaching was very brief or just in passing. Teachers did not have local maps as alleged by the subject advisor. Only school 'C' had maps of the local area and used them. In all the four cases, teachers separated mapwork from theory and did not integrate local environmental issues. Learners displayed challenges in map calculations. These challenges were displayed both in mapwork performances displayed in the tables provided and in the learners' work (see Appendix J and L). With reference to 2008, 2009 and 2010 term one geography mapwork performance (see Tables 4.1 to 4.8) the results indicate an unevenness, which could be related to how each teacher sets his or her own mapwork activities using his or her own standard especially for term one mapwork. For example, schools A and D whose overall external

Geography results were the lowest in the district in 2008 and 2009, show high scores for 2010 term one internal mapwork results.

It should, however, be noted here that the 2008 and 2009 results are a combination of Geography paper one (theory) and paper two (mapwork), while 2010 term one results are for mapwork only.

As indicated in Chapter 2, the curriculum specifies that mapwork should be integrated with theory and taught throughout the year. It is, however, surprising that its assessment is required separately in the first term. This gives teachers and learners the notion that mapwork is a once off or term one activity. As a result teachers concentrate more on mapwork during the first term. For the rest of the year, they deal with theory and only come back to mapwork a few days before the June, September or November examinations when they prepare learners to write examinations. As a result learners do not get frequent and continuous practice in map calculations and interpretation. Furthermore, it is not surprising why teachers separate mapwork from theory and make a cursory use of local context. The support that they receive only emphasized technical and examination preparation and classroom practice as against real-world fieldwork and research practice as stipulated by the curriculum policy and against the Chief Marker's recommendation that learners should be helped to understand the skills in reality and that, teachers should emphasize the theoretical importance of calculations.

4.9 Conclusion

In this chapter, I have presented findings regarding the requirements of the Geography curriculum policy and how the subject advisor supports teachers to put this policy into practice. I have also presented data from four cases reviewed to probe mapwork performance and integration that links maps with the use of local context and the integration of environmental issues. Lastly I have provided a cross-case summary of findings which indicate that the curriculum is not delivered as intended. The structure for this presentation has been guided by the categories used in the analytic memo (see Appendix D). The coding and references used in this chapter are explained in Chapter 3. In the next chapter, I discuss the findings from this chapter and relate them to literature discussed in Chapter 2.

CHAPTER FIVE

ANALYSIS OF EVIDENCE TO INFORM PROFESSIONAL DEVELOPMENT

Tell me, I forget; Show me, I remember; Involve me, I understand (Matiru & Mwangi, 1995 as cited in Mwenesongole, 2009)

5.1 Introduction

In this chapter, I examine the evidence generated in relation to the integration of mapwork and environmental issues, use of local context, and professional development and support.

The evidence presented in Chapter 4 provides a picture of current patterns of practice in the teaching of Geography to allow me to derive a sense of the professional development training necessary to improve examination performance. To do this I formulate and justify a number of analytical statements based on the weight of evidence presented and discuss research examined in Chapter 2 to review the research purpose and question.

My analysis is guided by a perspective on place-based education (see Chapter 2). This theoretical framework allows a critical engagement with the research evidence in current patterns of teachers' support and classroom practice to derive the design features for a professional development programme that I outline as recommendation in Chapter 6.

Overview:

In Chapter 4 I compiled all of the data generated from the policy documents, interviews and observations of supported classroom practice and learning in Geography. This data allowed me to get a much clearer picture of what is happening in schools so that I could extend my investigation to make the analytical statements below about current practice that would allow me to move towards possible solutions in a professional development programme.

Based on the case evidence presented in Chapter 4, it is possible to say that:

- 1. Current patterns of learner performance in mapwork indicate that learners are not achieving the necessary practical competence because of problems in calculations and map interpretation.**
- 2. Use of local context received cursory attention in current patterns of practice.**
- 3. Most teachers, who participated in this study, cover the curriculum content at a superficial level without adequate integration that engages learners in fieldwork and environmental activities.**
- 4. Seen against the evidence of the patterns of practice, it is possible to note that the current emphasis on concepts, technical skills and exam preparation to resolve the problem of mapwork failure could be working in opposition to what is intended.**

The study seeks to examine the evidence behind each statement and to review this in the light of other research and literature.

5.2. Analysis of evidence

The analytical statements are now examined in relation to the evidence presented in Chapter 4 before being discussed in order to derive findings that can inform professional development.

5.2.1 Challenges in map calculations and interpretation

Analytical statement 1: Current patterns of learner performance in mapwork indicate that learners are not achieving the necessary practical competence because of problems in calculations and map interpretation.

A reading of the data on learner performance in Chapter 4 paints a clear picture of failure in map calculations and interpretation skills. In all four case interviews teachers noted that learners from Grade 10-12 experience problems in calculations and map interpretation that included magnetic declination, bearings, distances and direction (ISAT1, ISBT1 & ISBT2). The learners' written work also indicated different challenges. For example in school A, Grade 12 learners' work indicated challenges in calculating gradient, magnetic bearing and area. In school B data from the classroom observation revealed that the Grade 11 pupils had some difficulties in using the calculator, in arranging scales and were reported to be mixing formulas. In school C some learners had problems in magnetic declination, grid reference and map code. In school D, it was reported that they confused direction, bearing and magnetic declination. There were mixed reactions regarding the cause of problems in calculations. The subject advisor ascribed it to negative attitude by the learners, the Grade 10 teacher from school B ascribed it to laziness of the learners while the Chief Marker ascribed it to lack of practice and understanding of skills in reality.

When an examination of this pattern of failure was extended to evidence in lesson planning and classroom practice, it became apparent that the students were not getting the contextual information necessary for them to gain experience and background knowledge so that calculations were meaningful. For example, local maps were not used in all but one school and the calculations were being taught as exercises from previous years' examination question papers (ISAT1& ISBT2). Here the evidence suggests that what is missing does not seem to be inadequate practice in calculations alone as alleged by the teacher in school A and by the Geography Chief Marker's reports of 2008 and 2009 (see Section 2.6), but a deeper problem of integration and contextualization that is producing a lack of relevance and understanding.

Other contributing factors according to the data presented are the following; teachers' college qualifications, availability of resources and learners' mathematical foundation. For example, teacher's qualifications could sometimes affect his/her knowledge. This was discussed in Chapter 2 and relates well with Morrow's (2007) view that the quality of teachers' knowledge and education influences their learners' epistemological access because they teach only that which they know and only that which is in the curriculum, that they cannot go beyond the parameters of the curriculum or bring the content to the context of the learners. For example, out of five teachers who participated in this study, only one had a degree in education while four had

teachers' diploma in education and received their qualifications during the Bantu or apartheid era. According to the National Policy Framework for Teacher Education and Development in South Africa (2006), as discussed in Chapter 2 (Section 2.11), these teachers were not trained to meet the demands of the present global environment. They have a poor conceptual and content knowledge which contributes to low levels of learner achievement. This was evident in school A (ISAT1) where the teacher with 27 years experience indicated that he had a problem in teaching cross section and GIS and in school B (ISBT1) and in school D (ISDT1) where teachers indicated that they did very little mapwork during their training at the college. This lack of conceptual and content knowledge caused them to concentrate on external examination question papers and drill learners with them instead of bringing the content to the context of their learners by setting their own question papers.

Data from interviews and lesson observation also indicate that learners did not have relevant resources for mapwork such as calculators and rulers. The few who had them did not know how to use them. For example in school A the teacher indicated that his learners are not 'equipped' (ISAT1). In school B in a group of eight pupils, there were only two calculators and one ruler. This situation could also be contributing to learners' underperformance in calculations. Weak Mathematical foundation was seen as another contributing factor. For example the teacher from school D (ISDT1), indicated that the shortage of Mathematics teachers at her school caused calculation problems with her learners. This relates well with Mwenesongole's (2009) research as discussed in Chapter 2, (Section 2.6) where he found that most learners do not perform well in mapwork because they lack motivation, basic map reading, and mathematical skills.

Literature reviewed in Chapter 2 again revealed that research in the Transkei by Ndlwana (1991) found, that the theoretical, abstract and non-localization of mapwork caused learners not to enjoy mapwork. The same was true with regard to theoretical and non-localization of mapwork in the cases that were examined. The school where teaching was contextualized had the best results, although there were other factors that contributed to their better results such as availability of resources and the better qualified teachers that one finds in advantaged schools.

Pedagogic practices presented in Chapter 4 also show that mapwork is classroom-based and teacher-centred. For example, in all four cases, lessons were conducted in the classrooms. In three cases teachers did the most talking while learners listened passively. This is similar to what

van Harmelen and Irwin highlighted that in the majority of school classrooms knowledge is presented as “neutral, absolute and given” van Harmelen and Irwin (1995) cited in Wilmot (1999, p. 114), and by Tshibalo (2003) and Mwenesongole (2009) who found that poor mapwork performance may be associated with the traditional lecture method of teacher-centeredness, where learners do not get enough work with practical examples.

The evidence with regard to a failure to develop practical competence clearly illustrates that there are varied layers of problems and that learners are not doing mapping that relates to real-world contexts and therefore relevant to them. This links well with the Geography Chief Marker’s advice that, “Geography is alive and educators should not kill it by keeping it classroom bound” (South Africa. DoE, 2009, p. 4). These problems illuminate what needs attention in professional development programmes.

5.2.2. Cursory use of local context

Analytical statement 2: Use of local context received cursory attention in current patterns of practice

Teachers and the subject advisor reported that the use of local context is important in the teaching of geography content and mapwork for these to be relevant for learners (Section 4.3.2). However, the evidence from three out of the four cases of classroom practice provides few examples of references to local context. For example, in school A the teacher (ISAT1) claimed during the interviews that he used local context and made examples of local winds in climatology, river courses and landforms in geomorphology and functional differentiation in settlement geography. His lesson about urban land-use zones constituted a very cursory reference to local context as for example, when he sent a learner to point a finger to where High street is found on a map of Grahamstown that was on the wall. In school B the Grade 10 teacher (OSBG10T2) used local context briefly when she wrote conventional signs for the church, the police station, the recreational area, and the golf course and asked her pupils whether those features were found in Grahamstown. In these two cases, the pattern of classroom practice appears to be teachers lecturing and making passing references to local examples whilst verbally presenting the concepts. The Grade 11 and 12 teacher in school B (ISBT1) acknowledged that

she did not teach in local context, while the Grade 11 teacher in school D indicated that she used local context “here and there”. (ISDT1)

Data from document analysis of the FET Geography curriculum policy in Chapter 4 reflect a curriculum which stipulates different contexts for different Grades, but requires that teachers start with local context before focusing on other contexts specific for different Grades, thereby saying that “teachers should be aware of and use local context ... which could be more suited to the experiences of the learner” (DA-GPP. 25). It was discussed in Chapter 2 (Section 2.9), that use of local context involves using examples of the local area when teaching, for example, using local resources such as local topographical maps and aerial photographs, videos of the local area, local street maps, local magazines and newspapers, models of local area, pictures of the local area, the local community, local flora and fauna, local physical landscapes, local tertiary institutions, local climate, local government and/or holistic local environment in terms of social, political, economic, cultural and physical environment.

Data from the four cases show that contrary to the subject advisor’s claim that he supports geography teachers to teach in local context by giving them local maps and some software which he alleged to have uploaded in their schools’ computers, only one school had 30 local maps which were bought out of the school coffers and these maps were being used sufficiently to teach in local context. Availability of resources facilitates the use of local context and as can be seen, most of the local resources that I have described above do not necessarily have to be purchased, but need teachers’ creativity and knowledge of the local area and its resources where he/she can either obtain or send learners or invite the local community into the classroom, or use learners to collect local newspapers, magazines, street maps, local plants or rocks and others.

In this one case where there was use of local context the learners showed interest and expressed a concern for the environment. Added to this, their examination performance was the highest of the three. It therefore seems that, introducing learners to their own locality so that geography concepts make sense to them and are seen through new eyes motivates their interest to learn. This links well with Sobel’s (2004) view that place-based education increases learners’ academic achievement while at the same time it improves Community vitality and environmental quality.

Neglect of, or cursory reference to local context does not give a firm grounding for the learner to grasp and have an interest in geography concepts and skills. This links well with Smith's (2007) observation that all educational experiences are aimed at developing in young people a sense of affiliation with the places where they live, that absencing this affiliation, can mean that there is little chance that the forms of care essential to environmental and social stewardship will emerge.

There is clearly a link between context and integration in the sense that the use of local context facilitates integration as is examined in the next analytical statement that extends this finding on evidence on integration through fieldwork and engagement with environmental issues.

5.2.3 Superficial integration of mapwork and environmental issues

Analytical statement 3: Most teachers, who participated in this study, cover the curriculum content at a superficial level without adequate integration that engages learners in fieldwork and environmental activities

Data from participating schools indicate a superficial integration of mapwork and environmental issues. For example out of five lessons observed, two teachers (OSAG10T1 and OSDG11T1) taught theory without integrating it with mapwork while three (OSBG11T1, OSBG10T2 and OSCG12T1) taught mapwork without integrating it with theory. In Chapter 2 I discussed the international and national imperatives to integrate environmental concerns in geography and how this is stipulated in the geography curriculum policy. For example, that, practical competence should form an integral part of the foundational and reflexive competence (South Africa. DoE, 2003). Also, teachers should engage learners in "fieldwork, using local maps and photos; recording geographical information in the local area" (DA-GGP. 34-35). Literature reviewed in Chapter 2 also indicated that the integrated geography curriculum shows coherence and develops a wide range of skills (Kyagulanyi, 1988) and also showed fieldwork as a teaching approach that is integrative on its own and that it adopts more of a participatory approach (O'Donoghue, 1993). It is also important to note that integration enables learners to interpret the map thereby solving the problem of map interpretation.

Findings from three of the four cases revealed that, although teachers reported fieldwork as necessary and important, further investigation revealed that few classes were getting fieldwork experience. For example in school A the teacher (ISAT1) indicated in the interview that he had never engaged his learners in local fieldwork because of time limitations and the fact that the school is located inside the township area where he could always point a finger at anything he taught about (see Section 4.5.4). In school 'B' the Grade 10 teacher (ISBT2) also indicated that she did not engage her learners in fieldwork because there was no time to do so. The teacher who taught Grade 11 and 12 from the same school (ISBT1) mentioned that she did not like fieldwork because she was never trained to do it (see Section 4.6.4). In school 'D' the Geography teacher (ISDT1) also indicated that she had never engaged her learners in local fieldwork (see Section 4.8.4). The last three cases cover time, training and experience, pointing to a need for an emphasis on this in any training programme.

On the question of pointing the finger from inside the classroom, Okpala (1988) argued that teachers should change from the talk-chalk theoretical approach to an involvement of students in practical work, group work, inquiry learning, games and simulations. On this score, La Grange in Fairhurst (1994) added that instead of studying make-believe situations and solving make-believe problems in the classroom, learners should be engaged in real-life situations through fieldwork. The example of finger pointing illustrates that teachers have a clear sense of how Geography refers to the outside world and that, learners should be given learning experiences in this and in the issues of the day. But this is not yet happening so it needs attention in professional development. The evidence suggests that the problems of examination performance (Analytical Statement 1), a failure to localize (Analytical Statement 2) and not undertaking fieldwork or engaging learners in environmental issues (Analytical Statement 3) all conspire to create a complex problem of relevance and education quality in three out of the four cases examined.

Regarding the question of lack of time, Adonis (1993) observed that problems such as transport costs, lack of time and disruption of school routine which are usually associated with long distance fieldwork can be overcome by using the local environment for fieldwork. She cited Biddle and Stimson (1968); Boorman, (1972); Pick, (1979) and Nightingale (1981), as saying that local fieldwork saves time and money, minimizes transport problems and causes less disruption to the school routine, and that, since local sites can be visited and revisited as many times as needed, this is one of the reasons why local fieldwork is given high value.

With regard to the issue of lack of professional training to do fieldwork, Innes (2005) blames the history of apartheid where teachers were poorly trained, but does not say why this is still the case 17 years after apartheid.

There was also little evidence of learners engaging with environmental issues in the limited fieldwork or in class. For example, when interviewed on how they integrate environmental concerns in their lessons, the teacher from school A mentioned soil erosion, buffer zones, meandering, braided streams and the straight stream. The teacher from school B mentioned pollution and squatter settlements, the teacher from school 'C' mentioned urban issues, pollution and waste disposal. In school 'D' the teacher mentioned drought. It was notable here that the teachers made reference to curriculum topics that they had taught to earlier grades and it appeared that there was no more time for fieldwork and environmental issues as the teaching in Grades 10-12 is more orientated to practice in examination topics and questions. It also became apparent that teachers do not have adequate knowledge of environmental issues and a holistic view and knowledge of the concept of environment. For example, this was evident when in school A the teacher indicated that he integrated environmental issues such as the river's course and its meandering. This indicated a lack of knowledge of what environmental issues are. It is therefore not surprising why there is superficial integration of environmental issues in mapwork. This relates well with Lotz-Sisitka, Rosenberg, Nsubuga and Schudel's observation as quoted by Nsubuga (2009) in Chapter 2 that many teachers at FET level have inadequate knowledge of environmental concepts and issues, and tend to skip the environmental content of the curriculum or to teach it in a superficial and disjointed manner. This is what is happening in three out of the four schools which participated in this study and points to the need for professional development in this area.

Superficial integration seems to be one of the contributing causes of underperformance in mapwork examination (Paper two) particularly in calculations and map interpretation as mentioned in Analytical Statement 1 for the following reasons: it distorts coherence in the subjects as learners are not able to see the relationship between theory and practice, whereby theory represents the content of geography which includes environmental issues and practice represents geographical skills and techniques. Furthermore, calculations do not become meaningful and relevant as technical skills are emphasized instead of teaching skills in reality.

Use of local context facilitates integration of content, and integration of content facilitates use of local context. For example, the teaching of or investigation of local environmental issues where learners attempt to answer such questions as what, where, why, how, when, who in enquiry-based fieldwork or research assist them to use maps and to draw on their content knowledge thereby integrating theory with practice.

There is a need for professional development support in order for proper epistemological and pedagogic practices to happen and for policy to be put into practice, especially with regard to integration. In the next analytical statement I thus look at the evidence in current patterns of professional development support.

5.2.4 Current patterns of professional development and support

Analytical statement 4: Seen against the evidence of the patterns of practice, it is possible to note that the current emphasis on concepts, technical skills and exam preparation to resolve the problem of mapwork failure could be working in opposition to what is intended.

Data presented in Chapter 4 reveal that the current training emphasized technical mapping skills and key geography concepts to the exclusion of integration, fieldwork and local environmental research. This was evident when, for example the Geography subject advisor was asked during the interview whether teachers gave learners some research projects on environmental issues; he replied that he had discouraged them to do research as it took a lot of time (see Section 4.3.2). Also when he was asked how he supported teachers to integrate mapwork and environmental issues; he said; "...I actually from time to time face them that they should actually integrate mapwork and theory in their approach" (IGSA). He further indicated that he had given them the user friendly software that had some exercises (see Section 4.3.1). It therefore means that since teachers are only told or instructed to integrate mapwork with content in their support without being shown how, this might be the reason why they teach mapwork separately and theory separately. As the saying goes "*Tell me, I forget; Show me, I remember; Involve me, I understand*" (Matiru & Mwangi, 1995 as cited in Mwenesongole, 2009). Looking at the qualifications and pedagogic practices, especially of teachers in the underperforming schools, it is important that they are shown how to integrate and made to actually carry out the integration

through investigative fieldwork and research. Since the **how** [my emphasis] alone may not be enough or effective for proper and quality teaching, they should also be taught **why** [my emphasis] they are required to integrate and localize their teaching.

The same was apparent when the workshop facilitator who was invited to teach mapwork to the Grahamstown teachers did not integrate any theory but emphasized technical skills. For example, he indicated that he was currently not focusing on integration of local environmental issues and only gave examples on how they could be integrated. He also indicated that he could not include fieldwork in his workshop because he did not have time for that. (see Section 4.3.2)

Clearly the technical side of mapwork has to be dealt with, but at the moment the technical side alone is missing the main point of the integrative nature of the geography curriculum which enables learners to interpret the map and to see coherence in the subject. The narrowed professional development experience of defining map concepts, doing exercises in technical calculations and the exclusion of integration and use of local context keeps the learning abstract and classroom bound (see Sections 4.5.2, 4.6.2, 4.7.2, and 4.8.2), learners seldom see the relevance in what they are doing and are not getting any motivation to learn with understanding (see Section 4.2.1) as the curriculum intends (Mwenesongole, 2009). It seems as if the serious problem of student performance is being responded to with a short term view of training in calculations and exercises in map skills. However, the evidence generated in this study suggests that the problem may need the opposite, a long term view of training on how to integrate theory with practice and in context to show coherence, produce relevance, enhanced skills and general performance.

Neglecting integration of any kind, but especially through fieldwork and contextualization in professional development support makes teachers either neglect them too or teach them superficially if ever they attempt to teach them. This denies learners important situated skills, knowledge and values which are emphasized by the NCS curriculum. For example, as discussed in Chapter 2 (see Section 2.7), fieldwork provides learners with vital skills such as observation, recording, research, and management of time and energy. It further provides them with skills such as measuring of distances, angles, rates and quantities. This means that local fieldwork has the potential to improve mapwork performance of learners, especially in calculations by means of measuring different things in the real-world that are familiar to them. In support of this

analysis, Sobel (2004) noted that place-based learning; because it is hands-on and uses real-world learning experiences, has the potential to improve academic performance.

Current global trends in the teacher professional development literature focus on active participation and relevance in context. Robottom (1987) for example, suggests that for professional development to be effective, it should be enquiry-based, participatory and practice-based, critical, community-based and collaborative. Mapwork through investigative fieldwork and research where local environmental issues are investigated provide an integrated and contextualized teaching and learning process. This links well with the theory of place-based education which focuses on pedagogies characterized as experiential, action-oriented, participatory, and community-based and focused on real-world problem-solving (Altman and Low, 1992, as cited in Alun 2009). With regard to practice-based professional development, Wilmot (1999, p. 115) argues that telling teachers about teaching strategies or giving them quick-fix recipes will not enable them to empower themselves as agents of change. Here, she advises that the teaching strategies should be work-shopped in a participatory manner with teachers actually 'doing' the theory.

It was interesting to learn that the policy as presented and analyzed in Chapter 4 (see Section 4.2.3) clearly stipulated the teaching strategies to be used in the teaching of Geography such as; systematic approach, systems approach, issue-based approach and use of fieldwork (see Section 4.2.3). It was thus a surprise to me that pedagogic practice in schools and professional development overlook these, thereby providing a narrow orientation to the subject. Practice-based professional development in context may, in this case, help teachers understand and implement policy and become reflective practitioners who are able to reconsider what they teach and why they teach it.

As discussed in Chapter 2, learning should occur in a context that aims for a better understanding of issues in the learners' locality. The argument for context as attributed by Cornbleth (2000) is not new. It was developed from the work of Grundy (1987) who argued that curriculum is constructed within the learning situation and that learning is a social process, while knowledge is socially constructed. It became clear to me that teachers need professional development that will help them to align to policy by teaching in ways that are integrative, contextual and relevant to the learners. This means that an enhanced framework for professional development in geography

should include integration of theory with practice and be based on processes that are local and relevant so that they provide access to geographical concepts and build geographical skills.

5.3 Conclusion

The research findings from interviews and lesson observations indicate superficial integration and localization of mapwork and environmental issues either through classroom practice and fieldwork and research activities. It is, however, worthwhile to mention that besides superficial integration and localization which were the focus of this study, there were many other challenges which were found to be impacting negatively on mapwork performance at underperforming schools such as; lack of local maps, too much use of theory and less practice, talk-chalk teaching method, drilling of learners with previous year's matric examination papers, language problems, lack of lesson planning and lack of mapwork and fieldwork knowledge by teachers. These findings point to the need for professional development that is integrative, localized, activity-based and beyond. In the next chapter I sum up the study and make recommendations based on the findings.

CHAPTER SIX

SUMMARY AND RECOMMENDATIONS

6.1 Introduction

In this chapter I provide a brief summary of the study, describe its potential value and make recommendations, based on the analytical statements in Chapter 5, regarding strategies to improve professional development practice. I then critically reflect on the research process and make suggestions for further research.

6.2 Summary of the study

This was a small-scale interpretative case study of four Grahamstown Education District FET schools. It set out to generate data on how FET geography teachers integrate mapwork and environmental issues using local context, so as to contribute to the professional development programme.

Data for the study was generated using qualitative methods such as document analysis, interviews and lesson observations. The most important documents analyzed were: the National Curriculum Statement (NCS) Grades 10–12 (General) Geography Policy (2003) and the Learning Programme Guideline (2008) which specified the scope of learning and assessment for the three grades in the Further Education and Training band. These were carefully studied in order to obtain a clear understanding of their stipulations regarding the integration of mapwork and environmental issues in Geography, and the use of local context. The Policy also guided me in formulating questions to ask teachers in the interviews and in compiling observation schedules.

The data generated allowed me to draw the following analytical statements which served as findings for this study, that: Current patterns of learner performance in mapwork indicate that learners are not achieving the necessary practical competence because of problems in

calculations and map interpretation, use of local context receives cursory attention in current patterns of pedagogic practices, mapwork through fieldwork and environmental issues are superficially integrated and that current teacher support and training workshops place excessive emphasis on concepts and technical skills and exam preparation in an attempt to resolve the problem of mapwork performance.

The study therefore proposes a framework for a professional development programme that focuses on integration and contextualized teaching and active, hands-on learning in the local environment (see Appendix P).

6.3 Potential value of the study

Not much research has been done on how Geography teachers use local topographical maps and aerial photographs to teach local environmental issues especially in underperforming schools. The study will therefore add to the scholarly research and literature in the field. The findings of this study will contribute to professional development programmes and be of use to Geography curriculum developers. It is hoped that the recommendations made by this study, based on its findings, will improve pedagogic practice and adherence to policy with regard to integration, contextualization and relevance and therefore learner performance in mapwork.

Although the study was based on the NCS curriculum, it will benefit the new Curriculum and Assessment Policy Statement (CAPS) which is about to be implemented because it promotes the use of local context, by saying:

This curriculum aims to ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives. In this regard, the curriculum promotes knowledge in local contexts, while being sensitive to global imperatives. (South Africa. DoE, 2011, p. 5)

It also places high value on integration by stipulating that “Geographical skills and techniques should be integrated with the [content] topics throughout the year”. (South Africa. DoE, 2011, p. 14)

6.4 Recommendations

Since the main goal of this study is to inform professional development, the following recommendations are therefore made for professional development programmes that take into account the following:

- Workshops and support that integrate mapwork with content to show subject coherence. This will show some teachers who are not able to integrate theory with practice how this is done, and how to develop lesson plans that take into account integration and contextualization.
- Workshops and support that make use of local context in terms of local resources and local references. This will show relevance in the subject taught and studied. These local workshops should also familiarize teachers with the local areas by giving them activities that will take them to different areas in their local areas.
- Workshops and support that engage teachers in local fieldwork using FET geography topics. These should be conducted during the school holidays and be oriented to planning the next cycle of teaching. The participating teachers should also be given the chance to actually do the place-based learning activities and compile study materials for investigating the local environment.
- Schools should be provided with maps of their local areas to enable them to localize their teaching and to facilitate integration.

The following are the examples of enhanced possibilities that emerged as I worked with the evidence reviewed in this study and the perspectives in the literature. These were useful to develop an approach to professional development that moves beyond attention to technical problems and begin to address the wider challenge of contextualization and knowledge access. The study thus moves to a discussion on ways in which professional development could be done to strengthen integration and contextualization. The following (including Appendix P) are the proposed guidelines.

6.4.1 Active learning activities as a strategy for integration and contextualization

The key issue that is important for inclusion in a professional development programme is how the concepts and local resources can be used in ways that relate to local sustainability practices that are relevant to learners and the subject content to be taught. For example a topic like soil erosion could be linked to tree planting or water quality could be linked to water audits. Also food security could be linked to vegetable gardening or a topic like land pollution could be linked to clean-ups, composting and recycling.

Including an active learning approach and sustainability practices in professional development could also be extended to investigating local issues using local maps.

6.4.2 Local/place-based fieldwork and issues - Investigative activities/visits.

A professional development course could include local investigations that involve for example, visits to:

- Local municipality – provision of services
- Nearby streams – cleanliness/ pollution
- Local commercial services – environmental policy
- Local health care centres – health issues
- Local sewerage and landfill sites – management and hazard control
- Housing – provision of houses and their conditions
- Local police station – crime
- Rural issues – overgrazing and overstocking and over cropping
- Surrounding residential area - household – usage of water and electricity

In all of these cases of engagement in local context it would be important for the learners to have experience with local maps to locate themselves and to do transect walks that relate to what has been covered in the classroom. These would assist them to do map interpretation (see Table 2.1),

to learn and understand conventional signs, to use compass and/or GPS, to draw and/or to orientate a map. It would also assist them in identifying and comparing features on the map with features on the actual ground in the local area and to see the relationship between relief and human activities. Furthermore, partnerships could also be formed with the local community, businesses and organizations to facilitate easy access and deeper local learning.

6.4.3 Classroom activities

The real-world could also be brought inside the classroom through engaging learners in local issues through the use of the following classroom activities that encourage active learning:

Debate, simulations, role play, environ-games, inviting speakers to the classroom from the local community, municipality, local health care centres, local tertiary institutions and model making.

6.4.4 Calculations

Calculations done in context familiar to learners such as using the real-world local environment like local landscapes become less abstract to learners and motivate them to learn (Mwenesongole, 2009). They also help them to comprehend the scale of the map (see Table 2.1).

These could take the form of the following examples:

- Taking the transect walks of selected areas and calculating:
- Area of the landfill site or sewerage site
- Distance from landfill/sewerage to the residential area
- Gradient of selected landforms and determining susceptibility to erosion and mass wasting – deciding on prevention methods such as contour ploughing, tree planting and others.

6.4.5 Local/ Place-based resources

Local maps (topo, aerial and street maps), local newspapers and magazines, local landscapes, local community and local institutions of higher learning can facilitate place-based learning and make learning relevant, interesting and less abstract.

6.4.6 Further aspect to be included in professional development programmes

- Holistic view of the environment (Physical, social, economic and political)
- Environmental issues and risks
- Sustainable development
- Sustainability strategies and/or practices
- Inclusion of fieldwork in school's year plan
- Catering for learners with different learning disabilities in fieldwork
- Establishment of a geography fieldwork policy
- Fieldwork resources
- Planning of fieldwork
- Setting clear objectives for fieldwork
- Application of GIS
- Values and attitude of teachers towards environmental issues and risks

My overall assessment however, is that the lack of content knowledge, integrating skills and contextual experience amongst current teachers is the most difficult issue to address. This cannot be done through workshops alone, but will require a long term strategy of upgrading qualifications and acquiring experience. Addressing this difficult question must remain beyond the scope of this study. What is recommended above, however, is an approach to professional development that addresses this lack of experience and knowledge with a strategy of practical resourcing support that is directed towards teachers, learning, and producing practical materials for localizing through their lessons or classroom practice.

6.5 Critical reflection on the research process and suggestions for further research

This section presents a critical reflection on the whole research process with regard to limitations, challenges encountered and lessons learned during the study. It also provides issues for further research.

6.5.1 Critical reflection on the research process

The study, being a small-scale case study of only four FET schools, cannot claim generalizability but is meant merely to provide some insights into classroom practices and suggest a framework for professional development to improve classroom practice, assisting Geography teachers to put into practice the policy regarding the integration of mapwork and content first using local context. The limiting scope of the research coverage and the limited time during which the study was conducted must also be acknowledged. The following snags and challenges imposed further limitations on data collection: the long school holidays, the 2010 soccer World Cup, the teachers' strike action, the June and trial examinations, and teachers cancelling appointments and changing lessons.

When considering the research goal of informing professional development programmes, I realize that more data should have been collected by interviewing and observing more than one workshop facilitator in order to get a deeper and solid background on the support that is given to teachers. I am also aware that although the research methodology, methods and theoretical framework were suitable and relevant for the study, more could have been achieved by including more schools and observing more lessons, but because of time limitations, this was not possible. Lastly I am aware that the semi-structured interviews and observation schedule did not dig deep enough into the problem of integration and localization. However, interacting with a wide range of literature deepened and widened my understanding of the importance of Place-based Education. Although the study focused on integration and localization, the classroom observation especially in underperforming schools revealed many other challenges which need serious attention.

6.5.2 Suggestions for further research

Because of the limited time available and the half-thesis scope of this study, there were issues raised that could not be investigated. These included:

- The extent to which GET geography, especially in the senior phase, informs and prepares learners for FET mapwork.
- The subject allocation of Social Science at senior phase level.

- Integration of geography with other subjects and the use of other contexts such as continental and global.
- Teachers' perception of professional development programmes and support.
- An investigation into how Geography learners use the knowledge, skills and values from other subjects to support and improve their subject performance in Geography.

6.6 Concluding remarks

The world is facing extensive environmental crises. Most of these are socially induced, and education is expected to respond to these crises. Geography is seen as the vehicle for environmental education because of its focus on human-environmental interactions, perhaps exemplified in the integrated and contextualized teaching of mapwork. There is therefore a need for the professional development of teachers as agents of transformation and change, that does not only emphasize concepts and technical skills but also deals with environmental risk reduction, adaptation and resilience; professional development that is experiential, action-oriented, participatory, community-based and focus on real-world problem-solving.

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APPENDICES

APPENDIX A: An Interview Schedule

1. Were you trained to teach Geography?
 2. What level of training do you have?
 3. How much mapwork did you do in your training? Was it **localized**?
 4. How long have you taught Geography?
(At what grades?)
-

1. Tell me about the Geography that you teach.
 2. What aspects do **you** feel most confident to teach?
(Would you be able to train others on those, especially the junior teachers?)
 3. What are the main problems **you** are experiencing in the teaching of Geography?
-

4. How is **your** learners' mapwork/paper 2 performance?
(What aspects of mapwork are the most difficult for them?)
(What do you think causes this?)
5. Do you think teaching mapwork in local context can enhance their Geographic skills and techniques?
(how?)
6. Do you use local maps in your teaching?
(Where did you get them from?)
(How have you used these maps?)
7. **Do you think it is necessary to teach in local context?**
(How does it benefit learners?)
8. What support do you have to teach in the local context?
(How is this encouraged and supported in your reading of policy?)
9. How do you locally contextualize the **environmental content** in the grades that you teach?
10. What local **environmental issues** do you deal with when teaching mapwork?

11. Do you think learners need Geographical skills and techniques in order to learn **environmental issues**?
 12. Do you ever take learners out?
(Which topics are best for this?)
-

APPENDIX B: Interview transcripts

Interview – Date: 19/04/2010 (ISBT1)

Interviewer: the first question says, were you trained as a Geography teacher?

Respondent: yes

Interviewer: what level of training do you have?

Respondent: I have STD the duration is three years

Interviewer: STD three years: how much training in map work did you have?

Respondent: it was little

Interviewer: hmm, Can you explain how little is little What is it that you didn't do?....

Respondent: MMM ... i would say enokuba my lecturer didn't like that part of mapwork, to be honest with you I didn't understand mapwork during ifield.

Interviewer: Ok

Respondent: I have done calculations

Interviewer: Are you saying..?

Respondent: I did mapwork but little

Interviewer : When you were doing mapwork, did they teach you local things? Was it localized mapwork?

Respondent: No it was not a localized mapwork.

Interviewer: Ok.

Respondent: We were using any topographical map, as we were supposed to use a Zwelitsha map okanye King williams Town

Interviewer : Where did you train?

Respondent: At Zwelitsha, Griffis Mxenge

Interviewer: How long have you taught Geography?

Respondent: I started in 1996 is + - 10 years...to date

Interviewer: What Grades have you taught from there untill now?

Respondent: Ok I did teach grade 8 to 12

Interviewer: Ok and now, what grade are you teaching now

Respondent: I'm teaching grade 11 to 12

Interviewer: Ok(learners got inside the classroom during the interview to collect their books)

Interviewer: In your teaching of Geography what aspects do you feel confident to teach?

Respondent: I like to teach that module of climate and weather

Interviewer: What grade is that?

Respondent: Iclimatology, , I can say iclimatology

Interviewer: Ok that is Grade 12 neh!

Respondent: Eee .. Grade 11, Grade 12 Ya Grade 12

Interviewer: Ok, do you feel so confident that you can teach others? Junior teachers, people who do not have as much experience as you have?

Respondent: Junior teachers, I can try (she laughed)

Interviewer: Ok Maybe you can try on what?

Respondent: To teach

Interviewer: Weather and climate ne?

Respondent: Ya

Interviewer: Ok, what are the main problems you are experiencing in your teaching of Geography?

Respondent: The first problem is the language

Interviewer: Language, can you explain how is it a problem

Respondent: They don't understand icontent , through ilanguage, if you are teaching you must mix with iXhosa so that they can understand

Interviewer: Ok, how is your learners' performance in mapwork?

Respondent: MMM, learners' performance?

Interviewer: Take for example grade 11 and 12 maybe as you trace their performance

Respondent: They are still struggling, neh, especially the calculation part, they mix up formulars if mhlaumbi (maybe) kwi question paper, they can write iformulars, maybe they can perform better, when they wrote itest they mix up iformulars

Interviewer: What do you think causes this ... mixing of formulas and problems in calculations?

Respondent: I think that when you are teaching neh, they will say that they did understand, when it comes through iwriting they don't understand

Interviewer: Ok, do you think teaching mapwork in local context like teaching mapwork of Grahamstown using map of Grahamstown... Grahamstown things, do you think.. that is what I mean by local context, do you think it can enhance their general Geographic techniques?

Respondent: Yes, because they will be familiar with the places that are on the map

Interviewer: Ok. Do you use any local map?

Respondent: No I don't teach in any local context

Interviewer: So how do you localize your teaching therefore if don't have ...

Respondent: I'm using the topographical maps of any place so ...

Interviewer: Ok, so as you are using topographical map of other places, do you cover any aspects of Grahamstown?

Respondent: No

Interviewer: Ok, so you don't teach anything in local context?

Respondent: If I'm talking about iconventional symbols, like mos if you are talking about ilocal context you are referring to ibuildings, I'm going to teach ilanto i convevtional signs, I'll show ibuildings like i land –use zones nazo, they are there in the map

Interviewer: Ok, but generally do you think it is necessary to teach in local context?

Respondent: Yes, so that they can be familiar

Interviewer: So that they can be familiar okAccording to the syllabus, teachers have to teach in local context, provincial context, continental and global context, but first local context, that is according to the policy, is there any support from the department of Education for you to teach in that local context as stipulated by the policy?

Respondent: It is ..There is support neh mam...

Interviewer: In what way?

Respondent: If we need help from Idepartment, they assist us in helping neh, but we don't have ezi Grahamstown maps

Interviewer: Have you ever asked for Grahamstown maps from the subject advisor?

Respondent: To be honest, I did't ask Grahamstown map from subject advisor

Interviewer: Ok. In your syllabus, it says that the curriculum has to be integrated with environmental learning isn't it? environmental education, how do you integrate environmental learning in your Geography teaching? Are there any environmental problems that you deal with?

Respondent: Ok, ya there are environmental problems like ipollution

Interviewer: Ok, is there any other thing?

Respondent: And also isquatter settlements, they are also environmental problems.

Interviewer: Yes, exactly how do you teach that pollution and squatting?

Respondent: Ok if you come to squatter settlements neh, they are iproblems mos neh? Because there are advantages and disadvantages of ipollution and also isquatter isettlement, if we look at isquatter settlement isite le sime kuyo, this is not a site that is favourable for settlement. So there

will be that problem of providing services to people that are living in squatter settlement. I services like proper sanitation

Interviewer: So how do you teach this pollution and squatter settlements, do you give it to learners in the form of a research project or assignment or what?

Respondent: Some sort of assignment or research to research which type of pollution we are experiencing in Grahamstown, what causes that pollution, that kind of pollution

Interviewer: Ok, have you ever given them any research project?

Respondent: Enoba it was 2 year ago, the research of pollution around iarea le yaze Grahamstown

Interviewer: What type of pollution was that?

Respondent: Land pollution

Interviewer: Land pollution, ok, did they take it in a form of research or it was just an assignment?

Respondent: It was in a form of research to research what type of pollution we have here, what causes that kind of pollution and so on

Interviewer: Ok, do you think when you give learners research project, do you think that can enhance their mapwork, that is General Geographic skills and techniques?

Respondent: Skills and techniques, ya because they will do mhlaumbi some bar graphs using that information they got from people around if they are asking some questions.

Interviewer: Ok, but do you think it is necessary to teach environmental issues, environmental problems in Geography?

Respondent: Yes

Interviewer: Why, don't you think that part of environmental education should be a separate subject itself?

Respondent: I environmental problems?

Interviewer: MMM

Respondent: We must teach environmental problems around us.

Interviewer: Can your learners interpret the map?

Respondent: They are trying to interpret maps

Interviewer: Ok, have you ever taken them out?

Respondent: No

Interviewer: Ok what could be the reasons?

Respondent: EEE ...Maybe even me as a teacher, I don't like that part.

Interviewer: Ok, why don't you like it?

Respondent: If I can get assistance, like if you are teaching fluvial processes, they need to see these different landform, and its the part that I am not comfortable in teaching, the part of landforms

Interviewer: Is it because maybe in your training you didn't get thorough training or maybe it's just that you don't like the chapter neh?

Respondent: We didn't get proper training

Interviewer: Miss Thank you very much.

Interview transcript: Geography subject advisor (IGSA)

Date: 19/04/2010

Interviewer: How many schools do Geography?

Respondent: 19

Interviewer: Which schools among them got the lowest Geography results in 2009?

Respondent: "K" and "N"

Interviewer: Have they always been underperforming like this or was it their first time?

Respondent: "N" is the first time and "K" has dropped last year

Interviewer: "K" has dropped?

Respondent: Ya

Interviewer: Ok, what are you doing to support them?

Respondent: We support them with resources, coaching, training them

Interviewer: Exactly how do you coach them?

Respondent: Coaching them in the use of materials and also on some difficult areas that are actually challenging them

Interviewer: Ok, exactly what are their problems?

Respondent: Ok, with "K", the main problem, when I asked the teacher, it lies with the learners who are not fully supported by their parents. He said therefore that it lies with management thereafter, there are problems of attendance and the rest, but also the teacher himself got the challenge in certain areas of Geography.

Interviewer: Exactly which section of Geography do you think he has a problem?

Respondent: It's within areas of mapwork and GIS

Interviewer: Ok, generally can you comment on the problem of mapwork in general.

Respondent: Mapwork is a national problem, but we try to end it, apha eRini its never a problem to us it's a national problem

Interviewer: Apha eRini How are you ... ee

Respondent: Workshopping and following up, workshopping educators providing necessary and user friendly resources and follow ups to educators.

Interviewer: Ok, do you think learners themselves have a problem or it's teachers who have got a problem in mapwork, especially mapwork?

Respondent: Ya, learners may have a problem particularly in calculation part of it, but that is actually attitudinal, those who are in fact negative about calculations

Interviewer: Ok, according to the syllabus, the NCS curriculum, teachers have to teach in local context isn't it?

Respondent: MMM...

Interviewer: Especially under mapwork they have to do fieldwork using local maps, what support do you give them?

Respondent: They have got material that is related to local, local maps, they have got the software

Interviewer: Do they all have maps of Grahamstown?

Respondent: Ya, they got maps and the software that I have put in their local computer labs, with all the map aspects, they have got two packages of mapwork, software in their computers

Interviewer: You said you have 19 schools, all these 19 schools have got maps of Grahamstown?

Respondent: They've got maps of Grahamstown, and I have ordered also the actual local map of the provincial. Let me show you example of it here, this is one of them

Interviewer: How do you make sure that they teach in local context?

Respondent: To me ..

Interviewer: According to how the policy stipulates

Respondent: One thing is that the examples that they should use, in many aspects of Geography, because map is the base of teaching, you can teach settlement Geography you can teach Geomorphology, you can teach climatology, but you can adapt those one, this is what I am actually telling them, and I have done those particular aspects within the local area using examples from area itself, whether you talk about land use and so on.

Interviewer: Do your teachers voluntarily call you to help them if they have got problems?

Respondent: They do that.

Interviewer: Ok, do you ever do class visits and demonstrations according to the subject advisors' responsibility?

Respondent: I do that

Interviewer: Ok, have you ever demonstrated one of the problematic areas experienced by the teachers?

Respondent: I've done that

Interviewer: Can you make example?

Respondent: Particularly for the integration of any topic using mapwork, for the purposes of coverage of the syllabus.

Interviewer: Ok, what environmental issues are teachers integrating in their..., because environmental education has to be integrated in the teaching of Geography, what environmental education or issues have you seen them integrating?

Respondent: Like for example the question of pollution, water pollution, Grahamstown actually had some challenges on that one in the past.

Interviewer: How do you as the subject advisor make sure that they cover LO.1?

Respondent: What is happening is that I actually from time to time face them that they should actually integrate mapwork and theory in their approach

Interviewer: And how do they integrate it?

Respondent: Like for example, the example that I have made, that when they are going to teach a particular topic there on settlement, then they use the topographical map to indicate that one, that's the first part of it. And the second one, the software that I have actually given them is also having some kind of exercises that from time to time that the learner should actually use, and is actually user friendly also to the educator

Interviewer: Ok, do they give learners some research projects? Have you seen this in their portfolios?

Respondent: With the research this year, I've seen but this year I have not encouraged them to do any research, I encouraged them to do practical work, within the teaching time or extra time. So with the research then ... in fact I have discouraged them to do it, because it actually takes time, it is out of focus this year. The interaction between the teacher and the learner is given priority more than going out and spend a lot of time.

Interviewer: Do you think that the teaching and learning in local context is important?

Respondent: Ya, but one should actually start by learning the basics then adapt those basics to the local context, local context alone will actually be meaningless if one does not know the basics, but from the general approach, for example if one talks about pollution must first of all know about pollution, talk about water pollution, know those things, then from there you can go to specifics.

Interviewer: So concepts are more important, they form the basics?

Respondent: Ya, that's what I have been saying to them that that's the only way that one can teach Geography, for example they are going to talk about earth evolution, learners must first of all know the concept evolution, then from there you can move to the process, so in other words what I'm trying to say to them is that the approach is the question of understanding of concepts, then move to the process.

Interviewer: The very last question sir, you said you have 19 schools which are doing Geography, in your planning, what strategies are there that you have put in place to improve the results this year on your site as a subject advisor, I know they have got their own subject improvement plans?

Respondent: I have actually identified the areas that cause underperformance, but anyway in Grahamstown seven schools obtained 100% and some of them with good levels.

Interviewer: Ok, so those who obtained less, what strategies do you have in place to improve their results?

Respondent: But on top of that, I had to identify the general challenging areas in Geography not only for the schools that have underperformed.

Interviewer: Do you still have to identify them?

Respondent: I have identified them already.

Interviewer: Oh! you have identified them already?

Respondent: The challenging area is mapwork and with mapwork, is in fact calculations, that is from the general aspect.

Interviewer: Is it a challenge to teachers or learners?

Respondent: The challenge to teachers, that's a general trend, nationally, provincially, ya, we may not actually have that much in Grahamstown that challenge, but I'm saying that because it's a challenge I should attend to it

Interviewer: What do you think is the cause of this?

Respondent: The general cause, I think it's actually the attitude of learners together with educators on calculations, the second one is for learners who are unable to use the reference signs provided in the map.

Interviewer: So how have you planned to counteract that?

Respondent: There is a guide that is actually used which is more or less in a form of exercise that had to be given exercise to learners from time to time per school so that to improve their learning of conventional signs, but the thing is that they cannot use the very bottom one in the map, because the maps are provided with those things, what I said to educators, they must constantly interact with the learners and inform them to be conscious that at the bottom of each topographical map the conventional signs reference is at the bottom and learners should be conscious of that ... then the 3rd area is GIS, the tendency of educator is to isolate GIS from the normal mapwork assuming that it's the total strange area, different from mapwork, whereas in actual sense GIS is the programme that is used for the teaching of mapwork but now using computers. One simple question that was a challenge to learners in 2009 was the very first question that was asking the use of GIS layers in the particular areas of the map that was indicated. Learners confused that with the use of the GIS's programme, those are 2 different things, whenever a topographical map is drawn it uses certain layers and GIS use those layers and you actually get those layers by looking at the conventional signs, so that was a tricky question that learners cannot answer.

Interviewer: Do you think teachers understand that?

Respondent: They understand now, I explained what is actually happening when the topographical map is being drawn we use layers and those are the layers that GIS programme actually use, but GIS as a programme can actually be utilised for various things so they actually make that demarcation between the two. The question was not difficult but it was the question of reasoning. Ok, those were the areas, with the paper one, things were not actually as bad because there were some common questions, but teachers do not necessarily finish the syllabus that is the thing for the last question, that is people and their needs that was the area that most of the educators could not finish.

Interviewer: Is it because the syllabus is too long?

Respondent: Ya, it's too long, but of course what I have actually said to them, is that, particularly the affected schools like "K", they have actually started with the early classes and extra classes, so that they can actually cover the syllabus.

Interviewer: Is there anything that you want to comment on?

Respondent: Ya, the last thing is that, to address also this problem we again actually giving them mapwork workshop to assist the educators during the week.

Interviewer: Is it the one you were announcing?

Respondent: Ya

Interviewer: Ok, so the workshop is basically on mapwork?

Respondent: Ya, basically on mapwork

Interviewer: Is it because mapwork is a real real big problem?

Respondent: Not necessarily for Grahamstown but because I just want to reinforce

Interviewer: But is it a problem in other provinces?

Respondent: Nationally is a problem, that's why the national office has even given the priority of controlled test now to mapwork there are 2 controlled tests, mapwork, so that is a little bit of a change, so from research, research has been specified practical, after all research was just contributing to CASS marks, this one is contributing also to both CASS marks and to exams.

Interviewer: Sir, thank you very much.

APPENDIX C: Observation Schedule

OBSERVATION SCHEDULE

School: 'B'	Grade: 11	Subject: GEOGRAPHY	No. Of pupils: 15
Participant: OSBG/IT1	Lesson Duration: 35 min	LO & AS: 1:AS4	
Time: 09h20 - 09h55	Date: 23/04/10	Period: 3	
Topic: Measuring Distances on Topographical Map.			
Things to observe		Comments	
1. How does the teacher introduce the lesson?		She wrote the topic on the board and distributed maps to pupils. She asked learners to define what a scale is & what different types of scale they are.	
2. What prior knowledge do pupils show?		Learners seemed to have done the topic before e.g. they knew all types of scales.	
3. What strategies does the teacher employ in teaching? How did s/he involve pupils in the lesson?		By asking them to define the word scale, mention types of scales. By asking them to write types of scale on the board by asking learners to arrange scales from the smallest to the largest, the lesson was teacher centred in that the teacher was the one writing all calculations on the board. It was more of the telling strategy.	
4. Does the teacher use the map of local area (Grahamstown)?		No, she used the map of Mpumalanga - Middleburg. Each learner had his/her own map and ortho photo.	
5. Does each pupil have his/her own map?		Yes, but since they were sitting too close to each other, she could have made learners share maps in pairs.	
6. What other LTSM are pupils using?		Topographical maps and aerial photo (ortho photo) of the map which she did not refer to.	

<p>7. What Geographical skills and techniques did the lesson contribute for pupils?</p>	<p>Measuring straight distance on 1:50 000 topographical map. But the teacher dominated the class by doing most of the calculations herself on the board thereby denying pupils chance to do it.</p>
<p>8. What local environmental concerns did the lesson cover?</p>	<p>None. The lesson was slow and unproductive for integrating local environmental issues, for example the teacher could have made learners to calculate distance from landfill or sewage site to residential area.</p>
<p>9. What activities did the lesson engage pupils on?</p>	<p>Measuring distances and re-arranging different scales from smallest to biggest and vice versa.</p>
<p>10. How did the teacher interact with learners to facilitate and support learning?</p>	<p>The teacher distributed the map of Middleburg to learners and asked them to calculate distances but gave them only 5 mins to do that. She started by asking them to name types of scales.</p>
<p>11. Was the lesson conducted in the classroom or outside? If outside, exactly where?</p>	<p>In the classroom. Learners were seated in groups of 7 and 8 but the desks were not allowing them to interact with each other.</p>
<p>12. What problems did pupils have?</p>	<p>They could not distinguish between small and big scale. They did could not mentally calculate numbers called by the teacher.</p>
<p>13. How does the teacher assess learners' knowledge, understanding and acquisition of skills and techniques in this lesson?</p>	<p>The teacher informally asked learners to name types of scales to assess learners' prior knowledge but dwelled on scales for a long time. She also asked them to calculate distances on the map but gave them a very short time to do so. She did not mark them or asked them to mark each other.</p>

APPENDIX D: Analytical Memo

Category: Pedagogic Practices and challenges		
Method	Summary of statements	Data source
Document analysis: Geography curriculum policy	<ul style="list-style-type: none"> • Issue-based approach • Local fieldwork 	DA - GPP.12
Semi-structured interviews	<ul style="list-style-type: none"> • Teacher experiencing problems with cross-section and GIS 	ISAT1, IPTT1
	<ul style="list-style-type: none"> • Did very little mapwork at college • Gave learners an assignment previous year • Not comfortable with fluvial landforms chapter because of less training on it from college 	ISBT1
	<ul style="list-style-type: none"> • Uses local maps and does local fieldworks with Grade 11 and 12 	ISCT1
	<ul style="list-style-type: none"> • No investigative activities 	ISBT1, ISAT1, ISBT2, ISDT1
	<ul style="list-style-type: none"> • School does not have local maps 	ISBT2, ISDT1
Lesson observation	<ul style="list-style-type: none"> • Teaching is classroom-based and teacher-centred • Insufficient preparation – no lesson plan in place • No adaptation of non-local maps to local context 	OSBT1, OSAT1, OSBT2, OSDT1
	<ul style="list-style-type: none"> • Used lesson plan developed by Rhodes tutors 	TW -SA
	<ul style="list-style-type: none"> • Uses local maps, has + - 30 new and +-25 • Learners do group and individual calculations in the classroom 	OSCT1
	<ul style="list-style-type: none"> • Uses question papers set at provincial level for Grade 12 exam for GRADE 10 	TW -SB
Category: Learner performance and challenges noted		
Documents analysis: Chief marker's report	<ul style="list-style-type: none"> • 2008 and 2009 Chief markers' report indicated underperformance in mapwork calculations, orthophoto and topographical map interpretations 	CMR

Semi-structured interviews with teachers	<ul style="list-style-type: none"> • Calculations, magnetic declination and magnetic bearing and identification of the direction of the river • Calculations • confusion in direction and bearing and magnetic declination • Calculations and formulas • Calculations and profiles • Calculations and directions • Less mapwork background 	ISAT1, IPTT1 ISDT1, ISBT1 ISBT2 ISCT1 IWAT1 IGSA
Lesson observation	<ul style="list-style-type: none"> • Lack of prior knowledge • Not given enough mapwork activities/ practice 	OSAT1 OSDT1
	<ul style="list-style-type: none"> • Could not distinguish between small and large scale • Not enough materials to do mapwork e.g. 2 calculators and one ruler in a group of 8 pupils 	OSBT1
	<ul style="list-style-type: none"> • Map code, distances, mix/confuse longitude and latitude, when to subtract or add when calculating magnetic declination 	OSCT1
	<ul style="list-style-type: none"> • Very low performance – calculations and map interpretation • Question papers set at provincial level for Grade 12 final exam used for Grade 10 	LW-S(A,B,D) LW –S A,B
Category: Local fieldwork activities		
Document analysis: Geography curriculum policy	<ul style="list-style-type: none"> • Fieldwork: Using local maps and photos; recording Geographical information in the local area 	DA-GPP.34-35
Semi-structured interviews	<ul style="list-style-type: none"> • Not engaging learners in local fieldwork as there is not enough time • never had a fieldwork 	ISAT1, ISBT2
	<ul style="list-style-type: none"> • Not trained to do fieldwork at college 	ISBT1
	<ul style="list-style-type: none"> • Uses local maps and does local fieldworks with Grade 11 and 12 	ISCT1

Lesson observation	<ul style="list-style-type: none"> Local fieldwork done with grade 11 and 12 on investigation of local environmental issues 	TW - SC LW - SC
	<ul style="list-style-type: none"> Classroom teaching 	OSBT1, OSAT1, OSBT2, OSDT1
	<ul style="list-style-type: none"> No evidence of fieldwork No investigation questions in assessment task 	LW- S(A,B,D)
Use of local context		
Document analysis: Geography curriculum policy	<ul style="list-style-type: none"> The teacher should be aware of and use local context ... which could be more suited to the experiences of the learner Teachers should engage learners in fieldwork in which they use “local maps/photos; recording geographical information in the local area. Learners are expected to demonstrate a basic operational knowledge of physical and human processes and the patterns which result from them, as well as the interactions between humans and the environment on a local scale... learners are expected to apply knowledge and skills to manage local problems 	GPP. 25 GPP. 19 GPP. 20-21
Semi-structured interviews	<ul style="list-style-type: none"> Given them materials such as local maps and some software which are uploaded in schools computers Start by learning the basics and then adapt them to local context because local context alone is 	IGSA IGSA
	<ul style="list-style-type: none"> We have got a mapwork project whereby teachers can apply for their local maps so that they can get the 1:50 000 and 1:10 000 of the local area where the school is located. 	IWF
	<ul style="list-style-type: none"> Has 5 topographical maps of Grahamstown Dealing with climatology and geomorphology in particular like the river, the river courses and the landforms and also the dormitory towns The buffer zones, the signs and symbols 	ISAT1 ISAT1 ISAT1
	<ul style="list-style-type: none"> Do not have local maps Does not use any local context in teaching Adapts the content to Grahamstown context 	ISBT1, ISBT2 ISBT1

	<ul style="list-style-type: none"> Using one local map 	ISBT2 IWAT1
	<ul style="list-style-type: none"> Takes learners to different places around town to orientate the map To make sure that they understand contours and their arrangement 	ISCT1 ISCT1
	<ul style="list-style-type: none"> Used local context in Grade 10 in year 2009 when teaching map symbols using features such as trigonometrical beacons and others that are found along the road between Grahamstown and Riebeeck East. 	ISDT1
Lesson observation	<ul style="list-style-type: none"> Used local context by making examples of functions found in Grahamstown Central Business District (CBD). Asked learners to write on the board, names of furniture shops and financial institutions found at High street and at Beaufort Street. Discussed the professional services and low order services found in these two Streets. 	OSAG10T1 OSAG10T1 OSAG10T1
	<ul style="list-style-type: none"> Using the topographical maps and the orthophoto map of Middleburg 	OSBG11T1
	<ul style="list-style-type: none"> Learners asked whether conventional signs mentioned exist in Grahamstown 	OSBG10T2
	<ul style="list-style-type: none"> Clear evidence of the use of local context Gave each of his learners a map of Grahamstown and displayed the questions to be answered using the overhead projector. 	OSCG12T1 OSCG12T1
	<ul style="list-style-type: none"> Asked pupils whether the temperatures at Riebeeck East were the same as in Port Alfred with the approach of winter 	OSDG11T1
Integration of local environmental issues		
Document analysis: Geography curriculum policy	<p>Grade 10</p> <ul style="list-style-type: none"> Describe the links between environmental problems and social injustices in a local and global context <p>Grade 11</p> <ul style="list-style-type: none"> Examine issues and environment interactions in a local and continental context <p>Grade 12</p> <ul style="list-style-type: none"> Explore possible responses to issues and challenges arising from human and environment interactions in a local and national context. 	DA-GPP.29 DA-GPP.30

Semi-structured interviews	<ul style="list-style-type: none"> • Water pollution 	IGSA
	<ul style="list-style-type: none"> • They went and got into internet and looked at those ozone depletion and all other issues that have to do with the environment • The land use around the river and sewerage disposal • Landfill areas to what extent those materials and where they are located with regard to a river, • Pollution • Quality of the river • How water quality was taken over the years 	IWF
	<ul style="list-style-type: none"> • Make example for instance like erosion... • But to find out how many types of pollutions, maybe do they know about, each learner should ... exactly what type of pollution does seem to dominate in her or his area and then try to find out solutions for that. 	ISAT1
	<ul style="list-style-type: none"> • They have given their learners a research project on land pollution, but that it is not something that they do often. 	ISBT1 and ISBT2
	<ul style="list-style-type: none"> • About two years ago when she gave her pupils a research on land pollution 	ISBT1
	<ul style="list-style-type: none"> • I have asked the girls to come up with any urban issues that they wish to comment on in their project.... It could be pollution, it could be the strike action, it could be water problem in Grahamstown” • Given Grade 11 an assignment on waste disposal in Grahamstown 	ISCT1
	<ul style="list-style-type: none"> • Drought, floods and global warming 	ISDT1
Lesson observation	<ul style="list-style-type: none"> • A cursory reference to land pollution and traffic congestion 	OSAG10T1

APPENDIX E: District Director's Letter



Province of the
EASTERN CAPE
DEPARTMENT OF EDUCATION

Office of the District Director, Private Bag X 1001, Grahamstown 6140

Enquiries:

☎: 046-603 3200

☎: 046-622 3224

FAX COVER PAGE

ATTENTION	: Prof. Rob O'Donoghue
FAX NO.	: 086 515 2787
INSTITUTION	: Rhodes University
REMARKS	: Permission was granted for Mrs Rejoyce Batyi to conduct academic research. Please see attached approval.
TOTAL NO. OF PAGES	: 2
DATE	: 4/3/2010
FROM	: Mr A.T. Fetsha
DIRECTORATE	: District Director
SIGNATURE	:

NB: Attachment omitted because of anonymity regarding the names of schools. It is kept in the research file.

APPENDIX F: Principals' letter

17 'A' Street
Fingo Village
Grahamstown
6139
25/02/2010

The principal

Permission to conduct an academic research

I write to request for your permission to conduct research at your school. I am a part- time M Ed student at Rhodes University majoring in environmental education. The purpose of my research is to investigate how FET Geography teachers integrate mapwork and environmental issues using local context. This will inform a professional development initiative in mapwork and environmental education that I am planning for 2011.

In order to do these I have to conduct some interviews, observe the Geography lessons and to look at learners' work at your school.

This research is not attempting to criticize, evaluate or expose any of your teachers, learners or your school. No information provided by the teachers and learners will be presented in a way that will intimidate anyone.

I therefore request your permission to conduct this research at your school during the course of this year.

Should you require further information regarding this research, please feel free to contact my supervisor Professor Rob O'Donoghue at Rhodes University, Department of Education.

Thank you



Rejoyce Batyi (Mrs)

APPENDIX G: Teachers' letter

17 'A' Street
Fingo Village
Grahamstown
6139
25/02/2010

Dear Geography teacher,

Invitation to participate in research study

I write to invite you to participate in my research study by allowing me to interview you, to observe some of your lessons at the time appropriate to you, and to look at your pupil's written work. I am a part-time M Ed student at Rhodes University majoring in Environmental Education.

The purpose of my research is to investigate how Geography teachers integrate mapwork and environmental issues using local context. This will inform a professional development initiative in mapwork and environmental education that I am planning for 2011.

This research is by no means attempting to evaluate, intimidate or criticize you or your pupils but strictly for the purpose mentioned above. Your name and those of your pupils will not be mentioned in the report. You will also be free to withdraw from participating anytime you are no longer interested in participating.

Should you have any queries regarding this research please feel free to contact Professor Rob O'Donoghue at Rhodes University, Department of Education.

Your assistance in this regard will be highly appreciated.

Yours in Education



K.R Batyi (Mrs)

Tel: 0785580530

APPENDIX H: Lesson Plan – School A

Basic Lesson Plan

Name: _____ Class: 11C Date: 25/02/10

Subject: Geography (GIS) Duration: 45 min.

Goals/Outcomes: Gain understanding of what is GIS, how it works and what its uses are.

Introduction:

Highlight the aspect of cartography and ask why maps are made and what are some of the key characteristics of a map?

Introduce the term GIS = Geographic Information Systems. Allows data to be portrayed in order to see patterns and relationships in a subject.

Inform the students that a computer is used to perform this work.

Body:

Introduce the fact that there is a 'geodatabase' and explain the purpose of this. Highlight the fact that that data is useless unless it has a location (ask what they think the location could take the form of?) = latitude and longitude. Ask the students what the use of GIS is (should be able to give answer – in intro).

Highlight the fact that like a map you start off with little info and then build upon it. Creating layers. Each time you access the data and enter it to the 'system'.

Provide examples – places to drink (taps) and level of disease OR education facilities and population level OR areas of Grahamstown and water use. Layers will show the pattern!!

Very important term in GIS 'vectors'

- A point is the location of a feature (taps etc)
- A line shows linear features like roads/rivers
 - A polygon shows property boundaries

HIGHLIGHT THE FACT THAT THIS IS SIMILAR TO A NORMAL MAP – THATS WHAT IT IS!

The uses: traditional geographically related fields like urban planning and cartography, but also environmental impact assessment reports and natural resource management.

Conclusion:

Summarize the fact that GIS is essentially map-work BUT that it allows easy comparisons etc

APPENDIX I: School 'A' learner's work

School 'A' Learner's work



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

GEOGRAPHY – SECOND PAPER

MARKS: 100

TIME: 1½ hours

Surname: _____

Name: _____

Grade 12: _____

MARKS	48
	100
MODERATED	
	100

This memorandum consists of 10 pages.

SECTION A

QUESTION 1: MULTIPLE-CHOICE QUESTIONS [12.1.3 – 12.1.5] [12.2.1 – 12.2.3][12.3.1]

Refer to the 1:50 000 topographical map, 3227DD CAMBRIDGE and the 3227 DD 24 orthophoto map of NAHOON to answer the following questions:

Various possible options are provided as answers to the following questions. Choose the correct answer and write only the letter (A – D) next to the question number (1.1 – 1.10) in the block provided on the right-hand side of the page.

1.1 The scale of the orthophoto map is ... than that of the topographical map.

- A 50 000 times smaller
- B 10 000 times bigger
- C 10 times smaller
- D 5 times bigger

D

1.2 The following feature can be found at 32°54'24"S 27°51'30"E:

- A Communication tower
- B Wind pump
- C Monument
- D Ruins

B

1.3 The reference of the topographic map north east of 3227 DD is ...

- A 3227 DB.
- B 3227 DC.
- C 3228 CA.
- D 3228 CC.

B

1.4 The general direction of the Nahoon river in the mapped area is ...

- A from north to south.
- B from southeast to northwest.
- C from northwest to southeast.
- D from east to west.

C

1.5 The feature numbered 3 on the orthophoto map is ...

- A excavations.
- B rows of trees.
- C reservoirs.
- D cultivated lands.

A

- 1.6 The brickworks in block G9 is a ...
- A primary activity.
 - B secondary activity.
 - C tertiary activity.
 - D quaternary activity.
- A X
- 1.7 Choose the feature which will be best manipulated by using the raster method.
- A Dams
 - B Power lines
 - C Rivers
 - D National roads
- A //
- 1.8 The destructive waves found in this region will cause the following landform:
- A Baymouth walls
 - B Lagoons
 - C Stacks
 - D Tombola's
- C //
- 1.9 The climatological influence of the vegetation surrounding the activity numbered 4 on the map, is to ...
- A supply fuel wood to the activity at 4.
 - B increase the effect of El-nino.
 - C reduce the greenhouse effect.
 - D promote desertification.
- C //
- 1.10 The most suitable description of the slopes in blocks A8 and A9 is ...
- A below sea level.
 - B steep.
 - C gentle.
 - D concave.
- C X

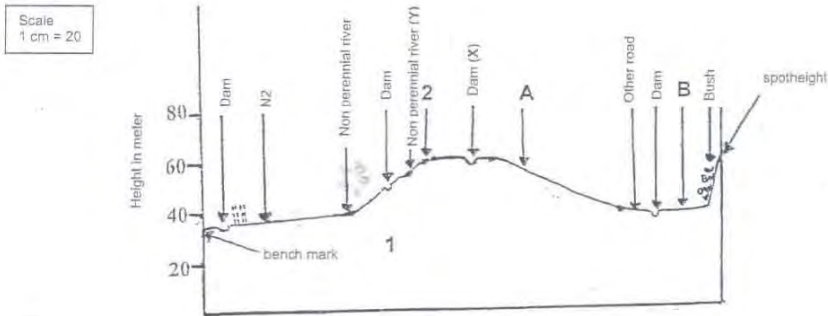
(10 x 2) 14 [20]

TOTAL SECTION A: 20

SECTION B

QUESTION 2: CROSS PROFILE and CALCULATIONS
[12.1.3 – 12.1.5][12.2.1 – 12.2.2][12.3.1]

2.1 Study the cross profile below which covers the area from the bench mark in block H6 (height of 37,8) to spotheight 59 in block I9, and answer the questions that follow:



2.1.1 In which general direction does the non perennial river marked Y flow?
South West. (1 x 2) (2)

2.1.2 There are many small dams in this area. What could they be used for?
Wind power, bigel X ocean (1 x 2) (2)

6
2.1.3 Name the features marked A and B which are usually used to make travelling easier.
A: Hiking
B: other roads Method (2 x 2) (4)

2.1.4 Which environmental problem is being experienced in the area north east of the dam marked X?
Polluted water X (1 x 2) (2)

2.1.5 Explain ONE measure that may be implemented to reduce the environmental problem mentioned in QUESTION 2.1.4.
:
:
:
? (2)

- 2.1.6 Determine the gradient between numbers 1 and 2 on the cross profile.
(The height of 1 is 37,8 m and 2 is 60 m)

2
6

$$\frac{VI}{HE} \text{ (ratio)} \quad \frac{60\text{ m} - 37,8\text{ m} = 22,2\text{ m}}{(4,3\text{ cm} \times 500) \times (4,3\text{ cm} \times 500) = 2150\text{ m} \times 2150} \quad 2150\text{ m}$$

ans. ~~4622500~~ 1:96,84 →

(6 x 1) (6)

- 2.2 Determine the magnetic bearing from the intersection of roads in block I6 to the intersection in block H7 if the true bearing is 46° and the magnetic declination is $26^\circ 30' W$.

0
2

$$\begin{array}{r} MB = TB + MD \\ 2000 \quad \quad \quad 26^\circ 30' \\ - 1995 \quad 46^\circ 26' 30'' W \quad \quad 20 W \\ \hline 5 \quad 72^\circ 30' W \quad \quad 26^\circ 10' W \end{array} \quad (2 \times 1) \quad (2)$$

- 2.3 Calculate the area of the railway depot numbered 4 on the topographical map in km^2 .

1
4

$$\begin{array}{l} \text{Area} = L \times B \\ 0,10 \times 0,5 \\ = 0,05 \end{array} \quad \begin{array}{l} 1\text{ cm} \times 0,4\text{ cm} \\ \hline 2 \times 2 \\ 0,5\text{ km} \times 0,2\text{ km} \quad (4 \times 1) \quad (4) \\ = 0,1\text{ km}^2 \end{array}$$

TOTAL SECTION B: $\frac{24}{9}$

SECTION C

QUESTION 3: MAP READING AND ANALYSIS
[12.1.3 – 12.1.5][12.2.1 – 12.2.2][12.3.1]

3.1 Name the sea current which can be found in this region and also mention its flow direction.

2/4

Sea current: INDIAN OCEAN

Flow direction: South ward (2 x 2) (4)

3.2 Identify TWO processes which have caused the river mouths of the Nahoon river and the Qinira river to be sandfilled.

0/4

BECAUSE OF MARSH LIFE
FISHER MANS

(Any 2) (2 x 2) (4)

3.3 By providing map evidence, explain why the name "Danger Point" in block J9 can be justified.

2/2

it is a rocky area.

(1 x 2) (2)

3.4 The East London Forest Reserve has restricted further development of the built-up area in a south easterly direction. Comment on the importance of this action by the authorities in creating environmental sustainability.

2/6

• the for Holiday Resort

(3 x 2) (6)

3.5 The residential areas of Berea, Baysville and Southernwood (block K4) are more developed than Nompumelelo in block I5. Substantiate the above statement by referring to TWO indicators of development which explains why there is a difference in development.

4/4

Availability of hospitals ✓
Better services in Baysville ✓
more recreational facilities ✓
(only two to be counted)

(Any 2) (2 x 2) (4)

3.6 Refer to both the map and photo to explain how engineers constructed the N2 while they had to consider physical obstacles like rivers and steep areas.

4/4

Bridges
cuttings

(Any 2) (2 x 2) (4)

- ✓ 3.7 Provide TWO advantages and TWO disadvantages of the location of the Hospital in block K3.

$\frac{4}{4}$

Advantages:

- NOT too far for SICK PEOPLE ✓
- transport road ✓
- people who are living there ✓

(4)

$\frac{4}{4}$

Disadvantages:

- Next to the road ✓
- people living NEAR ✓
- At risk to NOISE of tracks. ⁴ cars: -

(2 x 2)

(4)

- ✓ 3.8 Discuss how environmentalists and the natural physical area along the coastline encourage ecotourism in the region.

$\frac{0}{6}$

?

(Any 3) (3 x 2) (6)

[38]

TOTAL SECTION C: 22 38

SECTION D

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)
[12.1.3-12.1.5][12.2.1 -12.2.3][12.3.1 -12.3.2]

4.1 Study the illustrations below, which indicates hardware components used in GIS, and answer the questions that follow:



FIGURE 4.1

4.1.1 Explain what you understand by term: "GIS hardware components".

2/2
 ✓ Geograph information system it is used when you want to build a house it helps you to see whether the area is good to build (2 x 1) (2)
 a house or not.

4.1.2 Which component in the illustrations will be the most suitable to perform the following actions:

- 0/0*
0/0
0/0
0/0
0/0
- (a) Entering the amount of people living in Cambridge
 Scanner (1 x 2) (2)
 - (b) To give a street map of Beacon Bay
 (Data input) digitiser (1 x 2) (2)
 - (c) To give active remote sensing of the coastal area
 Internet (1 x 2) (2)

4.1.3 The person at A in FIGURE 4.1 is busy manipulating the data to represent reality. Explain the importance of this action.

$\frac{1}{2}$ • it is important because you can get the AREA you want
• If you want information you go to the computer. (2)

4.1.4 Name TWO methods of data manipulation that the person at A can use to represent reality.

$\frac{0}{2}$: ? (2 x 1) (2)

4.2 Explain the difference between spatial and attribute data and give an example of each by using the orthophoto map.

$\frac{0}{3}$ Spatial Data: ? (2 x 1) (2)
(Concept)
Example: ? (1 x 1) (1)

$\frac{0}{2}$ Attribute Data: ? (2 x 1) (2)
(Concept)
Example: ?

(1 x 1) (1)
[18]
03
TOTAL SECTION D: 18

GRAND TOTAL: 100

48

100

APPENDIX J: School 'B' Learner's work

School 'B' - learner's work

	MARCH 2010
GEOGRAPHY PAPER 2	MARKS: 82
SURNAME & NAME: _____	TIME 1 1/2
GRADE 10	

$$\frac{17}{82} \times 100 = \frac{20}{100}$$

RESOURCES

- An extract from the topographical map, 3419AB, CALEDON
Orthophoto map, 3419AB 24, CALEDON.

INSTRUCTIONS AND INFORMATION

- Answer all the questions in the spaces provided on this question paper.
- You are supplied with a 1:50 000 topographical map, 3419AB, CALEDON and an orthophoto map, 3419AB 24, CALEDON which is part of the same area.
- The following English terms or their Afrikaans translations are shown on the 1:50 000 topographical map.

ENGLISH	AFRIKAANS
Cemetery	Begraafplaas
Diggings	Uitgrawings
Golf course	Ghoftbaan
Hospital	Hospitaal
Mission station	Sendingsstasie
Sewerage works	Rioolwerke
Show grounds	Skougronde
Nature Reserve	Natuurreservaat
Prison	Gevangeris
Yacht club	Sel jagklub
Resort	Oord
Hot springs	Warmwaterbronne
Wildflower garden	Wildeblometuin

POSITION OF CALEDON WITHIN SOUTH AFRICA



SECTION A

Question 1: MULTIPLE-CHOICE QUESTIONS
Refer to the 1:50 000 topographical map 3419 AB and orthophoto map of 3419 AB 24, CALEDON to answer the following questions:

Various possible options are provided as answers to the following questions. Choose the correct answer and write only the letter (A-D) next to the question number (1.1 - 1.10) in the block provided on the right hand side of the page.

1.1 The map reference of the topographical map north of 3419 AB is ...

- A 3419 AD
- B 3319 CD
- C 3419 BC
- D 3319 CC B

1.2 The True Bearing of the Basil Newmark Reservoir (block L13) from the trig beacon (block N11) is ...

- A 222°
- B 89°
- C 42° C
- D 142° A

1.3 The feature that can be found at 34° 05' 44" S; 19° 17' 52" E is a ...

- A digging
- B dam
- C hiking trail
- D poort/gap. D

1.4 What type of scale is being represented on the topographic map?

- (i) Ratio
- (ii) Fraction
- (iii) Word
- (iv) Line

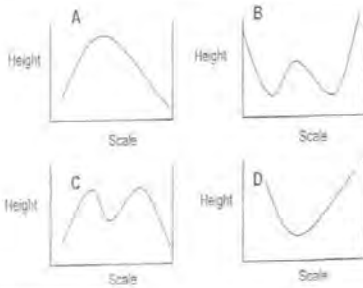
(iv)

Choose the correct combination

- A (i) (ii)
- B (ii) (iii)
- C (iii) (iv)
- D (i) (iv)

D

1.5 The most likely cross-profile from spot height 265 (block K6) until trig beacon 90 (block K7) is ...



C

1.6 The landform being represented by the letter C in block H12 is a ...

- A butte
- B mesa
- C table mountain
- D conical hill

C

1.7 The road that links Napier (block D14) with Coledon is a ...

- A main road
- B arterial route
- C national road
- D secondary road

D

1.8 The human activities that caused erosion in block L1, are possibly ...

- (i) mining
- (ii) deforestation
- (iii) poor farming methods
- (iv) poor road construction

(ii)

Choose the correct combination

- A (i) (iii)
- B (ii) (iv)
- C (ii) (iii)
- D (ii) (iv)

D

1.9 The feature being represented by the letter E on the orthophoto map is ...

- A digging
- B dam
- C rows of trees
- D recreation area

B

1.10 Which of the following map elements in Mercator's projection is the most reliable?

- A Direction
- B Distance
- C Size of continents
- D Scale

B

10/2/20

SECTION B

QUESTION 2 CALCULATIONS

2.1 Imagine you are a bank manager in Napier (block D14) and have to attend a meeting in Riversoenderend (block N15). Calculate the total distance (in km) that you have to travel by car, if you drive through Caledon. (Show all calculations)

$\frac{310,2}{2}$	$\frac{552,4}{2}$	
$=155,1$	$=276,2$	$=17,35$
$\frac{155,1}{10}$	$\frac{176,2}{10}$	
$=15,51 \text{ km}$	$=17,62 \text{ km}$	

2.2 Calculate the area of block H in km^2 (demarcated with red lines). 18,52 km (Show all calculations)

Length x Breadth	$11,1 \times 5,6$	$6,1 \times 3,6$
A = $11,1 \times 5,6$	$10,2$	$21,96$
B = $6,1 \times 3,6$	$11,1 \times 6,1$	$1,8$
$=20,771$	$=66,5$	$=3,5$
$\frac{66,5 \times 3,5}{2}$		
$=118,25$		

2.3 Determine the magnetic declination of the map in 2008. (Show all calculations)

23° at 23° in 2000

$22^\circ 25'$

No. of yrs: $2008 - 2000 = 8$

$22^\circ 25' \times 8 = 22^\circ 32'$

(1)

2.4 Calculate the gradient between spot height 265 in block K6 and contour line 405 in block H7

$\frac{265 \times 50 \text{ Oct.}}{1000}$	$\frac{405 \times 50 \text{ Oct.}}{1000}$
$=132,5$	$=202,5$

(6)

SECTION C

QUESTION 3

3.1 The mapped area experiences seasonal rainfall. Support your statement with evidence from the map.

X

(2)

3.2 There is an evidence that there is water shortage in some areas of the map. Refer to blocks D9 and D10.

De Hoop
Fynbos

(2)

3.3 Study the area in and around Caledon. Name 3 recreational activities available to the residents of Caledon.

- a. Golf course
- b. Yacht club Hot spring
- c. Mission station

3x2=6

Caledon, Coston and Sp. Res.

3.4 Name any 3 activities that could be taking place at the dam.

- Swimming
- Fishing
- boating

APPENDIX K: School 'C' teacher's portfolio work

Grade 12 Geography Project

- ✓ You are required to complete and hand in this project on the first Friday of the 3rd term., 2010.
- ✓ Use the Rubric provided to guide you!

Urban issues associated with my home town/city.

In your project, the following questions/issues must be addressed.

- ✓ At least two topical problems associated with your urban area must be mentioned.
- ✓ You must include a discussion on the causes and possible practical solutions for these issues.
- ✓ You must include a map of your urban home town, identifying the different land use zones and the places in which these issues are most prevalent.
- ✓ You are also, in your discussion, required to address the following question: "In what ways has the legacy of apartheid influenced the issues that you have mentioned?"

Please use your own initiative in this project!

Your write-up may be in poster or book form (I personally would prefer poster form), and you will have to present your work orally to the class. Only typed work will be accepted. You must include at least two references, apart from your textbook. References must be done properly!

School 'c'

Lesson Plan- Follow up lesson for Grahamstown Map

Aim: To give the girls the opportunity to revise their mapwork calculations using the map of Grahamstown.

Method:

- ✓ To follow on from the field trip to the Tic Research Institute Viewpoint, where the pupils had previously orientated the map while viewing a 360 degree view of Grahamstown.
- ✓ Ask girls to orientate their maps to the North.
- ✓ Ask questions on grid references, direction, bearing and magnetic bearing, straight and crooked distance as well as gradient, using the Beaufort Street/Somerset Street intersection as a starting point. A familiar starting point (using the hostel at this corner will give them a good starting point of reference).
- ✓ Pupils to each sit at their own desk (apart from Simone, who broke her finger at hockey).

Materials: Maps provided by me. Girls to bring their own measuring utensils.

Assessment: Not official; assessment. To go over each question on board/OHP once the pupils are finished with that question.

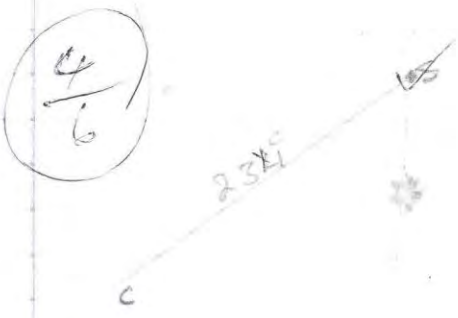
APPENDIX L: School 'D' learner's work

School 'D' Learner's work Learner's work


Grade: 11 Classwork 19-01-2010

Direction (Mapwork)

Example (1) measure the bearing from the school to the clinic



Example (2)
measure the bearing from the post office to the Hotel

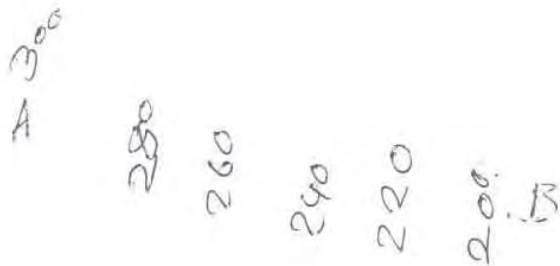


Grade 11

27-01-2010

Classwork

Calculate the average of the gradient of the slope between A and B



Gradient: $\frac{VI}{HI}$ $\frac{VI - HI}{300m - 200m}$

~~$\frac{300 - 200}{6.5 \times 0.5}$~~

$\frac{1}{6}$

Gradient: $\frac{HI}{VI}$

$300m - 200m$
 $3250m - 500m$
 $= \underline{2750m}$

$300m - 200m$
 $6.5 \times 500m$
 $3250m - 500m$
 $= 2750m$

DS 27/01/2010

APPENDIX M: Chief Marker's Report



Province of the
EASTERN CAPE
EDUCATION

Assessment and Examinations, Bundy Park, Buffalo Road, Schornville, KWT
* Private Bag 4571*KWT * 5600* REPUBLIC OF SOUTH AFRICA
* Enquiries: Mr V A JOSEPH Tel: +27436047810/9 Fax:043 604 7789/08654664627
* Email: Varkeychan.Joseph@edu.ecprov.gov.za

CHIEF MARKER'S REPORT INSTRUCTIONS

1. The Chief Markers are required to complete this report during the marking session. The aim of the report is to provide a feed back and to help subject advisors and educators to improve teaching and learning.
2. The report should be informed by discussions between the **Chief Marker, moderator, senior markers and markers** of the particular subject. **NB: There should be one report per subject per paper.**
3. The report must be detailed, informative and indicate question by question performance of the candidates and mark distribution of centres.
4. Reference may be made to the topics identified below as well as any aspect the Examiner wishes to bring to the attention of the subject advisors and educators.
5. **The report must be submitted in hard copy and an electronic version to the centre manager at the marking centre.**
6. All markers reports must be handed in with the hard copy.
7. The electronic report should be emailed to varkchan.joseph@edu.ecprov.gov.za
6. The centre managers then forward the reports to the Directorate of Assessment and Examination (Att: Mr. V A Joseph) in King William's Town.

SUBJECT:	GEOGRAPHY		
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GRADE:	12	PAPER:	2
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DATE OF EXAMINATION:	03 November 2009	DURATION:	1½hours
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1. ANALYSIS OF QUESTION BY QUESTION PERFORMANCE OF THE CANDIDATES

Give a detailed account of how the candidates performed in each question. In doing this, the following steps should be followed:

- 1.1 The aim/objective for setting the question (what skills, knowledge, values and attitudes were being tested by asking the question)
- 1.2 Relevance or relation of the question to the Los and Ass.
How did the candidates perform in the question?
- 1.3 Where did candidates lack expertise or fail in giving an appropriate answer to score high marks in the question?

PART THREE: ANALYSIS OF LEARNERS' RESPONSE

This section of the instrument will provide valuable feedback to teaching and learning in the classroom. To assist the internal moderator with the analysis of learner responses, the internal moderator must analyse, per question, a random sample of 100 scripts. This entails recording the responses (i.e. marks obtained) by learners from these 100 scripts on a per question basis. From the analysis, a brief explanation must be provided per question, either:

- (a) Explaining why the question was poorly answered together with suggestions for improvement, or
- (b) Describe any noteworthy observation relating to the responses of learners.

It is expected that a comment will be provided for each question.

QUESTION 1 – Multiple choice questions [20]:

Average Mark: 9,76

LOS: 1

LOS: 2

LOS: 3

ASS: 2, 3, 4, 5

ASS: 1, 2

ASS: 1

The aim of this type of question is to recall basic map-ready skills where learners simply had to study the map and the accompanying orthophoto before answering the question. Most learners' performance ranged from poor to average where certain centres did very well.

Questions on the interpretation of the orthophoto was a major concern for most centres as learners could not apply this basic theoretical knowledge in practice. Learners need more practice and exposure in this regard. Another problem area in this question is that learners lack the technique to eliminate the wrong responses in this type of questioning. Learners should be given more continuous exercises to master this technique. Many relied on guessing.

Recommendations

Educators should consult their Exam guidelines and SAG on the format of the question paper and train their learners accordingly.

Teachers need to revisit and integrate certain concepts on map-work taught in Grade 10 and 11, with that of the Grade 12 SAG guidelines to prepare learners well for the Grade 12 NSC exams.

QUESTION 2 – Calculations [20]

Average Mark: 6, 73

LOS: 1

LOS: 2

LOS: 3

ASS: 2, 3, 4, 5

ASS: 1, 2

ASS: 1

The aim of this question was to test learners mathematical skills integrated with their knowledge of maps and orthophoto maps.

Learner's response varied from poor to average. In Question 2.1 learners confused the diagram of the cross section with that of the longitudinal profile of a river thus resulting in negative responses. Q2.1.4 and Q2.2 learners could not grasp the difference between the concepts, Vertical Exaggeration and the gradient of the slope, as well as the formulae for these concepts. The lack of basic mathematic skills, the conversion according to the formulae and the application of the concepts resulted in responses varying from 0 to 12.

Recommendations

1. Learners should be trained in the GET phase to do calculations and conversions as well as integrate calculations with the Mathematics learning Area.
2. Regular exercises must be given to familiarize learners with the concepts and calculations.
3. Geography Examiners and Moderators Nationally and Provincially should seriously consider to supply learners during the NSC exams with a formulae sheet to improve results in this section of the subject.
4. Learners should understand the skills in reality. The theoretical importance of these calculations should be emphasized.

QUESTION 3 – Application of map theory and photo interpretation [40]

Average Mark: 14, 61

LOS: 1

LOS: 2

LOS: 3

ASS: 2, 3, 4,

ASS: 1, 2, 3, 4

ASS: 1

The aim of this question was to apply their geographical theory directly to practical map work. Most learners fared well in these questions.

Reasons for poor responses are:

1. Poor language and reading skills especially FAL learners, could not interpret the questions correctly and express themselves properly for example: plantation of trees and planting of trees and international boundary and border posts Question 3.4.3 and Stadiums and recreational fields Question 3.7.
2. Learners lack the ability to put the theory into practice due to language barriers for example: questions 3.1.2 and 3.1.3 and 3.4.1 and 3.4.2 and 3.6.1 and 3.6.2.
3. The unfair linking of questions 3.3.1 and 3.3.2.
4. Learners do not make use of the map reference and symbols outside the mapped area of the map.
5. Most learners could answer the lower order questions.

Recommendations

1. Regular worksheets involving map reading skills are important.
2. Integration of theory with map work on a regular basis.
3. Excessive use of the key words for example, Explain, differentiate, etc in homework exercises, tests and tasks to improve learner's knowledge and understanding.
4. Real life examples of features or photo's so that they can understand the value of knowing the functions and characteristics of features.

QUESTION 4 – GIS [20]

Average Mark: 5, 53

LOS: 1

LOS: 2

LOS: 3

ASS: 2, 3, 4, 5

ASS: 1, 4

ASS: 1

This question was a big challenge to all the candidates because it is a fairly new topic to educators and learners. The change in approach from testing basic knowledge to practical implementation of knowledge resulted in a very poor to average response from learners. In most centres learners did not even attempt to answer this question.

It is clear from learners responses that certain concepts in GIS as well as the topic of GIS as a whole were not properly introduced to learners – see recommendations.

Also, due to language barriers, learners confused the concepts of “Feeder Zone of a school” with “school Feeding Scheme” which influenced their response to the question. Learners were unfamiliar with the concepts of Data Layering in Question 4.2.1. [Grade 10 and 11 Learning Programme Guidelines] and Buffering. In 4.3.1 [Grade 12 L.P.G] This could be that educators themselves struggled to understand these concepts and/or did not receive the Grade 12 Geography Exam Guidelines in time.

Recommendations in this regard would be:

1. Training workshops for Educators on the topic of GIS. This will be run in 2010 from the premiers office. Enquire at your subject advisor.
2. Exam Guidelines to be distributed in schools at the beginning of the year [End of January] so that teachers can familiarize themselves with the content and plan ahead in preparing learners for the exams.
3. Some of the GIS concepts tested, are not discussed in the commonly used Grade 12 text book [Focus] therefore educators need to realize that they should not bind themselves to one specific textbook but to use other books as well and to integrate the Grade 12 Learning Programme with that of Grade 10 and 11.
4. Making GIS real, by doing paper GIS in class.

7. ANY ADVICE THAT YOU COULD GIVE TO EDUCATORS TO HELP LEARNERS TO REACH THE EXPECTED LEVELS.

1. More emphasis should be given to the teaching of map work for example, once a week or at the end of the theoretical discussion of a topic or concept to improve learners skills and techniques in the practical implementation of their knowledge.
2. Regular exercises should be given to learners on the different calculations. Also, examiners and moderators should think about giving a list of the formulae for the calculations in the question paper to improve learners ability to apply these formulae.
3. Educators should use the action words in each question regularly in tests, homework exercises and assignments for learners to familiarize themselves with it.
4. Capacitate educators on the topic of GIS through workshops to improve their understanding thereof and to benefit the learners in the end.

8. ANY OTHER COMMENTS

Geography is a subject that integrates a lot of learning areas. We should use this in our lesson preparations. Learners should understand the reality of Geography. They should understand the SPACE occupied around them and how humans and environment interact on a daily basis. Geography is alive and educators should not kill the subject by keeping it class room bound

SIGNATURE OF EXAMINER/MODERATOR: _____



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APPENDIX N: The environmental issues content of the FET Geography

(South Africa. DoE, 2003)

Environmental issues Content of FET Geography		
Grade 10	Grade 11	Grade 12
Context: global	Context: continental	Context: national
<ul style="list-style-type: none"> • Impact of humans on the atmosphere and weather (e.g. the ozone issue, global warming, acid rain, the greenhouse effect. • The impact (positive and negative) of humans on weathering and erosion processes. • Key human-environment interactions: population issues and dilemmas including poverty, racism, employment, conflicts, inequalities, HIV/AIDS, refugees and gender issues. 	<ul style="list-style-type: none"> • Climate change • Hazards (flooding and drought) • Impact of humans on oceans e.g. pollution, over-exploitation • Forms of exploitation and its impact on sustainable living • Coastal environments • Human impact on ecosystems and the consequences • Human impact on different biomes • Development and sustainability: application of development strategies in local context • Energy use and management: causes and effects of energy production related to pollution • Environmental effects of resource and energy consumption on world temperatures • Sustainable energy principles and approaches: new forms of energy and approaches to energy conservation 	<ul style="list-style-type: none"> • Climate at regional and local scale(urban and valley climate) • Climate hazards and human response • <u>Climate Change</u> <ul style="list-style-type: none"> ◦ Sustainable measures to prevent climate change ◦ Climatic changes in Africa and the effect on Africans ◦ Human response to climate change ◦ Kyoto Protocol ◦ Reducing the effects of climate change in Africa and developing nations <p><u>Human-environment interactions</u></p> <ul style="list-style-type: none"> • Urban settlement issues / problems: Inner city problems, Urban blight, Congestion, Pollution, Land use conflict, bylaws, Standard of living, Political influences, Informal settlements. • Governance of urban settlements: Changing urban settlements, Local authorities, Agenda 21 • Food security, risks and vulnerability • Sustainable use and management of water: Water conservation and Water management strategies

APPENDIX O: The NCS mapwork curriculum: South Africa

Source: DoE, 2003, p. 34-35

Grade 10	Grade 11	Grade 12
<ul style="list-style-type: none"> ▪ Using atlases: to familiarise and empower learners to use atlases on various themes as a rich source of spatially and non-spatially referenced data and information. ▪ Map use and map skills: these include reading and analysis of maps, orthophoto maps, oblique and vertical aerial photographs and graphical data, executing different techniques for example: <ul style="list-style-type: none"> • map orientation (map position, types of Grid reference); • different types of scales used on different maps and photos; • direction and true bearing; • map calculations (distance, area, gradient, vertical exaggeration); • drawing cross-sections and 	<ul style="list-style-type: none"> ▪ Using atlases: to familiarise and empower learners to use atlases on various themes as a rich source of spatially and non-spatially referenced data and information. ▪ Map use and map skills: includes reading and analysis of maps, orthophoto maps, aerial photographs and graphic data; executing different techniques for example: <ul style="list-style-type: none"> • Consolidation and more advanced application of map skills and techniques done in Grade 10 on topographical maps, aerial photos and orthophoto maps; • Reading, analysis and interpretation of 1:50 000 topographical maps and orthophotos, integrating concepts done in content section. 	<ul style="list-style-type: none"> ▪ Using atlases: to familiarise and empower learners to use atlases on various themes as a rich source of spatially and non-spatially referenced data and information. ▪ Map use and map skills: includes reading and analysis of maps, orthophoto maps, aerial photographs and graphic data; executing different techniques for example: <ul style="list-style-type: none"> • Consolidation and more advanced application of map skills and techniques done in Grade 10 and 11 on topographical maps, orthophoto maps and aerial photos; • Reading, analysis and interpretation of 1:50 000 topographical maps and orthophoto maps integrating concepts done in

determining intervisibility; map analysis and interpretation		content section.
<ul style="list-style-type: none"> ▪ Map projections: Lambert. 	<ul style="list-style-type: none"> ▪ Map projections: Mercator. 	<ul style="list-style-type: none"> ▪ Map projections: Gauss Conformal, Universal Transverse Mercator.
<ul style="list-style-type: none"> ▪ Fieldwork: using local maps/photos; recording geographical information in the local area. 	<ul style="list-style-type: none"> ▪ Fieldwork: using local maps/photos; recording geographical information in the local area. 	<ul style="list-style-type: none"> ▪ Fieldwork: using local maps/photos; recording geographical information in the local area.
<ul style="list-style-type: none"> ▪ Geographical Information Systems (GIS); <ul style="list-style-type: none"> • General concepts (e.g. systems, information systems, GIS, remote sensing); • Geographical concepts (e.g. spatial objects, lines, points, nodes, scales [small versus large], resolution [spectral and spatial]). 	<ul style="list-style-type: none"> ▪ Functional elements of a GIS including: <ul style="list-style-type: none"> • Data acquisition; • Satellite remote sensing as a digital data source; • Pre-processing; • Data processing. 	<ul style="list-style-type: none"> ▪ Functional elements of a GIS including: <ul style="list-style-type: none"> • Data management; • Data manipulation and analysis, and spatial analysis; • Product generation; • Application.

APPENDIX P: Example of Professional Development Framework

Geography				
An example of fieldwork integrating mapwork with local environmental issue (soil erosion)				
Physical		Theme	Human	
		Resources and sustainability		
Environmental issue: topic - Soil erosion (topic found in NCS Grade 10 & CAPS, Grade 11)	How soils are formed		Causes of soil erosion	Evidence of soil erosion
	Soil as a resource		Impacts of soil erosion: <ul style="list-style-type: none"> ➤ Ecological ➤ Physical ➤ Economical ➤ Social and ➤ Political 	Management strategies to prevent and control soil erosion.
Resources	APPLICATION OF GIS	GEOGRAPHICAL SKILLS AND TECHNIQUES	Reading , analysis and interpretation	
1:50 000 topographical and 1;10 000 orthophoto local maps			Activities	Skills
Local pictures			Orientation <ul style="list-style-type: none"> ➤ Orientating maps in the field ➤ Using maps to identify place/s where soil erosion is taking place, by making use of conventional signs. 	Direction – using compass direction and/or GPS - finding the location of the eroded place
Textbooks			Drawing <ul style="list-style-type: none"> ➤ Drawing a cross section of an eroded area and calculating its vertical exaggeration ➤ Drawing sketch maps of eroded area 	Grid reference (spatial data) Cross-sections Sketch maps of eroded area
Google Earth maps			Calculations <ul style="list-style-type: none"> ➤ Calculating the gradient and 	<i>Vertical exaggeration</i>

Cameras			area of the eroded place in m ²	<i>Area</i> _(polygon)
Compass			➤ Calculating the distance from school to the eroded area	<i>Distance</i> (polyline)
				<i>Gradient</i>
GPS			Interpretation and analysis of data	GIS
			➤ Vector and raster	
Tape measures			Interviews and Observations	Asking questions and drawing up questionnaires (spatial query)
				Acquiring information (data acquisition)
Set of instruments				Organizing information (data management)
				Analyzing information (data analysis and manipulation)
Calculators				Making decisions and judgments (e.g. buffering)
				Reporting
			➤ Oral ➤ Posters ➤ PowerPoint presentation	